



## Full wwPDB EM Validation Report ⓘ

Jul 8, 2025 – 03:42 PM JST

PDB ID : 8X55 / pdb\_00008x55  
EMDB ID : EMD-38063  
Title : BA.2.86 Spike Trimer with T356K mutation (3 RBD down)  
Authors : Yue, C.; Liu, P.  
Deposited on : 2023-11-16  
Resolution : 3.75 Å(reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : **FAILED**  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4-5-2 with Phenix2.0rc1  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : **FAILED**  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.44

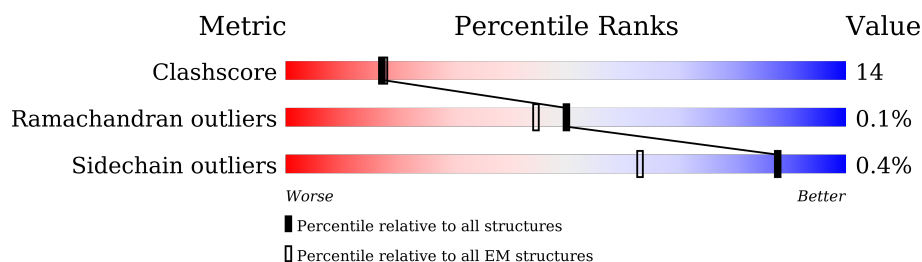
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.75 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



| Metric                | Whole archive<br>(#Entries) | EM structures<br>(#Entries) |
|-----------------------|-----------------------------|-----------------------------|
| Clashscore            | 210492                      | 15764                       |
| Ramachandran outliers | 207382                      | 16835                       |
| Sidechain outliers    | 206894                      | 16415                       |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ .

| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 1   | A     | 1206   | 62% 26% 12%      |
| 1   | B     | 1206   | 62% 26% 12%      |
| 1   | C     | 1206   | 59% 29% 12%      |
| 2   | D     | 2      | 100%             |
| 2   | E     | 2      | 100%             |
| 2   | F     | 2      | 100%             |
| 2   | G     | 2      | 100%             |
| 2   | H     | 2      | 100%             |
| 2   | I     | 2      | 100%             |

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| Mol | Chain | Length | Quality of chain                                                                        |
|-----|-------|--------|-----------------------------------------------------------------------------------------|
| 2   | J     | 2      |  100% |
| 2   | K     | 2      |  100% |
| 2   | L     | 2      |  100% |
| 2   | M     | 2      |  100% |
| 2   | N     | 2      |  100% |
| 2   | O     | 2      |  100% |
| 2   | P     | 2      |  100% |
| 2   | Q     | 2      |  100% |
| 2   | R     | 2      |  100% |

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 25749 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Spike glycoprotein.

| Mol | Chain | Residues | Atoms |      |      |      |    | AltConf | Trace |
|-----|-------|----------|-------|------|------|------|----|---------|-------|
| 1   | A     | 1063     | Total | C    | N    | O    | S  | 0       | 0     |
|     |       |          | 8318  | 5324 | 1384 | 1572 | 38 |         |       |
| 1   | B     | 1063     | Total | C    | N    | O    | S  | 0       | 0     |
|     |       |          | 8318  | 5324 | 1384 | 1572 | 38 |         |       |
| 1   | C     | 1063     | Total | C    | N    | O    | S  | 0       | 0     |
|     |       |          | 8318  | 5324 | 1384 | 1572 | 38 |         |       |

There are 219 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment        | Reference  |
|-------|---------|----------|--------|----------------|------------|
| A     | -2      | ALA      | -      | expression tag | UNP P0DTC2 |
| A     | -1      | THR      | -      | expression tag | UNP P0DTC2 |
| A     | 16      | MET      | -      | insertion      | UNP P0DTC2 |
| A     | 17      | PRO      | ASN    | conflict       | UNP P0DTC2 |
| A     | 19      | PHE      | THR    | conflict       | UNP P0DTC2 |
| A     | 20      | ASN      | THR    | conflict       | UNP P0DTC2 |
| A     | 21      | LEU      | ARG    | conflict       | UNP P0DTC2 |
| A     | 22      | ILE      | THR    | conflict       | UNP P0DTC2 |
| A     | 23      | THR      | GLN    | conflict       | UNP P0DTC2 |
| A     | 24      | THR      | LEU    | conflict       | UNP P0DTC2 |
| A     | 25      | THR      | PRO    | conflict       | UNP P0DTC2 |
| A     | 26      | GLN      | PRO    | conflict       | UNP P0DTC2 |
| A     | 27      | SER      | ALA    | conflict       | UNP P0DTC2 |
| A     | 50      | LEU      | SER    | conflict       | UNP P0DTC2 |
| A     | ?       | -        | HIS    | deletion       | UNP P0DTC2 |
| A     | ?       | -        | VAL    | deletion       | UNP P0DTC2 |
| A     | 127     | PHE      | VAL    | conflict       | UNP P0DTC2 |
| A     | 143     | ASP      | GLY    | variant        | UNP P0DTC2 |
| A     | ?       | -        | TYR    | deletion       | UNP P0DTC2 |
| A     | 157     | SER      | PHE    | conflict       | UNP P0DTC2 |
| A     | 158     | GLY      | ARG    | conflict       | UNP P0DTC2 |
| A     | ?       | -        | ASN    | deletion       | UNP P0DTC2 |
| A     | 212     | ILE      | LEU    | variant        | UNP P0DTC2 |
| A     | 213     | GLY      | VAL    | variant        | UNP P0DTC2 |

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| Chain | Residue | Modelled | Actual | Comment  | Reference  |
|-------|---------|----------|--------|----------|------------|
| A     | 216     | PHE      | LEU    | conflict | UNP P0DTC2 |
| A     | 245     | ASN      | HIS    | conflict | UNP P0DTC2 |
| A     | 264     | ASP      | ALA    | conflict | UNP P0DTC2 |
| A     | 332     | VAL      | ILE    | conflict | UNP P0DTC2 |
| A     | 339     | HIS      | GLY    | variant  | UNP P0DTC2 |
| A     | 371     | PHE      | SER    | conflict | UNP P0DTC2 |
| A     | 373     | PRO      | SER    | variant  | UNP P0DTC2 |
| A     | 375     | PHE      | SER    | variant  | UNP P0DTC2 |
| A     | 376     | ALA      | THR    | variant  | UNP P0DTC2 |
| A     | 403     | LYS      | ARG    | conflict | UNP P0DTC2 |
| A     | 405     | ASN      | ASP    | variant  | UNP P0DTC2 |
| A     | 408     | SER      | ARG    | variant  | UNP P0DTC2 |
| A     | 417     | ASN      | LYS    | variant  | UNP P0DTC2 |
| A     | 440     | LYS      | ASN    | variant  | UNP P0DTC2 |
| A     | 445     | HIS      | VAL    | conflict | UNP P0DTC2 |
| A     | 446     | SER      | GLY    | variant  | UNP P0DTC2 |
| A     | 450     | ASP      | ASN    | conflict | UNP P0DTC2 |
| A     | 452     | TRP      | LEU    | conflict | UNP P0DTC2 |
| A     | 460     | LYS      | ASN    | variant  | UNP P0DTC2 |
| A     | 477     | ASN      | SER    | variant  | UNP P0DTC2 |
| A     | 478     | LYS      | THR    | variant  | UNP P0DTC2 |
| A     | 481     | LYS      | ASN    | conflict | UNP P0DTC2 |
| A     | ?       | -        | VAL    | deletion | UNP P0DTC2 |
| A     | 484     | LYS      | GLU    | variant  | UNP P0DTC2 |
| A     | 486     | PRO      | PHE    | variant  | UNP P0DTC2 |
| A     | 498     | ARG      | GLN    | variant  | UNP P0DTC2 |
| A     | 501     | TYR      | ASN    | variant  | UNP P0DTC2 |
| A     | 505     | HIS      | TYR    | variant  | UNP P0DTC2 |
| A     | 554     | LYS      | GLU    | conflict | UNP P0DTC2 |
| A     | 570     | VAL      | ALA    | conflict | UNP P0DTC2 |
| A     | 614     | GLY      | ASP    | variant  | UNP P0DTC2 |
| A     | 621     | SER      | PRO    | conflict | UNP P0DTC2 |
| A     | 655     | TYR      | HIS    | variant  | UNP P0DTC2 |
| A     | 679     | LYS      | ASN    | variant  | UNP P0DTC2 |
| A     | 681     | ARG      | PRO    | variant  | UNP P0DTC2 |
| A     | 683     | ALA      | ARG    | conflict | UNP P0DTC2 |
| A     | 685     | ALA      | ARG    | conflict | UNP P0DTC2 |
| A     | 764     | LYS      | ASN    | variant  | UNP P0DTC2 |
| A     | 796     | TYR      | ASP    | variant  | UNP P0DTC2 |
| A     | 817     | PRO      | PHE    | conflict | UNP P0DTC2 |
| A     | 892     | PRO      | ALA    | conflict | UNP P0DTC2 |
| A     | 899     | PRO      | ALA    | conflict | UNP P0DTC2 |

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| Chain | Residue | Modelled | Actual | Comment        | Reference  |
|-------|---------|----------|--------|----------------|------------|
| A     | 939     | PHE      | SER    | conflict       | UNP P0DTC2 |
| A     | 942     | PRO      | ALA    | conflict       | UNP P0DTC2 |
| A     | 954     | HIS      | GLN    | variant        | UNP P0DTC2 |
| A     | 969     | LYS      | ASN    | variant        | UNP P0DTC2 |
| A     | 986     | PRO      | LYS    | variant        | UNP P0DTC2 |
| A     | 987     | PRO      | VAL    | variant        | UNP P0DTC2 |
| A     | 1143    | LEU      | PRO    | conflict       | UNP P0DTC2 |
| B     | -2      | ALA      | -      | expression tag | UNP P0DTC2 |
| B     | -1      | THR      | -      | expression tag | UNP P0DTC2 |
| B     | 16      | MET      | -      | insertion      | UNP P0DTC2 |
| B     | 17      | PRO      | ASN    | conflict       | UNP P0DTC2 |
| B     | 19      | PHE      | THR    | conflict       | UNP P0DTC2 |
| B     | 20      | ASN      | THR    | conflict       | UNP P0DTC2 |
| B     | 21      | LEU      | ARG    | conflict       | UNP P0DTC2 |
| B     | 22      | ILE      | THR    | conflict       | UNP P0DTC2 |
| B     | 23      | THR      | GLN    | conflict       | UNP P0DTC2 |
| B     | 24      | THR      | LEU    | conflict       | UNP P0DTC2 |
| B     | 25      | THR      | PRO    | conflict       | UNP P0DTC2 |
| B     | 26      | GLN      | PRO    | conflict       | UNP P0DTC2 |
| B     | 27      | SER      | ALA    | conflict       | UNP P0DTC2 |
| B     | 50      | LEU      | SER    | conflict       | UNP P0DTC2 |
| B     | ?       | -        | HIS    | deletion       | UNP P0DTC2 |
| B     | ?       | -        | VAL    | deletion       | UNP P0DTC2 |
| B     | 127     | PHE      | VAL    | conflict       | UNP P0DTC2 |
| B     | 143     | ASP      | GLY    | variant        | UNP P0DTC2 |
| B     | ?       | -        | TYR    | deletion       | UNP P0DTC2 |
| B     | 157     | SER      | PHE    | conflict       | UNP P0DTC2 |
| B     | 158     | GLY      | ARG    | conflict       | UNP P0DTC2 |
| B     | ?       | -        | ASN    | deletion       | UNP P0DTC2 |
| B     | 212     | ILE      | LEU    | variant        | UNP P0DTC2 |
| B     | 213     | GLY      | VAL    | variant        | UNP P0DTC2 |
| B     | 216     | PHE      | LEU    | conflict       | UNP P0DTC2 |
| B     | 245     | ASN      | HIS    | conflict       | UNP P0DTC2 |
| B     | 264     | ASP      | ALA    | conflict       | UNP P0DTC2 |
| B     | 332     | VAL      | ILE    | conflict       | UNP P0DTC2 |
| B     | 339     | HIS      | GLY    | variant        | UNP P0DTC2 |
| B     | 371     | PHE      | SER    | conflict       | UNP P0DTC2 |
| B     | 373     | PRO      | SER    | variant        | UNP P0DTC2 |
| B     | 375     | PHE      | SER    | variant        | UNP P0DTC2 |
| B     | 376     | ALA      | THR    | variant        | UNP P0DTC2 |
| B     | 403     | LYS      | ARG    | conflict       | UNP P0DTC2 |
| B     | 405     | ASN      | ASP    | variant        | UNP P0DTC2 |

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| Chain | Residue | Modelled | Actual | Comment        | Reference  |
|-------|---------|----------|--------|----------------|------------|
| B     | 408     | SER      | ARG    | variant        | UNP P0DTC2 |
| B     | 417     | ASN      | LYS    | variant        | UNP P0DTC2 |
| B     | 440     | LYS      | ASN    | variant        | UNP P0DTC2 |
| B     | 445     | HIS      | VAL    | conflict       | UNP P0DTC2 |
| B     | 446     | SER      | GLY    | variant        | UNP P0DTC2 |
| B     | 450     | ASP      | ASN    | conflict       | UNP P0DTC2 |
| B     | 452     | TRP      | LEU    | conflict       | UNP P0DTC2 |
| B     | 460     | LYS      | ASN    | variant        | UNP P0DTC2 |
| B     | 477     | ASN      | SER    | variant        | UNP P0DTC2 |
| B     | 478     | LYS      | THR    | variant        | UNP P0DTC2 |
| B     | 481     | LYS      | ASN    | conflict       | UNP P0DTC2 |
| B     | ?       | -        | VAL    | deletion       | UNP P0DTC2 |
| B     | 484     | LYS      | GLU    | variant        | UNP P0DTC2 |
| B     | 486     | PRO      | PHE    | variant        | UNP P0DTC2 |
| B     | 498     | ARG      | GLN    | variant        | UNP P0DTC2 |
| B     | 501     | TYR      | ASN    | variant        | UNP P0DTC2 |
| B     | 505     | HIS      | TYR    | variant        | UNP P0DTC2 |
| B     | 554     | LYS      | GLU    | conflict       | UNP P0DTC2 |
| B     | 570     | VAL      | ALA    | conflict       | UNP P0DTC2 |
| B     | 614     | GLY      | ASP    | variant        | UNP P0DTC2 |
| B     | 621     | SER      | PRO    | conflict       | UNP P0DTC2 |
| B     | 655     | TYR      | HIS    | variant        | UNP P0DTC2 |
| B     | 679     | LYS      | ASN    | variant        | UNP P0DTC2 |
| B     | 681     | ARG      | PRO    | variant        | UNP P0DTC2 |
| B     | 683     | ALA      | ARG    | conflict       | UNP P0DTC2 |
| B     | 685     | ALA      | ARG    | conflict       | UNP P0DTC2 |
| B     | 764     | LYS      | ASN    | variant        | UNP P0DTC2 |
| B     | 796     | TYR      | ASP    | variant        | UNP P0DTC2 |
| B     | 817     | PRO      | PHE    | conflict       | UNP P0DTC2 |
| B     | 892     | PRO      | ALA    | conflict       | UNP P0DTC2 |
| B     | 899     | PRO      | ALA    | conflict       | UNP P0DTC2 |
| B     | 939     | PHE      | SER    | conflict       | UNP P0DTC2 |
| B     | 942     | PRO      | ALA    | conflict       | UNP P0DTC2 |
| B     | 954     | HIS      | GLN    | variant        | UNP P0DTC2 |
| B     | 969     | LYS      | ASN    | variant        | UNP P0DTC2 |
| B     | 986     | PRO      | LYS    | variant        | UNP P0DTC2 |
| B     | 987     | PRO      | VAL    | variant        | UNP P0DTC2 |
| B     | 1143    | LEU      | PRO    | conflict       | UNP P0DTC2 |
| C     | -2      | ALA      | -      | expression tag | UNP P0DTC2 |
| C     | -1      | THR      | -      | expression tag | UNP P0DTC2 |
| C     | 16      | MET      | -      | insertion      | UNP P0DTC2 |
| C     | 17      | PRO      | ASN    | conflict       | UNP P0DTC2 |

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| Chain | Residue | Modelled | Actual | Comment  | Reference  |
|-------|---------|----------|--------|----------|------------|
| C     | 19      | PHE      | THR    | conflict | UNP P0DTC2 |
| C     | 20      | ASN      | THR    | conflict | UNP P0DTC2 |
| C     | 21      | LEU      | ARG    | conflict | UNP P0DTC2 |
| C     | 22      | ILE      | THR    | conflict | UNP P0DTC2 |
| C     | 23      | THR      | GLN    | conflict | UNP P0DTC2 |
| C     | 24      | THR      | LEU    | conflict | UNP P0DTC2 |
| C     | 25      | THR      | PRO    | conflict | UNP P0DTC2 |
| C     | 26      | GLN      | PRO    | conflict | UNP P0DTC2 |
| C     | 27      | SER      | ALA    | conflict | UNP P0DTC2 |
| C     | 50      | LEU      | SER    | conflict | UNP P0DTC2 |
| C     | ?       | -        | HIS    | deletion | UNP P0DTC2 |
| C     | ?       | -        | VAL    | deletion | UNP P0DTC2 |
| C     | 127     | PHE      | VAL    | conflict | UNP P0DTC2 |
| C     | 143     | ASP      | GLY    | variant  | UNP P0DTC2 |
| C     | ?       | -        | TYR    | deletion | UNP P0DTC2 |
| C     | 157     | SER      | PHE    | conflict | UNP P0DTC2 |
| C     | 158     | GLY      | ARG    | conflict | UNP P0DTC2 |
| C     | ?       | -        | ASN    | deletion | UNP P0DTC2 |
| C     | 212     | ILE      | LEU    | variant  | UNP P0DTC2 |
| C     | 213     | GLY      | VAL    | variant  | UNP P0DTC2 |
| C     | 216     | PHE      | LEU    | conflict | UNP P0DTC2 |
| C     | 245     | ASN      | HIS    | conflict | UNP P0DTC2 |
| C     | 264     | ASP      | ALA    | conflict | UNP P0DTC2 |
| C     | 332     | VAL      | ILE    | conflict | UNP P0DTC2 |
| C     | 339     | HIS      | GLY    | variant  | UNP P0DTC2 |
| C     | 371     | PHE      | SER    | conflict | UNP P0DTC2 |
| C     | 373     | PRO      | SER    | variant  | UNP P0DTC2 |
| C     | 375     | PHE      | SER    | variant  | UNP P0DTC2 |
| C     | 376     | ALA      | THR    | variant  | UNP P0DTC2 |
| C     | 403     | LYS      | ARG    | conflict | UNP P0DTC2 |
| C     | 405     | ASN      | ASP    | variant  | UNP P0DTC2 |
| C     | 408     | SER      | ARG    | variant  | UNP P0DTC2 |
| C     | 417     | ASN      | LYS    | variant  | UNP P0DTC2 |
| C     | 440     | LYS      | ASN    | variant  | UNP P0DTC2 |
| C     | 445     | HIS      | VAL    | conflict | UNP P0DTC2 |
| C     | 446     | SER      | GLY    | variant  | UNP P0DTC2 |
| C     | 450     | ASP      | ASN    | conflict | UNP P0DTC2 |
| C     | 452     | TRP      | LEU    | conflict | UNP P0DTC2 |
| C     | 460     | LYS      | ASN    | variant  | UNP P0DTC2 |
| C     | 477     | ASN      | SER    | variant  | UNP P0DTC2 |
| C     | 478     | LYS      | THR    | variant  | UNP P0DTC2 |
| C     | 481     | LYS      | ASN    | conflict | UNP P0DTC2 |

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| Chain | Residue | Modelled | Actual | Comment  | Reference  |
|-------|---------|----------|--------|----------|------------|
| C     | ?       | -        | VAL    | deletion | UNP P0DTC2 |
| C     | 484     | LYS      | GLU    | variant  | UNP P0DTC2 |
| C     | 486     | PRO      | PHE    | variant  | UNP P0DTC2 |
| C     | 498     | ARG      | GLN    | variant  | UNP P0DTC2 |
| C     | 501     | TYR      | ASN    | variant  | UNP P0DTC2 |
| C     | 505     | HIS      | TYR    | variant  | UNP P0DTC2 |
| C     | 554     | LYS      | GLU    | conflict | UNP P0DTC2 |
| C     | 570     | VAL      | ALA    | conflict | UNP P0DTC2 |
| C     | 614     | GLY      | ASP    | variant  | UNP P0DTC2 |
| C     | 621     | SER      | PRO    | conflict | UNP P0DTC2 |
| C     | 655     | TYR      | HIS    | variant  | UNP P0DTC2 |
| C     | 679     | LYS      | ASN    | variant  | UNP P0DTC2 |
| C     | 681     | ARG      | PRO    | variant  | UNP P0DTC2 |
| C     | 683     | ALA      | ARG    | conflict | UNP P0DTC2 |
| C     | 685     | ALA      | ARG    | conflict | UNP P0DTC2 |
| C     | 764     | LYS      | ASN    | variant  | UNP P0DTC2 |
| C     | 796     | TYR      | ASP    | variant  | UNP P0DTC2 |
| C     | 817     | PRO      | PHE    | conflict | UNP P0DTC2 |
| C     | 892     | PRO      | ALA    | conflict | UNP P0DTC2 |
| C     | 899     | PRO      | ALA    | conflict | UNP P0DTC2 |
| C     | 939     | PHE      | SER    | conflict | UNP P0DTC2 |
| C     | 942     | PRO      | ALA    | conflict | UNP P0DTC2 |
| C     | 954     | HIS      | GLN    | variant  | UNP P0DTC2 |
| C     | 969     | LYS      | ASN    | variant  | UNP P0DTC2 |
| C     | 986     | PRO      | LYS    | variant  | UNP P0DTC2 |
| C     | 987     | PRO      | VAL    | variant  | UNP P0DTC2 |
| C     | 1143    | LEU      | PRO    | conflict | UNP P0DTC2 |

- Molecule 2 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



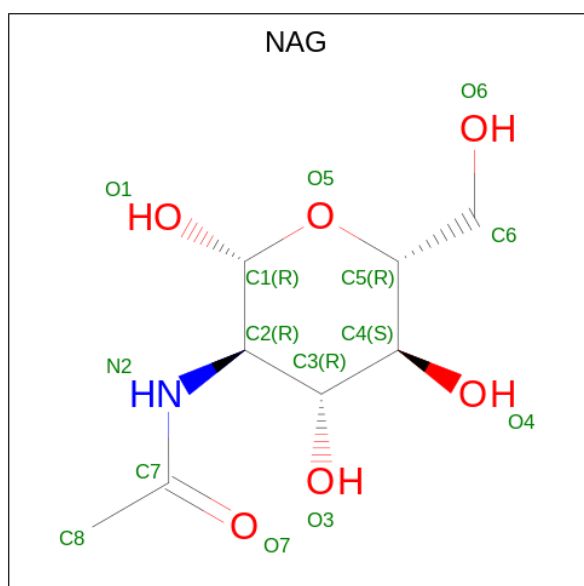
| Mol | Chain | Residues | Atoms |    |   |    | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|-------|
| 2   | D     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |
| 2   | E     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |
| 2   | F     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |

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| Mol | Chain | Residues | Atoms |    |   |    | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|-------|
| 2   | G     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |
| 2   | H     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |
| 2   | I     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |
| 2   | J     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |
| 2   | K     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |
| 2   | L     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |
| 2   | M     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |
| 2   | N     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |
| 2   | O     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |
| 2   | P     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |
| 2   | Q     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |
| 2   | R     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 25    | 14 | 1 | 10 |         |       |

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula:  $C_8H_{15}NO_6$ ).



| Mol | Chain | Residues | Atoms |   |   |   | AltConf |
|-----|-------|----------|-------|---|---|---|---------|
| 3   | A     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | A     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | A     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | A     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | A     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | A     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | A     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | A     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | B     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | B     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | B     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | B     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | B     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | B     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | B     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | B     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | C     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | C     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |

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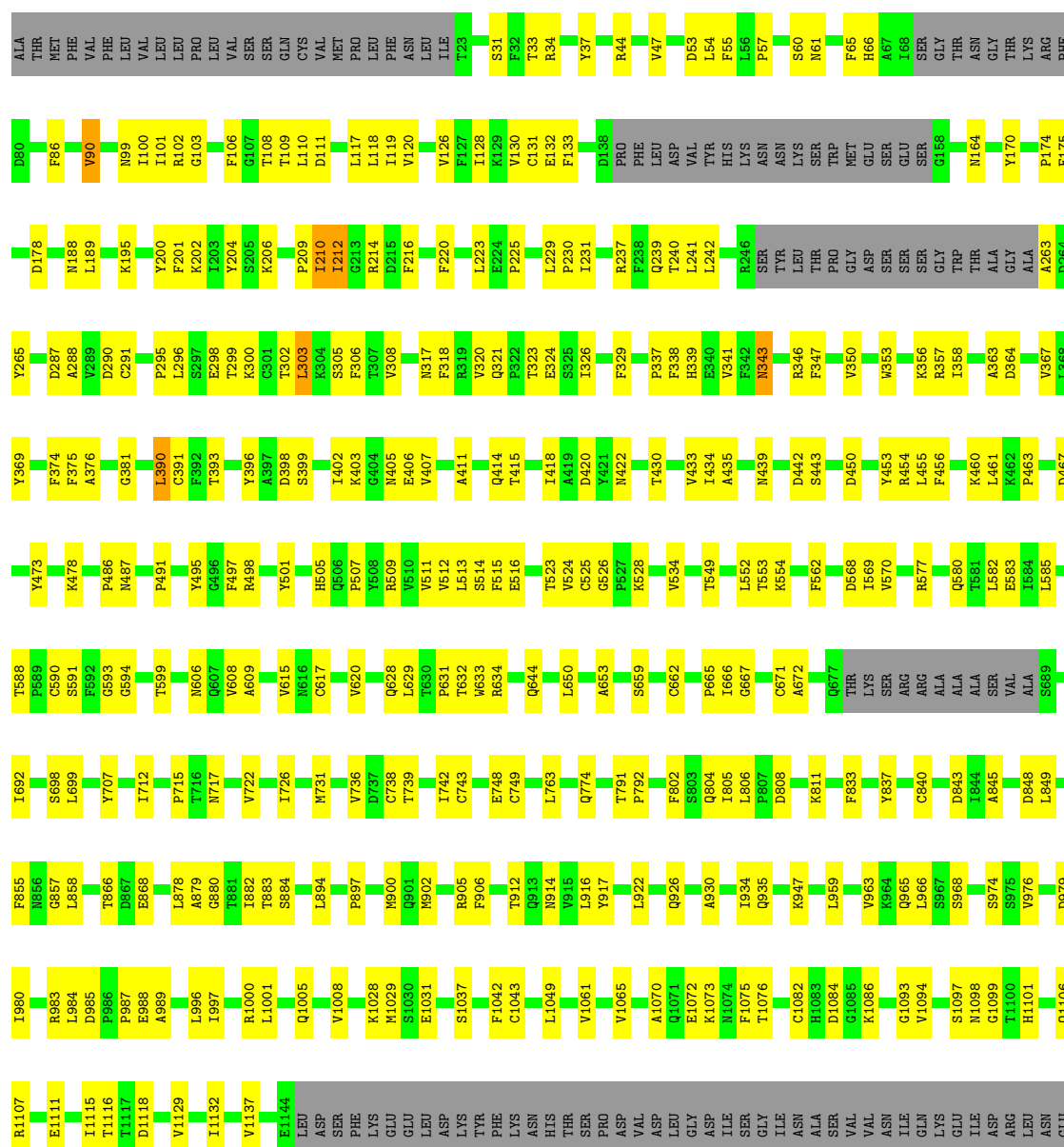
| Mol | Chain | Residues | Atoms |   |   |   | AltConf |
|-----|-------|----------|-------|---|---|---|---------|
| 3   | C     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | C     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | C     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | C     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | C     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | C     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 3   | C     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |

### 3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Spike glycoprotein

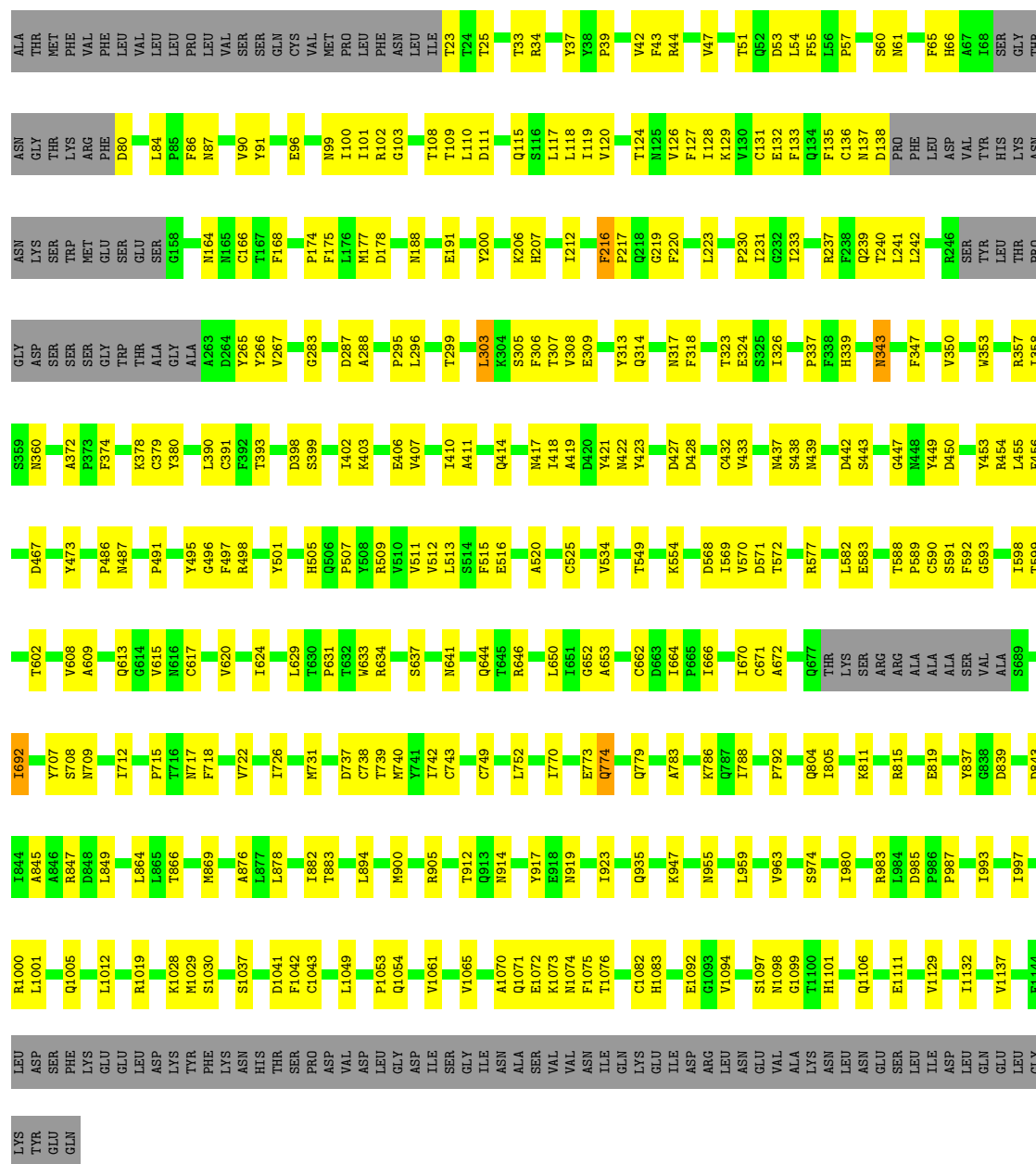
Chain A: 



VAL  
ALA  
LYS  
ASN  
LEU  
LEU  
ASN  
GLU  
SER  
LEU  
LEU  
ILE  
ASP  
PRO  
LEU  
GLN  
GLU  
LEU  
GLY  
TYR  
GLN

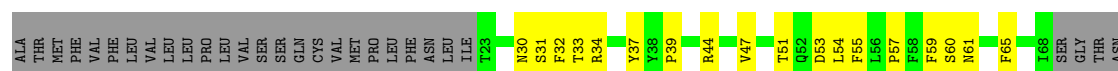
• Molecule 1: Spike glycoprotein

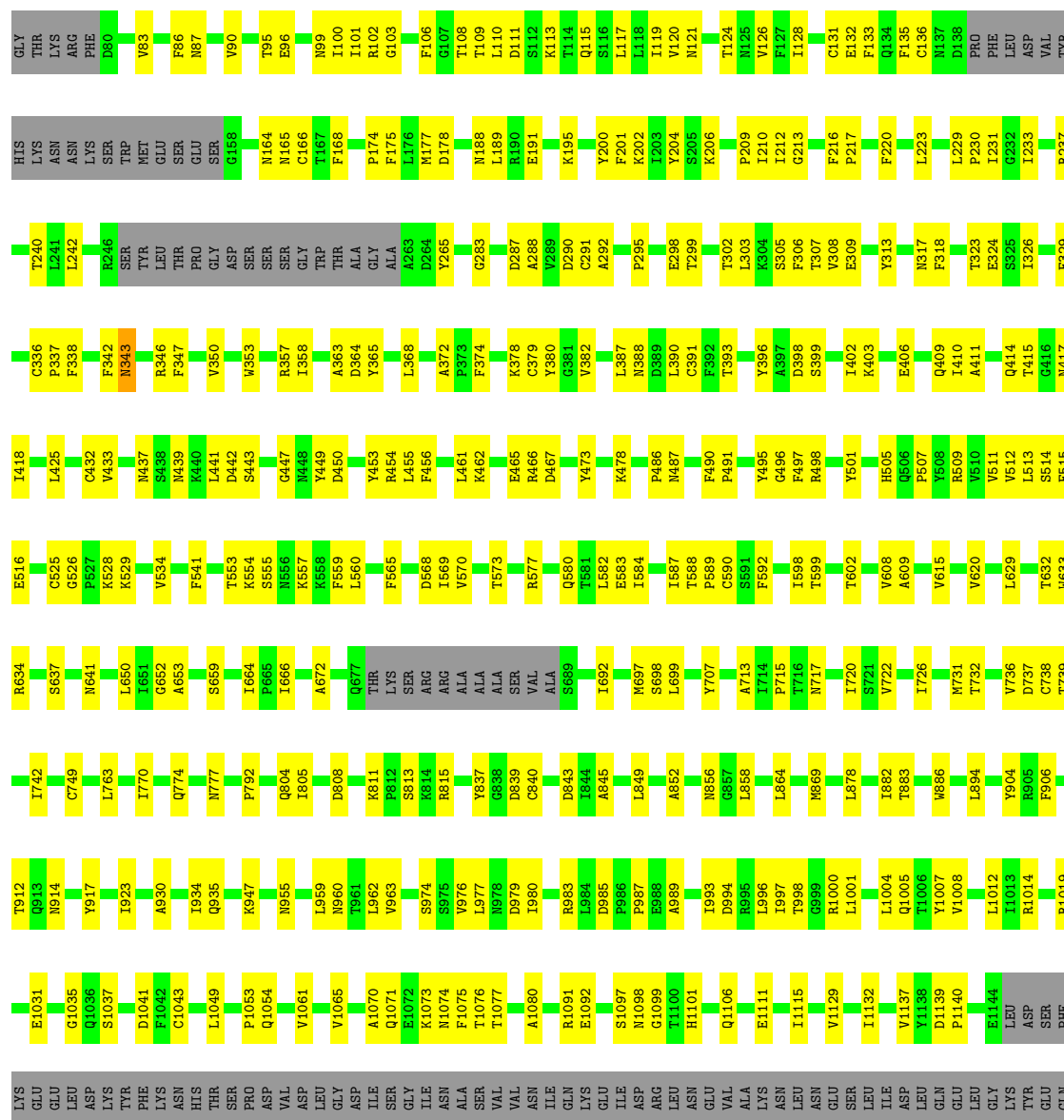
Chain B:  62% 26% 12%



• Molecule 1: Spike glycoprotein

Chain C:  59% 29% 12%





- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain D: 100%

MA61  
BM42

- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E: 100%

MA61  
BM42

- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F:  100%



- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain G:  100%



- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain H:  100%



- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain I:  100%



- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain J:  100%



- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K:  100%



- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain L:  100%



- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:  100%

NAG1  
BMA2

- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N:  100%NAG1  
BMA2

- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain O:  100%NAG1  
BMA2

- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain P:  100%NAG1  
BMA2

- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain Q:  100%NAG1  
BMA2

- Molecule 2: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain R:  100%NAG1  
BMA2

## 4 Experimental information

| Property                             | Value                     | Source    |
|--------------------------------------|---------------------------|-----------|
| EM reconstruction method             | SINGLE PARTICLE           | Depositor |
| Imposed symmetry                     | POINT, Not provided       |           |
| Number of particles used             | 96376                     | Depositor |
| Resolution determination method      | FSC 0.143 CUT-OFF         | Depositor |
| CTF correction method                | PHASE FLIPPING ONLY       | Depositor |
| Microscope                           | FEI TITAN                 | Depositor |
| Voltage (kV)                         | 300                       | Depositor |
| Electron dose ( $e^-/\text{\AA}^2$ ) | 60                        | Depositor |
| Minimum defocus (nm)                 | 1200                      | Depositor |
| Maximum defocus (nm)                 | 2000                      | Depositor |
| Magnification                        | Not provided              |           |
| Image detector                       | GATAN K2 SUMMIT (4k x 4k) | Depositor |

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, BMA

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Chain | Bond lengths |                | Bond angles |                |
|-----|-------|--------------|----------------|-------------|----------------|
|     |       | RMSZ         | # Z  >5        | RMSZ        | # Z  >5        |
| 1   | A     | 0.20         | 1/8518 (0.0%)  | 0.44        | 5/11592 (0.0%) |
| 1   | B     | 0.17         | 0/8518         | 0.43        | 2/11592 (0.0%) |
| 1   | C     | 0.16         | 0/8518         | 0.42        | 2/11592 (0.0%) |
| All | All   | 0.18         | 1/25554 (0.0%) | 0.43        | 9/34776 (0.0%) |

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

| Mol | Chain | #Chirality outliers | #Planarity outliers |
|-----|-------|---------------------|---------------------|
| 1   | A     | 0                   | 2                   |
| 1   | B     | 0                   | 1                   |
| All | All   | 0                   | 3                   |

All (1) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z     | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|-------|-------------|----------|
| 1   | A     | 209 | PRO  | CG-CD | -8.46 | 1.22        | 1.50     |

All (9) bond angle outliers are listed below:

| Mol | Chain | Res  | Type | Atoms   | Z      | Observed(°) | Ideal(°) |
|-----|-------|------|------|---------|--------|-------------|----------|
| 1   | A     | 209  | PRO  | CA-N-CD | -12.96 | 93.85       | 112.00   |
| 1   | A     | 209  | PRO  | N-CD-CG | -9.90  | 88.35       | 103.20   |
| 1   | B     | 1074 | ASN  | CA-C-N  | -5.96  | 115.35      | 122.44   |
| 1   | B     | 1074 | ASN  | C-N-CA  | -5.96  | 115.35      | 122.44   |
| 1   | C     | 1074 | ASN  | CA-C-N  | -5.93  | 115.39      | 122.44   |
| 1   | C     | 1074 | ASN  | C-N-CA  | -5.93  | 115.39      | 122.44   |
| 1   | A     | 463  | PRO  | CA-N-CD | -5.47  | 104.34      | 112.00   |

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| Mol | Chain | Res | Type | Atoms    | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|----------|-------|-------------|----------|
| 1   | A     | 209 | PRO  | CA-CB-CG | -5.40 | 94.23       | 104.50   |
| 1   | A     | 209 | PRO  | N-CA-CB  | -5.08 | 97.91       | 103.25   |

There are no chirality outliers.

All (3) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group   |
|-----|-------|-----|------|---------|
| 1   | A     | 210 | ILE  | Peptide |
| 1   | A     | 303 | LEU  | Peptide |
| 1   | B     | 303 | LEU  | Peptide |

## 5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1   | A     | 8318  | 0        | 8109     | 234     | 0            |
| 1   | B     | 8318  | 0        | 8109     | 236     | 0            |
| 1   | C     | 8318  | 0        | 8109     | 263     | 0            |
| 2   | D     | 25    | 0        | 22       | 0       | 0            |
| 2   | E     | 25    | 0        | 22       | 0       | 0            |
| 2   | F     | 25    | 0        | 22       | 0       | 0            |
| 2   | G     | 25    | 0        | 22       | 0       | 0            |
| 2   | H     | 25    | 0        | 22       | 0       | 0            |
| 2   | I     | 25    | 0        | 22       | 0       | 0            |
| 2   | J     | 25    | 0        | 22       | 0       | 0            |
| 2   | K     | 25    | 0        | 22       | 0       | 0            |
| 2   | L     | 25    | 0        | 22       | 0       | 0            |
| 2   | M     | 25    | 0        | 22       | 0       | 0            |
| 2   | N     | 25    | 0        | 22       | 0       | 0            |
| 2   | O     | 25    | 0        | 22       | 0       | 0            |
| 2   | P     | 25    | 0        | 22       | 0       | 0            |
| 2   | Q     | 25    | 0        | 22       | 0       | 0            |
| 2   | R     | 25    | 0        | 22       | 0       | 0            |
| 3   | A     | 140   | 0        | 130      | 1       | 0            |
| 3   | B     | 140   | 0        | 130      | 2       | 0            |
| 3   | C     | 140   | 0        | 130      | 2       | 0            |
| All | All   | 25749 | 0        | 25047    | 688     | 0            |

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 14.

All (688) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 1:A:391:CYS:HA   | 1:A:525:CYS:HB3   | 1.42                     | 1.02              |
| 1:B:391:CYS:HA   | 1:B:525:CYS:HB3   | 1.43                     | 1.01              |
| 1:C:731:MET:HB2  | 1:C:955:ASN:HD21  | 1.35                     | 0.89              |
| 1:B:96:GLU:OE1   | 1:B:100:ILE:N     | 2.18                     | 0.77              |
| 1:C:804:GLN:NE2  | 1:C:935:GLN:OE1   | 2.17                     | 0.77              |
| 1:A:1082:CYS:HB2 | 1:A:1132:ILE:HD11 | 1.68                     | 0.76              |
| 1:A:804:GLN:NE2  | 1:A:935:GLN:OE1   | 2.19                     | 0.76              |
| 1:B:34:ARG:NH2   | 1:B:219:GLY:O     | 2.21                     | 0.74              |
| 1:A:988:GLU:OE1  | 1:A:988:GLU:N     | 2.21                     | 0.73              |
| 1:C:454:ARG:NH1  | 1:C:467:ASP:O     | 2.22                     | 0.72              |
| 1:C:220:PHE:HE2  | 1:C:288:ALA:H     | 1.39                     | 0.71              |
| 1:B:53:ASP:OD2   | 1:B:54:LEU:N      | 2.24                     | 0.70              |
| 1:A:53:ASP:OD2   | 1:A:54:LEU:N      | 2.24                     | 0.70              |
| 1:C:577:ARG:HD3  | 1:C:582:LEU:HD13  | 1.73                     | 0.70              |
| 1:A:201:PHE:HB2  | 1:A:231:ILE:HG12  | 1.74                     | 0.70              |
| 1:B:131:CYS:SG   | 1:B:132:GLU:N     | 2.64                     | 0.70              |
| 1:C:131:CYS:SG   | 1:C:132:GLU:N     | 2.62                     | 0.70              |
| 1:B:454:ARG:NH1  | 1:B:467:ASP:O     | 2.24                     | 0.70              |
| 1:A:802:PHE:HB3  | 1:A:806:LEU:HD23  | 1.75                     | 0.69              |
| 1:B:220:PHE:HE1  | 1:B:288:ALA:H     | 1.41                     | 0.69              |
| 1:B:811:LYS:HA   | 1:B:811:LYS:HE3   | 1.73                     | 0.69              |
| 1:B:379:CYS:HA   | 1:B:432:CYS:HB2   | 1.72                     | 0.69              |
| 1:B:917:TYR:HB3  | 1:C:1129:VAL:HG12 | 1.74                     | 0.69              |
| 1:A:376:ALA:HB3  | 1:A:435:ALA:HB3   | 1.74                     | 0.68              |
| 1:C:191:GLU:N    | 1:C:191:GLU:OE1   | 2.25                     | 0.68              |
| 1:A:577:ARG:HD3  | 1:A:582:LEU:HD13  | 1.74                     | 0.68              |
| 1:C:391:CYS:HA   | 1:C:525:CYS:HB3   | 1.76                     | 0.68              |
| 1:A:353:TRP:CD1  | 1:A:353:TRP:H     | 2.11                     | 0.67              |
| 1:A:433:VAL:HG23 | 1:A:512:VAL:HG12  | 1.75                     | 0.67              |
| 1:C:206:LYS:HB3  | 1:C:223:LEU:HD23  | 1.76                     | 0.67              |
| 1:C:974:SER:HB3  | 1:C:980:ILE:HD11  | 1.77                     | 0.67              |
| 1:B:206:LYS:HB3  | 1:B:223:LEU:HD23  | 1.77                     | 0.66              |
| 1:B:402:ILE:HD12 | 1:B:403:LYS:H     | 1.60                     | 0.66              |
| 1:B:974:SER:HB3  | 1:B:980:ILE:HD11  | 1.76                     | 0.66              |
| 1:A:131:CYS:SG   | 1:A:132:GLU:N     | 2.64                     | 0.66              |
| 1:A:552:LEU:HD13 | 1:A:585:LEU:HD13  | 1.77                     | 0.66              |
| 1:A:763:LEU:HG   | 1:A:1008:VAL:HG21 | 1.77                     | 0.66              |

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| Atom-1            | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|-------------------|--------------------------|-------------------|
| 1:A:110:LEU:HD23  | 1:A:237:ARG:HE    | 1.60                     | 0.66              |
| 1:C:391:CYS:HA    | 1:C:525:CYS:CB    | 2.26                     | 0.66              |
| 1:C:858:LEU:HD13  | 1:C:963:VAL:HG12  | 1.78                     | 0.65              |
| 1:A:109:THR:H     | 1:A:237:ARG:HD3   | 1.60                     | 0.65              |
| 1:A:609:ALA:HB2   | 1:A:692:ILE:HD12  | 1.77                     | 0.65              |
| 1:C:34:ARG:NH2    | 1:C:217:PRO:O     | 2.30                     | 0.65              |
| 1:C:650:LEU:HD21  | 1:C:653:ALA:HB3   | 1.78                     | 0.65              |
| 1:C:659:SER:HB3   | 1:C:698:SER:HB2   | 1.78                     | 0.65              |
| 1:A:894:LEU:HD13  | 1:B:715:PRO:HD3   | 1.79                     | 0.64              |
| 1:C:39:PRO:HG2    | 1:C:51:THR:HG21   | 1.79                     | 0.64              |
| 1:A:406:GLU:HG2   | 1:A:418:ILE:HG13  | 1.79                     | 0.64              |
| 1:B:449:TYR:CD1   | 1:B:496:GLY:HA3   | 2.32                     | 0.64              |
| 1:C:115:GLN:HE21  | 1:C:233:ILE:HB    | 1.63                     | 0.64              |
| 1:B:738:CYS:SG    | 1:B:739:THR:N     | 2.71                     | 0.63              |
| 1:B:1106:GLN:NE2  | 1:B:1111:GLU:OE1  | 2.31                     | 0.63              |
| 1:B:609:ALA:HB2   | 1:B:692:ILE:HD12  | 1.80                     | 0.63              |
| 1:A:454:ARG:NH1   | 1:A:467:ASP:O     | 2.29                     | 0.63              |
| 1:B:577:ARG:HD3   | 1:B:582:LEU:HD13  | 1.80                     | 0.63              |
| 1:B:110:LEU:HB2   | 1:B:237:ARG:HH21  | 1.64                     | 0.63              |
| 1:B:650:LEU:HD21  | 1:B:653:ALA:HB3   | 1.81                     | 0.63              |
| 1:B:1028:LYS:NZ   | 1:B:1042:PHE:O    | 2.32                     | 0.63              |
| 1:A:303:LEU:HD11  | 1:A:308:VAL:HG22  | 1.81                     | 0.63              |
| 1:B:900:MET:SD    | 1:C:1077:THR:OG1  | 2.52                     | 0.63              |
| 1:B:919:ASN:O     | 1:B:923:ILE:HG13  | 1.99                     | 0.63              |
| 1:C:653:ALA:HB2   | 1:C:692:ILE:HG13  | 1.81                     | 0.63              |
| 1:A:442:ASP:OD1   | 1:A:509:ARG:NH2   | 2.32                     | 0.63              |
| 1:C:110:LEU:HD23  | 1:C:237:ARG:HH21  | 1.62                     | 0.63              |
| 1:C:777:ASN:HD21  | 1:C:1019:ARG:HA   | 1.63                     | 0.63              |
| 1:C:1031:GLU:HG3  | 1:C:1037:SER:HB3  | 1.80                     | 0.63              |
| 1:A:1037:SER:OG   | 1:A:1043:CYS:SG   | 2.53                     | 0.63              |
| 1:A:220:PHE:HE1   | 1:A:288:ALA:H     | 1.47                     | 0.63              |
| 1:A:930:ALA:O     | 1:A:934:ILE:HG23  | 1.99                     | 0.63              |
| 1:A:1115:ILE:HG22 | 1:A:1137:VAL:HG23 | 1.80                     | 0.62              |
| 1:C:736:VAL:HG22  | 1:C:858:LEU:HD23  | 1.81                     | 0.62              |
| 1:B:23:THR:N      | 1:B:80:ASP:OD1    | 2.31                     | 0.62              |
| 1:C:569:ILE:HG23  | 1:C:570:VAL:HG13  | 1.81                     | 0.62              |
| 1:A:1106:GLN:NE2  | 1:A:1111:GLU:OE1  | 2.32                     | 0.62              |
| 1:B:119:ILE:HD12  | 1:B:128:ILE:HG23  | 1.81                     | 0.62              |
| 1:B:486:PRO:O     | 1:B:487:ASN:ND2   | 2.32                     | 0.62              |
| 1:A:726:ILE:HG12  | 1:A:1061:VAL:HG22 | 1.80                     | 0.62              |
| 1:B:433:VAL:HG22  | 1:B:512:VAL:HG12  | 1.81                     | 0.62              |

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| Atom-1            | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|-------------------|--------------------------|-------------------|
| 1:C:442:ASP:OD1   | 1:C:509:ARG:NH2   | 2.32                     | 0.62              |
| 1:C:96:GLU:OE1    | 1:C:100:ILE:N     | 2.33                     | 0.62              |
| 1:C:726:ILE:HG12  | 1:C:1061:VAL:HG22 | 1.82                     | 0.62              |
| 1:A:206:LYS:HB3   | 1:A:223:LEU:HD23  | 1.82                     | 0.62              |
| 1:C:342:PHE:HE2   | 1:C:511:VAL:HG11  | 1.65                     | 0.61              |
| 1:B:39:PRO:HG2    | 1:B:51:THR:HG21   | 1.82                     | 0.61              |
| 1:A:396:TYR:HB2   | 1:A:514:SER:HB3   | 1.81                     | 0.61              |
| 1:C:57:PRO:HB2    | 1:C:60:SER:HB2    | 1.82                     | 0.61              |
| 1:C:763:LEU:HG    | 1:C:1008:VAL:HG21 | 1.82                     | 0.61              |
| 1:C:930:ALA:O     | 1:C:934:ILE:HG23  | 2.01                     | 0.61              |
| 1:B:599:THR:HB    | 1:B:608:VAL:HG12  | 1.82                     | 0.60              |
| 1:C:456:PHE:HB2   | 1:C:491:PRO:HA    | 1.83                     | 0.60              |
| 1:A:195:LYS:HE3   | 1:A:202:LYS:HD3   | 1.84                     | 0.60              |
| 1:A:128:ILE:HB    | 1:A:170:TYR:HB3   | 1.83                     | 0.60              |
| 1:A:57:PRO:HB2    | 1:A:60:SER:HB2    | 1.84                     | 0.60              |
| 1:A:659:SER:HB3   | 1:A:698:SER:HB2   | 1.83                     | 0.60              |
| 1:A:398:ASP:HB2   | 1:A:512:VAL:HG22  | 1.83                     | 0.60              |
| 1:B:837:TYR:OH    | 1:C:590:CYS:O     | 2.08                     | 0.60              |
| 1:A:590:CYS:O     | 1:C:837:TYR:OH    | 2.09                     | 0.60              |
| 1:B:1082:CYS:HB2  | 1:B:1132:ILE:HD11 | 1.83                     | 0.60              |
| 1:A:439:ASN:O     | 1:A:443:SER:OG    | 2.18                     | 0.60              |
| 1:A:1129:VAL:HG23 | 1:A:1132:ILE:HB   | 1.84                     | 0.59              |
| 1:B:115:GLN:HE21  | 1:B:233:ILE:HB    | 1.67                     | 0.59              |
| 1:C:135:PHE:HD2   | 1:C:136:CYS:H     | 1.50                     | 0.59              |
| 1:C:195:LYS:HE3   | 1:C:202:LYS:HD3   | 1.84                     | 0.59              |
| 1:C:486:PRO:O     | 1:C:487:ASN:ND2   | 2.35                     | 0.59              |
| 1:C:989:ALA:O     | 1:C:993:ILE:HG12  | 2.02                     | 0.59              |
| 1:A:715:PRO:HD3   | 1:C:894:LEU:HD13  | 1.84                     | 0.59              |
| 1:B:726:ILE:HG12  | 1:B:1061:VAL:HG22 | 1.83                     | 0.59              |
| 1:A:318:PHE:HZ    | 1:A:615:VAL:HG21  | 1.67                     | 0.59              |
| 1:B:378:LYS:NZ    | 1:B:380:TYR:OH    | 2.30                     | 0.59              |
| 1:B:849:LEU:H     | 1:B:849:LEU:HD23  | 1.68                     | 0.59              |
| 1:C:379:CYS:HA    | 1:C:432:CYS:HB2   | 1.83                     | 0.59              |
| 1:A:731:MET:CG    | 1:A:774:GLN:HE22  | 2.16                     | 0.58              |
| 1:B:439:ASN:O     | 1:B:443:SER:OG    | 2.18                     | 0.58              |
| 1:C:396:TYR:HB2   | 1:C:514:SER:HB3   | 1.83                     | 0.58              |
| 1:C:406:GLU:HG2   | 1:C:418:ILE:HG13  | 1.85                     | 0.58              |
| 1:B:894:LEU:HD13  | 1:C:715:PRO:HD3   | 1.86                     | 0.58              |
| 1:C:976:VAL:HB    | 1:C:979:ASP:HB2   | 1.86                     | 0.58              |
| 1:A:295:PRO:O     | 1:A:299:THR:HG23  | 2.03                     | 0.58              |
| 1:B:399:SER:HB3   | 1:B:511:VAL:HG22  | 1.85                     | 0.58              |

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| Atom-1            | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|------------------|--------------------------|-------------------|
| 1:C:738:CYS:SG    | 1:C:739:THR:N    | 2.77                     | 0.58              |
| 1:A:666:ILE:HD11  | 1:A:672:ALA:HB2  | 1.84                     | 0.58              |
| 1:C:31:SER:HA     | 1:C:216:PHE:HE2  | 1.68                     | 0.58              |
| 1:B:442:ASP:OD1   | 1:B:509:ARG:NH2  | 2.36                     | 0.58              |
| 1:C:393:THR:OG1   | 1:C:516:GLU:OE1  | 2.22                     | 0.58              |
| 1:C:439:ASN:O     | 1:C:443:SER:OG   | 2.17                     | 0.58              |
| 1:B:497:PHE:HD2   | 1:B:507:PRO:HG3  | 1.69                     | 0.58              |
| 1:C:240:THR:HG21  | 1:C:265:TYR:CE1  | 2.39                     | 0.58              |
| 1:A:415:THR:HG21  | 1:C:378:LYS:HB2  | 1.86                     | 0.57              |
| 1:A:974:SER:HB3   | 1:A:980:ILE:HD11 | 1.86                     | 0.57              |
| 1:C:53:ASP:OD1    | 1:C:54:LEU:N     | 2.35                     | 0.57              |
| 1:C:852:ALA:O     | 1:C:856:ASN:ND2  | 2.38                     | 0.57              |
| 1:C:1075:PHE:O    | 1:C:1076:THR:OG1 | 2.20                     | 0.57              |
| 1:B:1129:VAL:HG23 | 1:B:1132:ILE:HB  | 1.87                     | 0.57              |
| 1:C:128:ILE:HD11  | 1:C:175:PHE:HZ   | 1.70                     | 0.57              |
| 1:C:731:MET:HE1   | 1:C:1014:ARG:HB3 | 1.86                     | 0.57              |
| 1:A:109:THR:OG1   | 1:A:111:ASP:OD1  | 2.21                     | 0.57              |
| 1:A:549:THR:OG1   | 1:A:590:CYS:SG   | 2.60                     | 0.57              |
| 1:A:1075:PHE:O    | 1:A:1076:THR:OG1 | 2.21                     | 0.57              |
| 1:C:295:PRO:O     | 1:C:299:THR:HG23 | 2.05                     | 0.57              |
| 1:C:590:CYS:HB2   | 1:C:592:PHE:HE2  | 1.70                     | 0.57              |
| 1:B:295:PRO:O     | 1:B:299:THR:HG23 | 2.05                     | 0.57              |
| 1:A:420:ASP:HB3   | 1:A:460:LYS:HD2  | 1.87                     | 0.57              |
| 1:A:554:LYS:NZ    | 1:A:583:GLU:OE1  | 2.38                     | 0.56              |
| 1:C:1092:GLU:OE2  | 1:C:1092:GLU:N   | 2.37                     | 0.56              |
| 1:A:959:LEU:O     | 1:A:963:VAL:HG23 | 2.05                     | 0.56              |
| 1:A:1116:THR:OG1  | 1:A:1118:ASP:OD1 | 2.23                     | 0.56              |
| 1:C:210:ILE:O     | 1:C:213:GLY:N    | 2.38                     | 0.56              |
| 1:C:1106:GLN:NE2  | 1:C:1111:GLU:OE1 | 2.37                     | 0.56              |
| 1:A:849:LEU:HD23  | 1:A:849:LEU:H    | 1.70                     | 0.56              |
| 1:A:296:LEU:HB3   | 1:A:608:VAL:HG11 | 1.88                     | 0.56              |
| 1:A:588:THR:HG23  | 1:C:840:CYS:HB2  | 1.88                     | 0.56              |
| 1:B:178:ASP:OD1   | 1:B:178:ASP:N    | 2.39                     | 0.56              |
| 1:C:287:ASP:HB3   | 1:C:306:PHE:CZ   | 2.41                     | 0.56              |
| 1:C:632:THR:HA    | 1:C:634:ARG:HH21 | 1.71                     | 0.56              |
| 1:A:620:VAL:HG23  | 1:A:629:LEU:HD11 | 1.88                     | 0.56              |
| 1:B:118:LEU:C     | 1:B:119:ILE:HD13 | 2.31                     | 0.56              |
| 1:A:456:PHE:HB2   | 1:A:491:PRO:HA   | 1.87                     | 0.56              |
| 1:B:135:PHE:HE2   | 1:B:137:ASN:HB2  | 1.71                     | 0.56              |
| 1:B:287:ASP:HB3   | 1:B:306:PHE:CZ   | 2.41                     | 0.56              |
| 1:A:295:PRO:HG3   | 1:A:633:TRP:HD1  | 1.71                     | 0.56              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:A:53:ASP:HB3   | 1:A:55:PHE:HE1   | 1.71                     | 0.55              |
| 1:A:486:PRO:O    | 1:A:487:ASN:ND2  | 2.39                     | 0.55              |
| 1:C:456:PHE:HD2  | 1:C:473:TYR:HD2  | 1.52                     | 0.55              |
| 1:A:402:ILE:HD12 | 1:A:403:LYS:H    | 1.71                     | 0.55              |
| 1:C:53:ASP:HB3   | 1:C:55:PHE:HE1   | 1.71                     | 0.55              |
| 1:C:398:ASP:HB2  | 1:C:512:VAL:HG22 | 1.87                     | 0.55              |
| 1:C:174:PRO:O    | 1:C:177:MET:HE1  | 2.06                     | 0.55              |
| 1:B:164:ASN:ND2  | 3:B:1304:NAG:O7  | 2.38                     | 0.55              |
| 1:C:731:MET:CG   | 1:C:774:GLN:HE22 | 2.19                     | 0.55              |
| 1:C:462:LYS:HZ3  | 1:C:465:GLU:HB2  | 1.72                     | 0.55              |
| 1:C:912:THR:OG1  | 1:C:914:ASN:OD1  | 2.24                     | 0.55              |
| 1:B:1075:PHE:O   | 1:B:1076:THR:OG1 | 2.20                     | 0.55              |
| 1:A:287:ASP:HB3  | 1:A:306:PHE:CZ   | 2.42                     | 0.55              |
| 1:B:57:PRO:HB2   | 1:B:60:SER:HB2   | 1.89                     | 0.55              |
| 1:B:103:GLY:HA3  | 1:B:120:VAL:HA   | 1.88                     | 0.55              |
| 1:B:216:PHE:HE2  | 1:B:266:TYR:CD1  | 2.25                     | 0.55              |
| 1:B:406:GLU:HG2  | 1:B:418:ILE:HG13 | 1.89                     | 0.54              |
| 1:C:805:ILE:HB   | 1:C:878:LEU:HD11 | 1.90                     | 0.54              |
| 1:B:337:PRO:HG2  | 1:B:358:ILE:HD12 | 1.88                     | 0.54              |
| 1:B:34:ARG:CZ    | 1:B:217:PRO:HG2  | 2.37                     | 0.54              |
| 1:B:516:GLU:N    | 1:B:516:GLU:OE1  | 2.39                     | 0.54              |
| 1:C:666:ILE:HD11 | 1:C:672:ALA:HB2  | 1.88                     | 0.54              |
| 1:C:131:CYS:HB3  | 1:C:133:PHE:CZ   | 2.42                     | 0.54              |
| 1:C:388:ASN:HB3  | 1:C:528:LYS:HE3  | 1.88                     | 0.54              |
| 1:A:617:CYS:H    | 1:A:644:GLN:NE2  | 2.05                     | 0.54              |
| 1:B:33:THR:HG21  | 1:B:220:PHE:CE2  | 2.43                     | 0.54              |
| 1:A:456:PHE:HD2  | 1:A:473:TYR:HD2  | 1.56                     | 0.54              |
| 1:A:965:GLN:O    | 1:A:968:SER:OG   | 2.22                     | 0.54              |
| 1:C:365:TYR:HD2  | 1:C:368:LEU:HD13 | 1.72                     | 0.54              |
| 1:C:962:LEU:HD12 | 1:C:1007:TYR:CG  | 2.42                     | 0.54              |
| 1:A:742:ILE:O    | 1:A:1000:ARG:NH1 | 2.40                     | 0.54              |
| 1:A:1001:LEU:O   | 1:A:1005:GLN:HG2 | 2.08                     | 0.54              |
| 1:A:178:ASP:N    | 1:A:178:ASP:OD1  | 2.41                     | 0.53              |
| 1:B:378:LYS:HB2  | 1:C:415:THR:HG21 | 1.89                     | 0.53              |
| 1:C:598:ILE:HB   | 1:C:609:ALA:HB3  | 1.90                     | 0.53              |
| 1:A:1031:GLU:HG3 | 1:A:1037:SER:HB3 | 1.90                     | 0.53              |
| 1:C:168:PHE:HE1  | 1:C:231:ILE:HG13 | 1.73                     | 0.53              |
| 1:A:792:PRO:HG3  | 1:B:707:TYR:HB3  | 1.91                     | 0.53              |
| 1:B:124:THR:OG1  | 3:B:1301:NAG:O7  | 2.23                     | 0.53              |
| 1:C:305:SER:OG   | 1:C:306:PHE:N    | 2.42                     | 0.53              |
| 1:A:119:ILE:O    | 1:A:119:ILE:HG22 | 2.09                     | 0.53              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:B:307:THR:HA   | 1:B:602:THR:HG21 | 1.90                     | 0.53              |
| 1:C:103:GLY:HA3  | 1:C:120:VAL:HA   | 1.89                     | 0.53              |
| 1:B:779:GLN:HE22 | 1:B:783:ALA:HB3  | 1.74                     | 0.53              |
| 1:B:805:ILE:HB   | 1:B:878:LEU:HD11 | 1.91                     | 0.53              |
| 1:C:599:THR:HB   | 1:C:608:VAL:HG12 | 1.90                     | 0.53              |
| 1:A:501:TYR:HB3  | 1:A:505:HIS:HB2  | 1.91                     | 0.52              |
| 1:B:131:CYS:HB3  | 1:B:133:PHE:CZ   | 2.44                     | 0.52              |
| 1:C:135:PHE:HD2  | 1:C:136:CYS:N    | 2.06                     | 0.52              |
| 1:B:220:PHE:CD1  | 1:B:287:ASP:HA   | 2.45                     | 0.52              |
| 1:B:912:THR:OG1  | 1:B:914:ASN:OD1  | 2.26                     | 0.52              |
| 1:C:117:LEU:HD21 | 1:C:231:ILE:HG21 | 1.91                     | 0.52              |
| 1:C:516:GLU:OE2  | 1:C:516:GLU:N    | 2.41                     | 0.52              |
| 1:A:749:CYS:SG   | 1:A:997:ILE:HD11 | 2.50                     | 0.52              |
| 1:A:1028:LYS:NZ  | 1:A:1042:PHE:O   | 2.42                     | 0.52              |
| 1:B:347:PHE:HD2  | 1:B:399:SER:HB2  | 1.74                     | 0.52              |
| 1:B:450:ASP:OD1  | 1:B:450:ASP:N    | 2.40                     | 0.52              |
| 1:B:456:PHE:HD2  | 1:B:473:TYR:HD2  | 1.57                     | 0.52              |
| 1:B:109:THR:OG1  | 1:B:111:ASP:OD1  | 2.27                     | 0.52              |
| 1:C:742:ILE:O    | 1:C:1000:ARG:NH1 | 2.42                     | 0.52              |
| 1:C:994:ASP:O    | 1:C:998:THR:HG23 | 2.09                     | 0.52              |
| 1:B:983:ARG:HA   | 1:C:390:LEU:HD21 | 1.92                     | 0.52              |
| 1:A:805:ILE:HB   | 1:A:878:LEU:HD11 | 1.92                     | 0.52              |
| 1:B:568:ASP:OD1  | 1:B:572:THR:OG1  | 2.22                     | 0.52              |
| 1:B:641:ASN:HB3  | 1:B:652:GLY:H    | 1.74                     | 0.52              |
| 1:B:53:ASP:HB3   | 1:B:55:PHE:HE1   | 1.74                     | 0.52              |
| 1:C:437:ASN:OD1  | 1:C:439:ASN:ND2  | 2.43                     | 0.52              |
| 1:A:738:CYS:SG   | 1:A:739:THR:N    | 2.83                     | 0.52              |
| 1:A:985:ASP:OD1  | 1:A:987:PRO:HD2  | 2.10                     | 0.52              |
| 1:B:318:PHE:HD2  | 1:B:629:LEU:HD21 | 1.74                     | 0.52              |
| 1:B:554:LYS:NZ   | 1:B:583:GLU:OE1  | 2.42                     | 0.52              |
| 1:C:641:ASN:HB3  | 1:C:652:GLY:H    | 1.75                     | 0.52              |
| 1:C:843:ASP:O    | 1:C:845:ALA:N    | 2.43                     | 0.51              |
| 1:A:353:TRP:H    | 1:A:353:TRP:HD1  | 1.58                     | 0.51              |
| 1:A:843:ASP:O    | 1:A:845:ALA:N    | 2.43                     | 0.51              |
| 1:C:501:TYR:HB3  | 1:C:505:HIS:HB2  | 1.91                     | 0.51              |
| 1:C:808:ASP:HB3  | 1:C:811:LYS:HG2  | 1.92                     | 0.51              |
| 1:B:117:LEU:HD12 | 1:B:119:ILE:HD11 | 1.91                     | 0.51              |
| 1:B:815:ARG:HD2  | 1:B:819:GLU:HG2  | 1.92                     | 0.51              |
| 1:B:843:ASP:O    | 1:B:845:ALA:N    | 2.43                     | 0.51              |
| 1:A:523:THR:HG23 | 1:A:524:VAL:HG23 | 1.92                     | 0.51              |
| 1:A:450:ASP:OD1  | 1:A:450:ASP:N    | 2.43                     | 0.51              |

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| Atom-1            | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|-------------------|--------------------------|-------------------|
| 1:A:707:TYR:HB3   | 1:C:792:PRO:HG3   | 1.92                     | 0.51              |
| 1:A:858:LEU:HD13  | 1:A:963:VAL:HG22  | 1.92                     | 0.51              |
| 1:A:976:VAL:HB    | 1:A:979:ASP:HB3   | 1.93                     | 0.51              |
| 1:C:33:THR:HG21   | 1:C:220:PHE:CE1   | 2.44                     | 0.51              |
| 1:B:666:ILE:HD11  | 1:B:672:ALA:HB2   | 1.92                     | 0.51              |
| 1:B:1092:GLU:N    | 1:B:1092:GLU:OE2  | 2.43                     | 0.51              |
| 1:C:295:PRO:HG3   | 1:C:633:TRP:HD1   | 1.76                     | 0.51              |
| 1:C:447:GLY:HA2   | 1:C:498:ARG:HG2   | 1.93                     | 0.51              |
| 1:C:450:ASP:OD1   | 1:C:450:ASP:N     | 2.42                     | 0.51              |
| 1:C:590:CYS:HB2   | 1:C:592:PHE:CE2   | 2.46                     | 0.51              |
| 1:A:840:CYS:HB2   | 1:B:588:THR:HG23  | 1.91                     | 0.51              |
| 1:C:99:ASN:OD1    | 1:C:102:ARG:NH1   | 2.33                     | 0.51              |
| 1:A:562:PHE:HD1   | 1:A:562:PHE:H     | 1.59                     | 0.51              |
| 1:C:343:ASN:HA    | 3:C:1302:NAG:O7   | 2.11                     | 0.51              |
| 1:A:33:THR:HG21   | 1:A:220:PHE:CE2   | 2.46                     | 0.50              |
| 1:B:864:LEU:HD21  | 1:C:697:MET:HE1   | 1.92                     | 0.50              |
| 1:C:108:THR:HG22  | 1:C:109:THR:HG23  | 1.93                     | 0.50              |
| 1:C:633:TRP:HE3   | 1:C:633:TRP:H     | 1.55                     | 0.50              |
| 1:B:959:LEU:O     | 1:B:963:VAL:HG23  | 2.12                     | 0.50              |
| 1:C:44:ARG:HB3    | 1:C:47:VAL:HG11   | 1.93                     | 0.50              |
| 1:A:201:PHE:N     | 1:A:229:LEU:O     | 2.43                     | 0.50              |
| 1:A:912:THR:OG1   | 1:A:914:ASN:OD1   | 2.29                     | 0.50              |
| 1:B:102:ARG:HB3   | 1:B:120:VAL:HG23  | 1.92                     | 0.50              |
| 1:C:592:PHE:N     | 1:C:592:PHE:CD2   | 2.80                     | 0.50              |
| 1:B:60:SER:OG     | 1:B:61:ASN:N      | 2.44                     | 0.50              |
| 1:B:303:LEU:HD11  | 1:B:308:VAL:HG12  | 1.92                     | 0.50              |
| 1:B:398:ASP:HB3   | 1:B:512:VAL:HG22  | 1.93                     | 0.50              |
| 1:C:365:TYR:CD2   | 1:C:368:LEU:HD13  | 2.47                     | 0.50              |
| 1:C:985:ASP:OD2   | 1:C:987:PRO:HD2   | 2.12                     | 0.50              |
| 1:A:320:VAL:HB    | 1:A:591:SER:HB2   | 1.94                     | 0.50              |
| 1:A:808:ASP:HB3   | 1:A:811:LYS:HG2   | 1.94                     | 0.50              |
| 1:B:569:ILE:HG23  | 1:B:570:VAL:HG13  | 1.93                     | 0.50              |
| 1:C:731:MET:HG3   | 1:C:774:GLN:HE22  | 1.77                     | 0.50              |
| 1:C:83:VAL:HG11   | 1:C:237:ARG:NH1   | 2.27                     | 0.50              |
| 1:C:99:ASN:HB2    | 1:C:102:ARG:HH22  | 1.77                     | 0.50              |
| 1:A:736:VAL:HG12  | 1:A:858:LEU:HD23  | 1.95                     | 0.49              |
| 1:C:364:ASP:OD1   | 1:C:364:ASP:N     | 2.44                     | 0.49              |
| 1:C:598:ILE:HG23  | 1:C:664:ILE:HG21  | 1.93                     | 0.49              |
| 1:C:620:VAL:HG23  | 1:C:629:LEU:HD11  | 1.93                     | 0.49              |
| 1:C:1115:ILE:HG22 | 1:C:1137:VAL:HG23 | 1.93                     | 0.49              |
| 1:A:118:LEU:HG    | 1:A:120:VAL:HG12  | 1.93                     | 0.49              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 1:A:599:THR:HB   | 1:A:608:VAL:HG12  | 1.93                     | 0.49              |
| 1:A:855:PHE:HA   | 1:B:589:PRO:HG3   | 1.93                     | 0.49              |
| 1:B:439:ASN:OD1  | 1:B:507:PRO:HD2   | 2.13                     | 0.49              |
| 1:A:1084:ASP:O   | 1:A:1086:LYS:HG3  | 2.13                     | 0.49              |
| 1:B:449:TYR:HA   | 1:B:496:GLY:HA2   | 1.94                     | 0.49              |
| 1:C:37:TYR:HB3   | 1:C:223:LEU:HB2   | 1.93                     | 0.49              |
| 1:B:513:LEU:HB3  | 1:B:515:PHE:CE1   | 2.47                     | 0.49              |
| 1:B:722:VAL:HG22 | 1:B:1065:VAL:HG22 | 1.94                     | 0.49              |
| 1:C:106:PHE:HB2  | 1:C:117:LEU:HB2   | 1.95                     | 0.49              |
| 1:C:555:SER:HB3  | 1:C:584:ILE:HD12  | 1.93                     | 0.49              |
| 1:A:103:GLY:HA3  | 1:A:120:VAL:HA    | 1.94                     | 0.49              |
| 1:A:103:GLY:H    | 1:A:241:LEU:HB3   | 1.77                     | 0.49              |
| 1:A:375:PHE:HE2  | 1:A:407:VAL:HG11  | 1.77                     | 0.49              |
| 1:A:650:LEU:HD21 | 1:A:653:ALA:HB3   | 1.95                     | 0.49              |
| 1:B:86:PHE:CE2   | 1:B:90:VAL:HB     | 2.48                     | 0.49              |
| 1:B:779:GLN:NE2  | 1:B:783:ALA:HB3   | 2.27                     | 0.49              |
| 1:A:570:VAL:HG21 | 1:C:852:ALA:HB1   | 1.93                     | 0.49              |
| 1:B:438:SER:O    | 1:B:507:PRO:HB2   | 2.13                     | 0.49              |
| 1:B:447:GLY:HA2  | 1:B:498:ARG:HG2   | 1.95                     | 0.49              |
| 1:B:598:ILE:HB   | 1:B:609:ALA:HB3   | 1.94                     | 0.49              |
| 1:B:1037:SER:OG  | 1:B:1043:CYS:SG   | 2.64                     | 0.49              |
| 1:C:168:PHE:CZ   | 1:C:229:LEU:HD12  | 2.47                     | 0.49              |
| 1:A:37:TYR:OH    | 1:A:54:LEU:O      | 2.19                     | 0.49              |
| 1:B:168:PHE:HE1  | 1:B:231:ILE:HG13  | 1.78                     | 0.49              |
| 1:C:406:GLU:HA   | 1:C:409:GLN:HB3   | 1.94                     | 0.49              |
| 1:C:993:ILE:O    | 1:C:997:ILE:HG12  | 2.13                     | 0.49              |
| 1:C:1001:LEU:O   | 1:C:1005:GLN:HG2  | 2.12                     | 0.49              |
| 1:A:707:TYR:HB2  | 1:C:883:THR:HB    | 1.94                     | 0.48              |
| 1:B:411:ALA:HB3  | 1:B:414:GLN:HG3   | 1.95                     | 0.48              |
| 1:C:100:ILE:O    | 1:C:242:LEU:HD12  | 2.12                     | 0.48              |
| 1:C:410:ILE:HG23 | 1:C:425:LEU:HD11  | 1.96                     | 0.48              |
| 1:C:411:ALA:HB3  | 1:C:414:GLN:HG3   | 1.94                     | 0.48              |
| 1:A:731:MET:HG3  | 1:A:774:GLN:HE22  | 1.76                     | 0.48              |
| 1:A:498:ARG:HB2  | 1:A:501:TYR:HE1   | 1.79                     | 0.48              |
| 1:B:37:TYR:HB3   | 1:B:223:LEU:HB2   | 1.95                     | 0.48              |
| 1:B:318:PHE:CE1  | 1:B:593:GLY:HA3   | 2.48                     | 0.48              |
| 1:C:240:THR:HG21 | 1:C:265:TYR:HE1   | 1.78                     | 0.48              |
| 1:A:405:ASN:OD1  | 1:A:405:ASN:N     | 2.46                     | 0.48              |
| 1:B:350:VAL:HG22 | 1:B:422:ASN:HB3   | 1.95                     | 0.48              |
| 1:C:557:LYS:HB2  | 1:C:584:ILE:HD13  | 1.95                     | 0.48              |
| 1:B:497:PHE:CD2  | 1:B:507:PRO:HG3   | 2.49                     | 0.48              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 1:C:87:ASN:OD1   | 1:C:87:ASN:N      | 2.46                     | 0.48              |
| 1:C:292:ALA:HB1  | 1:C:632:THR:HG21  | 1.96                     | 0.48              |
| 1:A:31:SER:HA    | 1:A:216:PHE:HE2   | 1.79                     | 0.48              |
| 1:A:65:PHE:HB2   | 1:A:265:TYR:HB2   | 1.96                     | 0.48              |
| 1:A:100:ILE:C    | 1:A:101:ILE:HD13  | 2.38                     | 0.48              |
| 1:A:212:ILE:HG21 | 1:A:214:ARG:CZ    | 2.44                     | 0.48              |
| 1:A:338:PHE:HA   | 1:A:341:VAL:HG12  | 1.95                     | 0.48              |
| 1:A:905:ARG:HD2  | 1:A:1049:LEU:O    | 2.13                     | 0.48              |
| 1:B:136:CYS:C    | 1:B:138:ASP:H     | 2.22                     | 0.48              |
| 1:B:230:PRO:O    | 1:C:357:ARG:NH2   | 2.46                     | 0.48              |
| 1:A:60:SER:OG    | 1:A:61:ASN:N      | 2.47                     | 0.47              |
| 1:A:699:LEU:HD11 | 1:C:869:MET:HE3   | 1.96                     | 0.47              |
| 1:B:770:ILE:HD11 | 1:B:1012:LEU:HA   | 1.96                     | 0.47              |
| 1:B:453:TYR:CZ   | 1:B:455:LEU:HD11  | 2.48                     | 0.47              |
| 1:B:662:CYS:HB2  | 1:B:671:CYS:HB3   | 1.44                     | 0.47              |
| 1:A:883:THR:HB   | 1:B:707:TYR:HB2   | 1.96                     | 0.47              |
| 1:B:498:ARG:HB2  | 1:B:501:TYR:CZ    | 2.50                     | 0.47              |
| 1:B:883:THR:HB   | 1:C:707:TYR:HB2   | 1.96                     | 0.47              |
| 1:C:353:TRP:CD1  | 1:C:353:TRP:H     | 2.32                     | 0.47              |
| 1:A:210:ILE:O    | 1:A:212:ILE:HG22  | 2.14                     | 0.47              |
| 1:A:906:PHE:CD2  | 1:A:916:LEU:HB2   | 2.49                     | 0.47              |
| 1:B:326:ILE:HD11 | 1:B:534:VAL:HG22  | 1.95                     | 0.47              |
| 1:B:598:ILE:HG23 | 1:B:664:ILE:HG21  | 1.96                     | 0.47              |
| 1:B:99:ASN:CG    | 1:B:102:ARG:HH22  | 2.20                     | 0.47              |
| 1:C:353:TRP:CZ2  | 1:C:466:ARG:HG2   | 2.49                     | 0.47              |
| 1:A:106:PHE:HB2  | 1:A:117:LEU:HB3   | 1.97                     | 0.47              |
| 1:C:456:PHE:HB3  | 1:C:473:TYR:HB2   | 1.96                     | 0.47              |
| 1:A:188:ASN:OD1  | 1:A:188:ASN:N     | 2.47                     | 0.47              |
| 1:A:298:GLU:O    | 1:A:302:THR:HG23  | 2.15                     | 0.47              |
| 1:A:339:HIS:O    | 1:A:343:ASN:HB2   | 2.15                     | 0.47              |
| 1:B:347:PHE:CD2  | 1:B:399:SER:HB2   | 2.50                     | 0.47              |
| 1:B:456:PHE:HB2  | 1:B:491:PRO:HA    | 1.97                     | 0.47              |
| 1:B:549:THR:OG1  | 1:B:590:CYS:SG    | 2.62                     | 0.47              |
| 1:C:119:ILE:HG22 | 1:C:119:ILE:O     | 2.14                     | 0.47              |
| 1:C:178:ASP:N    | 1:C:178:ASP:OD1   | 2.48                     | 0.47              |
| 1:C:329:PHE:O    | 1:C:580:GLN:NE2   | 2.48                     | 0.47              |
| 1:C:947:LYS:HB2  | 1:C:947:LYS:HE3   | 1.72                     | 0.47              |
| 1:A:102:ARG:HA   | 1:A:102:ARG:NE    | 2.29                     | 0.47              |
| 1:A:712:ILE:HD13 | 1:A:1094:VAL:HG11 | 1.97                     | 0.47              |
| 1:C:100:ILE:C    | 1:C:101:ILE:HD13  | 2.39                     | 0.47              |
| 1:A:299:THR:O    | 1:A:303:LEU:HG    | 2.15                     | 0.47              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:A:983:ARG:HA   | 1:B:390:LEU:HD21 | 1.97                     | 0.47              |
| 1:B:752:LEU:HD23 | 1:B:993:ILE:HG22 | 1.97                     | 0.47              |
| 1:C:303:LEU:HD21 | 1:C:308:VAL:HG12 | 1.96                     | 0.47              |
| 1:C:350:VAL:HG11 | 1:C:418:ILE:HD12 | 1.96                     | 0.47              |
| 1:C:1053:PRO:O   | 1:C:1054:GLN:NE2 | 2.39                     | 0.47              |
| 1:A:632:THR:HA   | 1:A:634:ARG:HH21 | 1.80                     | 0.47              |
| 1:A:858:LEU:HD22 | 1:A:959:LEU:HD11 | 1.96                     | 0.47              |
| 1:C:303:LEU:HD12 | 1:C:303:LEU:O    | 2.14                     | 0.47              |
| 1:B:792:PRO:HG3  | 1:C:707:TYR:HB3  | 1.97                     | 0.46              |
| 1:A:305:SER:OG   | 1:A:306:PHE:N    | 2.47                     | 0.46              |
| 1:A:631:PRO:HA   | 1:A:633:TRP:CZ3  | 2.50                     | 0.46              |
| 1:B:188:ASN:OD1  | 1:B:188:ASN:N    | 2.48                     | 0.46              |
| 1:B:955:ASN:N    | 1:B:955:ASN:HD22 | 2.12                     | 0.46              |
| 1:B:37:TYR:OH    | 1:B:54:LEU:O     | 2.23                     | 0.46              |
| 1:B:108:THR:HG22 | 1:B:109:THR:HG23 | 1.97                     | 0.46              |
| 1:C:188:ASN:OD1  | 1:C:188:ASN:N    | 2.49                     | 0.46              |
| 1:C:337:PRO:HG2  | 1:C:358:ILE:HD12 | 1.97                     | 0.46              |
| 1:A:1075:PHE:HB3 | 1:A:1097:SER:O   | 2.15                     | 0.46              |
| 1:B:437:ASN:OD1  | 1:B:439:ASN:ND2  | 2.49                     | 0.46              |
| 1:B:1075:PHE:HB3 | 1:B:1097:SER:O   | 2.16                     | 0.46              |
| 1:B:398:ASP:HB3  | 1:B:512:VAL:CG2  | 2.45                     | 0.46              |
| 1:B:427:ASP:OD1  | 1:B:428:ASP:N    | 2.47                     | 0.46              |
| 1:C:113:LYS:HE2  | 1:C:113:LYS:HB3  | 1.77                     | 0.46              |
| 1:C:318:PHE:HZ   | 1:C:615:VAL:HG21 | 1.79                     | 0.46              |
| 1:A:329:PHE:O    | 1:A:580:GLN:NE2  | 2.48                     | 0.46              |
| 1:A:374:PHE:HE1  | 1:A:434:ILE:HG23 | 1.80                     | 0.46              |
| 1:B:513:LEU:HB3  | 1:B:515:PHE:HE1  | 1.81                     | 0.46              |
| 1:A:833:PHE:HB2  | 1:B:646:ARG:HB3  | 1.98                     | 0.46              |
| 1:B:629:LEU:HD22 | 1:B:631:PRO:HD2  | 1.96                     | 0.46              |
| 1:C:200:TYR:HA   | 1:C:230:PRO:HA   | 1.97                     | 0.46              |
| 1:A:99:ASN:HB2   | 1:A:102:ARG:HH22 | 1.81                     | 0.46              |
| 1:A:1093:GLY:O   | 1:C:904:TYR:OH   | 2.31                     | 0.46              |
| 1:B:126:VAL:HG11 | 1:B:175:PHE:CZ   | 2.51                     | 0.46              |
| 1:B:985:ASP:HB2  | 1:B:987:PRO:HD2  | 1.98                     | 0.46              |
| 1:C:554:LYS:NZ   | 1:C:583:GLU:OE1  | 2.45                     | 0.46              |
| 1:C:449:TYR:CD2  | 1:C:496:GLY:HA3  | 2.51                     | 0.46              |
| 1:C:609:ALA:HB2  | 1:C:692:ILE:HD12 | 1.97                     | 0.46              |
| 1:C:839:ASP:O    | 1:C:843:ASP:N    | 2.49                     | 0.46              |
| 1:A:553:THR:OG1  | 1:A:554:LYS:N    | 2.49                     | 0.45              |
| 1:A:731:MET:HG2  | 1:A:774:GLN:HE22 | 1.80                     | 0.45              |
| 1:B:617:CYS:H    | 1:B:644:GLN:NE2  | 2.14                     | 0.45              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 1:C:220:PHE:CD2  | 1:C:287:ASP:HA    | 2.51                     | 0.45              |
| 1:C:307:THR:HA   | 1:C:602:THR:HG21  | 1.98                     | 0.45              |
| 1:A:337:PRO:HG2  | 1:A:358:ILE:HD12  | 1.98                     | 0.45              |
| 1:A:381:GLY:HA3  | 1:A:430:THR:HA    | 1.98                     | 0.45              |
| 1:A:453:TYR:CZ   | 1:A:455:LEU:HD11  | 2.51                     | 0.45              |
| 1:C:96:GLU:OE2   | 1:C:101:ILE:HG12  | 2.15                     | 0.45              |
| 1:C:126:VAL:HG11 | 1:C:175:PHE:CZ    | 2.52                     | 0.45              |
| 1:C:736:VAL:CG2  | 1:C:858:LEU:HD23  | 2.46                     | 0.45              |
| 1:C:1075:PHE:HB3 | 1:C:1097:SER:O    | 2.16                     | 0.45              |
| 1:A:164:ASN:ND2  | 3:A:1304:NAG:O7   | 2.43                     | 0.45              |
| 1:A:880:GLY:O    | 1:A:884:SER:OG    | 2.29                     | 0.45              |
| 1:A:984:LEU:HB3  | 1:A:989:ALA:HB2   | 1.97                     | 0.45              |
| 1:B:1041:ASP:O   | 1:B:1041:ASP:OD2  | 2.34                     | 0.45              |
| 1:C:433:VAL:HA   | 1:C:512:VAL:HA    | 1.97                     | 0.45              |
| 1:A:37:TYR:HB3   | 1:A:223:LEU:HB2   | 1.98                     | 0.45              |
| 1:A:357:ARG:NH2  | 1:C:230:PRO:O     | 2.49                     | 0.45              |
| 1:A:606:ASN:OD1  | 1:A:606:ASN:N     | 2.47                     | 0.45              |
| 1:A:356:LYS:HE2  | 1:A:356:LYS:HB3   | 1.74                     | 0.45              |
| 1:B:299:THR:O    | 1:B:303:LEU:HG    | 2.16                     | 0.45              |
| 1:B:495:TYR:CD2  | 1:B:497:PHE:HE1   | 2.34                     | 0.45              |
| 1:B:617:CYS:HA   | 1:B:620:VAL:HG12  | 1.97                     | 0.45              |
| 1:B:773:GLU:OE1  | 1:B:1019:ARG:HB2  | 2.17                     | 0.45              |
| 1:A:1107:ARG:HD3 | 1:C:904:TYR:CE2   | 2.51                     | 0.45              |
| 1:B:25:THR:HG23  | 1:B:66:HIS:HB2    | 1.98                     | 0.45              |
| 1:B:788:ILE:HG23 | 1:B:876:ALA:HB2   | 1.98                     | 0.45              |
| 1:B:788:ILE:HD11 | 1:C:699:LEU:HB2   | 1.98                     | 0.45              |
| 1:B:1083:HIS:HB2 | 1:B:1137:VAL:HG12 | 1.98                     | 0.45              |
| 1:B:318:PHE:HZ   | 1:B:615:VAL:HG21  | 1.82                     | 0.45              |
| 1:C:528:LYS:HE2  | 1:C:528:LYS:N     | 2.31                     | 0.45              |
| 1:C:722:VAL:HG22 | 1:C:1065:VAL:HG22 | 1.99                     | 0.45              |
| 1:B:742:ILE:O    | 1:B:1000:ARG:NH1  | 2.49                     | 0.45              |
| 1:C:770:ILE:HD11 | 1:C:1012:LEU:HA   | 1.99                     | 0.45              |
| 1:A:189:LEU:HD12 | 1:A:189:LEU:HA    | 1.84                     | 0.45              |
| 1:B:231:ILE:HG22 | 1:B:233:ILE:HG23  | 1.99                     | 0.45              |
| 1:B:717:ASN:C    | 1:B:1070:ALA:HB3  | 2.42                     | 0.45              |
| 1:B:894:LEU:HB3  | 1:C:713:ALA:O     | 2.17                     | 0.45              |
| 1:C:529:LYS:HD2  | 1:C:529:LYS:C     | 2.41                     | 0.45              |
| 1:A:212:ILE:HG23 | 1:A:214:ARG:H     | 1.82                     | 0.44              |
| 1:A:220:PHE:CD1  | 1:A:287:ASP:HA    | 2.52                     | 0.44              |
| 1:A:290:ASP:OD1  | 1:A:291:CYS:N     | 2.48                     | 0.44              |
| 1:A:439:ASN:OD1  | 1:A:507:PRO:HD2   | 2.17                     | 0.44              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 1:A:554:LYS:HD2  | 1:A:554:LYS:HA    | 1.80                     | 0.44              |
| 1:B:712:ILE:HD13 | 1:B:1094:VAL:HG11 | 1.99                     | 0.44              |
| 1:B:947:LYS:HB3  | 1:B:947:LYS:HE3   | 1.73                     | 0.44              |
| 1:C:513:LEU:HB3  | 1:C:515:PHE:CE1   | 2.51                     | 0.44              |
| 1:A:902:MET:HE2  | 1:A:902:MET:HA    | 1.99                     | 0.44              |
| 1:B:393:THR:HG21 | 1:B:520:ALA:HB3   | 1.99                     | 0.44              |
| 1:C:402:ILE:HG13 | 1:C:406:GLU:HB2   | 1.99                     | 0.44              |
| 1:C:439:ASN:OD1  | 1:C:507:PRO:HD2   | 2.17                     | 0.44              |
| 1:C:1080:ALA:O   | 1:C:1132:ILE:HG13 | 2.17                     | 0.44              |
| 1:A:922:LEU:O    | 1:A:926:GLN:HG3   | 2.17                     | 0.44              |
| 1:C:168:PHE:HZ   | 1:C:229:LEU:HD12  | 1.83                     | 0.44              |
| 1:C:849:LEU:HD23 | 1:C:849:LEU:H     | 1.82                     | 0.44              |
| 1:C:1041:ASP:OD1 | 1:C:1041:ASP:O    | 2.35                     | 0.44              |
| 1:A:1073:LYS:HB2 | 1:A:1075:PHE:CZ   | 2.51                     | 0.44              |
| 1:B:100:ILE:O    | 1:B:242:LEU:HD12  | 2.17                     | 0.44              |
| 1:B:168:PHE:CE1  | 1:B:231:ILE:HG13  | 2.52                     | 0.44              |
| 1:C:124:THR:OG1  | 3:C:1301:NAG:O7   | 2.25                     | 0.44              |
| 1:C:326:ILE:HD11 | 1:C:534:VAL:HG22  | 1.99                     | 0.44              |
| 1:C:1073:LYS:HB2 | 1:C:1075:PHE:CZ   | 2.53                     | 0.44              |
| 1:C:1076:THR:HB  | 1:C:1097:SER:HB3  | 1.99                     | 0.44              |
| 1:A:86:PHE:CE2   | 1:A:90:VAL:HB     | 2.52                     | 0.44              |
| 1:A:1082:CYS:HB2 | 1:A:1132:ILE:CD1  | 2.45                     | 0.44              |
| 1:A:662:CYS:HB2  | 1:A:671:CYS:HB3   | 1.61                     | 0.44              |
| 1:A:665:PRO:HB3  | 1:C:864:LEU:HD22  | 2.00                     | 0.44              |
| 1:A:878:LEU:O    | 1:A:882:ILE:HG23  | 2.18                     | 0.44              |
| 1:B:65:PHE:HE2   | 1:B:84:LEU:HD21   | 1.82                     | 0.44              |
| 1:B:391:CYS:HA   | 1:B:525:CYS:CB    | 2.30                     | 0.44              |
| 1:B:774:GLN:CA   | 1:B:774:GLN:HE21  | 2.30                     | 0.44              |
| 1:B:1073:LYS:HB2 | 1:B:1075:PHE:CZ   | 2.52                     | 0.44              |
| 1:A:126:VAL:HG11 | 1:A:175:PHE:CZ    | 2.53                     | 0.44              |
| 1:A:369:TYR:OH   | 1:B:421:TYR:OH    | 2.22                     | 0.44              |
| 1:A:461:LEU:HD23 | 1:A:461:LEU:HA    | 1.86                     | 0.44              |
| 1:B:1071:GLN:H   | 1:B:1071:GLN:HG3  | 1.54                     | 0.44              |
| 1:A:748:GLU:H    | 1:A:748:GLU:CD    | 2.26                     | 0.44              |
| 1:A:363:ALA:O    | 1:A:526:GLY:HA2   | 2.18                     | 0.43              |
| 1:A:791:THR:HG21 | 1:A:806:LEU:CD1   | 2.48                     | 0.43              |
| 1:C:298:GLU:O    | 1:C:302:THR:HG23  | 2.18                     | 0.43              |
| 1:C:323:THR:OG1  | 1:C:324:GLU:N     | 2.50                     | 0.43              |
| 1:C:720:ILE:HD13 | 1:C:923:ILE:HG23  | 2.00                     | 0.43              |
| 1:C:749:CYS:SG   | 1:C:997:ILE:HD11  | 2.58                     | 0.43              |
| 1:A:317:ASN:ND2  | 1:C:737:ASP:OD2   | 2.51                     | 0.43              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:A:1098:ASN:OD1 | 1:A:1099:GLY:N   | 2.51                     | 0.43              |
| 1:C:102:ARG:HD3  | 1:C:121:ASN:O    | 2.18                     | 0.43              |
| 1:B:91:TYR:OH    | 1:B:191:GLU:OE2  | 2.20                     | 0.43              |
| 1:B:1082:CYS:HB2 | 1:B:1132:ILE:CD1 | 2.47                     | 0.43              |
| 1:C:378:LYS:NZ   | 1:C:380:TYR:OH   | 2.37                     | 0.43              |
| 1:A:346:ARG:NH1  | 1:A:450:ASP:OD2  | 2.51                     | 0.43              |
| 1:A:347:PHE:HD2  | 1:A:399:SER:HB2  | 1.83                     | 0.43              |
| 1:B:240:THR:HG21 | 1:B:265:TYR:CE2  | 2.52                     | 0.43              |
| 1:C:588:THR:HG22 | 1:C:589:PRO:O    | 2.17                     | 0.43              |
| 1:C:886:TRP:HB3  | 1:C:1035:GLY:HA2 | 2.01                     | 0.43              |
| 1:A:848:ASP:OD1  | 1:A:848:ASP:N    | 2.52                     | 0.43              |
| 1:A:914:ASN:HD21 | 1:A:1111:GLU:CD  | 2.27                     | 0.43              |
| 1:B:407:VAL:HA   | 1:B:410:ILE:HD12 | 1.99                     | 0.43              |
| 1:C:32:PHE:HA    | 1:C:59:PHE:CD1   | 2.53                     | 0.43              |
| 1:C:131:CYS:HB2  | 1:C:166:CYS:HB3  | 1.87                     | 0.43              |
| 1:C:732:THR:H    | 1:C:955:ASN:ND2  | 2.17                     | 0.43              |
| 1:A:326:ILE:HD11 | 1:A:534:VAL:HG22 | 2.01                     | 0.43              |
| 1:C:309:GLU:O    | 1:C:313:TYR:OH   | 2.32                     | 0.43              |
| 1:A:403:LYS:HB2  | 1:A:495:TYR:CE2  | 2.53                     | 0.43              |
| 1:A:947:LYS:HE2  | 1:A:947:LYS:HB2  | 1.75                     | 0.43              |
| 1:B:743:CYS:HB3  | 1:B:749:CYS:HB3  | 1.80                     | 0.43              |
| 1:B:773:GLU:OE1  | 1:B:1019:ARG:HD3 | 2.19                     | 0.43              |
| 1:C:347:PHE:HD2  | 1:C:399:SER:HB2  | 1.84                     | 0.43              |
| 1:A:66:HIS:HD1   | 1:A:263:ALA:N    | 2.17                     | 0.43              |
| 1:A:99:ASN:HB2   | 1:A:102:ARG:NH2  | 2.33                     | 0.43              |
| 1:A:323:THR:OG1  | 1:A:324:GLU:N    | 2.51                     | 0.43              |
| 1:B:1098:ASN:OD1 | 1:B:1099:GLY:N   | 2.52                     | 0.43              |
| 1:B:1098:ASN:CG  | 1:B:1101:HIS:H   | 2.27                     | 0.43              |
| 1:C:44:ARG:O     | 1:C:283:GLY:HA2  | 2.19                     | 0.43              |
| 1:C:168:PHE:CE1  | 1:C:231:ILE:HG13 | 2.51                     | 0.43              |
| 1:B:200:TYR:HA   | 1:B:230:PRO:HA   | 2.01                     | 0.43              |
| 1:B:731:MET:HB2  | 1:B:955:ASN:OD1  | 2.18                     | 0.43              |
| 1:B:126:VAL:HG23 | 1:B:174:PRO:HA   | 1.99                     | 0.43              |
| 1:B:403:LYS:H    | 1:B:495:TYR:HE2  | 1.67                     | 0.43              |
| 1:C:109:THR:OG1  | 1:C:111:ASP:OD1  | 2.37                     | 0.43              |
| 1:C:1098:ASN:OD1 | 1:C:1098:ASN:N   | 2.52                     | 0.43              |
| 1:A:204:TYR:CD1  | 1:A:225:PRO:HB3  | 2.54                     | 0.42              |
| 1:B:1053:PRO:O   | 1:B:1054:GLN:NE2 | 2.43                     | 0.42              |
| 1:A:411:ALA:HB3  | 1:A:414:GLN:HG3  | 2.01                     | 0.42              |
| 1:A:513:LEU:HB3  | 1:A:515:PHE:CE1  | 2.55                     | 0.42              |
| 1:B:353:TRP:H    | 1:B:353:TRP:CD1  | 2.36                     | 0.42              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 1:C:453:TYR:OH   | 1:C:455:LEU:HD21  | 2.19                     | 0.42              |
| 1:C:736:VAL:HG11 | 1:C:1004:LEU:HD11 | 2.00                     | 0.42              |
| 1:A:241:LEU:HD12 | 1:A:242:LEU:H     | 1.83                     | 0.42              |
| 1:A:1098:ASN:OD1 | 1:A:1098:ASN:N    | 2.51                     | 0.42              |
| 1:B:339:HIS:O    | 1:B:343:ASN:HB2   | 2.19                     | 0.42              |
| 1:A:34:ARG:HG2   | 1:A:216:PHE:CZ    | 2.53                     | 0.42              |
| 1:C:95:THR:HB    | 1:C:189:LEU:HD13  | 2.02                     | 0.42              |
| 1:C:553:THR:OG1  | 1:C:554:LYS:N     | 2.52                     | 0.42              |
| 1:C:749:CYS:SG   | 1:C:977:LEU:HD21  | 2.59                     | 0.42              |
| 1:A:100:ILE:O    | 1:A:242:LEU:HD12  | 2.19                     | 0.42              |
| 1:A:126:VAL:HG23 | 1:A:174:PRO:HA    | 2.01                     | 0.42              |
| 1:A:318:PHE:CZ   | 1:A:615:VAL:HG21  | 2.51                     | 0.42              |
| 1:A:497:PHE:CG   | 1:A:507:PRO:HG3   | 2.54                     | 0.42              |
| 1:A:996:LEU:HD23 | 1:A:996:LEU:HA    | 1.85                     | 0.42              |
| 1:B:347:PHE:CE1  | 1:B:509:ARG:HD3   | 2.55                     | 0.42              |
| 1:B:1030:SER:OG  | 1:C:1041:ASP:OD2  | 2.37                     | 0.42              |
| 1:C:977:LEU:HD12 | 1:C:977:LEU:HA    | 1.85                     | 0.42              |
| 1:A:391:CYS:HA   | 1:A:525:CYS:CB    | 2.31                     | 0.42              |
| 1:B:239:GLN:HG2  | 1:B:240:THR:H     | 1.85                     | 0.42              |
| 1:A:44:ARG:HB3   | 1:A:47:VAL:HG11   | 2.01                     | 0.42              |
| 1:A:350:VAL:HG22 | 1:A:422:ASN:HB3   | 2.00                     | 0.42              |
| 1:A:966:LEU:HD23 | 1:A:966:LEU:O     | 2.20                     | 0.42              |
| 1:B:740:MET:C    | 1:B:740:MET:SD    | 3.03                     | 0.42              |
| 1:B:993:ILE:O    | 1:B:997:ILE:HD12  | 2.19                     | 0.42              |
| 1:C:60:SER:OG    | 1:C:61:ASN:N      | 2.53                     | 0.42              |
| 1:C:858:LEU:HD21 | 1:C:962:LEU:HD22  | 2.01                     | 0.42              |
| 1:A:119:ILE:HD13 | 1:A:119:ILE:HA    | 1.79                     | 0.42              |
| 1:A:130:VAL:HG21 | 1:A:231:ILE:HG23  | 2.01                     | 0.42              |
| 1:A:239:GLN:HG2  | 1:A:240:THR:H     | 1.85                     | 0.42              |
| 1:A:318:PHE:CE1  | 1:A:593:GLY:HA3   | 2.54                     | 0.42              |
| 1:A:321:GLN:NE2  | 1:A:628:GLN:HA    | 2.35                     | 0.42              |
| 1:A:390:LEU:HD21 | 1:C:983:ARG:HA    | 2.02                     | 0.42              |
| 1:A:478:LYS:HE3  | 1:A:478:LYS:HB2   | 1.87                     | 0.42              |
| 1:B:317:ASN:OD1  | 1:B:317:ASN:N     | 2.52                     | 0.42              |
| 1:B:786:LYS:HA   | 1:B:786:LYS:HD3   | 1.78                     | 0.42              |
| 1:B:847:ARG:NH2  | 1:C:573:THR:O     | 2.52                     | 0.42              |
| 1:C:402:ILE:HD12 | 1:C:495:TYR:CE2   | 2.55                     | 0.42              |
| 1:C:717:ASN:C    | 1:C:1070:ALA:HB3  | 2.45                     | 0.42              |
| 1:A:402:ILE:HD12 | 1:A:495:TYR:CE2   | 2.55                     | 0.42              |
| 1:A:897:PRO:HG2  | 1:A:900:MET:SD    | 2.60                     | 0.42              |
| 1:B:127:PHE:CE1  | 1:B:129:LYS:HE3   | 2.55                     | 0.42              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:B:323:THR:OG1  | 1:B:324:GLU:N    | 2.51                     | 0.42              |
| 1:B:804:GLN:NE2  | 1:B:935:GLN:OE1  | 2.52                     | 0.42              |
| 1:B:866:THR:OG1  | 1:B:869:MET:HG2  | 2.20                     | 0.42              |
| 1:C:363:ALA:O    | 1:C:526:GLY:HA2  | 2.20                     | 0.42              |
| 1:A:317:ASN:HA   | 1:A:594:GLY:HA2  | 2.00                     | 0.42              |
| 1:A:717:ASN:C    | 1:A:1070:ALA:HB3 | 2.45                     | 0.42              |
| 1:B:718:PHE:HZ   | 1:B:923:ILE:HG12 | 1.84                     | 0.42              |
| 1:C:65:PHE:HB2   | 1:C:265:TYR:CB   | 2.50                     | 0.42              |
| 1:A:568:ASP:CG   | 1:A:569:ILE:N    | 2.78                     | 0.41              |
| 1:B:44:ARG:HB3   | 1:B:47:VAL:HG11  | 2.01                     | 0.41              |
| 1:B:811:LYS:HE3  | 1:B:811:LYS:CA   | 2.47                     | 0.41              |
| 1:C:378:LYS:HD3  | 1:C:380:TYR:CE1  | 2.54                     | 0.41              |
| 1:C:560:LEU:O    | 1:C:577:ARG:NH2  | 2.53                     | 0.41              |
| 1:C:960:ASN:HA   | 1:C:963:VAL:HG22 | 2.01                     | 0.41              |
| 1:A:837:TYR:OH   | 1:B:589:PRO:O    | 2.38                     | 0.41              |
| 1:B:119:ILE:HG22 | 1:B:119:ILE:O    | 2.20                     | 0.41              |
| 1:B:419:ALA:HA   | 1:B:423:TYR:O    | 2.20                     | 0.41              |
| 1:B:718:PHE:CZ   | 1:B:923:ILE:HG12 | 2.56                     | 0.41              |
| 1:C:37:TYR:OH    | 1:C:54:LEU:O     | 2.22                     | 0.41              |
| 1:A:1098:ASN:CG  | 1:A:1101:HIS:H   | 2.27                     | 0.41              |
| 1:B:44:ARG:O     | 1:B:283:GLY:HA2  | 2.21                     | 0.41              |
| 1:B:87:ASN:OD1   | 1:B:87:ASN:N     | 2.52                     | 0.41              |
| 1:B:372:ALA:HB3  | 1:B:374:PHE:CE1  | 2.56                     | 0.41              |
| 1:C:498:ARG:HB2  | 1:C:501:TYR:CZ   | 2.55                     | 0.41              |
| 1:C:541:PHE:CE2  | 1:C:587:ILE:HD12 | 2.55                     | 0.41              |
| 1:C:568:ASP:OD2  | 1:C:570:VAL:HG22 | 2.20                     | 0.41              |
| 1:B:177:MET:HB3  | 1:B:207:HIS:ND1  | 2.35                     | 0.41              |
| 1:B:372:ALA:HB3  | 1:B:374:PHE:HE1  | 1.85                     | 0.41              |
| 1:C:124:THR:O    | 1:C:174:PRO:HD3  | 2.20                     | 0.41              |
| 1:C:1037:SER:OG  | 1:C:1043:CYS:SG  | 2.61                     | 0.41              |
| 1:C:1071:GLN:H   | 1:C:1071:GLN:HG3 | 1.52                     | 0.41              |
| 1:A:858:LEU:CD1  | 1:A:963:VAL:HG22 | 2.50                     | 0.41              |
| 1:B:265:TYR:O    | 1:B:267:VAL:HG23 | 2.20                     | 0.41              |
| 1:B:1001:LEU:O   | 1:B:1005:GLN:HG2 | 2.20                     | 0.41              |
| 1:C:417:ASN:ND2  | 1:C:455:LEU:HD23 | 2.36                     | 0.41              |
| 1:A:230:PRO:HD2  | 1:B:357:ARG:HH21 | 1.84                     | 0.41              |
| 1:A:791:THR:HG22 | 1:A:879:ALA:HB2  | 2.03                     | 0.41              |
| 1:B:339:HIS:NE2  | 1:B:343:ASN:OD1  | 2.54                     | 0.41              |
| 1:B:878:LEU:O    | 1:B:882:ILE:HG23 | 2.21                     | 0.41              |
| 1:C:403:LYS:HB2  | 1:C:495:TYR:CE2  | 2.55                     | 0.41              |
| 1:C:557:LYS:HD2  | 1:C:559:PHE:HE1  | 1.86                     | 0.41              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:A:108:THR:HG22 | 1:A:109:THR:HG23 | 2.02                     | 0.41              |
| 1:A:131:CYS:HB3  | 1:A:133:PHE:CE1  | 2.56                     | 0.41              |
| 1:A:866:THR:HG23 | 1:A:868:GLU:H    | 1.86                     | 0.41              |
| 1:B:131:CYS:HB2  | 1:B:166:CYS:HB3  | 1.96                     | 0.41              |
| 1:B:309:GLU:O    | 1:B:313:TYR:OH   | 2.24                     | 0.41              |
| 1:B:624:ILE:HG23 | 1:B:634:ARG:HD2  | 2.01                     | 0.41              |
| 1:C:86:PHE:CE2   | 1:C:90:VAL:HB    | 2.55                     | 0.41              |
| 1:C:188:ASN:HA   | 1:C:209:PRO:HA   | 2.03                     | 0.41              |
| 1:C:813:SER:OG   | 1:C:815:ARG:NE   | 2.40                     | 0.41              |
| 1:A:1073:LYS:HE2 | 1:A:1075:PHE:CE1 | 2.56                     | 0.41              |
| 1:B:42:VAL:HG12  | 1:C:565:PHE:HB2  | 2.02                     | 0.41              |
| 1:B:96:GLU:OE2   | 1:B:101:ILE:HD12 | 2.21                     | 0.41              |
| 1:B:108:THR:C    | 1:B:110:LEU:H    | 2.29                     | 0.41              |
| 1:B:403:LYS:HB2  | 1:B:495:TYR:CE2  | 2.56                     | 0.41              |
| 1:B:631:PRO:HB3  | 1:B:633:TRP:CZ3  | 2.54                     | 0.41              |
| 1:B:737:ASP:OD2  | 1:C:317:ASN:ND2  | 2.53                     | 0.41              |
| 1:C:336:CYS:HB2  | 1:C:338:PHE:CE2  | 2.55                     | 0.41              |
| 1:C:403:LYS:HB3  | 1:C:406:GLU:OE1  | 2.21                     | 0.41              |
| 1:C:878:LEU:O    | 1:C:882:ILE:HG23 | 2.21                     | 0.41              |
| 1:C:959:LEU:O    | 1:C:963:VAL:HG13 | 2.21                     | 0.41              |
| 1:A:321:GLN:HE21 | 1:A:628:GLN:HA   | 1.86                     | 0.41              |
| 1:A:347:PHE:CE1  | 1:A:509:ARG:HD3  | 2.56                     | 0.41              |
| 1:A:633:TRP:H    | 1:A:633:TRP:HE3  | 1.67                     | 0.41              |
| 1:B:43:PHE:CE2   | 1:C:557:LYS:HD3  | 2.56                     | 0.41              |
| 1:B:296:LEU:HB3  | 1:B:608:VAL:HG11 | 2.03                     | 0.41              |
| 1:B:591:SER:O    | 1:B:592:PHE:C    | 2.64                     | 0.41              |
| 1:B:708:SER:OG   | 1:B:709:ASN:N    | 2.53                     | 0.41              |
| 1:B:839:ASP:O    | 1:B:843:ASP:N    | 2.54                     | 0.41              |
| 1:B:905:ARG:HD2  | 1:B:1049:LEU:O   | 2.21                     | 0.41              |
| 1:B:1072:GLU:N   | 1:B:1072:GLU:OE1 | 2.54                     | 0.41              |
| 1:B:1098:ASN:OD1 | 1:B:1098:ASN:N   | 2.50                     | 0.41              |
| 1:C:30:ASN:HB3   | 1:C:32:PHE:CE2   | 2.56                     | 0.41              |
| 1:C:461:LEU:HD23 | 1:C:461:LEU:HA   | 1.85                     | 0.41              |
| 1:C:497:PHE:HA   | 1:C:501:TYR:HE2  | 1.86                     | 0.41              |
| 1:A:743:CYS:HB3  | 1:A:749:CYS:HB3  | 1.84                     | 0.41              |
| 1:A:1072:GLU:OE1 | 1:A:1072:GLU:N   | 2.54                     | 0.41              |
| 1:B:34:ARG:NH1   | 1:B:217:PRO:HG2  | 2.36                     | 0.41              |
| 1:B:305:SER:OG   | 1:B:306:PHE:N    | 2.54                     | 0.41              |
| 1:B:637:SER:O    | 1:B:637:SER:OG   | 2.37                     | 0.41              |
| 1:C:372:ALA:HB3  | 1:C:374:PHE:HE1  | 1.86                     | 0.41              |
| 1:C:1098:ASN:OD1 | 1:C:1099:GLY:N   | 2.54                     | 0.41              |

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| Atom-1            | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|-------------------|--------------------------|-------------------|
| 1:C:1098:ASN:CG   | 1:C:1101:HIS:H    | 2.29                     | 0.41              |
| 1:C:1139:ASP:HA   | 1:C:1140:PRO:HD3  | 1.94                     | 0.41              |
| 1:A:393:THR:OG1   | 1:A:516:GLU:OE1   | 2.31                     | 0.40              |
| 1:A:528:LYS:N     | 1:A:528:LYS:HD2   | 2.37                     | 0.40              |
| 1:C:164:ASN:CG    | 1:C:165:ASN:H     | 2.29                     | 0.40              |
| 1:A:200:TYR:HA    | 1:A:230:PRO:HA    | 2.03                     | 0.40              |
| 1:A:364:ASP:O     | 1:A:367:VAL:HG22  | 2.21                     | 0.40              |
| 1:A:914:ASN:ND2   | 1:A:1111:GLU:OE2  | 2.50                     | 0.40              |
| 1:B:241:LEU:HD12  | 1:B:242:LEU:H     | 1.87                     | 0.40              |
| 1:A:300:LYS:HG3   | 1:A:305:SER:O     | 2.21                     | 0.40              |
| 1:A:667:GLY:HA2   | 1:C:864:LEU:HA    | 2.03                     | 0.40              |
| 1:A:1129:VAL:HG12 | 1:C:917:TYR:HB3   | 2.02                     | 0.40              |
| 1:B:314:GLN:NE2   | 1:B:613:GLN:HE22  | 2.20                     | 0.40              |
| 1:B:417:ASN:OD1   | 1:B:418:ILE:HG12  | 2.21                     | 0.40              |
| 1:B:501:TYR:HB3   | 1:B:505:HIS:HB2   | 2.03                     | 0.40              |
| 1:C:382:VAL:HG21  | 1:C:387:LEU:HD21  | 2.04                     | 0.40              |
| 1:C:478:LYS:HE3   | 1:C:478:LYS:HB2   | 1.88                     | 0.40              |
| 1:C:637:SER:O     | 1:C:637:SER:OG    | 2.37                     | 0.40              |
| 1:C:996:LEU:HD23  | 1:C:996:LEU:HA    | 1.88                     | 0.40              |
| 1:A:109:THR:HG1   | 1:A:111:ASP:CG    | 2.26                     | 0.40              |
| 1:A:1029:MET:HE2  | 1:A:1029:MET:HB2  | 1.98                     | 0.40              |
| 1:B:666:ILE:HB    | 1:B:670:ILE:O     | 2.21                     | 0.40              |
| 1:C:201:PHE:HB2   | 1:C:231:ILE:HD13  | 2.02                     | 0.40              |
| 1:C:229:LEU:H     | 1:C:229:LEU:HD23  | 1.85                     | 0.40              |
| 1:C:290:ASP:OD1   | 1:C:291:CYS:N     | 2.48                     | 0.40              |
| 1:C:490:PHE:CG    | 1:C:491:PRO:HD2   | 2.56                     | 0.40              |
| 1:C:1091:ARG:HB3  | 1:C:1092:GLU:OE2  | 2.21                     | 0.40              |
| 1:A:722:VAL:HG22  | 1:A:1065:VAL:HG22 | 2.03                     | 0.40              |
| 1:A:857:GLY:HA2   | 1:B:592:PHE:CE2   | 2.55                     | 0.40              |
| 1:A:917:TYR:O     | 1:B:1129:VAL:HG12 | 2.22                     | 0.40              |
| 1:B:360:ASN:O     | 1:B:360:ASN:ND2   | 2.54                     | 0.40              |
| 1:B:406:GLU:OE1   | 1:B:406:GLU:N     | 2.48                     | 0.40              |
| 1:B:1029:MET:HE2  | 1:B:1029:MET:HB2  | 1.96                     | 0.40              |
| 1:C:108:THR:C     | 1:C:110:LEU:H     | 2.28                     | 0.40              |
| 1:C:195:LYS:HE2   | 1:C:204:TYR:HE1   | 1.85                     | 0.40              |
| 1:C:906:PHE:HE1   | 1:C:1049:LEU:HD11 | 1.86                     | 0.40              |

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed        | Favoured   | Allowed  | Outliers | Percentiles |    |
|-----|-------|-----------------|------------|----------|----------|-------------|----|
| 1   | A     | 1053/1206 (87%) | 972 (92%)  | 80 (8%)  | 1 (0%)   | 48          | 79 |
| 1   | B     | 1053/1206 (87%) | 975 (93%)  | 76 (7%)  | 2 (0%)   | 44          | 73 |
| 1   | C     | 1053/1206 (87%) | 975 (93%)  | 77 (7%)  | 1 (0%)   | 48          | 79 |
| All | All   | 3159/3618 (87%) | 2922 (92%) | 233 (7%) | 4 (0%)   | 50          | 79 |

All (4) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | A     | 212 | ILE  |
| 1   | C     | 212 | ILE  |
| 1   | B     | 212 | ILE  |
| 1   | B     | 216 | PHE  |

### 5.3.2 Protein sidechains

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed        | Rotameric   | Outliers | Percentiles |    |
|-----|-------|-----------------|-------------|----------|-------------|----|
| 1   | A     | 925/1054 (88%)  | 921 (100%)  | 4 (0%)   | 89          | 93 |
| 1   | B     | 925/1054 (88%)  | 921 (100%)  | 4 (0%)   | 89          | 93 |
| 1   | C     | 925/1054 (88%)  | 922 (100%)  | 3 (0%)   | 91          | 94 |
| All | All   | 2775/3162 (88%) | 2764 (100%) | 11 (0%)  | 88          | 93 |

All (11) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | A     | 90  | VAL  |
| 1   | A     | 343 | ASN  |
| 1   | A     | 390 | LEU  |
| 1   | A     | 511 | VAL  |
| 1   | B     | 343 | ASN  |
| 1   | B     | 571 | ASP  |
| 1   | B     | 692 | ILE  |
| 1   | B     | 774 | GLN  |
| 1   | C     | 343 | ASN  |
| 1   | C     | 346 | ARG  |
| 1   | C     | 441 | LEU  |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (33) such sidechains are listed below:

| Mol | Chain | Res  | Type |
|-----|-------|------|------|
| 1   | A     | 185  | ASN  |
| 1   | A     | 271  | GLN  |
| 1   | A     | 388  | ASN  |
| 1   | A     | 505  | HIS  |
| 1   | A     | 644  | GLN  |
| 1   | A     | 784  | GLN  |
| 1   | A     | 955  | ASN  |
| 1   | A     | 960  | ASN  |
| 1   | A     | 965  | GLN  |
| 1   | A     | 1005 | GLN  |
| 1   | B     | 137  | ASN  |
| 1   | B     | 185  | ASN  |
| 1   | B     | 271  | GLN  |
| 1   | B     | 321  | GLN  |
| 1   | B     | 388  | ASN  |
| 1   | B     | 487  | ASN  |
| 1   | B     | 607  | GLN  |
| 1   | B     | 613  | GLN  |
| 1   | B     | 784  | GLN  |
| 1   | B     | 957  | GLN  |
| 1   | B     | 1002 | GLN  |
| 1   | C     | 185  | ASN  |
| 1   | C     | 271  | GLN  |
| 1   | C     | 321  | GLN  |
| 1   | C     | 388  | ASN  |
| 1   | C     | 439  | ASN  |
| 1   | C     | 607  | GLN  |
| 1   | C     | 777  | ASN  |

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| Mol | Chain | Res  | Type |
|-----|-------|------|------|
| 1   | C     | 955  | ASN  |
| 1   | C     | 957  | GLN  |
| 1   | C     | 965  | GLN  |
| 1   | C     | 1005 | GLN  |
| 1   | C     | 1011 | GLN  |

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates ⓘ

30 monosaccharides are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Type | Chain | Res | Link | Bond lengths |      |             | Bond angles |      |             |
|-----|------|-------|-----|------|--------------|------|-------------|-------------|------|-------------|
|     |      |       |     |      | Counts       | RMSZ | $\# Z  > 2$ | Counts      | RMSZ | $\# Z  > 2$ |
| 2   | NAG  | D     | 1   | 2,1  | 14,14,15     | 0.25 | 0           | 17,19,21    | 0.40 | 0           |
| 2   | BMA  | D     | 2   | 2    | 11,11,12     | 0.63 | 0           | 15,15,17    | 0.72 | 0           |
| 2   | NAG  | E     | 1   | 2,1  | 14,14,15     | 0.20 | 0           | 17,19,21    | 0.43 | 0           |
| 2   | BMA  | E     | 2   | 2    | 11,11,12     | 0.64 | 0           | 15,15,17    | 0.77 | 0           |
| 2   | NAG  | F     | 1   | 2,1  | 14,14,15     | 0.26 | 0           | 17,19,21    | 0.45 | 0           |
| 2   | BMA  | F     | 2   | 2    | 11,11,12     | 0.60 | 0           | 15,15,17    | 0.81 | 0           |
| 2   | NAG  | G     | 1   | 2,1  | 14,14,15     | 0.23 | 0           | 17,19,21    | 0.41 | 0           |
| 2   | BMA  | G     | 2   | 2    | 11,11,12     | 0.59 | 0           | 15,15,17    | 0.68 | 0           |
| 2   | NAG  | H     | 1   | 2,1  | 14,14,15     | 1.17 | 1 (7%)      | 17,19,21    | 1.06 | 1 (5%)      |
| 2   | BMA  | H     | 2   | 2    | 11,11,12     | 0.57 | 0           | 15,15,17    | 1.23 | 2 (13%)     |
| 2   | NAG  | I     | 1   | 2,1  | 14,14,15     | 0.25 | 0           | 17,19,21    | 0.40 | 0           |
| 2   | BMA  | I     | 2   | 2    | 11,11,12     | 0.61 | 0           | 15,15,17    | 0.71 | 0           |
| 2   | NAG  | J     | 1   | 2,1  | 14,14,15     | 0.21 | 0           | 17,19,21    | 0.43 | 0           |

| Mol | Type | Chain | Res | Link | Bond lengths |      |          | Bond angles |      |          |
|-----|------|-------|-----|------|--------------|------|----------|-------------|------|----------|
|     |      |       |     |      | Counts       | RMSZ | # Z  > 2 | Counts      | RMSZ | # Z  > 2 |
| 2   | BMA  | J     | 2   | 2    | 11,11,12     | 0.64 | 0        | 15,15,17    | 0.78 | 0        |
| 2   | NAG  | K     | 1   | 2,1  | 14,14,15     | 0.26 | 0        | 17,19,21    | 0.45 | 0        |
| 2   | BMA  | K     | 2   | 2    | 11,11,12     | 0.61 | 0        | 15,15,17    | 0.82 | 0        |
| 2   | NAG  | L     | 1   | 2,1  | 14,14,15     | 0.20 | 0        | 17,19,21    | 0.40 | 0        |
| 2   | BMA  | L     | 2   | 2    | 11,11,12     | 0.58 | 0        | 15,15,17    | 0.68 | 0        |
| 2   | NAG  | M     | 1   | 2,1  | 14,14,15     | 1.16 | 1 (7%)   | 17,19,21    | 1.07 | 1 (5%)   |
| 2   | BMA  | M     | 2   | 2    | 11,11,12     | 0.57 | 0        | 15,15,17    | 1.21 | 1 (6%)   |
| 2   | NAG  | N     | 1   | 2,1  | 14,14,15     | 0.24 | 0        | 17,19,21    | 0.41 | 0        |
| 2   | BMA  | N     | 2   | 2    | 11,11,12     | 0.61 | 0        | 15,15,17    | 0.71 | 0        |
| 2   | NAG  | O     | 1   | 2,1  | 14,14,15     | 0.20 | 0        | 17,19,21    | 0.42 | 0        |
| 2   | BMA  | O     | 2   | 2    | 11,11,12     | 0.63 | 0        | 15,15,17    | 0.78 | 0        |
| 2   | NAG  | P     | 1   | 2,1  | 14,14,15     | 0.27 | 0        | 17,19,21    | 0.45 | 0        |
| 2   | BMA  | P     | 2   | 2    | 11,11,12     | 0.60 | 0        | 15,15,17    | 0.81 | 0        |
| 2   | NAG  | Q     | 1   | 2,1  | 14,14,15     | 0.21 | 0        | 17,19,21    | 0.40 | 0        |
| 2   | BMA  | Q     | 2   | 2    | 11,11,12     | 0.58 | 0        | 15,15,17    | 0.67 | 0        |
| 2   | NAG  | R     | 1   | 2,1  | 14,14,15     | 1.21 | 1 (7%)   | 17,19,21    | 1.11 | 1 (5%)   |
| 2   | BMA  | R     | 2   | 2    | 11,11,12     | 0.59 | 0        | 15,15,17    | 1.25 | 3 (20%)  |

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

| Mol | Type | Chain | Res | Link | Chirals | Torsions  | Rings   |
|-----|------|-------|-----|------|---------|-----------|---------|
| 2   | NAG  | D     | 1   | 2,1  | -       | 2/6/23/26 | 0/1/1/1 |
| 2   | BMA  | D     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |
| 2   | NAG  | E     | 1   | 2,1  | -       | 2/6/23/26 | 0/1/1/1 |
| 2   | BMA  | E     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |
| 2   | NAG  | F     | 1   | 2,1  | -       | 2/6/23/26 | 0/1/1/1 |
| 2   | BMA  | F     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |
| 2   | NAG  | G     | 1   | 2,1  | -       | 1/6/23/26 | 0/1/1/1 |
| 2   | BMA  | G     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |
| 2   | NAG  | H     | 1   | 2,1  | -       | 2/6/23/26 | 0/1/1/1 |
| 2   | BMA  | H     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |
| 2   | NAG  | I     | 1   | 2,1  | -       | 2/6/23/26 | 0/1/1/1 |
| 2   | BMA  | I     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |
| 2   | NAG  | J     | 1   | 2,1  | -       | 2/6/23/26 | 0/1/1/1 |
| 2   | BMA  | J     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |
| 2   | NAG  | K     | 1   | 2,1  | -       | 2/6/23/26 | 0/1/1/1 |
| 2   | BMA  | K     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |

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| Mol | Type | Chain | Res | Link | Chirals | Torsions  | Rings   |
|-----|------|-------|-----|------|---------|-----------|---------|
| 2   | NAG  | L     | 1   | 2,1  | -       | 1/6/23/26 | 0/1/1/1 |
| 2   | BMA  | L     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |
| 2   | NAG  | M     | 1   | 2,1  | -       | 2/6/23/26 | 0/1/1/1 |
| 2   | BMA  | M     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |
| 2   | NAG  | N     | 1   | 2,1  | -       | 2/6/23/26 | 0/1/1/1 |
| 2   | BMA  | N     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |
| 2   | NAG  | O     | 1   | 2,1  | -       | 2/6/23/26 | 0/1/1/1 |
| 2   | BMA  | O     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |
| 2   | NAG  | P     | 1   | 2,1  | -       | 2/6/23/26 | 0/1/1/1 |
| 2   | BMA  | P     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |
| 2   | NAG  | Q     | 1   | 2,1  | -       | 1/6/23/26 | 0/1/1/1 |
| 2   | BMA  | Q     | 2   | 2    | -       | 0/2/19/22 | 0/1/1/1 |
| 2   | NAG  | R     | 1   | 2,1  | -       | 2/6/23/26 | 0/1/1/1 |
| 2   | BMA  | R     | 2   | 2    | -       | 1/2/19/22 | 0/1/1/1 |

All (3) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z     | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|-------|-------------|----------|
| 2   | R     | 1   | NAG  | O5-C1 | -4.19 | 1.37        | 1.43     |
| 2   | H     | 1   | NAG  | O5-C1 | -4.04 | 1.37        | 1.43     |
| 2   | M     | 1   | NAG  | O5-C1 | -4.02 | 1.37        | 1.43     |

All (9) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms    | Z    | Observed(°) | Ideal(°) |
|-----|-------|-----|------|----------|------|-------------|----------|
| 2   | R     | 1   | NAG  | C3-C4-C5 | 3.13 | 115.81      | 110.24   |
| 2   | H     | 1   | NAG  | C3-C4-C5 | 2.95 | 115.50      | 110.24   |
| 2   | M     | 1   | NAG  | C3-C4-C5 | 2.94 | 115.48      | 110.24   |
| 2   | R     | 2   | BMA  | C1-O5-C5 | 2.81 | 116.00      | 112.19   |
| 2   | H     | 2   | BMA  | C1-O5-C5 | 2.73 | 115.89      | 112.19   |
| 2   | M     | 2   | BMA  | C1-O5-C5 | 2.73 | 115.89      | 112.19   |
| 2   | H     | 2   | BMA  | O5-C1-C2 | 2.02 | 113.89      | 110.77   |
| 2   | R     | 2   | BMA  | C1-C2-C3 | 2.01 | 112.14      | 109.67   |
| 2   | R     | 2   | BMA  | O5-C1-C2 | 2.00 | 113.86      | 110.77   |

There are no chirality outliers.

All (28) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms       |
|-----|-------|-----|------|-------------|
| 2   | R     | 1   | NAG  | O5-C5-C6-O6 |

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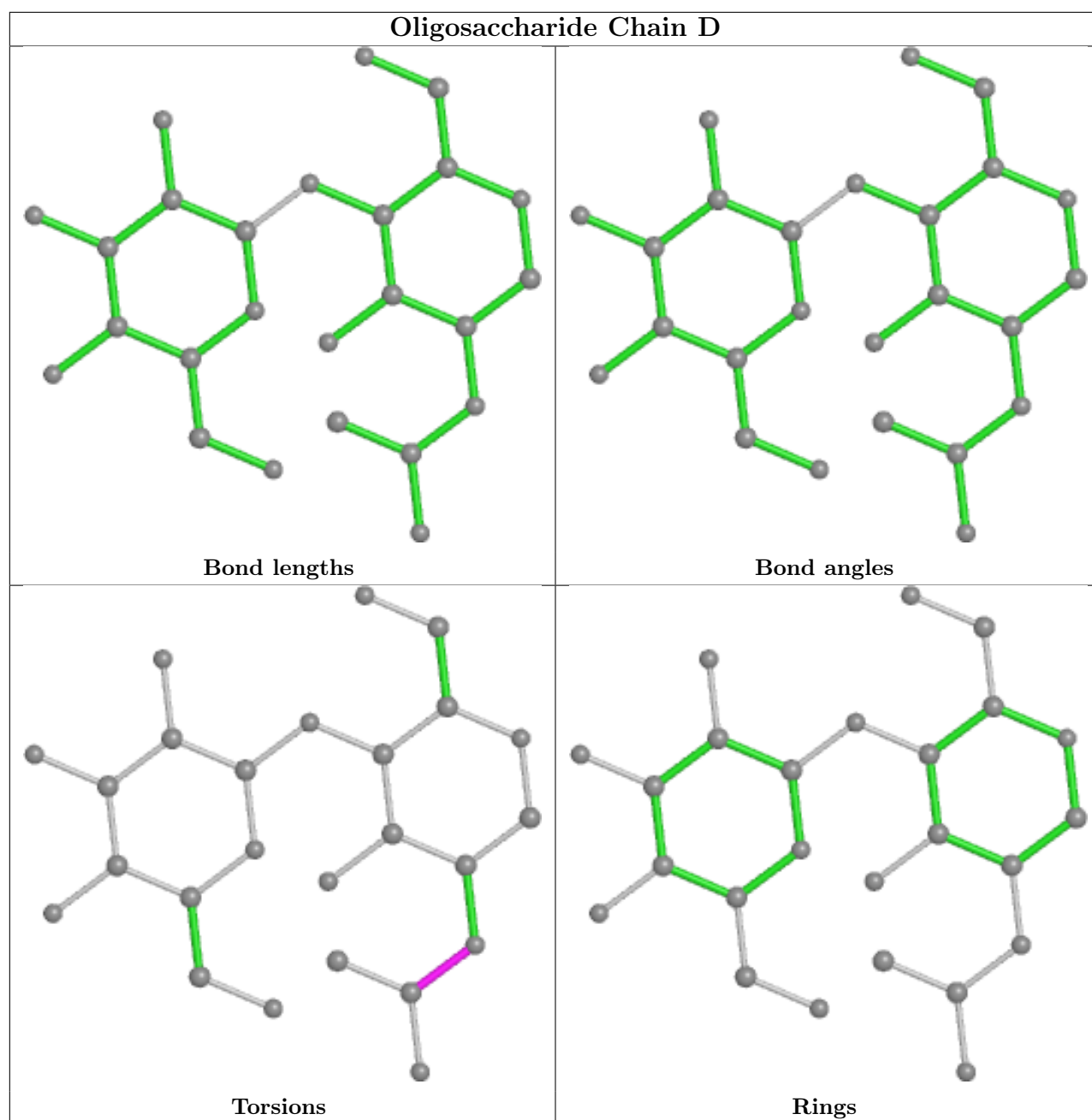
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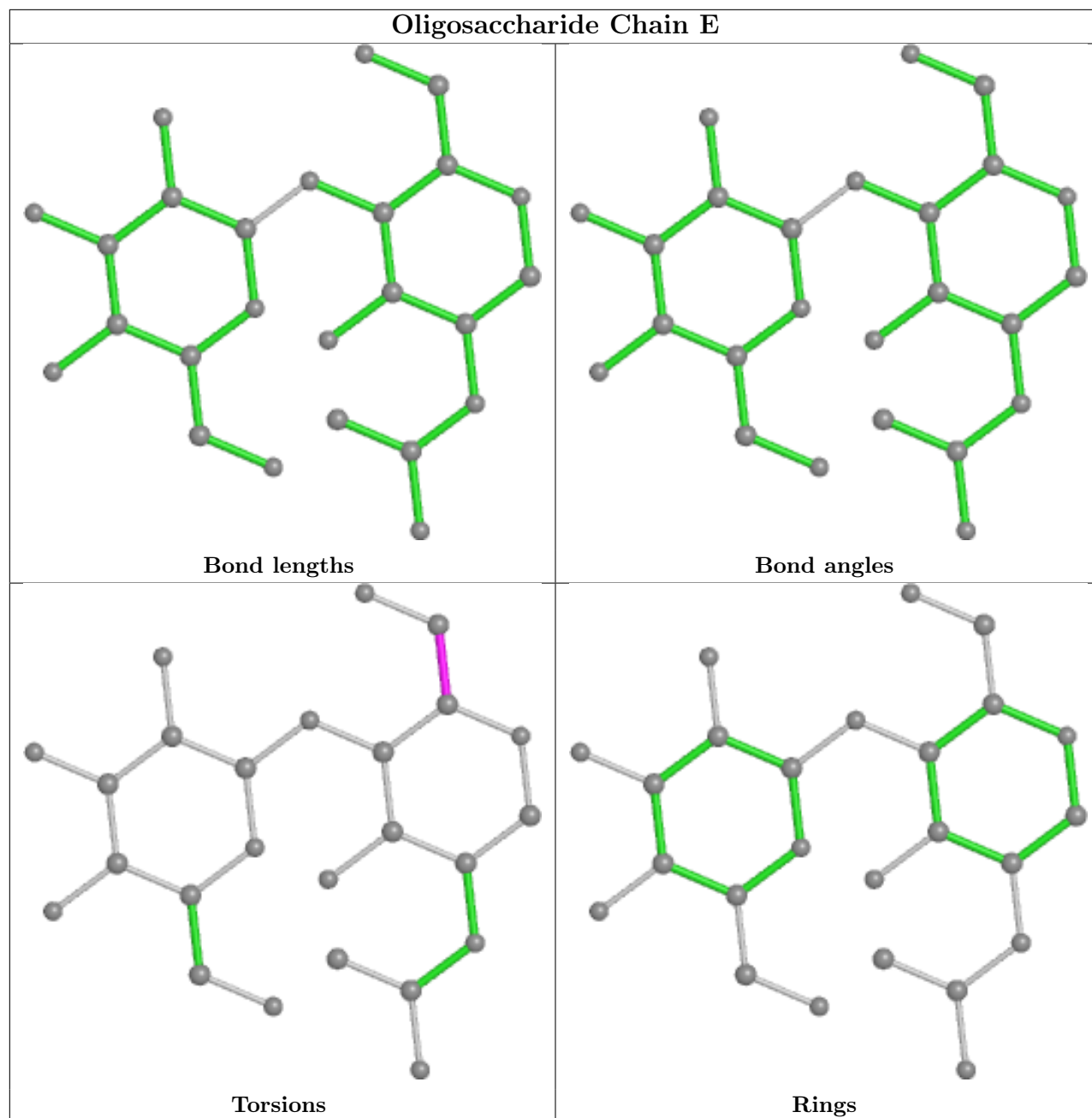
| Mol | Chain | Res | Type | Atoms       |
|-----|-------|-----|------|-------------|
| 2   | H     | 1   | NAG  | O5-C5-C6-O6 |
| 2   | M     | 1   | NAG  | O5-C5-C6-O6 |
| 2   | F     | 1   | NAG  | O5-C5-C6-O6 |
| 2   | K     | 1   | NAG  | O5-C5-C6-O6 |
| 2   | P     | 1   | NAG  | O5-C5-C6-O6 |
| 2   | K     | 1   | NAG  | C4-C5-C6-O6 |
| 2   | F     | 1   | NAG  | C4-C5-C6-O6 |
| 2   | H     | 1   | NAG  | C4-C5-C6-O6 |
| 2   | M     | 1   | NAG  | C4-C5-C6-O6 |
| 2   | R     | 1   | NAG  | C4-C5-C6-O6 |
| 2   | D     | 1   | NAG  | C8-C7-N2-C2 |
| 2   | D     | 1   | NAG  | O7-C7-N2-C2 |
| 2   | I     | 1   | NAG  | C8-C7-N2-C2 |
| 2   | I     | 1   | NAG  | O7-C7-N2-C2 |
| 2   | N     | 1   | NAG  | C8-C7-N2-C2 |
| 2   | N     | 1   | NAG  | O7-C7-N2-C2 |
| 2   | P     | 1   | NAG  | C4-C5-C6-O6 |
| 2   | J     | 1   | NAG  | O5-C5-C6-O6 |
| 2   | E     | 1   | NAG  | O5-C5-C6-O6 |
| 2   | O     | 1   | NAG  | O5-C5-C6-O6 |
| 2   | J     | 1   | NAG  | C4-C5-C6-O6 |
| 2   | O     | 1   | NAG  | C4-C5-C6-O6 |
| 2   | E     | 1   | NAG  | C4-C5-C6-O6 |
| 2   | L     | 1   | NAG  | O5-C5-C6-O6 |
| 2   | G     | 1   | NAG  | O5-C5-C6-O6 |
| 2   | R     | 2   | BMA  | O5-C5-C6-O6 |
| 2   | Q     | 1   | NAG  | O5-C5-C6-O6 |

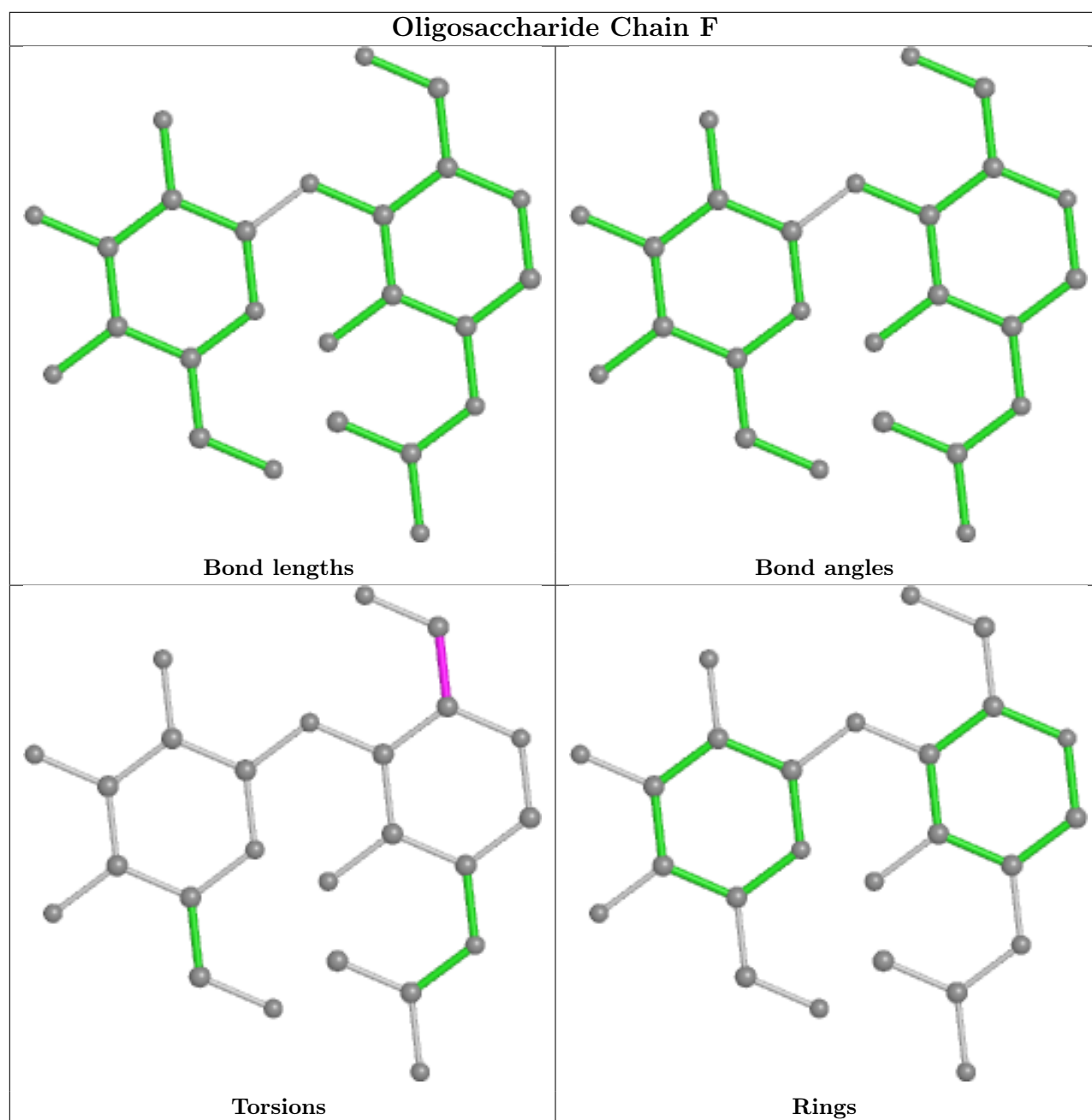
There are no ring outliers.

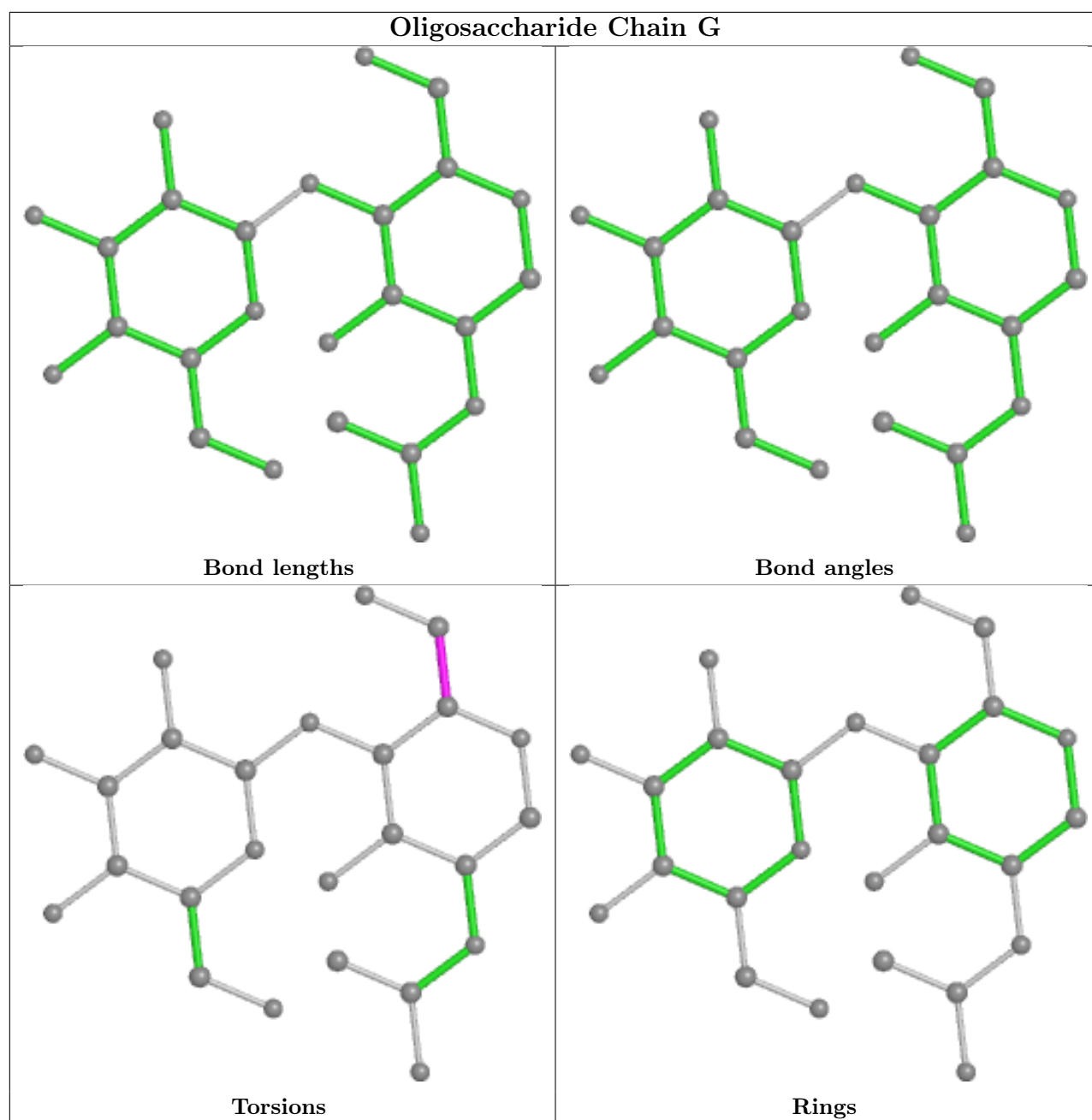
No monomer is involved in short contacts.

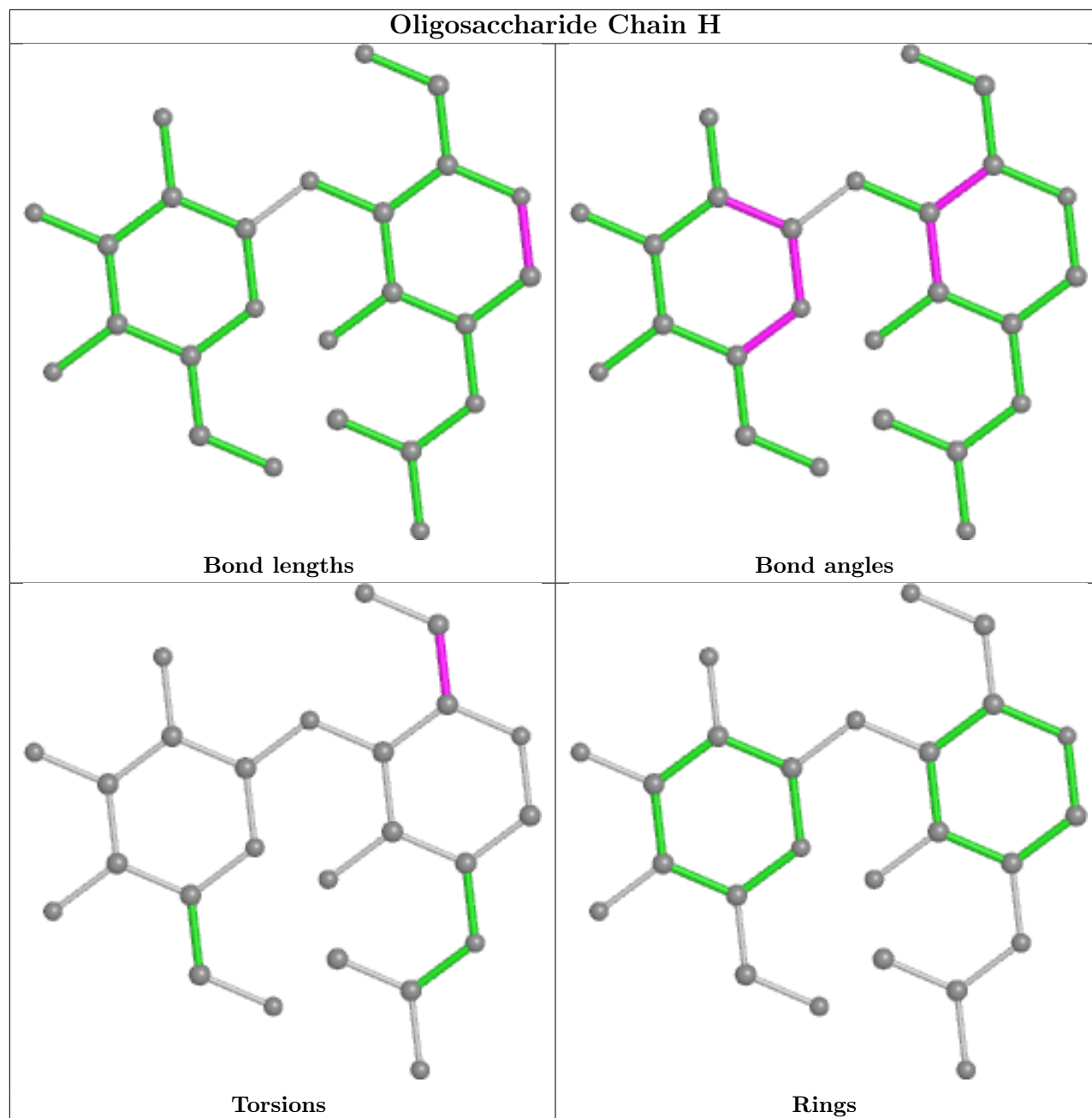
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

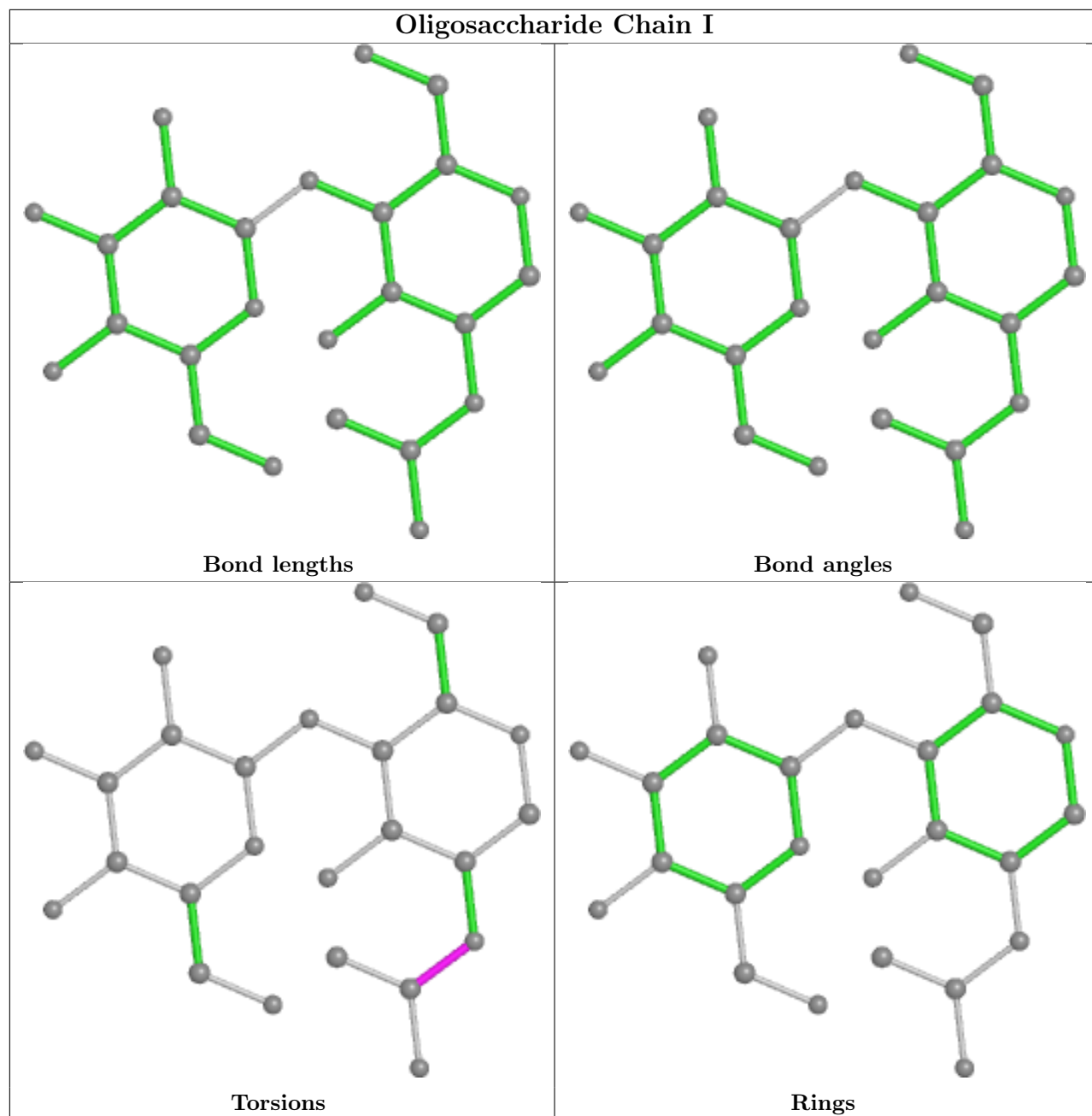


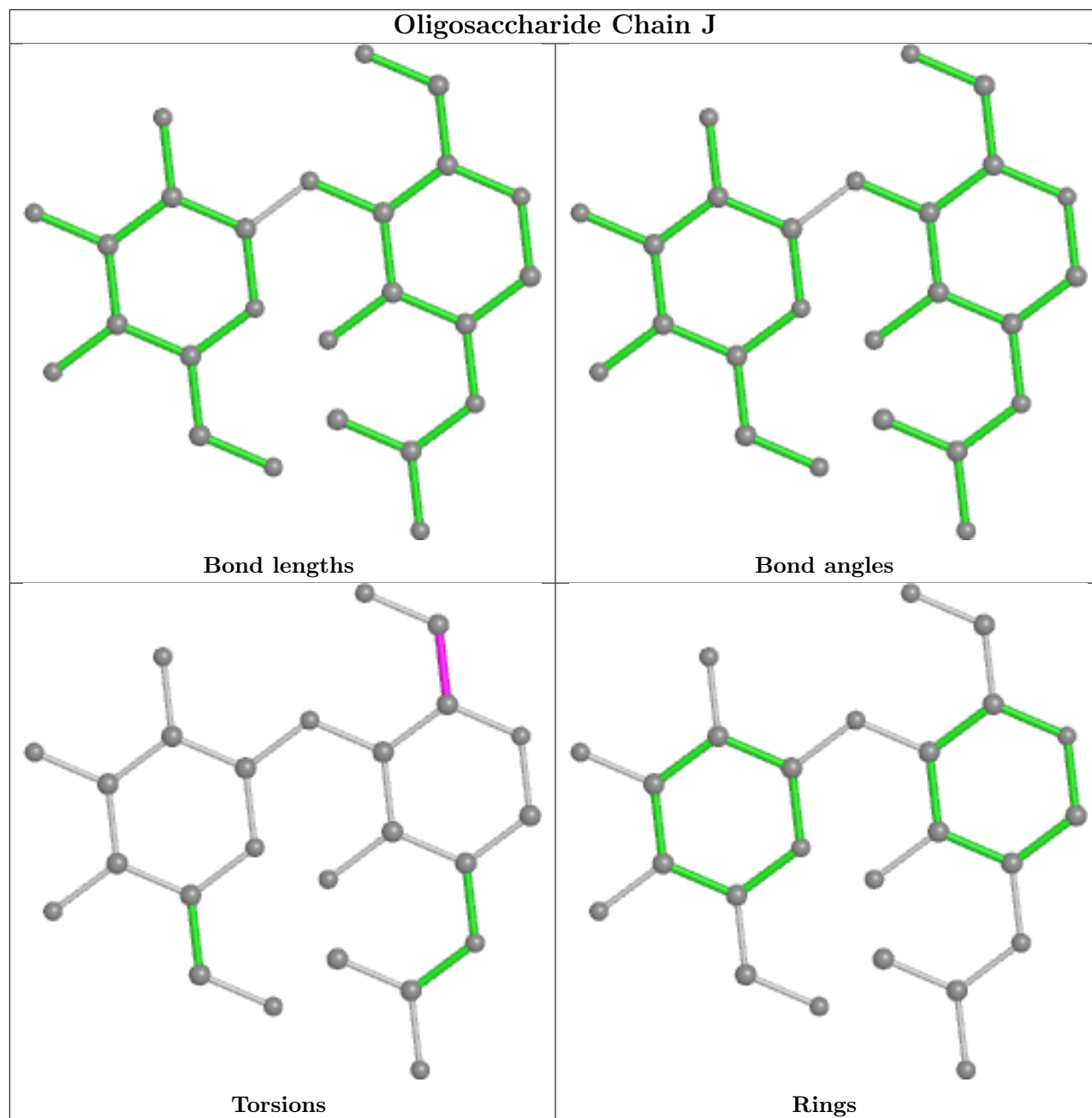


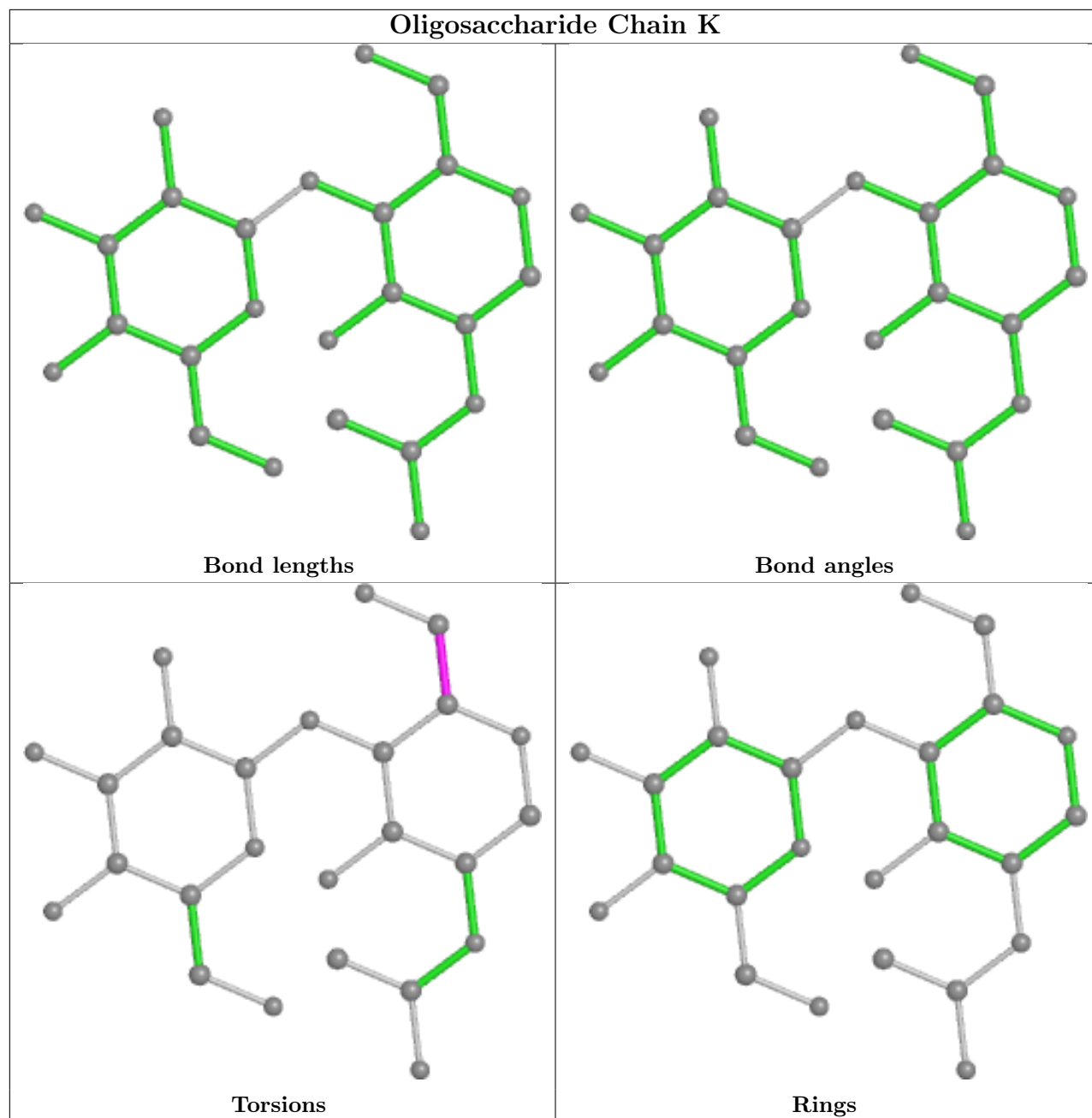


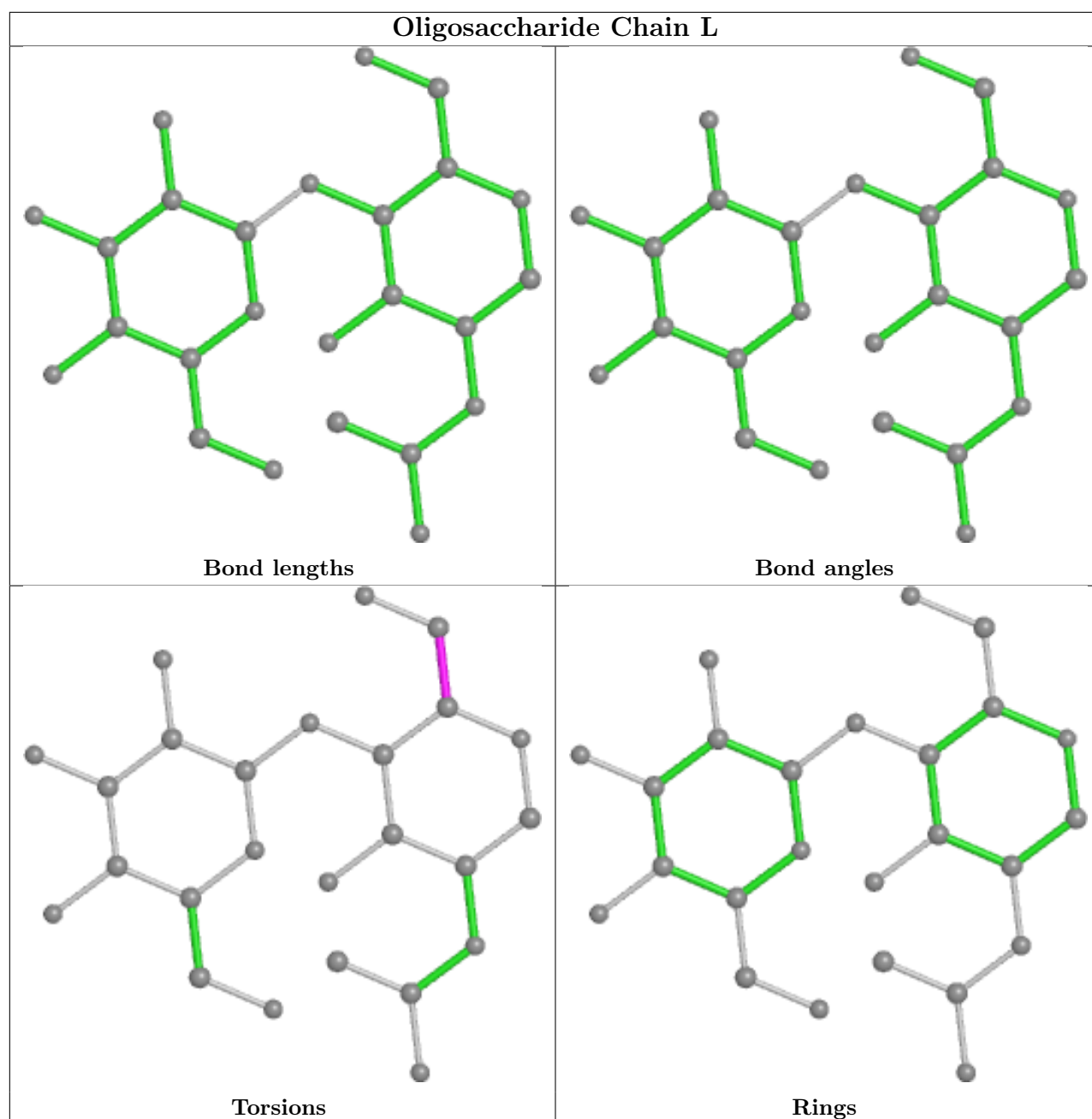


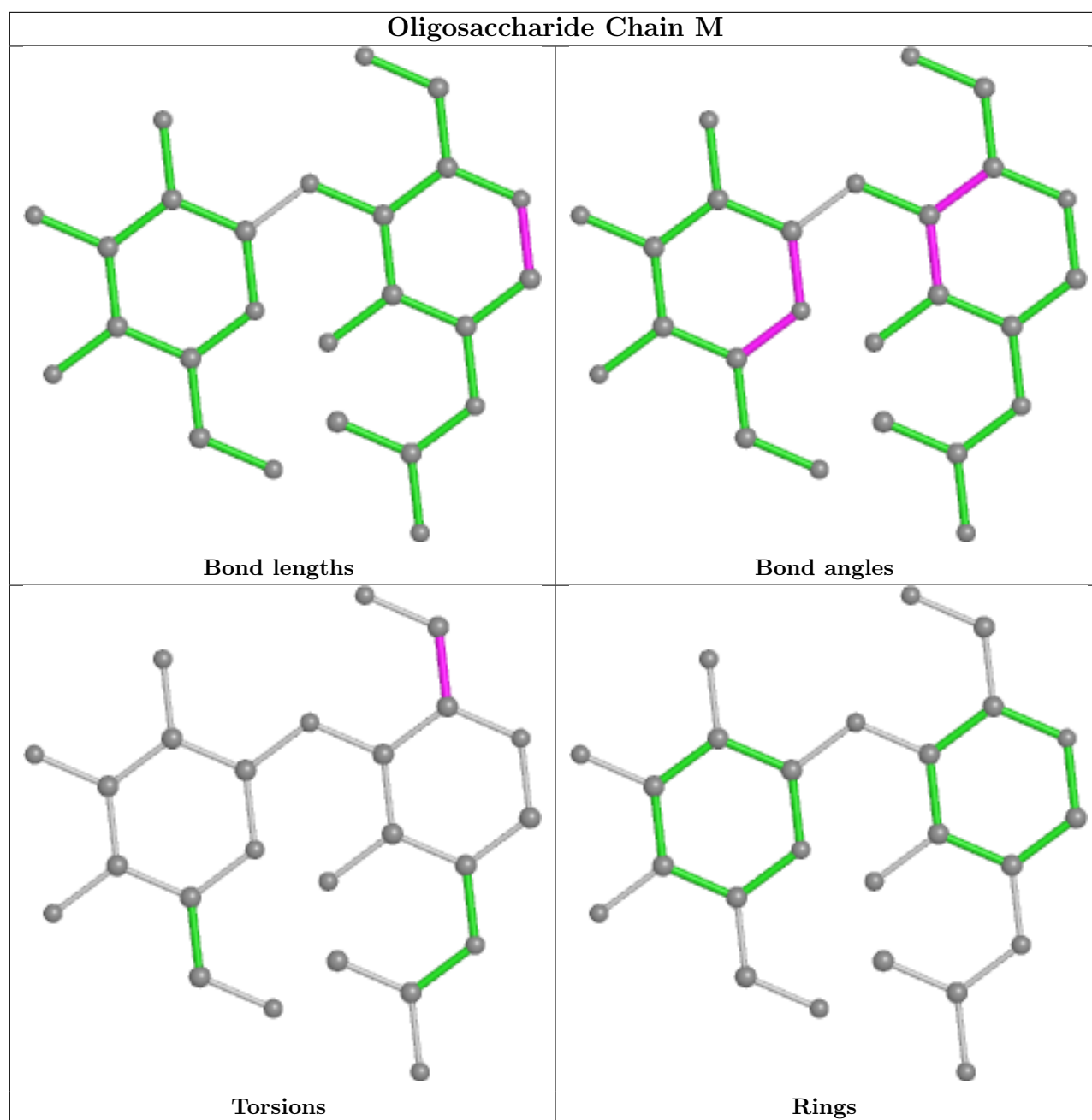


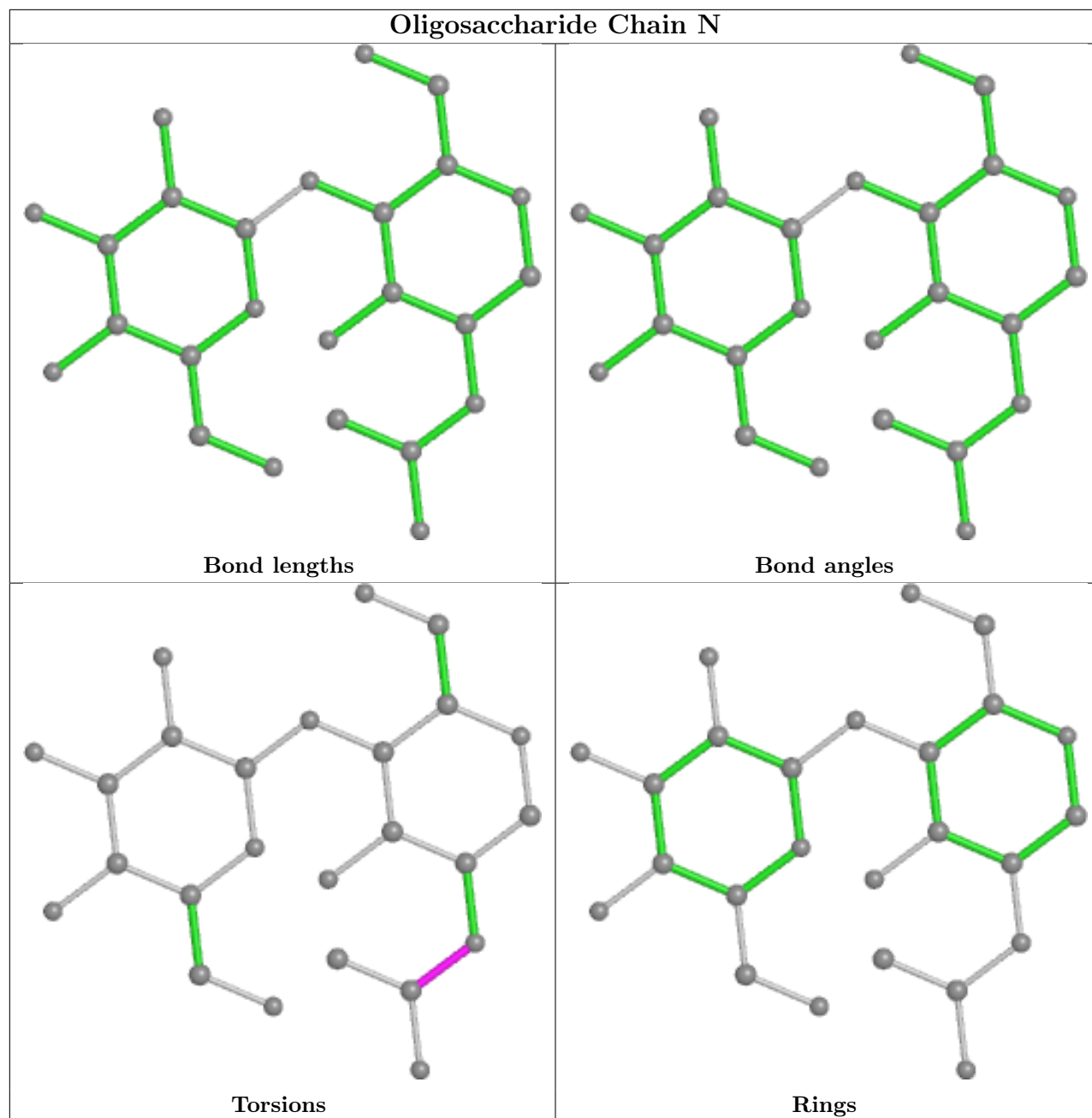


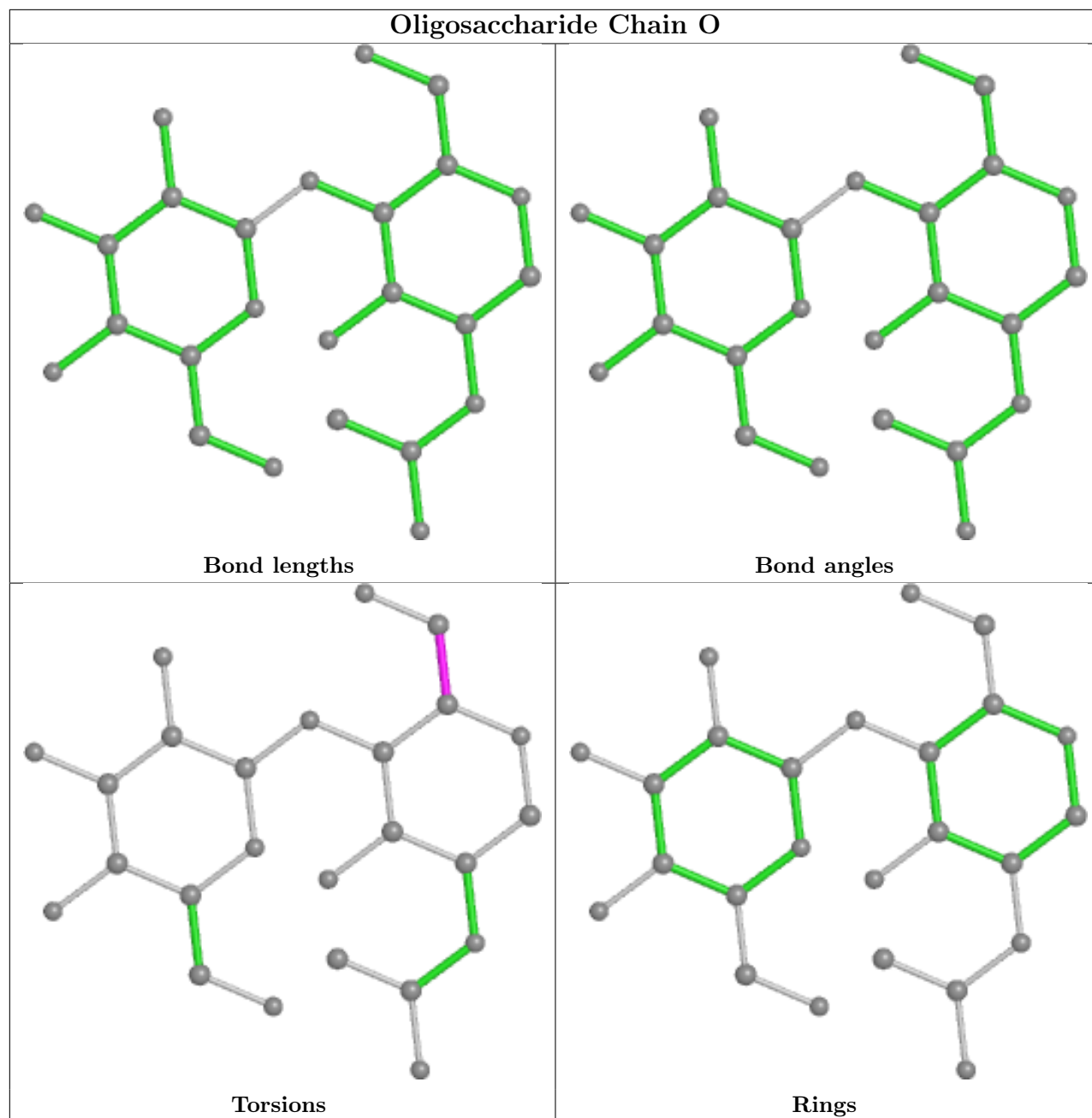


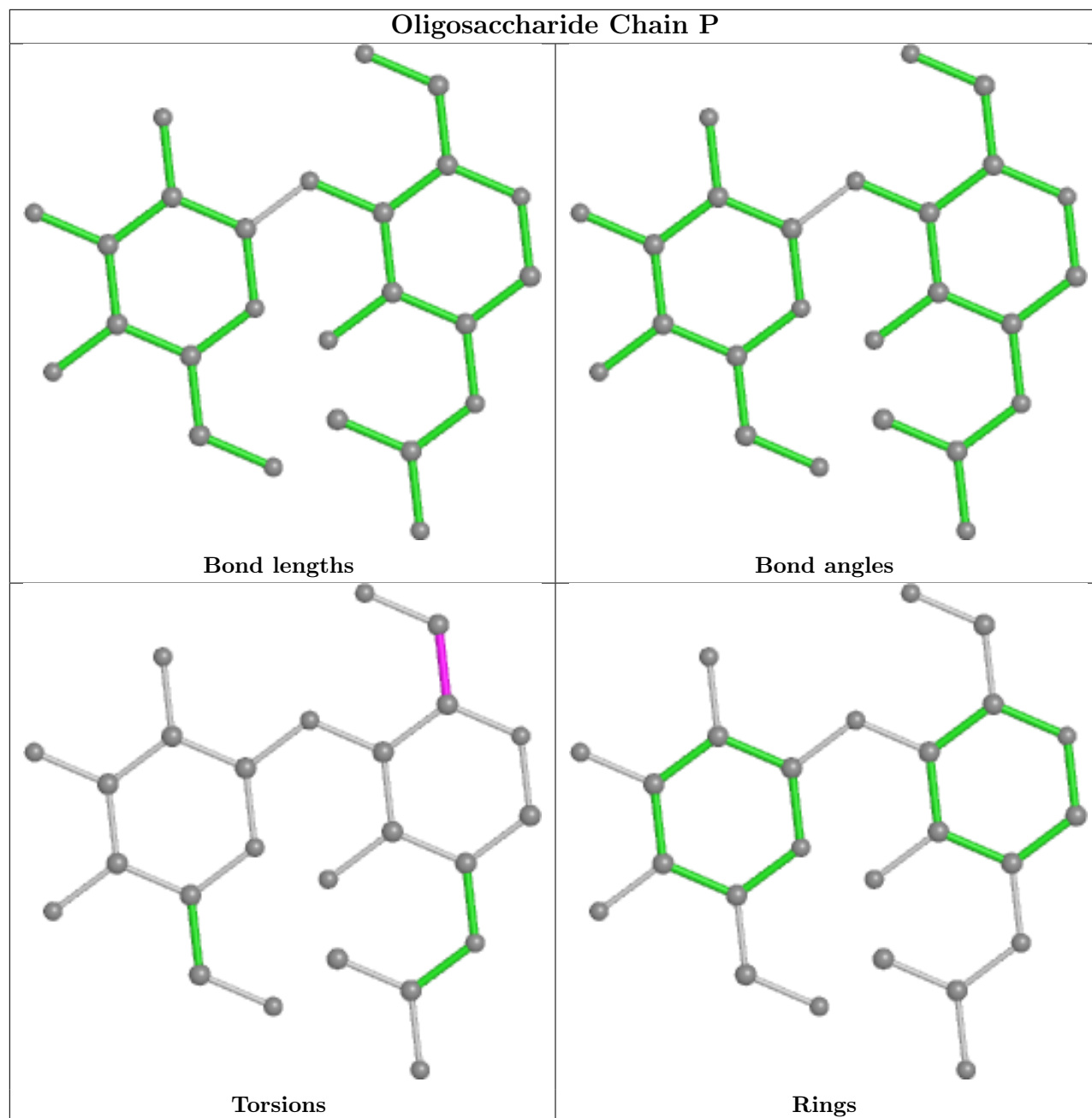


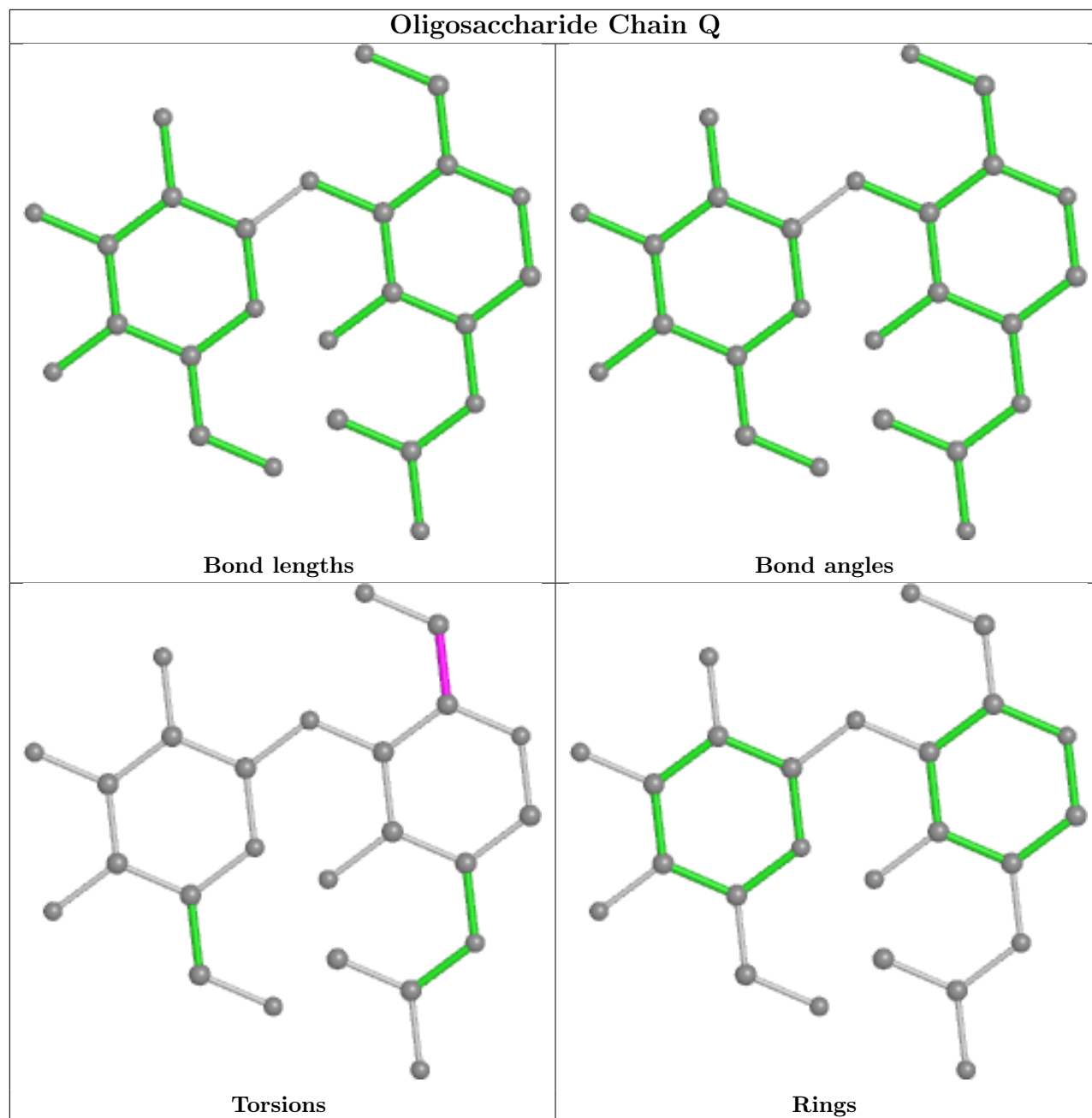


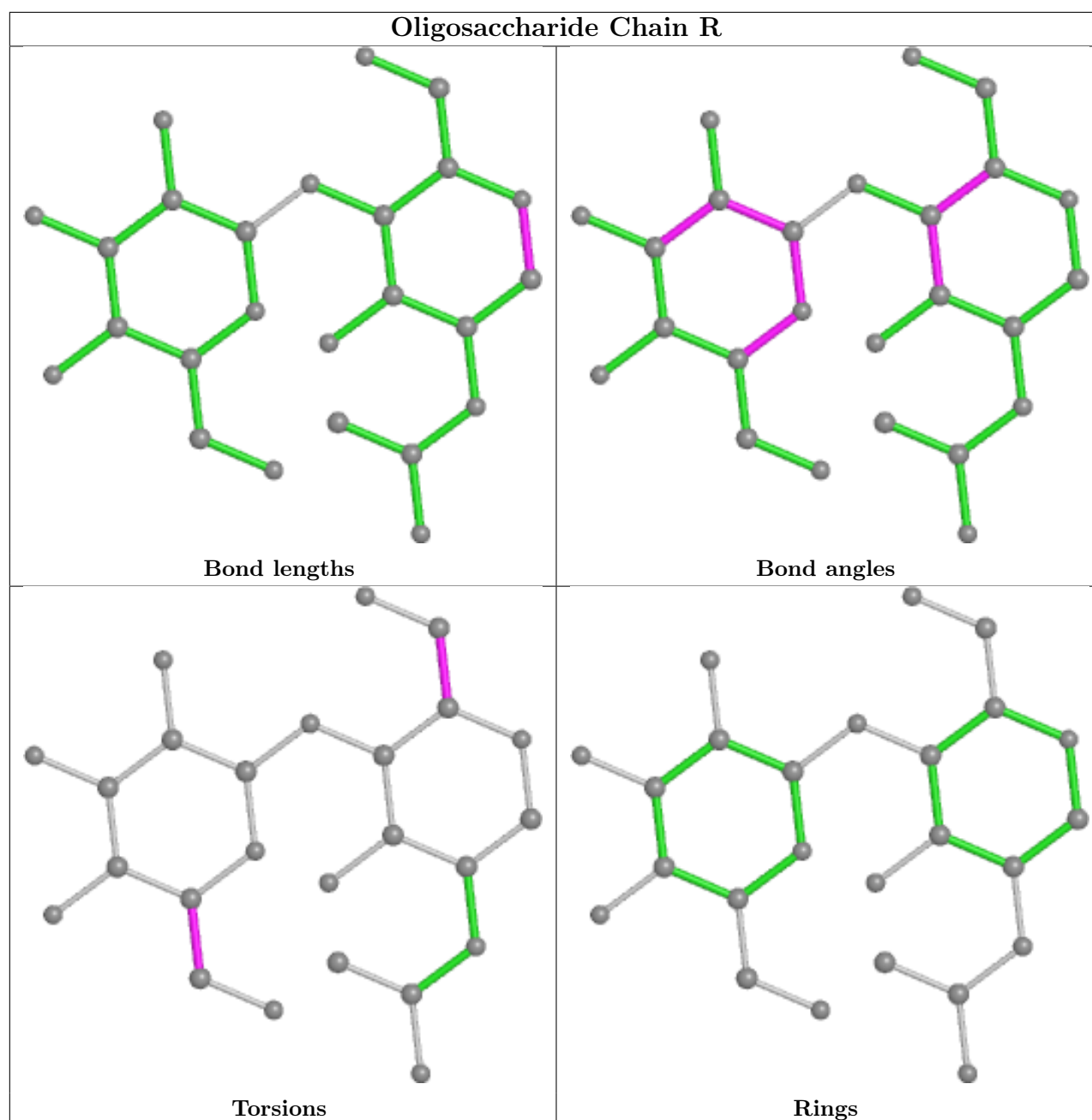












## 5.6 Ligand geometry [i](#)

30 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Type | Chain | Res  | Link | Bond lengths |      |          | Bond angles |      |          |
|-----|------|-------|------|------|--------------|------|----------|-------------|------|----------|
|     |      |       |      |      | Counts       | RMSZ | # Z  > 2 | Counts      | RMSZ | # Z  > 2 |
| 3   | NAG  | B     | 1306 | 1    | 14,14,15     | 0.19 | 0        | 17,19,21    | 0.43 | 0        |
| 3   | NAG  | B     | 1301 | 1    | 14,14,15     | 0.19 | 0        | 17,19,21    | 0.54 | 0        |
| 3   | NAG  | C     | 1309 | 1    | 14,14,15     | 0.17 | 0        | 17,19,21    | 0.42 | 0        |
| 3   | NAG  | A     | 1302 | 1    | 14,14,15     | 0.32 | 0        | 17,19,21    | 0.50 | 0        |
| 3   | NAG  | B     | 1309 | 1    | 14,14,15     | 0.18 | 0        | 17,19,21    | 0.42 | 0        |
| 3   | NAG  | B     | 1304 | 1    | 14,14,15     | 0.29 | 0        | 17,19,21    | 0.49 | 0        |
| 3   | NAG  | C     | 1307 | 1    | 14,14,15     | 0.35 | 0        | 17,19,21    | 1.42 | 1 (5%)   |
| 3   | NAG  | A     | 1308 | 1    | 14,14,15     | 0.35 | 0        | 17,19,21    | 0.40 | 0        |
| 3   | NAG  | A     | 1304 | 1    | 14,14,15     | 0.35 | 0        | 17,19,21    | 0.44 | 0        |
| 3   | NAG  | A     | 1303 | 1    | 14,14,15     | 0.28 | 0        | 17,19,21    | 0.44 | 0        |
| 3   | NAG  | C     | 1304 | 1    | 14,14,15     | 0.26 | 0        | 17,19,21    | 0.47 | 0        |
| 3   | NAG  | C     | 1303 | 1    | 14,14,15     | 0.30 | 0        | 17,19,21    | 0.44 | 0        |
| 3   | NAG  | B     | 1307 | 1    | 14,14,15     | 0.32 | 0        | 17,19,21    | 1.39 | 1 (5%)   |
| 3   | NAG  | A     | 1310 | 1    | 14,14,15     | 0.31 | 0        | 17,19,21    | 0.61 | 1 (5%)   |
| 3   | NAG  | A     | 1307 | 1    | 14,14,15     | 0.35 | 0        | 17,19,21    | 1.40 | 1 (5%)   |
| 3   | NAG  | A     | 1301 | 1    | 14,14,15     | 0.23 | 0        | 17,19,21    | 0.54 | 0        |
| 3   | NAG  | A     | 1306 | 1    | 14,14,15     | 0.20 | 0        | 17,19,21    | 0.42 | 0        |
| 3   | NAG  | B     | 1303 | 1    | 14,14,15     | 0.30 | 0        | 17,19,21    | 0.44 | 0        |
| 3   | NAG  | B     | 1305 | 1    | 14,14,15     | 0.19 | 0        | 17,19,21    | 0.41 | 0        |
| 3   | NAG  | A     | 1305 | 1    | 14,14,15     | 0.19 | 0        | 17,19,21    | 0.45 | 0        |
| 3   | NAG  | B     | 1308 | 1    | 14,14,15     | 0.33 | 0        | 17,19,21    | 0.40 | 0        |
| 3   | NAG  | C     | 1310 | 1    | 14,14,15     | 0.32 | 0        | 17,19,21    | 0.61 | 1 (5%)   |
| 3   | NAG  | C     | 1305 | 1    | 14,14,15     | 0.17 | 0        | 17,19,21    | 0.44 | 0        |
| 3   | NAG  | C     | 1308 | 1    | 14,14,15     | 0.34 | 0        | 17,19,21    | 0.40 | 0        |
| 3   | NAG  | B     | 1302 | 1    | 14,14,15     | 0.41 | 0        | 17,19,21    | 0.63 | 1 (5%)   |
| 3   | NAG  | C     | 1301 | 1    | 14,14,15     | 0.21 | 0        | 17,19,21    | 0.55 | 0        |
| 3   | NAG  | A     | 1309 | 1    | 14,14,15     | 0.18 | 0        | 17,19,21    | 0.42 | 0        |
| 3   | NAG  | C     | 1302 | 1    | 14,14,15     | 0.91 | 2 (14%)  | 17,19,21    | 0.90 | 1 (5%)   |
| 3   | NAG  | C     | 1306 | 1    | 14,14,15     | 0.19 | 0        | 17,19,21    | 0.42 | 0        |
| 3   | NAG  | B     | 1310 | 1    | 14,14,15     | 0.32 | 0        | 17,19,21    | 0.61 | 1 (5%)   |

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

| Mol | Type | Chain | Res  | Link | Chirals | Torsions  | Rings   |
|-----|------|-------|------|------|---------|-----------|---------|
| 3   | NAG  | B     | 1306 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | B     | 1301 | 1    | -       | 2/6/23/26 | 0/1/1/1 |
| 3   | NAG  | C     | 1309 | 1    | -       | 2/6/23/26 | 0/1/1/1 |

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| Mol | Type | Chain | Res  | Link | Chirals | Torsions  | Rings   |
|-----|------|-------|------|------|---------|-----------|---------|
| 3   | NAG  | A     | 1302 | 1    | -       | 2/6/23/26 | 0/1/1/1 |
| 3   | NAG  | B     | 1309 | 1    | -       | 2/6/23/26 | 0/1/1/1 |
| 3   | NAG  | B     | 1304 | 1    | -       | 4/6/23/26 | 0/1/1/1 |
| 3   | NAG  | C     | 1307 | 1    | -       | 1/6/23/26 | 0/1/1/1 |
| 3   | NAG  | A     | 1308 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | A     | 1304 | 1    | -       | 4/6/23/26 | 0/1/1/1 |
| 3   | NAG  | A     | 1303 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | C     | 1304 | 1    | -       | 4/6/23/26 | 0/1/1/1 |
| 3   | NAG  | C     | 1303 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | B     | 1307 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | A     | 1310 | 1    | -       | 4/6/23/26 | 0/1/1/1 |
| 3   | NAG  | A     | 1307 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | A     | 1301 | 1    | -       | 2/6/23/26 | 0/1/1/1 |
| 3   | NAG  | A     | 1306 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | B     | 1303 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | B     | 1305 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | A     | 1305 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | B     | 1308 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | C     | 1310 | 1    | -       | 4/6/23/26 | 0/1/1/1 |
| 3   | NAG  | C     | 1305 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | C     | 1308 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | B     | 1302 | 1    | -       | 1/6/23/26 | 0/1/1/1 |
| 3   | NAG  | C     | 1301 | 1    | -       | 2/6/23/26 | 0/1/1/1 |
| 3   | NAG  | A     | 1309 | 1    | -       | 2/6/23/26 | 0/1/1/1 |
| 3   | NAG  | C     | 1302 | 1    | -       | 1/6/23/26 | 0/1/1/1 |
| 3   | NAG  | C     | 1306 | 1    | -       | 0/6/23/26 | 0/1/1/1 |
| 3   | NAG  | B     | 1310 | 1    | -       | 4/6/23/26 | 0/1/1/1 |

All (2) bond length outliers are listed below:

| Mol | Chain | Res  | Type | Atoms | Z    | Observed(Å) | Ideal(Å) |
|-----|-------|------|------|-------|------|-------------|----------|
| 3   | C     | 1302 | NAG  | O5-C1 | 2.39 | 1.47        | 1.43     |
| 3   | C     | 1302 | NAG  | C1-C2 | 2.28 | 1.55        | 1.52     |

All (8) bond angle outliers are listed below:

| Mol | Chain | Res  | Type | Atoms    | Z    | Observed(°) | Ideal(°) |
|-----|-------|------|------|----------|------|-------------|----------|
| 3   | C     | 1307 | NAG  | C1-O5-C5 | 5.20 | 119.24      | 112.19   |
| 3   | A     | 1307 | NAG  | C1-O5-C5 | 5.13 | 119.15      | 112.19   |

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| Mol | Chain | Res  | Type | Atoms    | Z    | Observed(°) | Ideal(°) |
|-----|-------|------|------|----------|------|-------------|----------|
| 3   | B     | 1307 | NAG  | C1-O5-C5 | 5.07 | 119.06      | 112.19   |
| 3   | C     | 1302 | NAG  | C1-O5-C5 | 2.86 | 116.07      | 112.19   |
| 3   | B     | 1302 | NAG  | C1-O5-C5 | 2.25 | 115.24      | 112.19   |
| 3   | C     | 1310 | NAG  | C1-O5-C5 | 2.11 | 115.05      | 112.19   |
| 3   | B     | 1310 | NAG  | C1-O5-C5 | 2.10 | 115.04      | 112.19   |
| 3   | A     | 1310 | NAG  | C1-O5-C5 | 2.07 | 115.00      | 112.19   |

There are no chirality outliers.

All (41) torsion outliers are listed below:

| Mol | Chain | Res  | Type | Atoms       |
|-----|-------|------|------|-------------|
| 3   | A     | 1310 | NAG  | C4-C5-C6-O6 |
| 3   | B     | 1310 | NAG  | C4-C5-C6-O6 |
| 3   | C     | 1310 | NAG  | C4-C5-C6-O6 |
| 3   | A     | 1310 | NAG  | O5-C5-C6-O6 |
| 3   | B     | 1310 | NAG  | O5-C5-C6-O6 |
| 3   | C     | 1310 | NAG  | O5-C5-C6-O6 |
| 3   | A     | 1302 | NAG  | C4-C5-C6-O6 |
| 3   | C     | 1304 | NAG  | C4-C5-C6-O6 |
| 3   | A     | 1309 | NAG  | O5-C5-C6-O6 |
| 3   | B     | 1309 | NAG  | O5-C5-C6-O6 |
| 3   | C     | 1309 | NAG  | O5-C5-C6-O6 |
| 3   | A     | 1302 | NAG  | O5-C5-C6-O6 |
| 3   | C     | 1304 | NAG  | O5-C5-C6-O6 |
| 3   | B     | 1304 | NAG  | O5-C5-C6-O6 |
| 3   | A     | 1304 | NAG  | O5-C5-C6-O6 |
| 3   | A     | 1304 | NAG  | C8-C7-N2-C2 |
| 3   | A     | 1304 | NAG  | O7-C7-N2-C2 |
| 3   | A     | 1310 | NAG  | C8-C7-N2-C2 |
| 3   | A     | 1310 | NAG  | O7-C7-N2-C2 |
| 3   | B     | 1304 | NAG  | C8-C7-N2-C2 |
| 3   | B     | 1304 | NAG  | O7-C7-N2-C2 |
| 3   | B     | 1310 | NAG  | C8-C7-N2-C2 |
| 3   | B     | 1310 | NAG  | O7-C7-N2-C2 |
| 3   | C     | 1304 | NAG  | C8-C7-N2-C2 |
| 3   | C     | 1304 | NAG  | O7-C7-N2-C2 |
| 3   | C     | 1310 | NAG  | C8-C7-N2-C2 |
| 3   | C     | 1310 | NAG  | O7-C7-N2-C2 |
| 3   | C     | 1309 | NAG  | C4-C5-C6-O6 |
| 3   | A     | 1309 | NAG  | C4-C5-C6-O6 |
| 3   | B     | 1309 | NAG  | C4-C5-C6-O6 |
| 3   | A     | 1301 | NAG  | O5-C5-C6-O6 |

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| Mol | Chain | Res  | Type | Atoms       |
|-----|-------|------|------|-------------|
| 3   | C     | 1302 | NAG  | O5-C5-C6-O6 |
| 3   | C     | 1301 | NAG  | O5-C5-C6-O6 |
| 3   | B     | 1301 | NAG  | O5-C5-C6-O6 |
| 3   | B     | 1302 | NAG  | O5-C5-C6-O6 |
| 3   | B     | 1304 | NAG  | C4-C5-C6-O6 |
| 3   | A     | 1301 | NAG  | C3-C2-N2-C7 |
| 3   | B     | 1301 | NAG  | C3-C2-N2-C7 |
| 3   | C     | 1301 | NAG  | C3-C2-N2-C7 |
| 3   | A     | 1304 | NAG  | C4-C5-C6-O6 |
| 3   | C     | 1307 | NAG  | O5-C5-C6-O6 |

There are no ring outliers.

5 monomers are involved in 5 short contacts:

| Mol | Chain | Res  | Type | Clashes | Symm-Clashes |
|-----|-------|------|------|---------|--------------|
| 3   | B     | 1301 | NAG  | 1       | 0            |
| 3   | B     | 1304 | NAG  | 1       | 0            |
| 3   | A     | 1304 | NAG  | 1       | 0            |
| 3   | C     | 1301 | NAG  | 1       | 0            |
| 3   | C     | 1302 | NAG  | 1       | 0            |

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.