# Full wwPDB EM Validation Report

Jan 5, 2026 – 03:41 pm GMT

| | | |
|---|---|---|
| PDB ID | : | 9HUY / pdb_00009huy |
| EMDB ID | : | EMD-52420 |
| Title | : | CryoEM map of the large glutamate dehydrogenase composed of 180 kDa subunits from Mycobacterium smegmatis obtained in the presence of NAD+ and L-glutamate. Closed1 tetramer. |
| Authors | : | Lazaro, M.; Chamorro, N.; Lopez-Alonso, J.P.; Charro, D.; Rasia, R.M.; Jimenez-Oses, G.; Valle, M.; Lisa, M.N. |
| Deposited on | : | 2024-12-23 |
| Resolution | : | 3.54 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*
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:

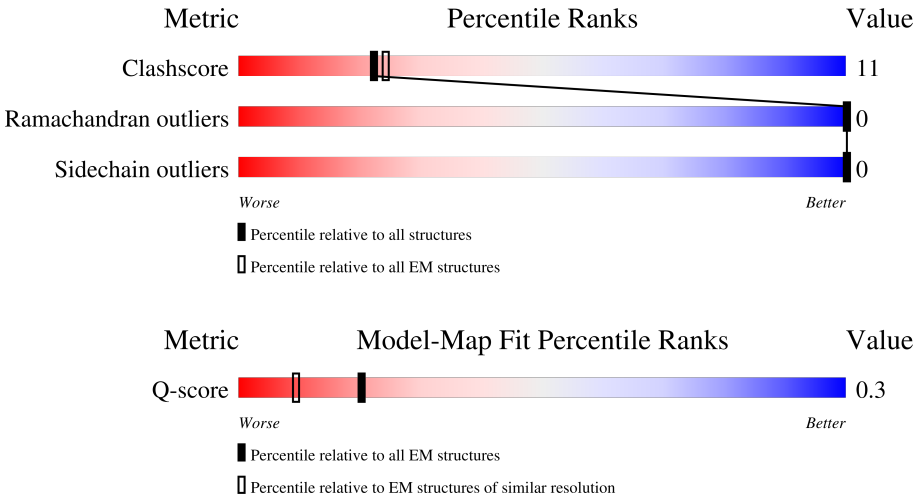
| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.1.dev129 |
| Mogul | : | ?.? (???), CSD ??CSD?? (????) |
| MolProbity | : | 4-5-2 with Phenix2.0 |
| buster-report | : | 1.1.7 (2018) |
| Percentile statistics | : | 20231227.v01 (using entries in the PDB archive December 27th 2023) |
| EM percentile statistics | : | 202505.v01 (Using data in the EMDB archive up until May 2025) |
| MapQ | : | 1.9.13 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.47 |

# 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 3.54 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 (#Entries) | EM structures (#Entries) | Similar EM resolution (#Entries, resolution range(Å)) |
|---|---|---|---|
| Clashscore | 210492 | 15764 | - |
| Ramachandran outliers | 207382 | 16835 | - |
| Sidechain outliers | 206894 | 16415 | - |
| Q-score | - | 25397 | 12891 ( 3.04 - 4.04 ) |

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 >=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 <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | A | 1611 | 50% 16% 33% |
| 1 | B | 1611 | 51% 16% 33% |
| 1 | C | 1611 | 51% 16% 33% |

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| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | D | 1611 | 51% 16% 33% |

# 2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 33576 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 NAD-specific glutamate dehydrogenase.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 1075 | Total 8350 | C 5240 | N 1496 | O 1594 | S 20 | 0 | 0 |
| 1 | B | 1075 | Total 8350 | C 5240 | N 1496 | O 1594 | S 20 | 0 | 0 |
| 1 | C | 1075 | Total 8350 | C 5240 | N 1496 | O 1594 | S 20 | 0 | 0 |
| 1 | D | 1075 | Total 8350 | C 5240 | N 1496 | O 1594 | S 20 | 0 | 0 |

There are 68 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | -16 | MET | - | initiating methionine | UNP A0R1C2 |
| A | -15 | HIS | - | expression tag | UNP A0R1C2 |
| A | -14 | HIS | - | expression tag | UNP A0R1C2 |
| A | -13 | HIS | - | expression tag | UNP A0R1C2 |
| A | -12 | HIS | - | expression tag | UNP A0R1C2 |
| A | -11 | HIS | - | expression tag | UNP A0R1C2 |
| A | -10 | HIS | - | expression tag | UNP A0R1C2 |
| A | -9 | GLU | - | expression tag | UNP A0R1C2 |
| A | -8 | ASN | - | expression tag | UNP A0R1C2 |
| A | -7 | LEU | - | expression tag | UNP A0R1C2 |
| A | -6 | TYR | - | expression tag | UNP A0R1C2 |
| A | -5 | PHE | - | expression tag | UNP A0R1C2 |
| A | -4 | GLN | - | expression tag | UNP A0R1C2 |
| A | -3 | GLY | - | expression tag | UNP A0R1C2 |
| A | -2 | ALA | - | expression tag | UNP A0R1C2 |
| A | -1 | ALA | - | expression tag | UNP A0R1C2 |
| A | 0 | SER | - | expression tag | UNP A0R1C2 |
| B | -16 | MET | - | initiating methionine | UNP A0R1C2 |
| B | -15 | HIS | - | expression tag | UNP A0R1C2 |
| B | -14 | HIS | - | expression tag | UNP A0R1C2 |
| B | -13 | HIS | - | expression tag | UNP A0R1C2 |
| B | -12 | HIS | - | expression tag | UNP A0R1C2 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| B | -11 | HIS | - | expression tag | UNP A0R1C2 |
| B | -10 | HIS | - | expression tag | UNP A0R1C2 |
| B | -9 | GLU | - | expression tag | UNP A0R1C2 |
| B | -8 | ASN | - | expression tag | UNP A0R1C2 |
| B | -7 | LEU | - | expression tag | UNP A0R1C2 |
| B | -6 | TYR | - | expression tag | UNP A0R1C2 |
| B | -5 | PHE | - | expression tag | UNP A0R1C2 |
| B | -4 | GLN | - | expression tag | UNP A0R1C2 |
| B | -3 | GLY | - | expression tag | UNP A0R1C2 |
| B | -2 | ALA | - | expression tag | UNP A0R1C2 |
| B | -1 | ALA | - | expression tag | UNP A0R1C2 |
| B | 0 | SER | - | expression tag | UNP A0R1C2 |
| C | -16 | MET | - | initiating methionine | UNP A0R1C2 |
| C | -15 | HIS | - | expression tag | UNP A0R1C2 |
| C | -14 | HIS | - | expression tag | UNP A0R1C2 |
| C | -13 | HIS | - | expression tag | UNP A0R1C2 |
| C | -12 | HIS | - | expression tag | UNP A0R1C2 |
| C | -11 | HIS | - | expression tag | UNP A0R1C2 |
| C | -10 | HIS | - | expression tag | UNP A0R1C2 |
| C | -9 | GLU | - | expression tag | UNP A0R1C2 |
| C | -8 | ASN | - | expression tag | UNP A0R1C2 |
| C | -7 | LEU | - | expression tag | UNP A0R1C2 |
| C | -6 | TYR | - | expression tag | UNP A0R1C2 |
| C | -5 | PHE | - | expression tag | UNP A0R1C2 |
| C | -4 | GLN | - | expression tag | UNP A0R1C2 |
| C | -3 | GLY | - | expression tag | UNP A0R1C2 |
| C | -2 | ALA | - | expression tag | UNP A0R1C2 |
| C | -1 | ALA | - | expression tag | UNP A0R1C2 |
| C | 0 | SER | - | expression tag | UNP A0R1C2 |
| D | -16 | MET | - | initiating methionine | UNP A0R1C2 |
| D | -15 | HIS | - | expression tag | UNP A0R1C2 |
| D | -14 | HIS | - | expression tag | UNP A0R1C2 |
| D | -13 | HIS | - | expression tag | UNP A0R1C2 |
| D | -12 | HIS | - | expression tag | UNP A0R1C2 |
| D | -11 | HIS | - | expression tag | UNP A0R1C2 |
| D | -10 | HIS | - | expression tag | UNP A0R1C2 |
| D | -9 | GLU | - | expression tag | UNP A0R1C2 |
| D | -8 | ASN | - | expression tag | UNP A0R1C2 |
| D | -7 | LEU | - | expression tag | UNP A0R1C2 |
| D | -6 | TYR | - | expression tag | UNP A0R1C2 |
| D | -5 | PHE | - | expression tag | UNP A0R1C2 |
| D | -4 | GLN | - | expression tag | UNP A0R1C2 |

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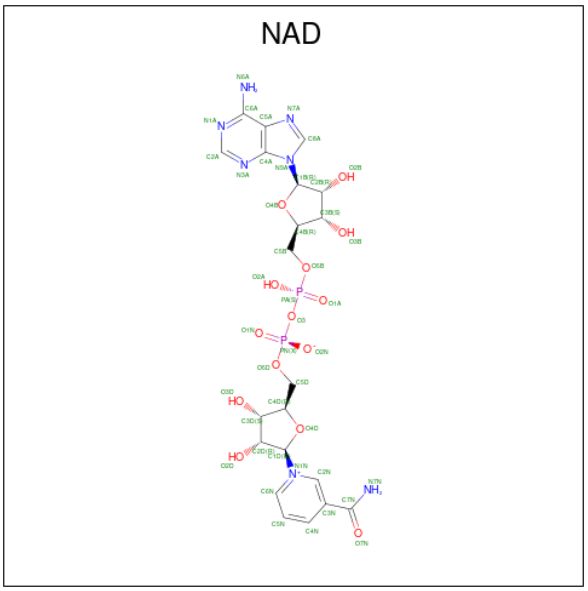
| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| D | -3 | GLY | - | expression tag | UNP A0R1C2 |
| D | -2 | ALA | - | expression tag | UNP A0R1C2 |
| D | -1 | ALA | - | expression tag | UNP A0R1C2 |
| D | 0 | SER | - | expression tag | UNP A0R1C2 |

- Molecule 2 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (CCD ID: NAD) (formula: $C_{21}H_{27}N_7O_{14}P_2$) (labeled as "Ligand of Interest" by depositor).



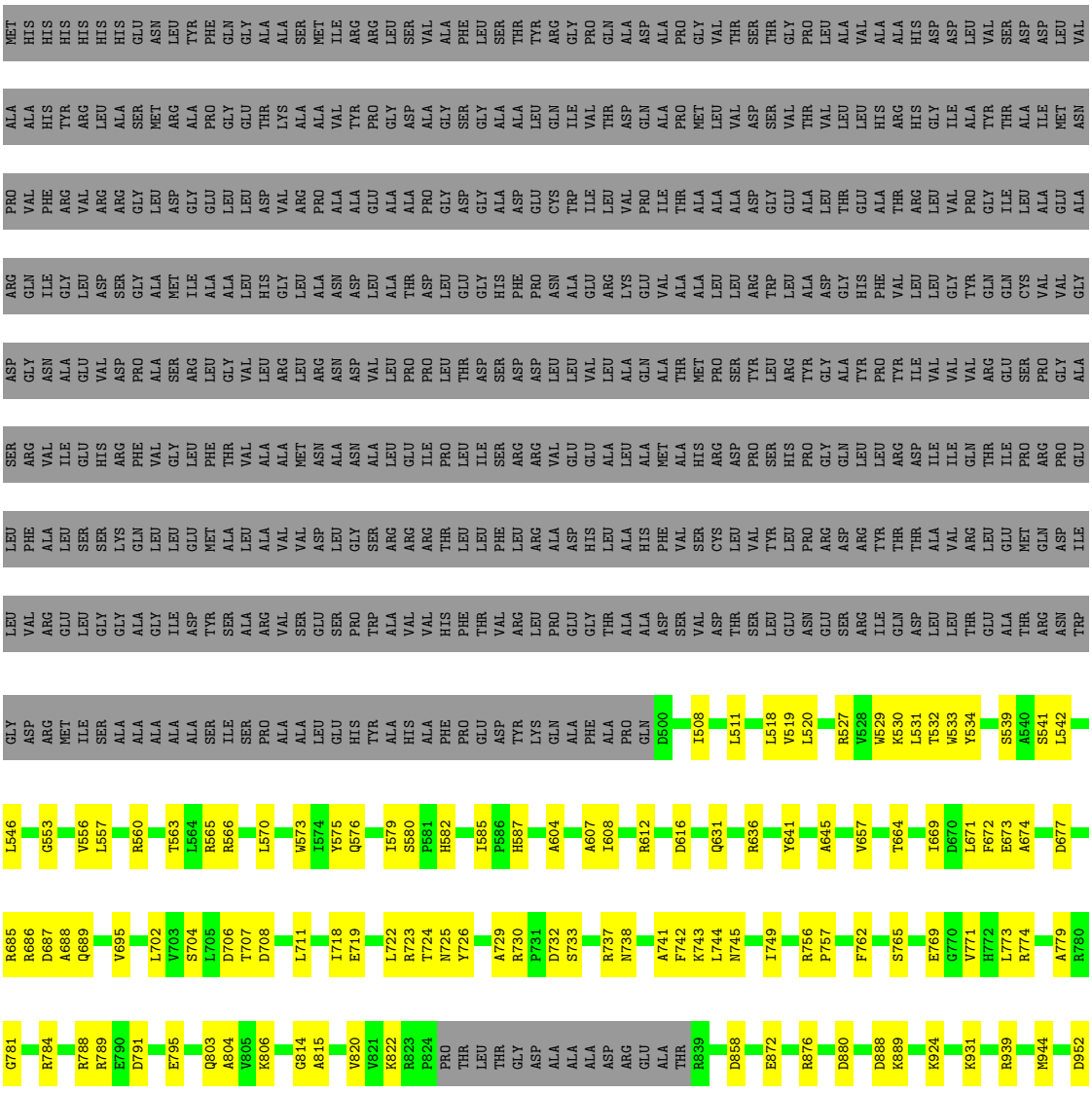

| Mol | Chain | Residues | Atoms | | | | | AltConf |
|---|---|---|---|---|---|---|---|---|
| 2 | A | 1 | Total | C | N | O | P | 0 |
| | | | 44 | 21 | 7 | 14 | 2 | |
| 2 | B | 1 | Total | C | N | O | P | 0 |
| | | | 44 | 21 | 7 | 14 | 2 | |
| 2 | C | 1 | Total | C | N | O | P | 0 |
| | | | 44 | 21 | 7 | 14 | 2 | |
| 2 | D | 1 | Total | C | N | O | P | 0 |
| | | | 44 | 21 | 7 | 14 | 2 | |

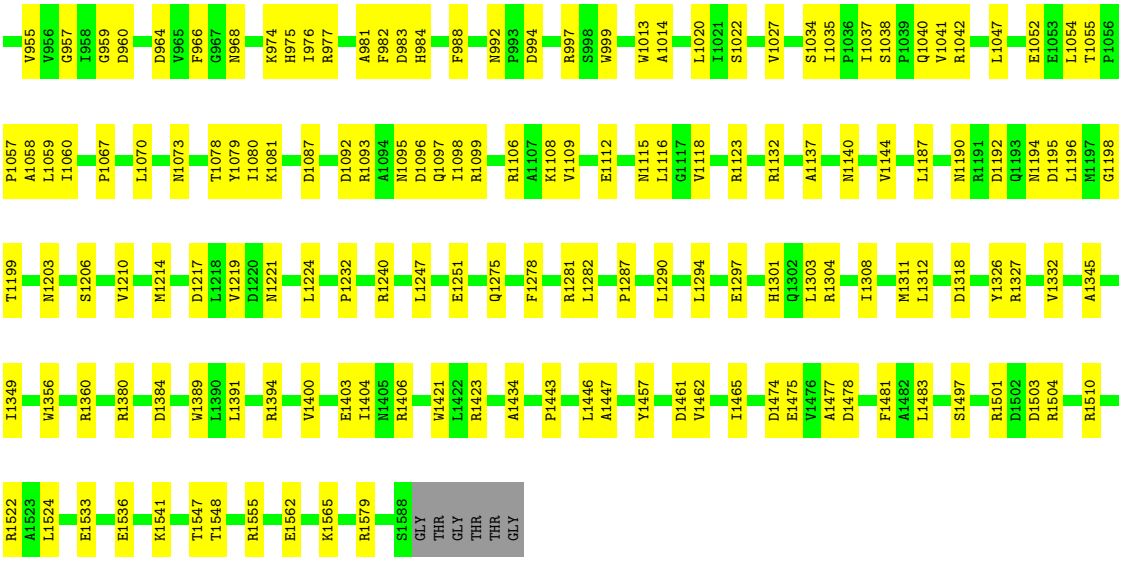
# 3 Residue-property plots (i)

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 and atom inclusion in map density. 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. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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: NAD-specific glutamate dehydrogenase

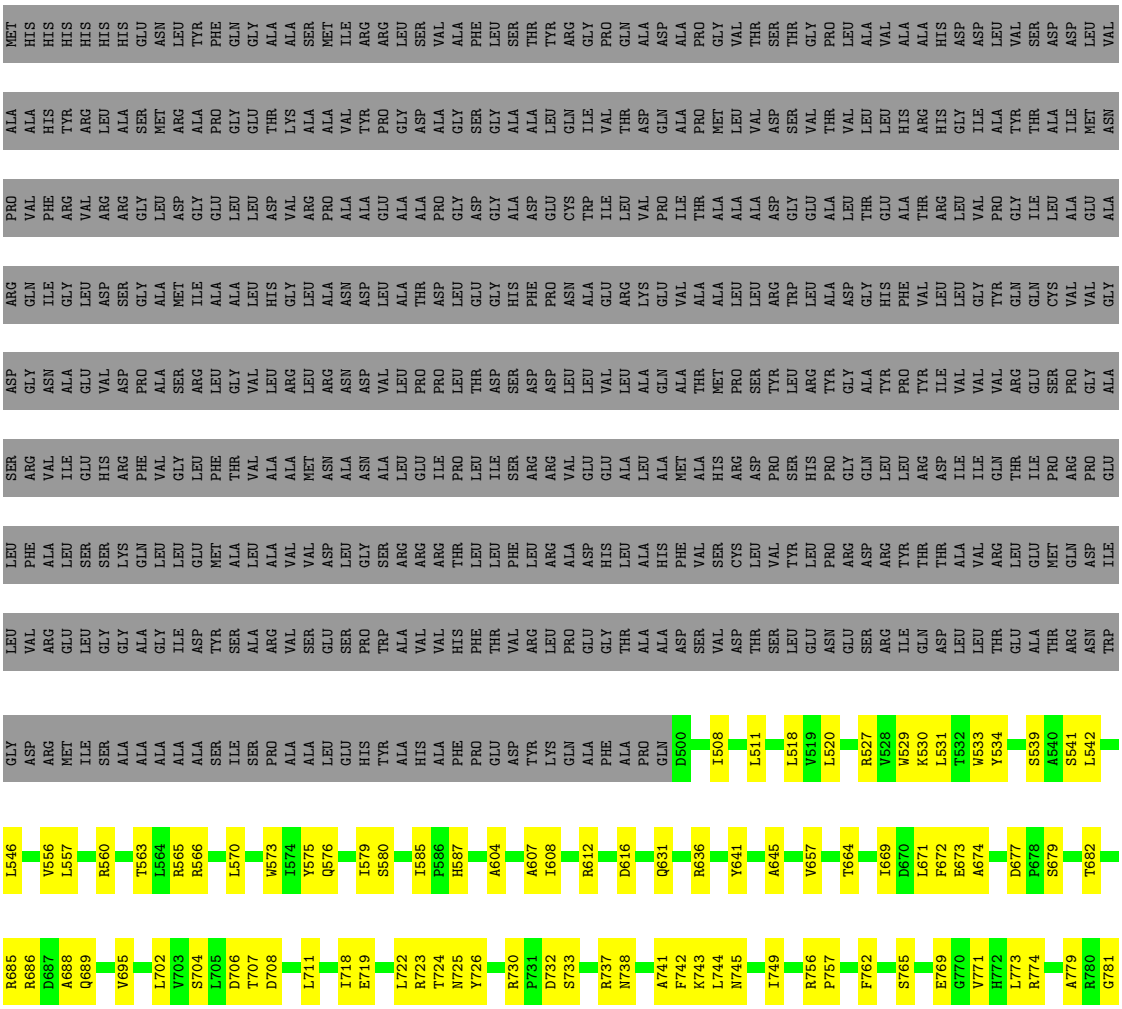
Chain A:

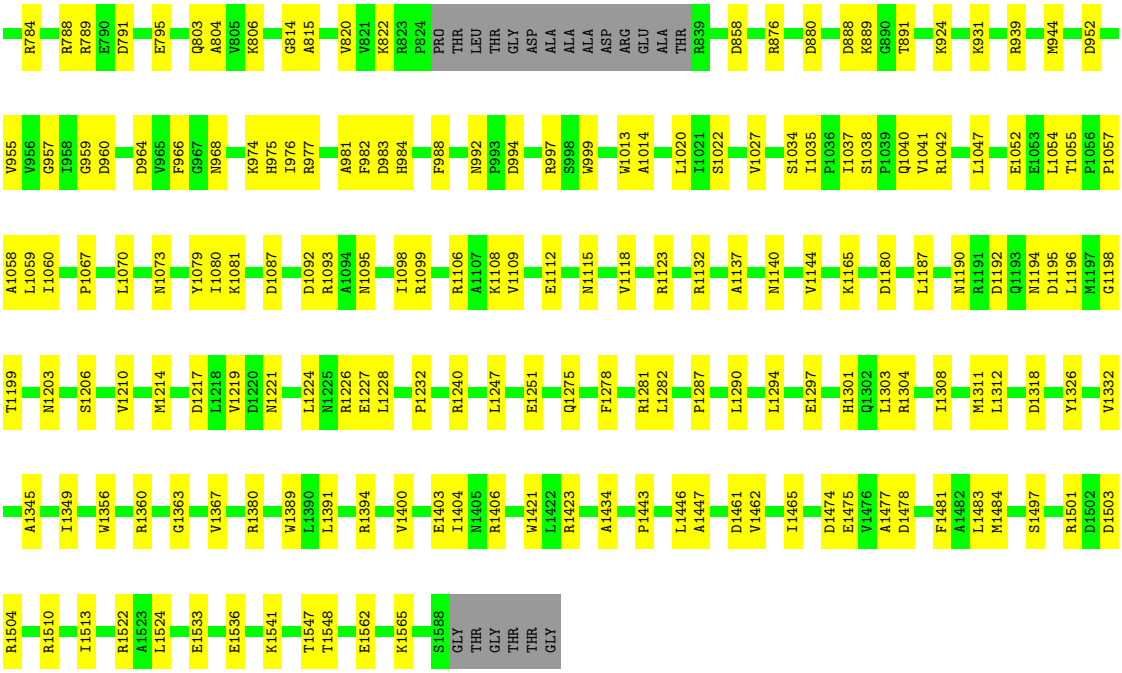






- Molecule 1: NAD-specific glutamate dehydrogenase

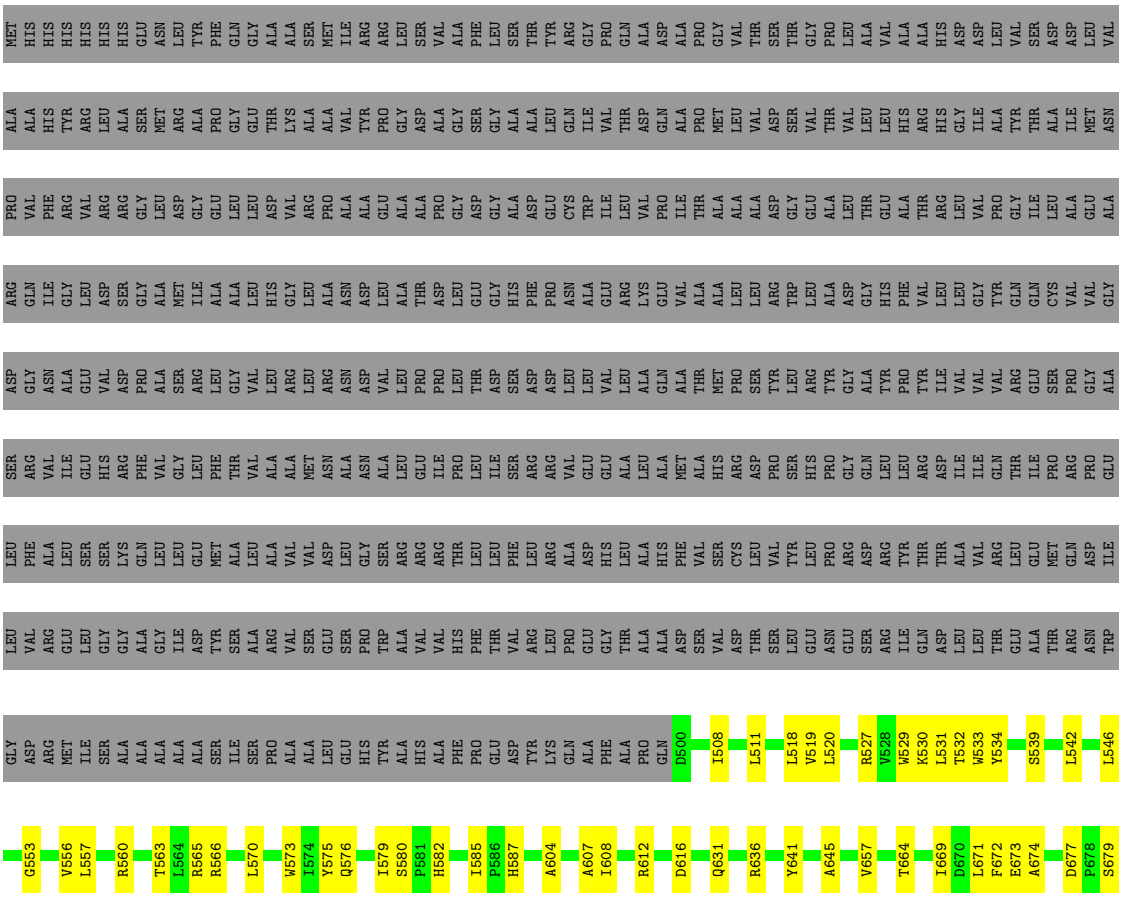
Chain B:

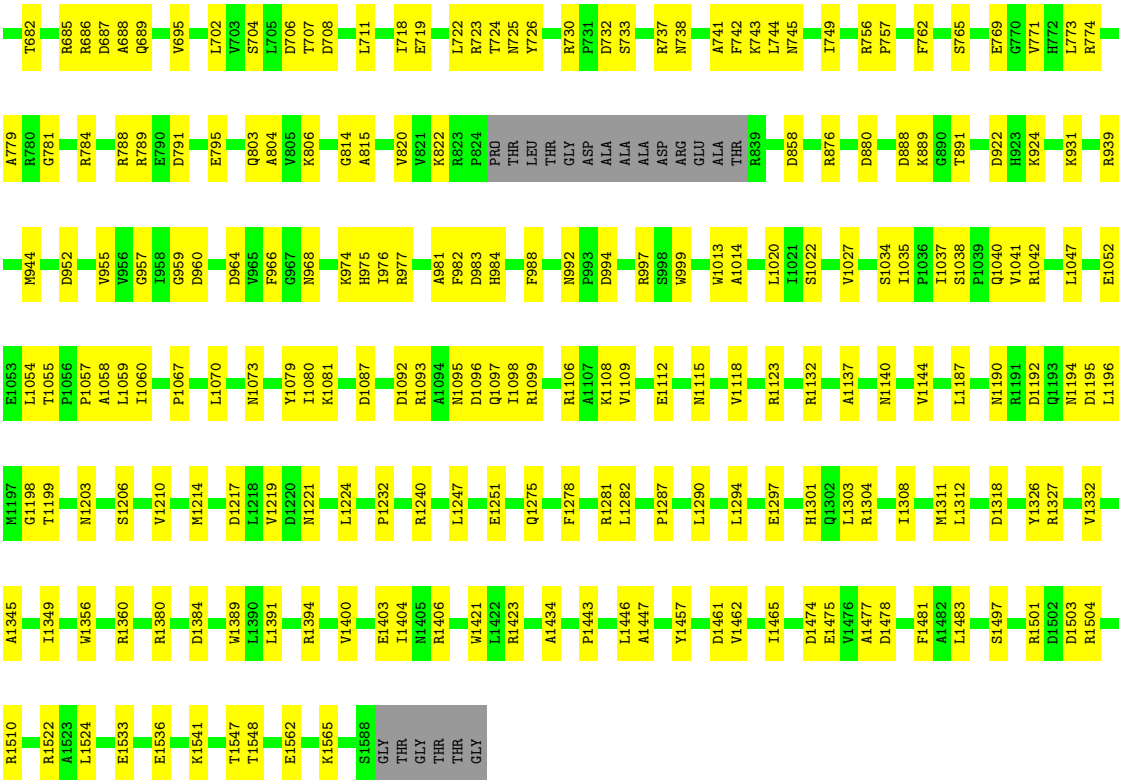






• Molecule 1: NAD-specific glutamate dehydrogenase

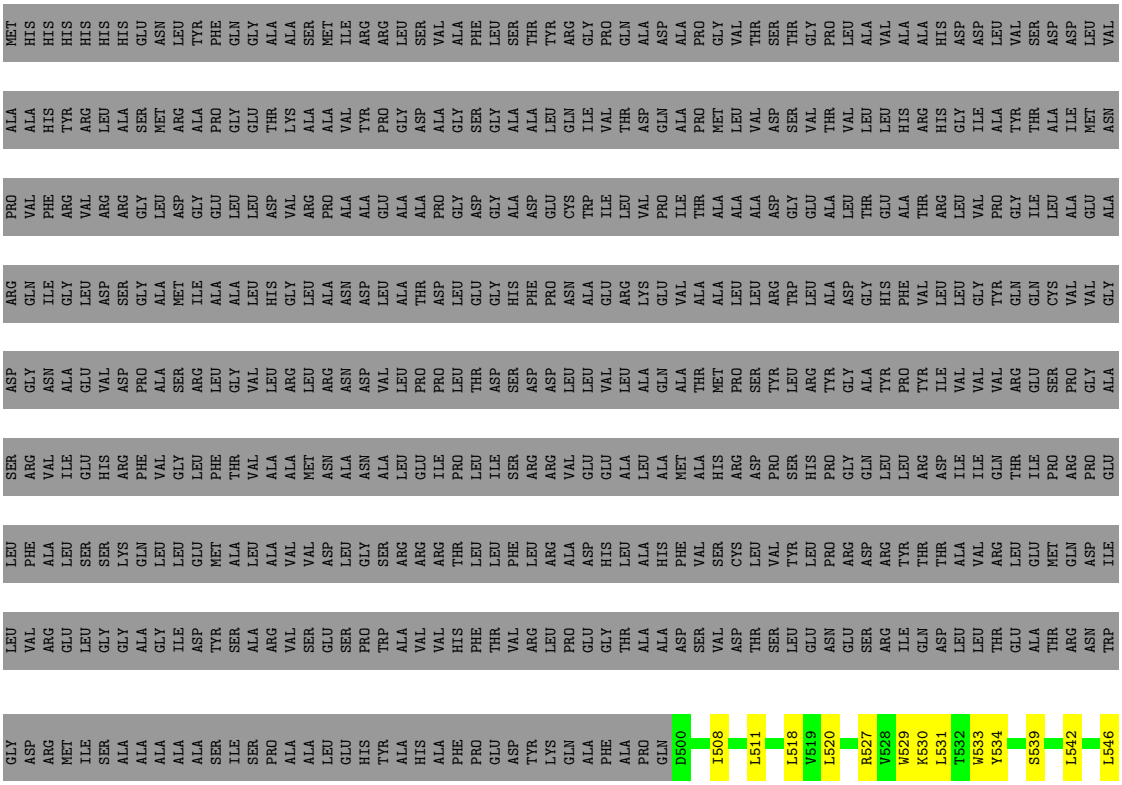
Chain C:

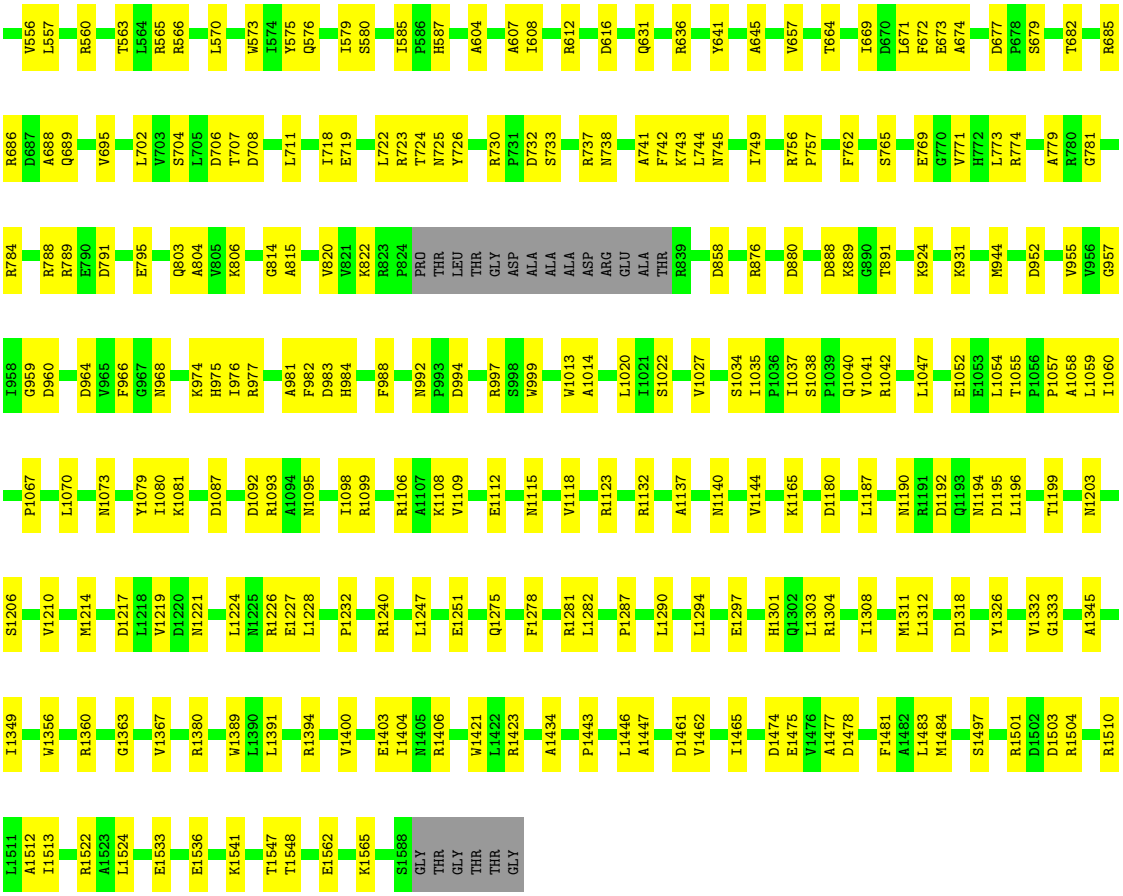






• Molecule 1: NAD-specific glutamate dehydrogenase

Chain D:


V556 L557 R560 T563 L564 R565 R566 L570 W573 I574 Y575 Q576 I579 S580 I585 P586 H587 A604 A607 I608 R612 D616 Q631 R636 Y641 A645 V657 T664 I669 D670 L671 F672 E673 A674 D677 P678 S679 T682 R685
R686 D687 A688 Q689 V695 L702 V703 S704 L705 D706 T707 D708 L711 I718 E719 L722 R723 T724 N725 Y726 R730 P731 D732 S733 R737 N738 A741 F742 K743 L744 N745 I749 R756 P757 F762 S765 E769 G770 V771 H772 L773 R774 A779 R780 G781
R784 R788 R789 E790 D791 E795 Q803 A804 V805 K806 G814 A815 V820 V821 K822 R823 P824 PRO THR LEU THR GLY ASP ALA ALA ALA ASP ARG GLU ALA THR R839 D858 R876 D880 D888 K889 G890 T891 K924 K931 M944 D952 V955 V956 G957
I958 G959 D960 D964 V965 F966 G967 N968 K974 H975 I976 R977 A981 F982 D983 H984 F988 N992 P993 D994 R997 S998 W999 W1013 A1014 L1020 I1021 S1022 V1027 S1034 I1035 P1036 I1037 S1038 P1039 Q1040 V1041 R1042 L1047 E1052 E1053 L1054 T1055 P1056 P1057 A1058 L1059 I1060
P1067 L1070 N1073 Y1079 I1080 K1081 D1087 D1092 R1093 A1094 N1095 I1098 R1099 R1106 A1107 K1108 V1109 E1112 N1115 V1118 R1123 R1132 A1137 N1140 V1144 K1165 D1180 L1187 N1190 R1191 D1192 Q1193 N1194 D1195 L1196 T1199 N1203
S1206 V1210 M1214 D1217 L1218 V1219 D1220 N1221 L1224 N1225 R1226 E1227 L1228 P1232 R1240 L1247 E1251 Q1275 F1278 R1281 L1282 P1287 L1290 L1294 E1297 H1301 Q1302 L1303 R1304 I1308 M1311 L1312 D1318 Y1326 V1332 G1333 A1345
I1349 W1356 R1360 G1363 V1367 R1380 W1389 L1390 L1391 R1394 V1400 E1403 I1404 N1405 R1406 W1421 L1422 R1423 A1434 P1443 L1446 A1447 D1461 V1462 I1465 D1474 E1475 V1476 A1477 D1478 F1481 A1482 L1483 M1484 S1497 R1501 D1502 D1503 R1504 R1510
L1511 A1512 I1513 R1522 A1523 L1524 E1533 E1536 K1541 T1547 T1548 E1562 K1565 S1588 GLY THR GLY THR THR GLY

# 4 Experimental information (i)

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, Not provided | |
| Number of particles used | 45998 | Depositor |
| Resolution determination method | FSC 0.143 CUT-OFF | Depositor |
| CTF correction method | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope | TFS KRIOS | Depositor |
| Voltage (kV) | 300 | Depositor |
| Electron dose ($e^-/Å^2$) | 49 | Depositor |
| Minimum defocus (nm) | 1000 | Depositor |
| Maximum defocus (nm) | 5000 | Depositor |
| Magnification | 130000 | Depositor |
| Image detector | GATAN K3 (6k x 4k) | Depositor |
| Maximum map value | 0.053 | Depositor |
| Minimum map value | -0.019 | Depositor |
| Average map value | 0.000 | Depositor |
| Map value standard deviation | 0.002 | Depositor |
| Recommended contour level | 0.005 | Depositor |
| Map size (Å) | 439.41602, 439.41602, 439.41602 | wwPDB |
| Map dimensions | 340, 340, 340 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 1.2924, 1.2924, 1.2924 | Depositor |

# 5 Model quality

## 5.1 Standard geometry

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

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 | 0.08 | 0/8502 | 0.22 | 0/11541 |
| 1 | B | 0.08 | 0/8502 | 0.22 | 0/11541 |
| 1 | C | 0.08 | 0/8502 | 0.22 | 0/11541 |
| 1 | D | 0.08 | 0/8502 | 0.22 | 0/11541 |
| All | All | 0.08 | 0/34008 | 0.22 | 0/46164 |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

## 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 | 8350 | 0 | 8301 | 193 | 0 |
| 1 | B | 8350 | 0 | 8301 | 189 | 0 |
| 1 | C | 8350 | 0 | 8301 | 186 | 0 |
| 1 | D | 8350 | 0 | 8301 | 189 | 0 |
| 2 | A | 44 | 0 | 26 | 11 | 0 |
| 2 | B | 44 | 0 | 26 | 11 | 0 |
| 2 | C | 44 | 0 | 26 | 11 | 0 |
| 2 | D | 44 | 0 | 26 | 11 | 0 |
| All | All | 33576 | 0 | 33308 | 750 | 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 11.

All (750) 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:960:ASP:HB2 | 1:A:983:ASP:OD2 | 1.42 | 1.20 |
| 1:B:960:ASP:HB2 | 1:B:983:ASP:OD2 | 1.42 | 1.20 |
| 1:D:960:ASP:HB2 | 1:D:983:ASP:OD2 | 1.42 | 1.20 |
| 1:C:960:ASP:HB2 | 1:C:983:ASP:OD2 | 1.42 | 1.20 |
| 1:B:960:ASP:CB | 1:B:983:ASP:OD2 | 2.24 | 0.86 |
| 1:D:960:ASP:CB | 1:D:983:ASP:OD2 | 2.24 | 0.86 |
| 1:C:960:ASP:CB | 1:C:983:ASP:OD2 | 2.24 | 0.84 |
| 1:A:960:ASP:CB | 1:A:983:ASP:OD2 | 2.24 | 0.84 |
| 1:D:1115:ASN:HD22 | 1:D:1140:ASN:HD21 | 1.33 | 0.76 |
| 1:B:1115:ASN:HD22 | 1:B:1140:ASN:HD21 | 1.33 | 0.76 |
| 1:C:1115:ASN:ND2 | 1:C:1140:ASN:ND2 | 2.34 | 0.75 |
| 1:A:1115:ASN:ND2 | 1:A:1140:ASN:ND2 | 2.34 | 0.75 |
| 1:B:1037:ILE:HB | 1:B:1052:GLU:HA | 1.69 | 0.75 |
| 1:D:1037:ILE:HB | 1:D:1052:GLU:HA | 1.69 | 0.75 |
| 1:C:1042:ARG:HH21 | 1:C:1047:LEU:H | 1.35 | 0.75 |
| 1:A:1042:ARG:HH21 | 1:A:1047:LEU:H | 1.35 | 0.75 |
| 1:B:1115:ASN:ND2 | 1:B:1140:ASN:ND2 | 2.34 | 0.75 |
| 1:D:1115:ASN:ND2 | 1:D:1140:ASN:ND2 | 2.34 | 0.74 |
| 1:B:1042:ARG:HH21 | 1:B:1047:LEU:H | 1.35 | 0.74 |
| 1:D:1042:ARG:HH21 | 1:D:1047:LEU:H | 1.35 | 0.74 |
| 1:A:546:LEU:HD13 | 1:B:546:LEU:HD13 | 1.68 | 0.74 |
| 1:A:1115:ASN:HD22 | 1:A:1140:ASN:HD21 | 1.33 | 0.73 |
| 1:C:1115:ASN:HD22 | 1:C:1140:ASN:HD21 | 1.33 | 0.73 |
| 1:C:1037:ILE:HB | 1:C:1052:GLU:HA | 1.69 | 0.73 |
| 1:A:1037:ILE:HB | 1:A:1052:GLU:HA | 1.69 | 0.73 |
| 1:A:1115:ASN:HD22 | 1:A:1140:ASN:ND2 | 1.86 | 0.73 |
| 1:C:1115:ASN:HD22 | 1:C:1140:ASN:ND2 | 1.86 | 0.73 |
| 1:C:530:LYS:HG3 | 1:C:576:GLN:HE22 | 1.54 | 0.73 |
| 1:A:530:LYS:HG3 | 1:A:576:GLN:HE22 | 1.54 | 0.73 |
| 1:D:530:LYS:HG3 | 1:D:576:GLN:HE22 | 1.54 | 0.72 |
| 1:B:530:LYS:HG3 | 1:B:576:GLN:HE22 | 1.54 | 0.72 |
| 1:D:671:LEU:HD12 | 1:D:686:ARG:HH22 | 1.56 | 0.71 |
| 1:B:671:LEU:HD12 | 1:B:686:ARG:HH22 | 1.56 | 0.71 |
| 1:A:671:LEU:HD12 | 1:A:686:ARG:HH22 | 1.56 | 0.70 |
| 1:C:671:LEU:HD12 | 1:C:686:ARG:HH22 | 1.56 | 0.70 |
| 1:B:1115:ASN:HD22 | 1:B:1140:ASN:ND2 | 1.86 | 0.70 |
| 1:D:1115:ASN:HD22 | 1:D:1140:ASN:ND2 | 1.86 | 0.70 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:765:SER:O | 1:B:822:LYS:NZ | 2.26 | 0.69 |
| 1:D:765:SER:O | 1:D:822:LYS:NZ | 2.26 | 0.69 |
| 1:D:1394:ARG:HH12 | 1:D:1406:ARG:HH12 | 1.41 | 0.68 |
| 1:B:1394:ARG:HH12 | 1:B:1406:ARG:HH12 | 1.41 | 0.68 |
| 1:C:1394:ARG:HH12 | 1:C:1406:ARG:HH12 | 1.42 | 0.68 |
| 1:A:1394:ARG:HH12 | 1:A:1406:ARG:HH12 | 1.41 | 0.68 |
| 1:B:997:ARG:HD2 | 1:B:1020:LEU:HD22 | 1.76 | 0.68 |
| 1:D:997:ARG:HD2 | 1:D:1020:LEU:HD22 | 1.76 | 0.68 |
| 1:D:1423:ARG:NH2 | 1:D:1478:ASP:OD1 | 2.26 | 0.67 |
| 1:B:1423:ARG:NH2 | 1:B:1478:ASP:OD1 | 2.26 | 0.67 |
| 1:C:765:SER:O | 1:C:822:LYS:NZ | 2.26 | 0.67 |
| 1:A:765:SER:O | 1:A:822:LYS:NZ | 2.26 | 0.67 |
| 1:A:1579:ARG:HE | 1:D:1512:ALA:HB1 | 1.60 | 0.66 |
| 1:A:983:ASP:CG | 1:A:984:HIS:H | 2.04 | 0.66 |
| 1:A:997:ARG:HD2 | 1:A:1020:LEU:HD22 | 1.76 | 0.66 |
| 1:B:527:ARG:NH2 | 1:B:585:ILE:O | 2.29 | 0.66 |
| 1:B:944:MET:HG3 | 1:B:1132:ARG:HE | 1.60 | 0.66 |
| 1:D:944:MET:HG3 | 1:D:1132:ARG:HE | 1.60 | 0.66 |
| 1:B:983:ASP:CG | 1:B:984:HIS:H | 2.04 | 0.66 |
| 1:C:997:ARG:HD2 | 1:C:1020:LEU:HD22 | 1.76 | 0.66 |
| 1:D:527:ARG:NH2 | 1:D:585:ILE:O | 2.29 | 0.66 |
| 1:D:983:ASP:CG | 1:D:984:HIS:H | 2.04 | 0.66 |
| 1:A:674:ALA:HB3 | 1:A:686:ARG:HH21 | 1.60 | 0.66 |
| 1:C:674:ALA:HB3 | 1:C:686:ARG:HH21 | 1.60 | 0.66 |
| 1:A:527:ARG:NH2 | 1:A:585:ILE:O | 2.29 | 0.66 |
| 1:C:944:MET:HG3 | 1:C:1132:ARG:HE | 1.60 | 0.66 |
| 1:B:1067:PRO:HG3 | 1:B:1106:ARG:HE | 1.61 | 0.65 |
| 1:C:527:ARG:NH2 | 1:C:585:ILE:O | 2.29 | 0.65 |
| 1:C:983:ASP:CG | 1:C:984:HIS:H | 2.03 | 0.65 |
| 1:A:944:MET:HG3 | 1:A:1132:ARG:HE | 1.60 | 0.65 |
| 1:B:674:ALA:HB3 | 1:B:686:ARG:HH21 | 1.60 | 0.65 |
| 1:D:674:ALA:HB3 | 1:D:686:ARG:HH21 | 1.60 | 0.65 |
| 1:D:1067:PRO:HG3 | 1:D:1106:ARG:HE | 1.61 | 0.65 |
| 1:A:1067:PRO:HG3 | 1:A:1106:ARG:HE | 1.61 | 0.65 |
| 1:A:671:LEU:HD22 | 1:A:695:VAL:HG21 | 1.78 | 0.65 |
| 1:C:1067:PRO:HG3 | 1:C:1106:ARG:HE | 1.61 | 0.65 |
| 1:C:671:LEU:HD22 | 1:C:695:VAL:HG21 | 1.79 | 0.65 |
| 1:B:671:LEU:HD22 | 1:B:695:VAL:HG21 | 1.78 | 0.64 |
| 1:B:1092:ASP:O | 1:B:1099:ARG:NH2 | 2.30 | 0.64 |
| 1:D:671:LEU:HD22 | 1:D:695:VAL:HG21 | 1.79 | 0.64 |
| 1:D:1092:ASP:O | 1:D:1099:ARG:NH2 | 2.30 | 0.64 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:1092:ASP:O | 1:A:1099:ARG:NH2 | 2.30 | 0.64 |
| 1:C:981:ALA:HB3 | 1:C:988:PHE:HB3 | 1.79 | 0.64 |
| 1:B:981:ALA:HB3 | 1:B:988:PHE:HB3 | 1.79 | 0.63 |
| 1:A:1014:ALA:HA | 1:A:1027:VAL:HG11 | 1.80 | 0.63 |
| 1:C:1014:ALA:HA | 1:C:1027:VAL:HG11 | 1.80 | 0.63 |
| 1:C:1092:ASP:O | 1:C:1099:ARG:NH2 | 2.30 | 0.63 |
| 1:D:981:ALA:HB3 | 1:D:988:PHE:HB3 | 1.79 | 0.63 |
| 1:A:981:ALA:HB3 | 1:A:988:PHE:HB3 | 1.79 | 0.63 |
| 1:B:1014:ALA:HA | 1:B:1027:VAL:HG11 | 1.80 | 0.63 |
| 1:B:1217:ASP:OD1 | 1:B:1221:ASN:ND2 | 2.32 | 0.63 |
| 1:D:1014:ALA:HA | 1:D:1027:VAL:HG11 | 1.80 | 0.63 |
| 1:D:1217:ASP:OD1 | 1:D:1221:ASN:ND2 | 2.32 | 0.63 |
| 1:A:1217:ASP:OD1 | 1:A:1221:ASN:ND2 | 2.32 | 0.63 |
| 1:C:1217:ASP:OD1 | 1:C:1221:ASN:ND2 | 2.32 | 0.63 |
| 1:C:1389:TRP:NE1 | 1:C:1461:ASP:OD1 | 2.30 | 0.63 |
| 1:A:1389:TRP:NE1 | 1:A:1461:ASP:OD1 | 2.30 | 0.62 |
| 1:A:1555:ARG:HD3 | 1:D:1333:GLY:HA3 | 1.80 | 0.62 |
| 1:B:565:ARG:HH22 | 1:B:570:LEU:N | 1.97 | 0.62 |
| 1:B:1389:TRP:NE1 | 1:B:1461:ASP:OD1 | 2.30 | 0.62 |
| 1:D:565:ARG:HH22 | 1:D:570:LEU:N | 1.98 | 0.62 |
| 1:D:1389:TRP:NE1 | 1:D:1461:ASP:OD1 | 2.30 | 0.62 |
| 1:B:1332:VAL:HG11 | 1:B:1391:LEU:HD23 | 1.81 | 0.62 |
| 1:D:1332:VAL:HG11 | 1:D:1391:LEU:HD23 | 1.81 | 0.62 |
| 1:D:1190:ASN:O | 1:D:1194:ASN:ND2 | 2.33 | 0.62 |
| 1:B:1190:ASN:O | 1:B:1194:ASN:ND2 | 2.33 | 0.62 |
| 1:C:1190:ASN:O | 1:C:1194:ASN:ND2 | 2.33 | 0.62 |
| 1:A:565:ARG:HH22 | 1:A:570:LEU:N | 1.98 | 0.62 |
| 1:A:1423:ARG:NH2 | 1:A:1478:ASP:OD1 | 2.26 | 0.62 |
| 1:C:565:ARG:HH22 | 1:C:570:LEU:N | 1.98 | 0.62 |
| 1:A:1190:ASN:O | 1:A:1194:ASN:ND2 | 2.33 | 0.61 |
| 1:B:508:ILE:O | 1:B:566:ARG:NH1 | 2.34 | 0.61 |
| 1:C:1423:ARG:NH2 | 1:C:1478:ASP:OD1 | 2.26 | 0.61 |
| 1:D:508:ILE:O | 1:D:566:ARG:NH1 | 2.34 | 0.61 |
| 1:A:508:ILE:O | 1:A:566:ARG:NH1 | 2.34 | 0.61 |
| 1:C:508:ILE:O | 1:C:566:ARG:NH1 | 2.33 | 0.61 |
| 1:A:1332:VAL:HG11 | 1:A:1391:LEU:HD23 | 1.81 | 0.61 |
| 1:C:1332:VAL:HG11 | 1:C:1391:LEU:HD23 | 1.81 | 0.61 |
| 1:B:1080:ILE:HD13 | 1:B:1118:VAL:HG22 | 1.82 | 0.61 |
| 1:C:542:LEU:HB3 | 1:C:546:LEU:HD11 | 1.83 | 0.61 |
| 1:D:1080:ILE:HD13 | 1:D:1118:VAL:HG22 | 1.82 | 0.61 |
| 1:D:1497:SER:HA | 1:D:1510:ARG:HH21 | 1.66 | 0.61 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:D:1536:GLU:O | 1:D:1541:LYS:NZ | 2.34 | 0.61 |
| 1:A:542:LEU:HB3 | 1:A:546:LEU:HD11 | 1.83 | 0.61 |
| 1:B:1497:SER:HA | 1:B:1510:ARG:HH21 | 1.66 | 0.61 |
| 1:C:1497:SER:HA | 1:C:1510:ARG:HH21 | 1.66 | 0.60 |
| 1:A:556:VAL:HA | 1:A:579:ILE:HG22 | 1.83 | 0.60 |
| 1:A:1497:SER:HA | 1:A:1510:ARG:HH21 | 1.66 | 0.60 |
| 1:A:1536:GLU:O | 1:A:1541:LYS:NZ | 2.34 | 0.60 |
| 1:B:1287:PRO:HD2 | 1:B:1290:LEU:HD12 | 1.83 | 0.60 |
| 1:C:556:VAL:HA | 1:C:579:ILE:HG22 | 1.83 | 0.60 |
| 1:D:1287:PRO:HD2 | 1:D:1290:LEU:HD12 | 1.83 | 0.60 |
| 1:C:1536:GLU:O | 1:C:1541:LYS:NZ | 2.34 | 0.60 |
| 1:B:542:LEU:HB3 | 1:B:546:LEU:HD11 | 1.83 | 0.60 |
| 1:C:1421:TRP:HB2 | 1:C:1481:PHE:HD2 | 1.67 | 0.60 |
| 1:D:542:LEU:HB3 | 1:D:546:LEU:HD11 | 1.83 | 0.60 |
| 1:B:664:THR:HG21 | 1:B:711:LEU:HD13 | 1.84 | 0.60 |
| 1:C:1080:ILE:HD13 | 1:C:1118:VAL:HG22 | 1.82 | 0.60 |
| 1:C:1287:PRO:HD2 | 1:C:1290:LEU:HD12 | 1.83 | 0.60 |
| 1:D:1421:TRP:HB2 | 1:D:1481:PHE:HD2 | 1.67 | 0.60 |
| 1:A:1287:PRO:HD2 | 1:A:1290:LEU:HD12 | 1.83 | 0.59 |
| 1:A:1080:ILE:HD13 | 1:A:1118:VAL:HG22 | 1.82 | 0.59 |
| 1:A:1421:TRP:HB2 | 1:A:1481:PHE:HD2 | 1.67 | 0.59 |
| 1:B:1421:TRP:HB2 | 1:B:1481:PHE:HD2 | 1.67 | 0.59 |
| 1:D:664:THR:HG21 | 1:D:711:LEU:HD13 | 1.84 | 0.59 |
| 1:B:556:VAL:HA | 1:B:579:ILE:HG22 | 1.83 | 0.59 |
| 1:D:556:VAL:HA | 1:D:579:ILE:HG22 | 1.83 | 0.59 |
| 1:A:1060:ILE:HG21 | 1:A:1098:ILE:HD11 | 1.83 | 0.59 |
| 1:C:1060:ILE:HG21 | 1:C:1098:ILE:HD11 | 1.83 | 0.59 |
| 1:D:1060:ILE:HG21 | 1:D:1098:ILE:HD11 | 1.83 | 0.59 |
| 1:B:1060:ILE:HG21 | 1:B:1098:ILE:HD11 | 1.84 | 0.59 |
| 1:B:616:ASP:OD2 | 1:B:636:ARG:NE | 2.33 | 0.59 |
| 1:D:616:ASP:OD2 | 1:D:636:ARG:NE | 2.33 | 0.59 |
| 1:B:539:SER:HB3 | 1:B:573:TRP:CE2 | 2.38 | 0.58 |
| 1:C:952:ASP:HA | 1:C:975:HIS:HB3 | 1.85 | 0.58 |
| 1:C:1115:ASN:HD21 | 2:C:1601:NAD:H6N | 1.69 | 0.58 |
| 1:D:539:SER:HB3 | 1:D:573:TRP:CE2 | 2.38 | 0.58 |
| 1:A:952:ASP:HA | 1:A:975:HIS:HB3 | 1.85 | 0.58 |
| 1:C:664:THR:HG21 | 1:C:711:LEU:HD13 | 1.84 | 0.58 |
| 1:A:1115:ASN:HD21 | 2:A:1601:NAD:H6N | 1.69 | 0.58 |
| 1:C:616:ASP:OD2 | 1:C:636:ARG:NE | 2.32 | 0.58 |
| 1:A:664:THR:HG21 | 1:A:711:LEU:HD13 | 1.84 | 0.58 |
| 1:A:616:ASP:OD2 | 1:A:636:ARG:NE | 2.33 | 0.58 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:539:SER:HB3 | 1:A:573:TRP:CE2 | 2.38 | 0.58 |
| 1:A:1555:ARG:NH1 | 1:D:1332:VAL:O | 2.37 | 0.58 |
| 1:B:1282:LEU:HD13 | 1:B:1308:ILE:HG12 | 1.86 | 0.58 |
| 1:C:539:SER:HB3 | 1:C:573:TRP:CE2 | 2.38 | 0.58 |
| 1:D:1282:LEU:HD13 | 1:D:1308:ILE:HG12 | 1.86 | 0.58 |
| 1:B:1301:HIS:O | 1:B:1304:ARG:NH1 | 2.37 | 0.57 |
| 1:C:1282:LEU:HD13 | 1:C:1308:ILE:HG12 | 1.86 | 0.57 |
| 1:D:1115:ASN:HD21 | 2:D:1601:NAD:H6N | 1.68 | 0.57 |
| 1:D:1301:HIS:O | 1:D:1304:ARG:NH1 | 2.37 | 0.57 |
| 1:A:1282:LEU:HD13 | 1:A:1308:ILE:HG12 | 1.86 | 0.57 |
| 1:B:1115:ASN:HD21 | 2:B:1601:NAD:H6N | 1.69 | 0.57 |
| 1:B:1533:GLU:O | 1:B:1541:LYS:NZ | 2.38 | 0.57 |
| 1:D:952:ASP:HA | 1:D:975:HIS:HB3 | 1.85 | 0.57 |
| 1:B:952:ASP:HA | 1:B:975:HIS:HB3 | 1.86 | 0.56 |
| 1:A:1301:HIS:O | 1:A:1304:ARG:NH1 | 2.37 | 0.56 |
| 1:D:1115:ASN:ND2 | 2:D:1601:NAD:H6N | 2.21 | 0.56 |
| 1:B:1115:ASN:ND2 | 2:B:1601:NAD:H6N | 2.21 | 0.56 |
| 1:C:1533:GLU:O | 1:C:1541:LYS:NZ | 2.38 | 0.56 |
| 1:B:685:ARG:NH1 | 1:B:689:GLN:OE1 | 2.38 | 0.56 |
| 1:D:685:ARG:NH1 | 1:D:689:GLN:OE1 | 2.38 | 0.56 |
| 1:A:1073:ASN:HB3 | 1:A:1112:GLU:HA | 1.88 | 0.56 |
| 1:C:1301:HIS:O | 1:C:1304:ARG:NH1 | 2.37 | 0.56 |
| 1:A:685:ARG:NH1 | 1:A:689:GLN:OE1 | 2.38 | 0.56 |
| 1:A:1533:GLU:O | 1:A:1541:LYS:NZ | 2.38 | 0.56 |
| 1:C:685:ARG:NH1 | 1:C:689:GLN:OE1 | 2.38 | 0.56 |
| 1:A:1115:ASN:ND2 | 2:A:1601:NAD:H6N | 2.21 | 0.55 |
| 1:C:1073:ASN:HB3 | 1:C:1112:GLU:HA | 1.88 | 0.55 |
| 1:C:1115:ASN:ND2 | 2:C:1601:NAD:H6N | 2.21 | 0.55 |
| 1:D:1210:VAL:HG12 | 1:D:1214:MET:HE3 | 1.89 | 0.55 |
| 1:B:1210:VAL:HG12 | 1:B:1214:MET:HE3 | 1.89 | 0.55 |
| 1:D:1073:ASN:HB3 | 1:D:1112:GLU:HA | 1.88 | 0.55 |
| 1:B:1073:ASN:HB3 | 1:B:1112:GLU:HA | 1.88 | 0.55 |
| 1:D:1394:ARG:NH1 | 1:D:1403:GLU:OE1 | 2.40 | 0.55 |
| 1:A:1394:ARG:NH1 | 1:A:1403:GLU:OE1 | 2.40 | 0.55 |
| 1:B:1394:ARG:NH1 | 1:B:1403:GLU:OE1 | 2.40 | 0.55 |
| 1:C:1394:ARG:NH1 | 1:C:1403:GLU:OE1 | 2.40 | 0.55 |
| 1:B:1240:ARG:NH1 | 1:B:1251:GLU:OE1 | 2.39 | 0.55 |
| 1:D:955:VAL:HG22 | 1:D:1070:LEU:HB3 | 1.89 | 0.55 |
| 1:D:1240:ARG:NH1 | 1:D:1251:GLU:OE1 | 2.39 | 0.55 |
| 1:A:955:VAL:HG22 | 1:A:1070:LEU:HB3 | 1.89 | 0.55 |
| 1:B:955:VAL:HG22 | 1:B:1070:LEU:HB3 | 1.89 | 0.55 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:706:ASP:OD1 | 1:B:707:THR:N | 2.40 | 0.55 |
| 1:C:804:ALA:HA | 1:C:814:GLY:HA3 | 1.90 | 0.55 |
| 1:A:1579:ARG:NH2 | 1:D:1512:ALA:O | 2.40 | 0.54 |
| 1:C:955:VAL:HG22 | 1:C:1070:LEU:HB3 | 1.89 | 0.54 |
| 1:D:706:ASP:OD1 | 1:D:707:THR:N | 2.40 | 0.54 |
| 1:A:804:ALA:HA | 1:A:814:GLY:HA3 | 1.90 | 0.54 |
| 1:B:631:GLN:NE2 | 1:B:673:GLU:OE2 | 2.40 | 0.54 |
| 1:C:1483:LEU:HD11 | 1:C:1524:LEU:HB3 | 1.89 | 0.54 |
| 1:B:1483:LEU:HD11 | 1:B:1524:LEU:HB3 | 1.90 | 0.54 |
| 1:B:1536:GLU:O | 1:B:1541:LYS:NZ | 2.34 | 0.54 |
| 1:D:1483:LEU:HD11 | 1:D:1524:LEU:HB3 | 1.90 | 0.54 |
| 1:A:631:GLN:NE2 | 1:A:673:GLU:OE2 | 2.40 | 0.54 |
| 1:A:806:LYS:HE3 | 1:A:1144:VAL:HG21 | 1.89 | 0.54 |
| 1:C:631:GLN:NE2 | 1:C:673:GLU:OE2 | 2.40 | 0.54 |
| 1:C:1210:VAL:HG12 | 1:C:1214:MET:HE3 | 1.89 | 0.54 |
| 1:D:631:GLN:NE2 | 1:D:673:GLU:OE2 | 2.40 | 0.54 |
| 1:A:1210:VAL:HG12 | 1:A:1214:MET:HE3 | 1.89 | 0.54 |
| 1:A:1483:LEU:HD11 | 1:A:1524:LEU:HB3 | 1.90 | 0.54 |
| 1:B:806:LYS:HE3 | 1:B:1144:VAL:HG21 | 1.89 | 0.54 |
| 1:C:779:ALA:HB1 | 1:C:815:ALA:HB2 | 1.90 | 0.54 |
| 1:C:806:LYS:HE3 | 1:C:1144:VAL:HG21 | 1.89 | 0.54 |
| 1:A:779:ALA:HB1 | 1:A:815:ALA:HB2 | 1.90 | 0.54 |
| 1:B:724:THR:HG22 | 1:B:726:TYR:H | 1.73 | 0.54 |
| 1:D:806:LYS:HE3 | 1:D:1144:VAL:HG21 | 1.89 | 0.54 |
| 1:D:724:THR:HG22 | 1:D:726:TYR:H | 1.73 | 0.54 |
| 1:A:518:LEU:HD23 | 1:A:531:LEU:HD21 | 1.90 | 0.54 |
| 1:B:1192:ASP:OD1 | 1:B:1360:ARG:NH1 | 2.40 | 0.54 |
| 1:C:706:ASP:OD1 | 1:C:707:THR:N | 2.40 | 0.54 |
| 1:C:1192:ASP:OD1 | 1:C:1360:ARG:NH1 | 2.40 | 0.54 |
| 1:A:706:ASP:OD1 | 1:A:707:THR:N | 2.40 | 0.54 |
| 1:C:518:LEU:HD23 | 1:C:531:LEU:HD21 | 1.90 | 0.54 |
| 1:D:1281:ARG:HE | 1:D:1311:MET:HE2 | 1.73 | 0.54 |
| 1:A:1192:ASP:OD1 | 1:A:1360:ARG:NH1 | 2.40 | 0.53 |
| 1:B:1108:LYS:HG2 | 1:B:1109:VAL:HG23 | 1.91 | 0.53 |
| 1:D:779:ALA:HB1 | 1:D:815:ALA:HB2 | 1.90 | 0.53 |
| 1:D:1192:ASP:OD1 | 1:D:1360:ARG:NH1 | 2.40 | 0.53 |
| 1:A:983:ASP:OD2 | 2:A:1601:NAD:O2B | 2.25 | 0.53 |
| 1:B:779:ALA:HB1 | 1:B:815:ALA:HB2 | 1.90 | 0.53 |
| 1:B:1281:ARG:HE | 1:B:1311:MET:HE2 | 1.73 | 0.53 |
| 1:D:1108:LYS:HG2 | 1:D:1109:VAL:HG23 | 1.91 | 0.53 |
| 1:C:724:THR:HG22 | 1:C:726:TYR:H | 1.73 | 0.53 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:983:ASP:OD2 | 2:C:1601:NAD:O2B | 2.25 | 0.53 |
| 1:C:1038:SER:OG | 1:C:1040:GLN:OE1 | 2.27 | 0.53 |
| 1:D:983:ASP:OD2 | 2:D:1601:NAD:O2B | 2.25 | 0.53 |
| 1:A:1038:SER:OG | 1:A:1040:GLN:OE1 | 2.27 | 0.53 |
| 1:B:804:ALA:HA | 1:B:814:GLY:HA3 | 1.90 | 0.53 |
| 1:A:541:SER:OG | 1:B:556:VAL:O | 2.24 | 0.53 |
| 1:A:724:THR:HG22 | 1:A:726:TYR:H | 1.73 | 0.53 |
| 1:B:788:ARG:HH22 | 1:B:795:GLU:HB2 | 1.74 | 0.53 |
| 1:D:804:ALA:HA | 1:D:814:GLY:HA3 | 1.90 | 0.53 |
| 1:A:641:TYR:O | 1:A:645:ALA:N | 2.41 | 0.53 |
| 1:D:788:ARG:HH22 | 1:D:795:GLU:HB2 | 1.74 | 0.53 |
| 1:C:511:LEU:HD11 | 1:C:534:TYR:HB3 | 1.89 | 0.53 |
| 1:C:641:TYR:O | 1:C:645:ALA:N | 2.41 | 0.53 |
| 1:C:722:LEU:HD11 | 1:C:745:ASN:HB2 | 1.91 | 0.53 |
| 1:A:722:LEU:HD11 | 1:A:745:ASN:HB2 | 1.91 | 0.53 |
| 1:B:788:ARG:NH2 | 1:B:791:ASP:O | 2.42 | 0.53 |
| 1:D:788:ARG:NH2 | 1:D:791:ASP:O | 2.42 | 0.53 |
| 1:A:511:LEU:HD11 | 1:A:534:TYR:HB3 | 1.89 | 0.53 |
| 1:B:511:LEU:HD11 | 1:B:534:TYR:HB3 | 1.89 | 0.52 |
| 1:C:1281:ARG:HE | 1:C:1311:MET:HE2 | 1.73 | 0.52 |
| 1:D:511:LEU:HD11 | 1:D:534:TYR:HB3 | 1.89 | 0.52 |
| 1:A:631:GLN:HB3 | 1:A:669:ILE:HD12 | 1.92 | 0.52 |
| 1:A:1281:ARG:HE | 1:A:1311:MET:HE2 | 1.73 | 0.52 |
| 1:B:983:ASP:OD2 | 2:B:1601:NAD:O2B | 2.25 | 0.52 |
| 1:A:788:ARG:NH2 | 1:A:791:ASP:O | 2.42 | 0.52 |
| 1:B:789:ARG:HG3 | 1:B:820:VAL:HG21 | 1.91 | 0.52 |
| 1:B:1038:SER:OG | 1:B:1040:GLN:OE1 | 2.27 | 0.52 |
| 1:C:631:GLN:HB3 | 1:C:669:ILE:HD12 | 1.92 | 0.52 |
| 1:C:788:ARG:NH2 | 1:C:791:ASP:O | 2.42 | 0.52 |
| 1:D:1038:SER:OG | 1:D:1040:GLN:OE1 | 2.27 | 0.52 |
| 1:A:959:GLY:N | 1:A:982:PHE:O | 2.32 | 0.52 |
| 1:D:789:ARG:HG3 | 1:D:820:VAL:HG21 | 1.91 | 0.52 |
| 1:B:1275:GLN:HB3 | 1:B:1278:PHE:HD2 | 1.75 | 0.52 |
| 1:C:1108:LYS:HG2 | 1:C:1109:VAL:HG23 | 1.91 | 0.52 |
| 1:D:983:ASP:OD1 | 1:D:984:HIS:N | 2.41 | 0.52 |
| 1:C:1112:GLU:OE2 | 1:C:1123:ARG:NE | 2.40 | 0.52 |
| 1:D:1275:GLN:HB3 | 1:D:1278:PHE:HD2 | 1.75 | 0.52 |
| 1:A:730:ARG:NH2 | 1:A:732:ASP:OD2 | 2.43 | 0.52 |
| 1:A:1112:GLU:OE2 | 1:A:1123:ARG:NE | 2.40 | 0.52 |
| 1:B:518:LEU:HD23 | 1:B:531:LEU:HD21 | 1.90 | 0.52 |
| 1:B:722:LEU:HD11 | 1:B:745:ASN:HB2 | 1.91 | 0.52 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:983:ASP:OD1 | 1:B:984:HIS:N | 2.41 | 0.52 |
| 1:D:722:LEU:HD11 | 1:D:745:ASN:HB2 | 1.91 | 0.52 |
| 1:A:1108:LYS:HG2 | 1:A:1109:VAL:HG23 | 1.91 | 0.52 |
| 1:B:604:ALA:O | 1:B:608:ILE:HG13 | 2.09 | 0.52 |
| 1:D:518:LEU:HD23 | 1:D:531:LEU:HD21 | 1.90 | 0.52 |
| 1:D:604:ALA:O | 1:D:608:ILE:HG13 | 2.09 | 0.52 |
| 1:B:806:LYS:HA | 1:B:1137:ALA:HB1 | 1.92 | 0.52 |
| 1:C:730:ARG:NH2 | 1:C:732:ASP:OD2 | 2.43 | 0.52 |
| 1:C:789:ARG:HG3 | 1:C:820:VAL:HG21 | 1.91 | 0.52 |
| 1:A:789:ARG:HG3 | 1:A:820:VAL:HG21 | 1.91 | 0.51 |
| 1:B:730:ARG:NH2 | 1:B:732:ASP:OD2 | 2.42 | 0.51 |
| 1:B:1203:ASN:OD1 | 1:B:1206:SER:OG | 2.28 | 0.51 |
| 1:C:604:ALA:O | 1:C:608:ILE:HG13 | 2.09 | 0.51 |
| 1:C:1195:ASP:OD2 | 1:C:1356:TRP:NE1 | 2.40 | 0.51 |
| 1:D:730:ARG:NH2 | 1:D:732:ASP:OD2 | 2.43 | 0.51 |
| 1:D:806:LYS:HA | 1:D:1137:ALA:HB1 | 1.93 | 0.51 |
| 1:D:1203:ASN:OD1 | 1:D:1206:SER:OG | 2.28 | 0.51 |
| 1:C:959:GLY:N | 1:C:982:PHE:O | 2.32 | 0.51 |
| 1:A:604:ALA:O | 1:A:608:ILE:HG13 | 2.09 | 0.51 |
| 1:B:631:GLN:HB3 | 1:B:669:ILE:HD12 | 1.92 | 0.51 |
| 1:B:702:LEU:HD13 | 1:B:708:ASP:HA | 1.93 | 0.51 |
| 1:C:1275:GLN:HB3 | 1:C:1278:PHE:HD2 | 1.75 | 0.51 |
| 1:D:702:LEU:HD13 | 1:D:708:ASP:HA | 1.93 | 0.51 |
| 1:A:1275:GLN:HB3 | 1:A:1278:PHE:HD2 | 1.75 | 0.51 |
| 1:C:806:LYS:HA | 1:C:1137:ALA:HB1 | 1.92 | 0.51 |
| 1:D:631:GLN:HB3 | 1:D:669:ILE:HD12 | 1.92 | 0.51 |
| 1:A:806:LYS:HA | 1:A:1137:ALA:HB1 | 1.92 | 0.51 |
| 1:A:1195:ASP:OD2 | 1:A:1356:TRP:NE1 | 2.40 | 0.51 |
| 1:A:1203:ASN:OD1 | 1:A:1206:SER:OG | 2.28 | 0.51 |
| 1:C:679:SER:O | 1:C:682:THR:OG1 | 2.24 | 0.51 |
| 1:C:788:ARG:HH22 | 1:C:795:GLU:HB2 | 1.74 | 0.51 |
| 1:C:1203:ASN:OD1 | 1:C:1206:SER:OG | 2.28 | 0.51 |
| 1:C:1294:LEU:HB3 | 1:C:1297:GLU:HB2 | 1.93 | 0.51 |
| 1:D:1533:GLU:O | 1:D:1541:LYS:NZ | 2.38 | 0.51 |
| 1:A:1294:LEU:HB3 | 1:A:1297:GLU:HB2 | 1.93 | 0.51 |
| 1:B:983:ASP:CG | 2:B:1601:NAD:HO2A | 2.19 | 0.51 |
| 1:A:788:ARG:HH22 | 1:A:795:GLU:HB2 | 1.74 | 0.51 |
| 1:D:565:ARG:NE | 1:D:566:ARG:O | 2.43 | 0.51 |
| 1:A:983:ASP:OD1 | 1:A:984:HIS:N | 2.41 | 0.50 |
| 1:B:565:ARG:NE | 1:B:566:ARG:O | 2.43 | 0.50 |
| 1:A:732:ASP:O | 1:A:737:ARG:NH2 | 2.38 | 0.50 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:983:ASP:OD1 | 1:C:984:HIS:N | 2.41 | 0.50 |
| 1:C:1240:ARG:NH1 | 1:C:1251:GLU:OE1 | 2.39 | 0.50 |
| 1:A:1474:ASP:OD1 | 1:A:1475:GLU:N | 2.44 | 0.50 |
| 1:C:702:LEU:HD13 | 1:C:708:ASP:HA | 1.93 | 0.50 |
| 1:C:725:ASN:OD1 | 1:C:741:ALA:N | 2.41 | 0.50 |
| 1:A:702:LEU:HD13 | 1:A:708:ASP:HA | 1.93 | 0.50 |
| 1:C:1474:ASP:OD1 | 1:C:1475:GLU:N | 2.44 | 0.50 |
| 1:B:1294:LEU:HB3 | 1:B:1297:GLU:HB2 | 1.93 | 0.50 |
| 1:A:565:ARG:NE | 1:A:566:ARG:O | 2.43 | 0.50 |
| 1:B:983:ASP:OD1 | 2:B:1601:NAD:O2B | 2.30 | 0.50 |
| 1:B:1474:ASP:OD1 | 1:B:1475:GLU:N | 2.44 | 0.50 |
| 1:C:565:ARG:NE | 1:C:566:ARG:O | 2.43 | 0.50 |
| 1:A:742:PHE:HB3 | 1:A:744:LEU:HD21 | 1.93 | 0.50 |
| 1:A:983:ASP:OD1 | 2:A:1601:NAD:O2B | 2.30 | 0.50 |
| 1:A:1240:ARG:NH1 | 1:A:1251:GLU:OE1 | 2.39 | 0.50 |
| 1:C:732:ASP:O | 1:C:737:ARG:NH2 | 2.38 | 0.50 |
| 1:C:742:PHE:HB3 | 1:C:744:LEU:HD21 | 1.93 | 0.50 |
| 1:D:983:ASP:OD1 | 2:D:1601:NAD:O2B | 2.30 | 0.50 |
| 1:D:1294:LEU:HB3 | 1:D:1297:GLU:HB2 | 1.93 | 0.50 |
| 1:D:1474:ASP:OD1 | 1:D:1475:GLU:N | 2.44 | 0.50 |
| 1:B:1087:ASP:OD1 | 1:B:1099:ARG:NH1 | 2.44 | 0.50 |
| 1:C:983:ASP:OD1 | 2:C:1601:NAD:O2B | 2.30 | 0.50 |
| 1:C:1087:ASP:OD1 | 1:C:1099:ARG:NH1 | 2.45 | 0.50 |
| 1:D:1087:ASP:OD1 | 1:D:1099:ARG:NH1 | 2.44 | 0.50 |
| 1:A:997:ARG:HB3 | 1:A:1020:LEU:HD13 | 1.94 | 0.50 |
| 1:A:1087:ASP:OD1 | 1:A:1099:ARG:NH1 | 2.45 | 0.50 |
| 1:A:983:ASP:CG | 2:A:1601:NAD:HO2A | 2.18 | 0.49 |
| 1:C:997:ARG:HB3 | 1:C:1020:LEU:HD13 | 1.94 | 0.49 |
| 1:D:533:TRP:HB3 | 1:D:575:TYR:HB2 | 1.94 | 0.49 |
| 1:B:533:TRP:HB3 | 1:B:575:TYR:HB2 | 1.94 | 0.49 |
| 1:B:607:ALA:HB1 | 1:B:612:ARG:HB2 | 1.94 | 0.49 |
| 1:B:718:ILE:O | 1:B:876:ARG:NH1 | 2.45 | 0.49 |
| 1:B:723:ARG:HB2 | 1:B:743:LYS:HB3 | 1.94 | 0.49 |
| 1:D:718:ILE:O | 1:D:876:ARG:NH1 | 2.45 | 0.49 |
| 1:D:757:PRO:HG2 | 1:D:773:LEU:HD22 | 1.94 | 0.49 |
| 1:B:757:PRO:HG2 | 1:B:773:LEU:HD22 | 1.94 | 0.49 |
| 1:D:607:ALA:HB1 | 1:D:612:ARG:HB2 | 1.94 | 0.49 |
| 1:D:723:ARG:HB2 | 1:D:743:LYS:HB3 | 1.94 | 0.49 |
| 1:A:718:ILE:O | 1:A:876:ARG:NH1 | 2.45 | 0.49 |
| 1:C:1214:MET:HE2 | 1:C:1326:TYR:HB3 | 1.94 | 0.49 |
| 1:A:1214:MET:HE2 | 1:A:1326:TYR:HB3 | 1.94 | 0.49 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:1443:PRO:HD2 | 1:A:1446:LEU:HD23 | 1.95 | 0.49 |
| 1:C:1345:ALA:HA | 1:C:1404:ILE:HD11 | 1.95 | 0.49 |
| 1:D:641:TYR:O | 1:D:645:ALA:N | 2.41 | 0.49 |
| 1:A:757:PRO:HG2 | 1:A:773:LEU:HD22 | 1.94 | 0.49 |
| 1:A:1345:ALA:HA | 1:A:1404:ILE:HD11 | 1.95 | 0.49 |
| 1:C:718:ILE:O | 1:C:876:ARG:NH1 | 2.45 | 0.49 |
| 1:C:1443:PRO:HD2 | 1:C:1446:LEU:HD23 | 1.95 | 0.49 |
| 1:A:607:ALA:HB1 | 1:A:612:ARG:HB2 | 1.94 | 0.49 |
| 1:B:641:TYR:O | 1:B:645:ALA:N | 2.41 | 0.49 |
| 1:B:742:PHE:HB3 | 1:B:744:LEU:HD21 | 1.93 | 0.49 |
| 1:B:1112:GLU:OE2 | 1:B:1123:ARG:NE | 2.40 | 0.49 |
| 1:C:757:PRO:HG2 | 1:C:773:LEU:HD22 | 1.94 | 0.49 |
| 1:D:1443:PRO:HD2 | 1:D:1446:LEU:HD23 | 1.95 | 0.49 |
| 1:A:1038:SER:HB3 | 1:A:1041:VAL:HG23 | 1.95 | 0.49 |
| 1:B:686:ARG:NH1 | 1:B:688:ALA:HA | 2.27 | 0.49 |
| 1:B:1443:PRO:HD2 | 1:B:1446:LEU:HD23 | 1.95 | 0.49 |
| 1:C:983:ASP:CG | 2:C:1601:NAD:HO2A | 2.20 | 0.49 |
| 1:C:1038:SER:HB3 | 1:C:1041:VAL:HG23 | 1.95 | 0.49 |
| 1:D:742:PHE:HB3 | 1:D:744:LEU:HD21 | 1.93 | 0.49 |
| 1:D:1112:GLU:OE2 | 1:D:1123:ARG:NE | 2.40 | 0.49 |
| 1:A:723:ARG:HB2 | 1:A:743:LYS:HB3 | 1.94 | 0.48 |
| 1:B:1038:SER:HB3 | 1:B:1041:VAL:HG23 | 1.95 | 0.48 |
| 1:C:607:ALA:HB1 | 1:C:612:ARG:HB2 | 1.94 | 0.48 |
| 1:D:1038:SER:HB3 | 1:D:1041:VAL:HG23 | 1.95 | 0.48 |
| 1:B:997:ARG:HB3 | 1:B:1020:LEU:HD13 | 1.94 | 0.48 |
| 1:C:686:ARG:NH1 | 1:C:688:ALA:HA | 2.27 | 0.48 |
| 1:D:686:ARG:NH1 | 1:D:688:ALA:HA | 2.27 | 0.48 |
| 1:D:732:ASP:O | 1:D:737:ARG:NH2 | 2.38 | 0.48 |
| 1:D:997:ARG:HB3 | 1:D:1020:LEU:HD13 | 1.94 | 0.48 |
| 1:A:686:ARG:NH1 | 1:A:688:ALA:HA | 2.27 | 0.48 |
| 1:B:1087:ASP:O | 1:B:1093:ARG:NH2 | 2.42 | 0.48 |
| 1:C:533:TRP:HB3 | 1:C:575:TYR:HB2 | 1.94 | 0.48 |
| 1:C:723:ARG:HB2 | 1:C:743:LYS:HB3 | 1.94 | 0.48 |
| 1:A:533:TRP:HB3 | 1:A:575:TYR:HB2 | 1.94 | 0.48 |
| 1:B:732:ASP:O | 1:B:737:ARG:NH2 | 2.38 | 0.48 |
| 1:D:1087:ASP:O | 1:D:1093:ARG:NH2 | 2.42 | 0.48 |
| 1:B:1345:ALA:HB2 | 1:B:1400:VAL:HG13 | 1.96 | 0.48 |
| 1:D:1345:ALA:HB2 | 1:D:1400:VAL:HG13 | 1.96 | 0.48 |
| 1:A:1199:THR:OG1 | 1:A:1380:ARG:NH2 | 2.46 | 0.48 |
| 1:B:1079:TYR:OH | 2:B:1601:NAD:N1A | 2.44 | 0.48 |
| 1:C:1199:THR:OG1 | 1:C:1380:ARG:NH2 | 2.46 | 0.48 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:D:1079:TYR:OH | 2:D:1601:NAD:N1A | 2.44 | 0.48 |
| 1:B:1199:THR:OG1 | 1:B:1380:ARG:NH2 | 2.46 | 0.48 |
| 1:D:1199:THR:OG1 | 1:D:1380:ARG:NH2 | 2.46 | 0.48 |
| 1:A:960:ASP:HB2 | 1:A:983:ASP:CG | 2.32 | 0.47 |
| 1:B:565:ARG:HH22 | 1:B:570:LEU:H | 1.62 | 0.47 |
| 1:D:959:GLY:N | 1:D:982:PHE:O | 2.32 | 0.47 |
| 1:D:1195:ASP:OD2 | 1:D:1356:TRP:NE1 | 2.40 | 0.47 |
| 1:B:1195:ASP:OD2 | 1:B:1356:TRP:NE1 | 2.40 | 0.47 |
| 1:D:1214:MET:HE2 | 1:D:1326:TYR:HB3 | 1.94 | 0.47 |
| 1:B:1345:ALA:HA | 1:B:1404:ILE:HD11 | 1.95 | 0.47 |
| 1:D:671:LEU:O | 1:D:686:ARG:NH2 | 2.47 | 0.47 |
| 1:A:983:ASP:CG | 2:A:1601:NAD:O2B | 2.57 | 0.47 |
| 1:B:671:LEU:O | 1:B:686:ARG:NH2 | 2.47 | 0.47 |
| 1:B:1214:MET:HE2 | 1:B:1326:TYR:HB3 | 1.94 | 0.47 |
| 1:C:922:ASP:OD1 | 1:C:922:ASP:N | 2.43 | 0.47 |
| 1:C:1079:TYR:OH | 2:C:1601:NAD:N1A | 2.44 | 0.47 |
| 1:D:565:ARG:HH22 | 1:D:570:LEU:H | 1.62 | 0.47 |
| 1:D:1345:ALA:HA | 1:D:1404:ILE:HD11 | 1.95 | 0.47 |
| 1:A:1079:TYR:OH | 2:A:1601:NAD:N1A | 2.44 | 0.47 |
| 1:C:960:ASP:HB2 | 1:C:983:ASP:CG | 2.32 | 0.47 |
| 1:B:959:GLY:N | 1:B:982:PHE:O | 2.32 | 0.47 |
| 1:C:983:ASP:CG | 2:C:1601:NAD:O2B | 2.57 | 0.47 |
| 1:A:557:LEU:HD11 | 1:A:580:SER:HB2 | 1.96 | 0.47 |
| 1:A:671:LEU:O | 1:A:686:ARG:NH2 | 2.47 | 0.47 |
| 1:A:725:ASN:OD1 | 1:A:741:ALA:N | 2.41 | 0.47 |
| 1:B:983:ASP:CG | 2:B:1601:NAD:O2B | 2.57 | 0.47 |
| 1:C:557:LEU:HD11 | 1:C:580:SER:HB2 | 1.96 | 0.47 |
| 1:C:1327:ARG:NH1 | 1:C:1384:ASP:OD2 | 2.42 | 0.47 |
| 1:A:803:GLN:HG2 | 1:A:815:ALA:O | 2.15 | 0.47 |
| 1:A:1232:PRO:HG2 | 1:A:1247:LEU:HD22 | 1.96 | 0.47 |
| 1:C:803:GLN:HG2 | 1:C:815:ALA:O | 2.15 | 0.47 |
| 1:A:1345:ALA:HB2 | 1:A:1400:VAL:HG13 | 1.95 | 0.47 |
| 1:B:1434:ALA:HA | 1:B:1447:ALA:HB1 | 1.97 | 0.47 |
| 1:C:671:LEU:O | 1:C:686:ARG:NH2 | 2.47 | 0.47 |
| 1:D:983:ASP:CG | 2:D:1601:NAD:O2B | 2.57 | 0.47 |
| 1:A:1327:ARG:NH1 | 1:A:1384:ASP:OD2 | 2.41 | 0.47 |
| 1:C:1232:PRO:HG2 | 1:C:1247:LEU:HD22 | 1.96 | 0.47 |
| 1:D:1434:ALA:HA | 1:D:1447:ALA:HB1 | 1.97 | 0.47 |
| 1:A:1078:THR:OG1 | 1:A:1116:LEU:O | 2.28 | 0.46 |
| 1:B:803:GLN:HG2 | 1:B:815:ALA:O | 2.15 | 0.46 |
| 1:B:1219:VAL:HG22 | 1:B:1224:LEU:HB3 | 1.98 | 0.46 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:1345:ALA:HB2 | 1:C:1400:VAL:HG13 | 1.96 | 0.46 |
| 1:D:1219:VAL:HG22 | 1:D:1224:LEU:HB3 | 1.98 | 0.46 |
| 1:B:732:ASP:HA | 1:B:737:ARG:HH12 | 1.81 | 0.46 |
| 1:B:983:ASP:CG | 1:B:984:HIS:N | 2.71 | 0.46 |
| 1:D:732:ASP:HA | 1:D:737:ARG:HH12 | 1.81 | 0.46 |
| 1:D:803:GLN:HG2 | 1:D:815:ALA:O | 2.15 | 0.46 |
| 1:D:983:ASP:CG | 1:D:984:HIS:N | 2.71 | 0.46 |
| 1:A:1434:ALA:HA | 1:A:1447:ALA:HB1 | 1.97 | 0.46 |
| 1:B:557:LEU:HD11 | 1:B:580:SER:HB2 | 1.96 | 0.46 |
| 1:C:1219:VAL:HG22 | 1:C:1224:LEU:HB3 | 1.98 | 0.46 |
| 1:A:1219:VAL:HG22 | 1:A:1224:LEU:HB3 | 1.98 | 0.46 |
| 1:D:557:LEU:HD11 | 1:D:580:SER:HB2 | 1.96 | 0.46 |
| 1:C:704:SER:OG | 1:C:706:ASP:OD1 | 2.31 | 0.46 |
| 1:B:704:SER:OG | 1:B:706:ASP:OD1 | 2.31 | 0.46 |
| 1:B:1035:ILE:HG21 | 1:B:1059:LEU:HD22 | 1.97 | 0.46 |
| 1:B:1092:ASP:HB3 | 1:B:1099:ARG:HH21 | 1.81 | 0.46 |
| 1:B:1092:ASP:OD2 | 1:B:1095:ASN:ND2 | 2.49 | 0.46 |
| 1:C:1434:ALA:HA | 1:C:1447:ALA:HB1 | 1.97 | 0.46 |
| 1:D:1035:ILE:HG21 | 1:D:1059:LEU:HD22 | 1.97 | 0.46 |
| 1:D:1092:ASP:OD2 | 1:D:1095:ASN:ND2 | 2.49 | 0.46 |
| 1:A:553:GLY:O | 1:A:582:HIS:ND1 | 2.46 | 0.46 |
| 1:A:1035:ILE:HG21 | 1:A:1059:LEU:HD22 | 1.97 | 0.46 |
| 1:A:1092:ASP:OD2 | 1:A:1095:ASN:ND2 | 2.49 | 0.46 |
| 1:B:1055:THR:HG23 | 1:B:1058:ALA:H | 1.81 | 0.46 |
| 1:C:1035:ILE:HG21 | 1:C:1059:LEU:HD22 | 1.97 | 0.46 |
| 1:C:1092:ASP:OD2 | 1:C:1095:ASN:ND2 | 2.49 | 0.46 |
| 1:D:1055:THR:HG23 | 1:D:1058:ALA:H | 1.81 | 0.46 |
| 1:A:704:SER:OG | 1:A:706:ASP:OD1 | 2.31 | 0.46 |
| 1:A:957:GLY:HA3 | 1:A:966:PHE:HE1 | 1.81 | 0.46 |
| 1:B:994:ASP:HB2 | 1:B:997:ARG:HH21 | 1.81 | 0.46 |
| 1:B:1232:PRO:HG2 | 1:B:1247:LEU:HD22 | 1.96 | 0.46 |
| 1:B:1562:GLU:HA | 1:B:1565:LYS:HE3 | 1.98 | 0.46 |
| 1:C:957:GLY:HA3 | 1:C:966:PHE:HE1 | 1.81 | 0.46 |
| 1:D:1092:ASP:HB3 | 1:D:1099:ARG:HH21 | 1.81 | 0.46 |
| 1:A:730:ARG:HB2 | 1:A:733:SER:HB3 | 1.98 | 0.45 |
| 1:B:672:PHE:HZ | 1:B:724:THR:HG21 | 1.81 | 0.45 |
| 1:B:957:GLY:HA3 | 1:B:966:PHE:HE1 | 1.81 | 0.45 |
| 1:D:672:PHE:HZ | 1:D:724:THR:HG21 | 1.81 | 0.45 |
| 1:D:957:GLY:HA3 | 1:D:966:PHE:HE1 | 1.81 | 0.45 |
| 1:D:994:ASP:HB2 | 1:D:997:ARG:HH21 | 1.81 | 0.45 |
| 1:D:1562:GLU:HA | 1:D:1565:LYS:HE3 | 1.98 | 0.45 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:983:ASP:OD1 | 2:A:1601:NAD:H1B | 2.17 | 0.45 |
| 1:A:1547:THR:HG23 | 1:A:1548:THR:HG23 | 1.98 | 0.45 |
| 1:B:1465:ILE:HD11 | 1:B:1522:ARG:HG3 | 1.97 | 0.45 |
| 1:C:730:ARG:HB2 | 1:C:733:SER:HB3 | 1.98 | 0.45 |
| 1:C:983:ASP:OD1 | 2:C:1601:NAD:H1B | 2.17 | 0.45 |
| 1:D:1232:PRO:HG2 | 1:D:1247:LEU:HD22 | 1.96 | 0.45 |
| 1:A:556:VAL:O | 1:B:541:SER:OG | 2.30 | 0.45 |
| 1:A:1055:THR:HG23 | 1:A:1058:ALA:H | 1.81 | 0.45 |
| 1:C:553:GLY:O | 1:C:582:HIS:ND1 | 2.46 | 0.45 |
| 1:C:723:ARG:HD2 | 1:C:743:LYS:HD3 | 1.99 | 0.45 |
| 1:C:1055:THR:HG23 | 1:C:1058:ALA:H | 1.81 | 0.45 |
| 1:D:1465:ILE:HD11 | 1:D:1522:ARG:HG3 | 1.97 | 0.45 |
| 1:A:723:ARG:HD2 | 1:A:743:LYS:HD3 | 1.99 | 0.45 |
| 1:B:1165:LYS:NZ | 1:B:1297:GLU:OE2 | 2.32 | 0.45 |
| 1:C:994:ASP:HB2 | 1:C:997:ARG:HH21 | 1.81 | 0.45 |
| 1:D:988:PHE:HD1 | 1:D:1027:VAL:HG22 | 1.81 | 0.45 |
| 1:A:960:ASP:N | 2:A:1601:NAD:O3B | 2.49 | 0.45 |
| 1:B:960:ASP:N | 2:B:1601:NAD:O3B | 2.49 | 0.45 |
| 1:C:960:ASP:N | 2:C:1601:NAD:O3B | 2.49 | 0.45 |
| 1:C:1547:THR:HG23 | 1:C:1548:THR:HG23 | 1.98 | 0.45 |
| 1:D:960:ASP:N | 2:D:1601:NAD:O3B | 2.49 | 0.45 |
| 1:D:1196:LEU:HD22 | 1:D:1318:ASP:HA | 1.98 | 0.45 |
| 1:A:672:PHE:HZ | 1:A:724:THR:HG21 | 1.81 | 0.45 |
| 1:B:730:ARG:HB2 | 1:B:733:SER:HB3 | 1.98 | 0.45 |
| 1:B:988:PHE:HD1 | 1:B:1027:VAL:HG22 | 1.81 | 0.45 |
| 1:B:1196:LEU:HD22 | 1:B:1318:ASP:HA | 1.98 | 0.45 |
| 1:C:983:ASP:CG | 1:C:984:HIS:N | 2.71 | 0.45 |
| 1:A:565:ARG:HH22 | 1:A:570:LEU:H | 1.62 | 0.45 |
| 1:A:1465:ILE:HD11 | 1:A:1522:ARG:HG3 | 1.97 | 0.45 |
| 1:C:988:PHE:HD1 | 1:C:1027:VAL:HG22 | 1.81 | 0.45 |
| 1:A:732:ASP:HA | 1:A:737:ARG:HH12 | 1.80 | 0.45 |
| 1:A:988:PHE:HD1 | 1:A:1027:VAL:HG22 | 1.81 | 0.45 |
| 1:A:994:ASP:HB2 | 1:A:997:ARG:HH21 | 1.81 | 0.45 |
| 1:C:527:ARG:HH21 | 1:C:587:HIS:CE1 | 2.34 | 0.45 |
| 1:C:784:ARG:HE | 1:C:889:LYS:HG2 | 1.82 | 0.45 |
| 1:C:1465:ILE:HD11 | 1:C:1522:ARG:HG3 | 1.97 | 0.45 |
| 1:D:1281:ARG:HH11 | 1:D:1312:LEU:HD23 | 1.81 | 0.45 |
| 1:A:527:ARG:HH21 | 1:A:587:HIS:CE1 | 2.34 | 0.45 |
| 1:B:527:ARG:HH21 | 1:B:587:HIS:CE1 | 2.34 | 0.45 |
| 1:B:888:ASP:OD1 | 1:B:891:THR:OG1 | 2.25 | 0.45 |
| 1:C:563:THR:HB | 1:C:573:TRP:CE3 | 2.52 | 0.45 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:D:730:ARG:HB2 | 1:D:733:SER:HB3 | 1.98 | 0.45 |
| 1:D:1165:LYS:NZ | 1:D:1297:GLU:OE2 | 2.32 | 0.45 |
| 1:A:784:ARG:HE | 1:A:889:LYS:HG2 | 1.82 | 0.45 |
| 1:A:983:ASP:CG | 1:A:984:HIS:N | 2.71 | 0.45 |
| 1:A:1092:ASP:HB3 | 1:A:1099:ARG:HH21 | 1.81 | 0.45 |
| 1:A:1562:GLU:HA | 1:A:1565:LYS:HE3 | 1.98 | 0.45 |
| 1:C:565:ARG:HH22 | 1:C:570:LEU:H | 1.62 | 0.45 |
| 1:C:672:PHE:HZ | 1:C:724:THR:HG21 | 1.81 | 0.45 |
| 1:C:732:ASP:HA | 1:C:737:ARG:HH12 | 1.81 | 0.45 |
| 1:C:888:ASP:OD1 | 1:C:891:THR:OG1 | 2.25 | 0.45 |
| 1:C:1562:GLU:HA | 1:C:1565:LYS:HE3 | 1.99 | 0.45 |
| 1:D:527:ARG:HH21 | 1:D:587:HIS:CE1 | 2.34 | 0.45 |
| 1:A:563:THR:HB | 1:A:573:TRP:CE3 | 2.52 | 0.44 |
| 1:A:931:LYS:HD3 | 1:A:1187:LEU:HD11 | 2.00 | 0.44 |
| 1:B:1281:ARG:HH11 | 1:B:1312:LEU:HD23 | 1.81 | 0.44 |
| 1:C:931:LYS:HD3 | 1:C:1187:LEU:HD11 | 2.00 | 0.44 |
| 1:D:888:ASP:OD1 | 1:D:891:THR:OG1 | 2.25 | 0.44 |
| 1:A:686:ARG:HH11 | 1:A:688:ALA:HA | 1.81 | 0.44 |
| 1:B:983:ASP:OD1 | 2:B:1601:NAD:H1B | 2.17 | 0.44 |
| 1:D:725:ASN:OD1 | 1:D:741:ALA:N | 2.41 | 0.44 |
| 1:A:1301:HIS:CE1 | 1:A:1303:LEU:HB2 | 2.53 | 0.44 |
| 1:B:725:ASN:OD1 | 1:B:741:ALA:N | 2.41 | 0.44 |
| 1:C:686:ARG:HH11 | 1:C:688:ALA:HA | 1.81 | 0.44 |
| 1:C:1055:THR:OG1 | 1:C:1057:PRO:HD2 | 2.18 | 0.44 |
| 1:C:1092:ASP:HB3 | 1:C:1099:ARG:HH21 | 1.81 | 0.44 |
| 1:D:983:ASP:OD1 | 2:D:1601:NAD:H1B | 2.17 | 0.44 |
| 1:D:1301:HIS:CE1 | 1:D:1303:LEU:HB2 | 2.53 | 0.44 |
| 1:A:1055:THR:OG1 | 1:A:1057:PRO:HD2 | 2.18 | 0.44 |
| 1:B:931:LYS:HD3 | 1:B:1187:LEU:HD11 | 1.99 | 0.44 |
| 1:B:1301:HIS:CE1 | 1:B:1303:LEU:HB2 | 2.53 | 0.44 |
| 1:C:1301:HIS:CE1 | 1:C:1303:LEU:HB2 | 2.53 | 0.44 |
| 1:D:769:GLU:HB2 | 1:D:822:LYS:NZ | 2.32 | 0.44 |
| 1:D:931:LYS:HD3 | 1:D:1187:LEU:HD11 | 1.99 | 0.44 |
| 1:B:563:THR:HB | 1:B:573:TRP:CE3 | 2.52 | 0.44 |
| 1:C:1196:LEU:HD22 | 1:C:1318:ASP:HA | 1.98 | 0.44 |
| 1:D:983:ASP:CG | 2:D:1601:NAD:HO2A | 2.25 | 0.44 |
| 1:A:1196:LEU:HD22 | 1:A:1318:ASP:HA | 1.98 | 0.44 |
| 1:B:769:GLU:HB2 | 1:B:822:LYS:NZ | 2.33 | 0.44 |
| 1:B:1055:THR:OG1 | 1:B:1057:PRO:HD2 | 2.17 | 0.44 |
| 1:B:1547:THR:HG23 | 1:B:1548:THR:HG23 | 1.98 | 0.44 |
| 1:D:1547:THR:HG23 | 1:D:1548:THR:HG23 | 1.98 | 0.44 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:520:LEU:HD11 | 1:A:529:TRP:HB3 | 2.00 | 0.44 |
| 1:D:563:THR:HB | 1:D:573:TRP:CE3 | 2.52 | 0.44 |
| 1:D:1055:THR:OG1 | 1:D:1057:PRO:HD2 | 2.18 | 0.44 |
| 1:B:1349:ILE:HG13 | 1:B:1404:ILE:HG12 | 2.00 | 0.44 |
| 1:C:520:LEU:HD11 | 1:C:529:TRP:HB3 | 2.00 | 0.44 |
| 1:C:1281:ARG:HH11 | 1:C:1312:LEU:HD23 | 1.81 | 0.44 |
| 1:D:612:ARG:O | 1:D:738:ASN:ND2 | 2.44 | 0.44 |
| 1:D:1349:ILE:HG13 | 1:D:1404:ILE:HG12 | 2.00 | 0.44 |
| 1:A:774:ARG:NH1 | 1:A:880:ASP:OD2 | 2.50 | 0.44 |
| 1:B:520:LEU:HD11 | 1:B:529:TRP:HB3 | 2.00 | 0.44 |
| 1:B:723:ARG:HD2 | 1:B:743:LYS:HD3 | 1.99 | 0.44 |
| 1:D:723:ARG:HD2 | 1:D:743:LYS:HD3 | 1.99 | 0.44 |
| 1:A:769:GLU:HB2 | 1:A:822:LYS:NZ | 2.32 | 0.43 |
| 1:A:983:ASP:OD1 | 2:A:1601:NAD:C1B | 2.66 | 0.43 |
| 1:B:612:ARG:O | 1:B:738:ASN:ND2 | 2.44 | 0.43 |
| 1:B:686:ARG:HH11 | 1:B:688:ALA:HA | 1.81 | 0.43 |
| 1:D:520:LEU:HD11 | 1:D:529:TRP:HB3 | 2.00 | 0.43 |
| 1:A:1281:ARG:HH11 | 1:A:1312:LEU:HD23 | 1.81 | 0.43 |
| 1:C:769:GLU:HB2 | 1:C:822:LYS:NZ | 2.32 | 0.43 |
| 1:C:774:ARG:NH1 | 1:C:880:ASP:OD2 | 2.50 | 0.43 |
| 1:C:983:ASP:OD1 | 2:C:1601:NAD:C1B | 2.66 | 0.43 |
| 1:D:686:ARG:HH11 | 1:D:688:ALA:HA | 1.81 | 0.43 |
| 1:A:781:GLY:HA3 | 1:A:815:ALA:O | 2.18 | 0.43 |
| 1:B:774:ARG:NH1 | 1:B:880:ASP:OD2 | 2.50 | 0.43 |
| 1:D:749:ILE:O | 1:D:756:ARG:NH1 | 2.51 | 0.43 |
| 1:B:719:GLU:O | 1:B:876:ARG:NH2 | 2.52 | 0.43 |
| 1:B:749:ILE:O | 1:B:756:ARG:NH1 | 2.52 | 0.43 |
| 1:C:781:GLY:HA3 | 1:C:815:ALA:O | 2.18 | 0.43 |
| 1:D:774:ARG:NH1 | 1:D:880:ASP:OD2 | 2.50 | 0.43 |
| 1:D:784:ARG:HE | 1:D:889:LYS:HG2 | 1.81 | 0.43 |
| 1:B:992:ASN:O | 1:B:1022:SER:OG | 2.36 | 0.43 |
| 1:D:719:GLU:O | 1:D:876:ARG:NH2 | 2.52 | 0.43 |
| 1:A:749:ILE:O | 1:A:756:ARG:NH1 | 2.51 | 0.43 |
| 1:B:983:ASP:OD1 | 2:B:1601:NAD:C1B | 2.66 | 0.43 |
| 1:C:749:ILE:O | 1:C:756:ARG:NH1 | 2.51 | 0.43 |
| 1:D:983:ASP:OD1 | 2:D:1601:NAD:C1B | 2.66 | 0.43 |
| 1:D:992:ASN:O | 1:D:1022:SER:OG | 2.36 | 0.43 |
| 1:B:784:ARG:HE | 1:B:889:LYS:HG2 | 1.82 | 0.43 |
| 1:D:781:GLY:HA3 | 1:D:815:ALA:O | 2.18 | 0.43 |
| 1:D:960:ASP:HB2 | 1:D:983:ASP:CG | 2.32 | 0.43 |
| 1:D:1282:LEU:HB2 | 1:D:1308:ILE:HD11 | 2.01 | 0.43 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:974:LYS:HA | 1:A:999:TRP:CD1 | 2.54 | 0.43 |
| 1:B:781:GLY:HA3 | 1:B:815:ALA:O | 2.18 | 0.43 |
| 1:B:1282:LEU:HB2 | 1:B:1308:ILE:HD11 | 2.01 | 0.43 |
| 1:C:974:LYS:HA | 1:C:999:TRP:CD1 | 2.54 | 0.43 |
| 1:B:974:LYS:HA | 1:B:999:TRP:CD1 | 2.54 | 0.43 |
| 1:C:719:GLU:O | 1:C:876:ARG:NH2 | 2.52 | 0.43 |
| 1:D:974:LYS:HA | 1:D:999:TRP:CD1 | 2.54 | 0.43 |
| 1:A:612:ARG:O | 1:A:738:ASN:ND2 | 2.44 | 0.42 |
| 1:A:719:GLU:O | 1:A:876:ARG:NH2 | 2.52 | 0.42 |
| 1:A:955:VAL:HG21 | 1:A:976:ILE:HG23 | 2.01 | 0.42 |
| 1:B:960:ASP:HB2 | 1:B:983:ASP:CG | 2.32 | 0.42 |
| 1:C:955:VAL:HG21 | 1:C:976:ILE:HG23 | 2.01 | 0.42 |
| 1:C:1081:LYS:HB2 | 1:C:1099:ARG:HD2 | 2.01 | 0.42 |
| 1:D:518:LEU:HB3 | 1:D:531:LEU:HD11 | 2.00 | 0.42 |
| 1:A:1081:LYS:HB2 | 1:A:1099:ARG:HD2 | 2.01 | 0.42 |
| 1:B:955:VAL:HG21 | 1:B:976:ILE:HG23 | 2.01 | 0.42 |
| 1:B:1462:VAL:HG11 | 1:B:1477:ALA:HB2 | 2.01 | 0.42 |
| 1:C:959:GLY:HA2 | 2:C:1601:NAD:H1B | 2.01 | 0.42 |
| 1:D:955:VAL:HG21 | 1:D:976:ILE:HG23 | 2.01 | 0.42 |
| 1:A:959:GLY:HA2 | 2:A:1601:NAD:H1B | 2.02 | 0.42 |
| 1:B:518:LEU:HB3 | 1:B:531:LEU:HD11 | 2.00 | 0.42 |
| 1:D:1462:VAL:HG11 | 1:D:1477:ALA:HB2 | 2.02 | 0.42 |
| 1:C:1349:ILE:HG13 | 1:C:1404:ILE:HG12 | 2.00 | 0.42 |
| 1:B:673:GLU:O | 1:B:677:ASP:HB2 | 2.19 | 0.42 |
| 1:C:518:LEU:HB3 | 1:C:531:LEU:HD11 | 2.00 | 0.42 |
| 1:C:784:ARG:HA | 1:C:888:ASP:CG | 2.45 | 0.42 |
| 1:A:784:ARG:HA | 1:A:888:ASP:CG | 2.45 | 0.42 |
| 1:A:1349:ILE:HG13 | 1:A:1404:ILE:HG12 | 2.00 | 0.42 |
| 1:C:612:ARG:O | 1:C:738:ASN:ND2 | 2.44 | 0.42 |
| 1:C:1462:VAL:HG11 | 1:C:1477:ALA:HB2 | 2.01 | 0.42 |
| 1:D:673:GLU:O | 1:D:677:ASP:HB2 | 2.19 | 0.42 |
| 1:A:518:LEU:HB3 | 1:A:531:LEU:HD11 | 2.00 | 0.42 |
| 1:C:1210:VAL:O | 1:C:1214:MET:HG3 | 2.20 | 0.42 |
| 1:D:1081:LYS:HB2 | 1:D:1099:ARG:HD2 | 2.00 | 0.42 |
| 1:B:723:ARG:NH1 | 1:B:858:ASP:OD1 | 2.53 | 0.42 |
| 1:B:1081:LYS:HB2 | 1:B:1099:ARG:HD2 | 2.01 | 0.42 |
| 1:D:723:ARG:NH1 | 1:D:858:ASP:OD1 | 2.53 | 0.42 |
| 1:D:1227:GLU:HG2 | 1:D:1228:LEU:HD12 | 2.02 | 0.42 |
| 1:A:977:ARG:NH2 | 1:A:992:ASN:OD1 | 2.53 | 0.42 |
| 1:A:1210:VAL:O | 1:A:1214:MET:HG3 | 2.20 | 0.42 |
| 1:A:1462:VAL:HG11 | 1:A:1477:ALA:HB2 | 2.02 | 0.42 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:657:VAL:HG13 | 1:B:707:THR:HG23 | 2.02 | 0.42 |
| 1:B:1226:ARG:NH2 | 1:B:1232:PRO:O | 2.46 | 0.42 |
| 1:B:1227:GLU:HG2 | 1:B:1228:LEU:HD12 | 2.02 | 0.42 |
| 1:B:1501:ARG:HG2 | 1:B:1510:ARG:HD3 | 2.02 | 0.42 |
| 1:D:1226:ARG:NH2 | 1:D:1232:PRO:O | 2.46 | 0.42 |
| 1:D:1501:ARG:HG2 | 1:D:1510:ARG:HD3 | 2.02 | 0.42 |
| 1:B:679:SER:O | 1:B:682:THR:OG1 | 2.24 | 0.42 |
| 1:D:1042:ARG:NH2 | 1:D:1047:LEU:H | 2.11 | 0.42 |
| 1:A:964:ASP:OD1 | 1:A:968:ASN:ND2 | 2.53 | 0.41 |
| 1:B:1210:VAL:O | 1:B:1214:MET:HG3 | 2.20 | 0.41 |
| 1:C:723:ARG:NH1 | 1:C:858:ASP:OD1 | 2.53 | 0.41 |
| 1:C:977:ARG:NH2 | 1:C:992:ASN:OD1 | 2.53 | 0.41 |
| 1:D:657:VAL:HG13 | 1:D:707:THR:HG23 | 2.02 | 0.41 |
| 1:D:679:SER:O | 1:D:682:THR:OG1 | 2.24 | 0.41 |
| 1:A:723:ARG:NH1 | 1:A:858:ASP:OD1 | 2.53 | 0.41 |
| 1:A:1301:HIS:HE1 | 1:A:1303:LEU:HB2 | 1.85 | 0.41 |
| 1:B:977:ARG:NH2 | 1:B:992:ASN:OD1 | 2.53 | 0.41 |
| 1:B:1042:ARG:NH2 | 1:B:1047:LEU:H | 2.11 | 0.41 |
| 1:C:1282:LEU:HB2 | 1:C:1308:ILE:HD11 | 2.01 | 0.41 |
| 1:D:1210:VAL:O | 1:D:1214:MET:HG3 | 2.20 | 0.41 |
| 1:D:1301:HIS:HE1 | 1:D:1303:LEU:HB2 | 1.85 | 0.41 |
| 1:B:784:ARG:HA | 1:B:888:ASP:CG | 2.45 | 0.41 |
| 1:B:1301:HIS:HE1 | 1:B:1303:LEU:HB2 | 1.85 | 0.41 |
| 1:B:1308:ILE:HD13 | 1:B:1308:ILE:HA | 1.92 | 0.41 |
| 1:C:657:VAL:HG13 | 1:C:707:THR:HG23 | 2.02 | 0.41 |
| 1:C:964:ASP:OD1 | 1:C:968:ASN:ND2 | 2.53 | 0.41 |
| 1:C:1301:HIS:HE1 | 1:C:1303:LEU:HB2 | 1.85 | 0.41 |
| 1:D:784:ARG:HA | 1:D:888:ASP:CG | 2.45 | 0.41 |
| 1:D:977:ARG:NH2 | 1:D:992:ASN:OD1 | 2.53 | 0.41 |
| 1:D:1308:ILE:HD13 | 1:D:1308:ILE:HA | 1.92 | 0.41 |
| 1:A:1087:ASP:O | 1:A:1093:ARG:NH2 | 2.42 | 0.41 |
| 1:C:673:GLU:O | 1:C:677:ASP:HB2 | 2.19 | 0.41 |
| 1:D:1484:MET:HE2 | 1:D:1484:MET:HB3 | 1.92 | 0.41 |
| 1:A:673:GLU:O | 1:A:677:ASP:HB2 | 2.19 | 0.41 |
| 1:A:960:ASP:HA | 1:A:1013:TRP:NE1 | 2.36 | 0.41 |
| 1:A:1282:LEU:HB2 | 1:A:1308:ILE:HD11 | 2.01 | 0.41 |
| 1:B:959:GLY:HA2 | 2:B:1601:NAD:H1B | 2.02 | 0.41 |
| 1:B:1503:ASP:OD1 | 1:B:1504:ARG:N | 2.54 | 0.41 |
| 1:C:527:ARG:HD3 | 1:C:527:ARG:HA | 1.93 | 0.41 |
| 1:C:960:ASP:HA | 1:C:1013:TRP:NE1 | 2.36 | 0.41 |
| 1:D:959:GLY:HA2 | 2:D:1601:NAD:H1B | 2.02 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:D:1503:ASP:OD1 | 1:D:1504:ARG:N | 2.54 | 0.41 |
| 1:A:560:ARG:HB2 | 1:A:576:GLN:HB3 | 2.02 | 0.41 |
| 1:C:1087:ASP:O | 1:C:1093:ARG:NH2 | 2.42 | 0.41 |
| 1:A:657:VAL:HG13 | 1:A:707:THR:HG23 | 2.02 | 0.41 |
| 1:A:1503:ASP:OD1 | 1:A:1504:ARG:N | 2.54 | 0.41 |
| 1:B:994:ASP:OD2 | 1:B:997:ARG:NE | 2.54 | 0.41 |
| 1:B:1484:MET:HE2 | 1:B:1484:MET:HB3 | 1.92 | 0.41 |
| 1:C:1501:ARG:HG2 | 1:C:1510:ARG:HD3 | 2.02 | 0.41 |
| 1:C:1503:ASP:OD1 | 1:C:1504:ARG:N | 2.54 | 0.41 |
| 1:D:994:ASP:OD2 | 1:D:997:ARG:NE | 2.54 | 0.41 |
| 1:A:687:ASP:OD1 | 1:A:687:ASP:N | 2.53 | 0.41 |
| 1:A:1501:ARG:HG2 | 1:A:1510:ARG:HD3 | 2.02 | 0.41 |
| 1:C:1297:GLU:OE1 | 1:C:1297:GLU:N | 2.41 | 0.41 |
| 1:D:964:ASP:OD1 | 1:D:968:ASN:ND2 | 2.53 | 0.41 |
| 1:D:1510:ARG:HA | 1:D:1513:ILE:HG22 | 2.03 | 0.41 |
| 1:A:939:ARG:HE | 1:A:1198:GLY:HA3 | 1.86 | 0.41 |
| 1:A:992:ASN:O | 1:A:1022:SER:OG | 2.36 | 0.41 |
| 1:A:1389:TRP:HB2 | 1:A:1457:TYR:HE1 | 1.86 | 0.41 |
| 1:B:762:PHE:HD1 | 1:B:771:VAL:HG12 | 1.86 | 0.41 |
| 1:B:964:ASP:OD1 | 1:B:968:ASN:ND2 | 2.53 | 0.41 |
| 1:B:1510:ARG:HA | 1:B:1513:ILE:HG22 | 2.03 | 0.41 |
| 1:C:560:ARG:HB2 | 1:C:576:GLN:HB3 | 2.03 | 0.41 |
| 1:C:687:ASP:N | 1:C:687:ASP:OD1 | 2.53 | 0.41 |
| 1:C:939:ARG:HE | 1:C:1198:GLY:HA3 | 1.86 | 0.41 |
| 1:C:1389:TRP:HB2 | 1:C:1457:TYR:HE1 | 1.86 | 0.41 |
| 1:D:762:PHE:HD1 | 1:D:771:VAL:HG12 | 1.86 | 0.41 |
| 1:A:527:ARG:HD3 | 1:A:527:ARG:HA | 1.93 | 0.41 |
| 1:A:994:ASP:OD2 | 1:A:997:ARG:NE | 2.54 | 0.41 |
| 1:A:1034:SER:OG | 1:A:1054:LEU:N | 2.53 | 0.41 |
| 1:C:992:ASN:O | 1:C:1022:SER:OG | 2.36 | 0.41 |
| 1:D:960:ASP:HA | 1:D:1013:TRP:NE1 | 2.36 | 0.41 |
| 1:D:1363:GLY:HA2 | 1:D:1367:VAL:HB | 2.03 | 0.41 |
| 1:A:762:PHE:HD1 | 1:A:771:VAL:HG12 | 1.86 | 0.40 |
| 1:B:960:ASP:HA | 1:B:1013:TRP:NE1 | 2.36 | 0.40 |
| 1:B:1034:SER:OG | 1:B:1054:LEU:N | 2.53 | 0.40 |
| 1:B:1363:GLY:HA2 | 1:B:1367:VAL:HB | 2.03 | 0.40 |
| 1:C:1034:SER:OG | 1:C:1054:LEU:N | 2.53 | 0.40 |
| 1:C:1214:MET:HG2 | 1:C:1326:TYR:CG | 2.56 | 0.40 |
| 1:D:1034:SER:OG | 1:D:1054:LEU:N | 2.54 | 0.40 |
| 1:A:519:VAL:HB | 1:A:532:THR:OG1 | 2.22 | 0.40 |
| 1:B:560:ARG:HB2 | 1:B:576:GLN:HB3 | 2.03 | 0.40 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:519:VAL:HB | 1:C:532:THR:OG1 | 2.22 | 0.40 |
| 1:A:1096:ASP:OD1 | 1:A:1097:GLN:N | 2.55 | 0.40 |
| 1:A:1297:GLU:OE1 | 1:A:1297:GLU:N | 2.41 | 0.40 |
| 1:C:762:PHE:HD1 | 1:C:771:VAL:HG12 | 1.86 | 0.40 |
| 1:C:924:LYS:HA | 1:C:964:ASP:OD1 | 2.22 | 0.40 |
| 1:C:1096:ASP:OD1 | 1:C:1097:GLN:N | 2.55 | 0.40 |
| 1:D:560:ARG:HB2 | 1:D:576:GLN:HB3 | 2.03 | 0.40 |
| 1:D:924:LYS:HA | 1:D:964:ASP:OD1 | 2.22 | 0.40 |
| 1:A:729:ALA:N | 1:A:872:GLU:OE2 | 2.54 | 0.40 |
| 1:A:924:LYS:HA | 1:A:964:ASP:OD1 | 2.22 | 0.40 |
| 1:B:924:LYS:HA | 1:B:964:ASP:OD1 | 2.22 | 0.40 |
| 1:B:1180:ASP:OD1 | 1:B:1180:ASP:N | 2.54 | 0.40 |
| 1:D:1180:ASP:OD1 | 1:D:1180:ASP:N | 2.54 | 0.40 |
| 1:A:1214:MET:HG2 | 1:A:1326:TYR:CG | 2.56 | 0.40 |
| 1:B:939:ARG:HE | 1:B:1198:GLY:HA3 | 1.86 | 0.40 |
| 1:D:704:SER:OG | 1:D:706:ASP:OD1 | 2.31 | 0.40 |

There are no symmetry-related clashes.

## 5.3 Torsion angles (i)

### 5.3.1 Protein backbone (i)

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 | 1071/1611 (66%) | 1047 (98%) | 24 (2%) | 0 | 100 | 100 |
| 1 | B | 1071/1611 (66%) | 1047 (98%) | 24 (2%) | 0 | 100 | 100 |
| 1 | C | 1071/1611 (66%) | 1046 (98%) | 25 (2%) | 0 | 100 | 100 |
| 1 | D | 1071/1611 (66%) | 1048 (98%) | 23 (2%) | 0 | 100 | 100 |
| All | All | 4284/6444 (66%) | 4188 (98%) | 96 (2%) | 0 | 100 | 100 |

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains (i)

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 | 877/1294 (68%) | 877 (100%) | 0 | 100 | 100 |
| 1 | B | 877/1294 (68%) | 877 (100%) | 0 | 100 | 100 |
| 1 | C | 877/1294 (68%) | 877 (100%) | 0 | 100 | 100 |
| 1 | D | 877/1294 (68%) | 877 (100%) | 0 | 100 | 100 |
| All | All | 3508/5176 (68%) | 3508 (100%) | 0 | 100 | 100 |

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (34) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 576 | GLN |
| 1 | A | 745 | ASN |
| 1 | A | 984 | HIS |
| 1 | A | 1115 | ASN |
| 1 | A | 1225 | ASN |
| 1 | A | 1295 | HIS |
| 1 | A | 1449 | HIS |
| 1 | A | 1456 | GLN |
| 1 | B | 576 | GLN |
| 1 | B | 745 | ASN |
| 1 | B | 984 | HIS |
| 1 | B | 1115 | ASN |
| 1 | B | 1225 | ASN |
| 1 | B | 1275 | GLN |
| 1 | B | 1295 | HIS |
| 1 | B | 1449 | HIS |
| 1 | B | 1456 | GLN |
| 1 | C | 576 | GLN |
| 1 | C | 745 | ASN |
| 1 | C | 984 | HIS |
| 1 | C | 1115 | ASN |
| 1 | C | 1225 | ASN |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | C | 1295 | HIS |
| 1 | C | 1449 | HIS |
| 1 | C | 1456 | GLN |
| 1 | D | 576 | GLN |
| 1 | D | 745 | ASN |
| 1 | D | 984 | HIS |
| 1 | D | 1115 | ASN |
| 1 | D | 1225 | ASN |
| 1 | D | 1275 | GLN |
| 1 | D | 1295 | HIS |
| 1 | D | 1449 | HIS |
| 1 | D | 1456 | 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

There are no oligosaccharides in this entry.

### 5.6 Ligand geometry

4 ligands are modelled in this entry.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

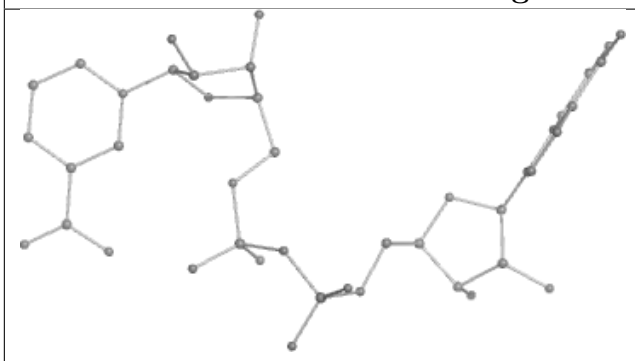
There are no ring outliers.

No monomer is involved in short contacts.

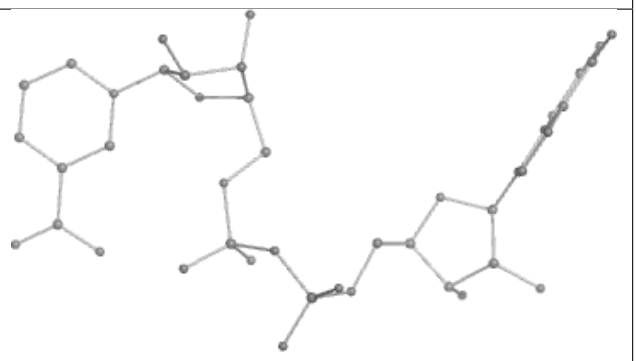
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will

also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

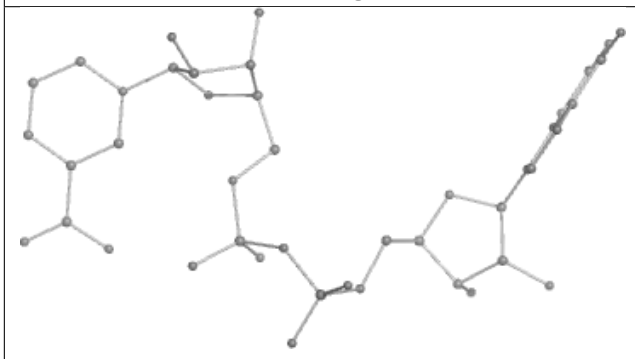
**Ligand NAD A 1601**



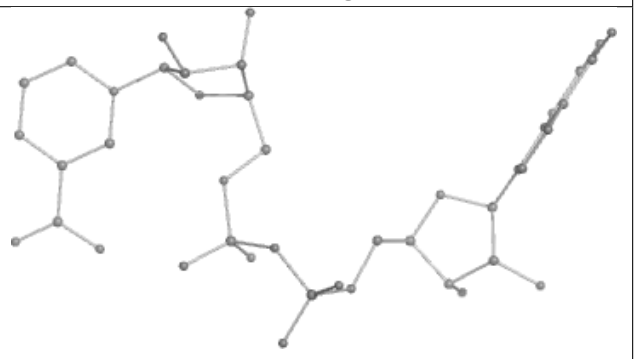
**Bond lengths**



**Bond angles**

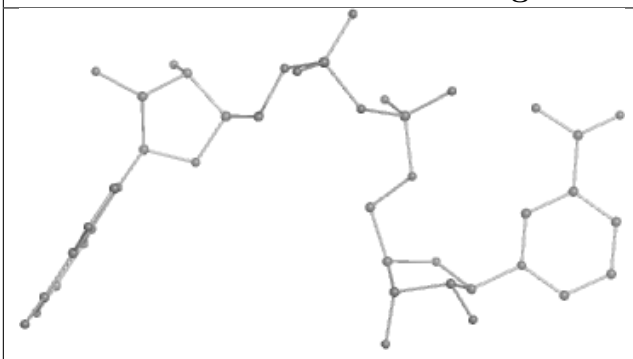


**Torsions**

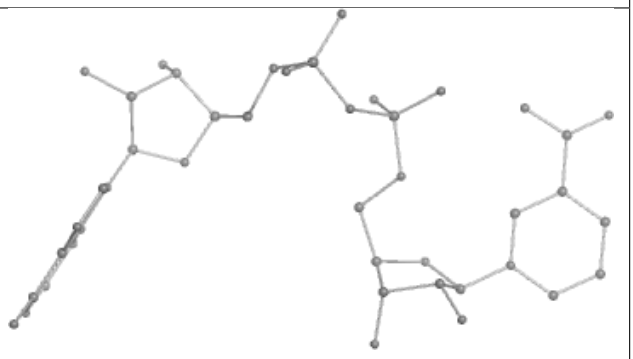


**Rings**

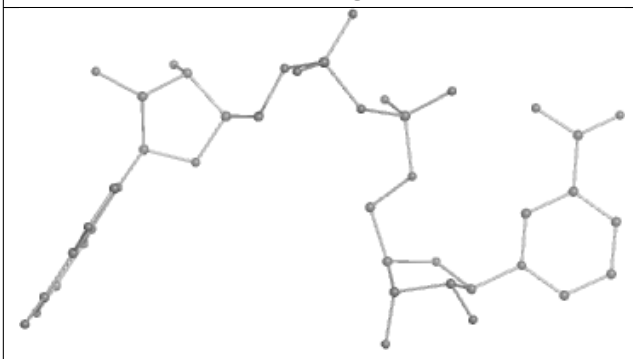
**Ligand NAD B 1601**



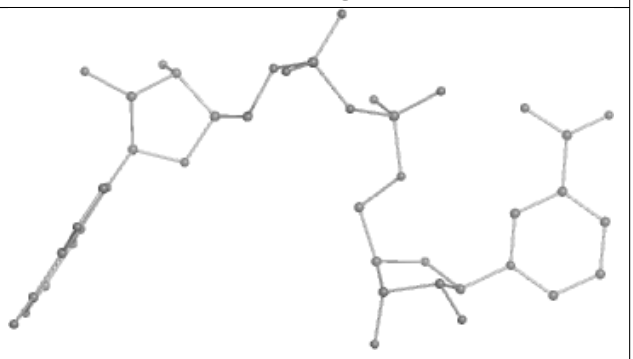
Bond lengths



Bond angles

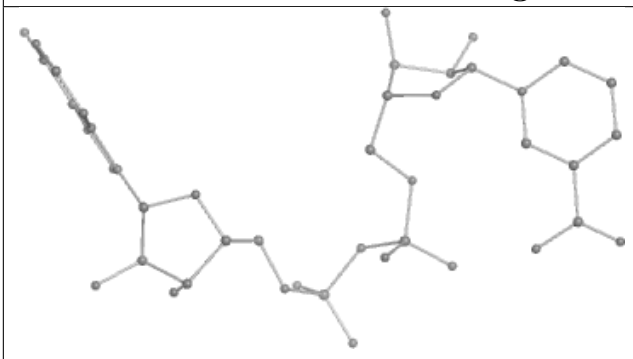


Torsions

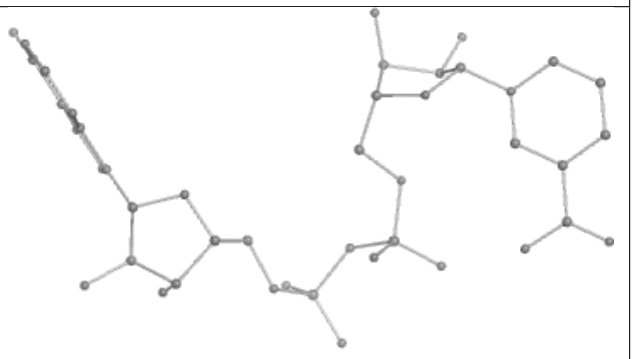


Rings

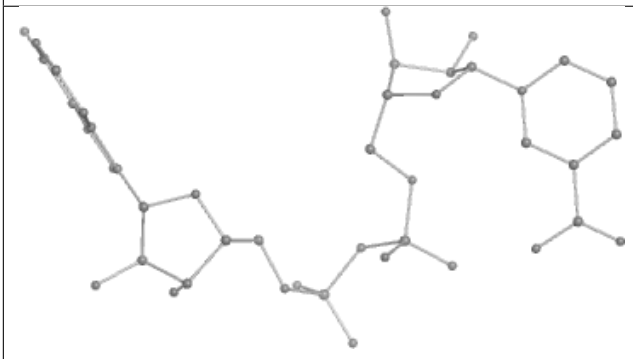
**Ligand NAD C 1601**



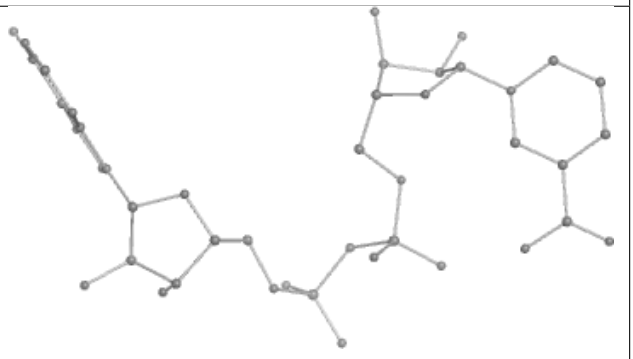
Bond lengths



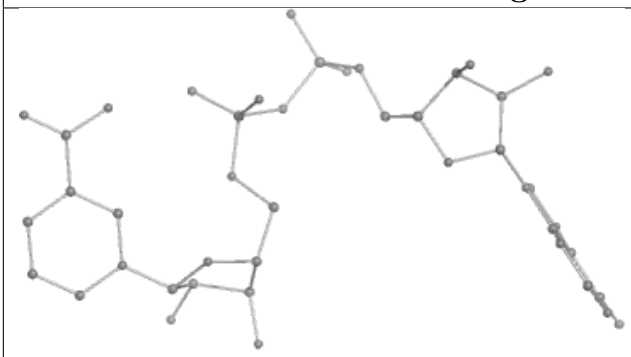
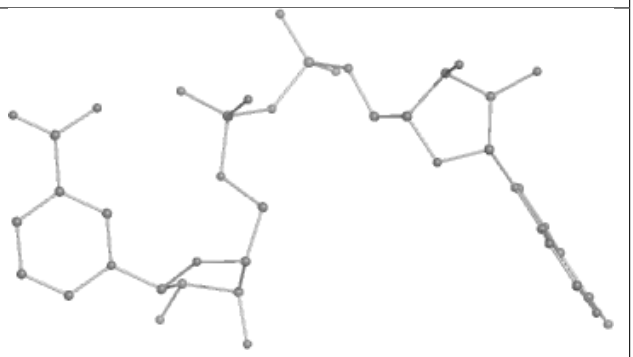
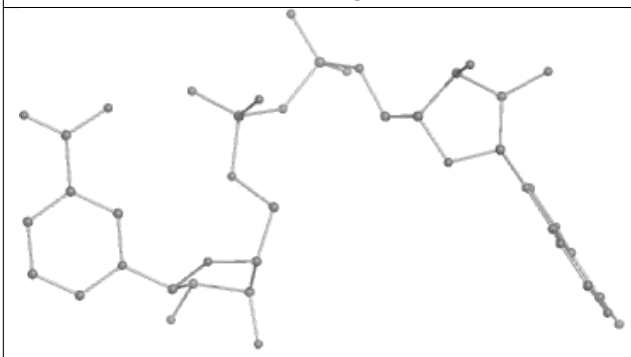
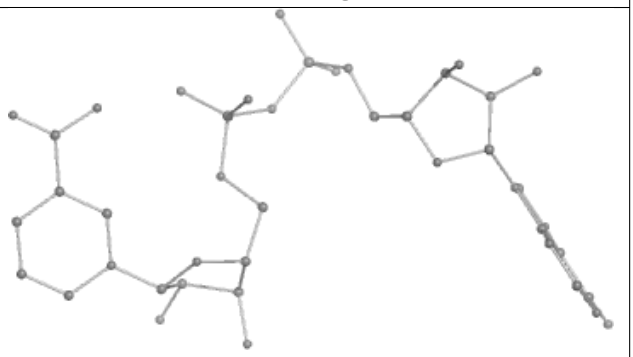
Bond angles



Torsions



Rings

| Ligand NAD D 1601 | |
|---|---|
|  Bond lengths |  Bond angles |
|  Torsions |  Rings |

## 5.7 Other polymers

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

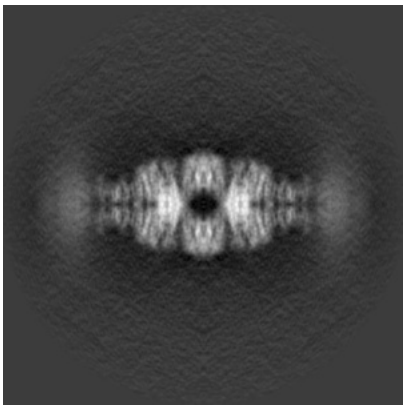
# 6 Map visualisation

This section contains visualisations of the EMDB entry EMD-52420. These allow visual inspection of the internal detail of the map and identification of artifacts.

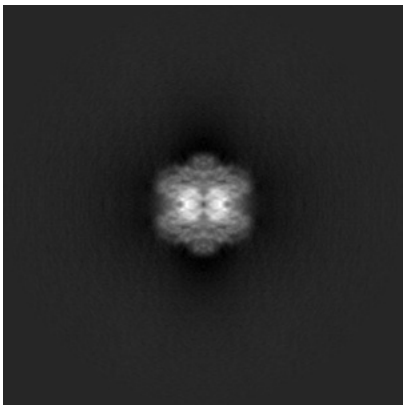
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

## 6.1 Orthogonal projections

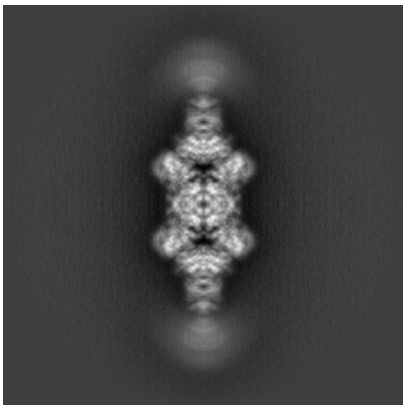
### 6.1.1 Primary map



X

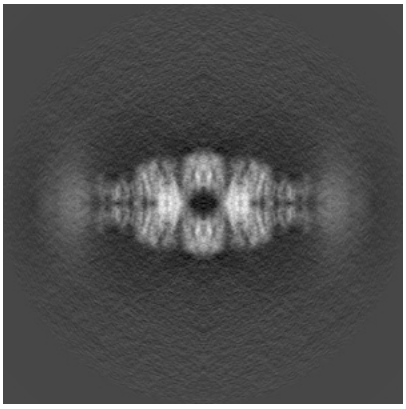


Y

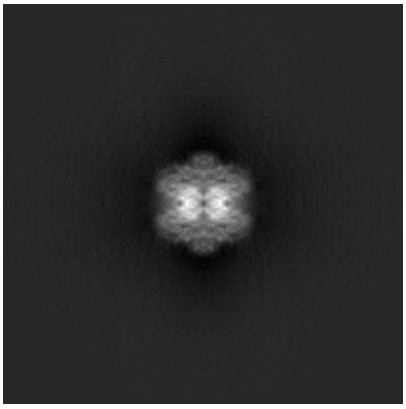


Z

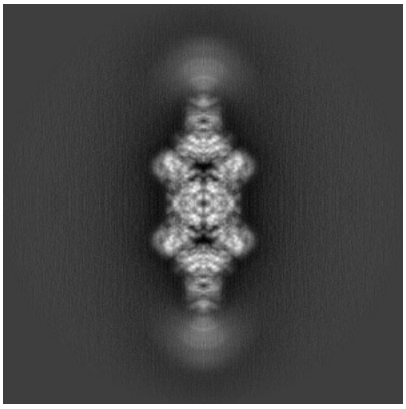
### 6.1.2 Raw map



X



Y

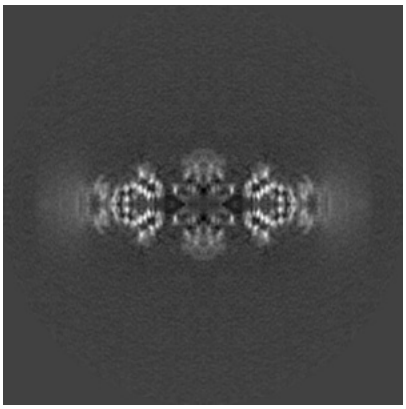


Z

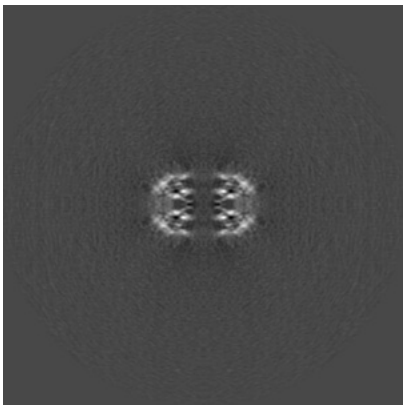
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices (i)

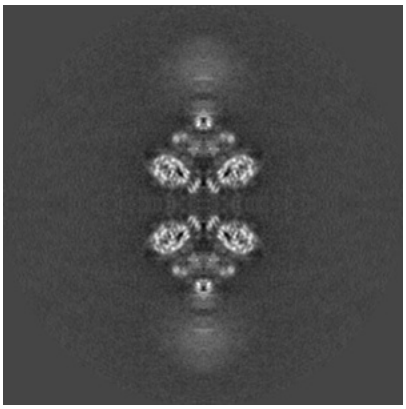
### 6.2.1 Primary map



X Index: 170

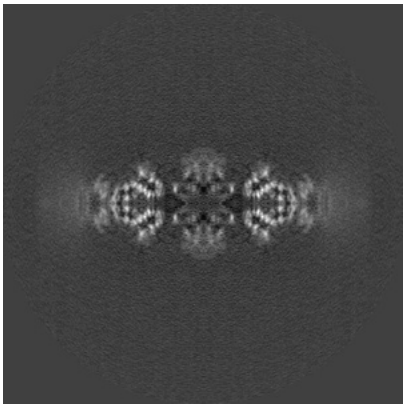


Y Index: 170

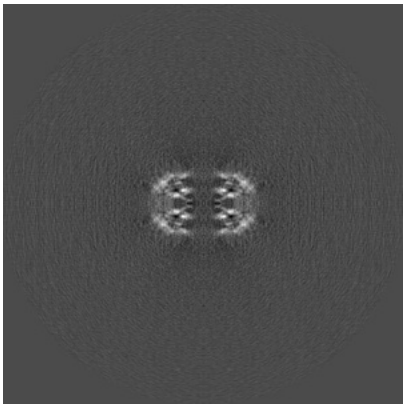


Z Index: 170

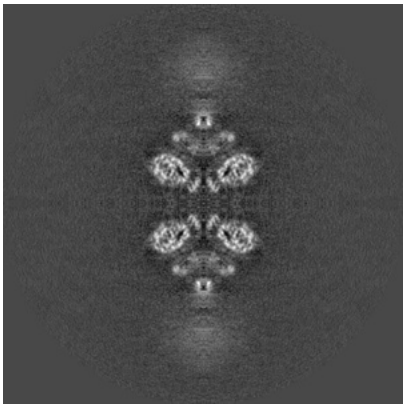
### 6.2.2 Raw map



X Index: 170



Y Index: 170

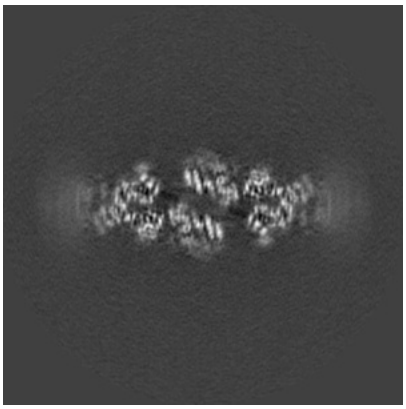


Z Index: 170

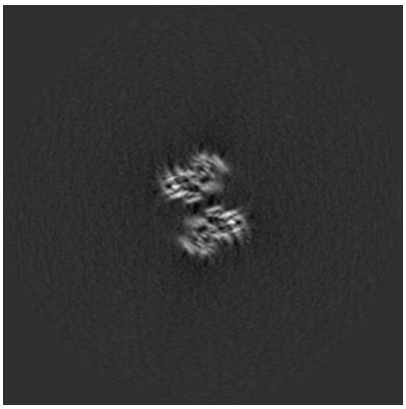
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices (i)

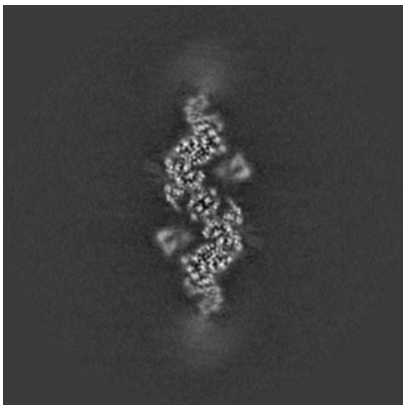
### 6.3.1 Primary map



X Index: 174

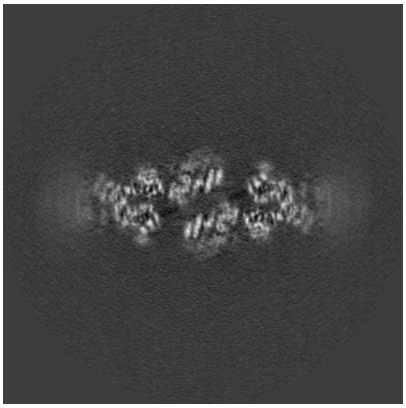


Y Index: 143

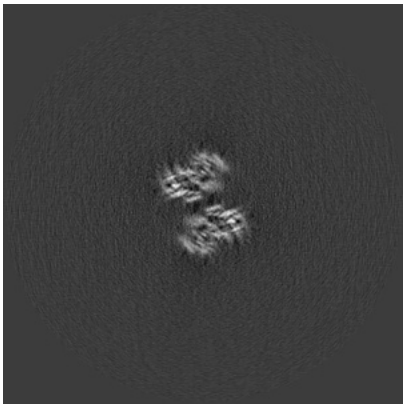


Z Index: 157

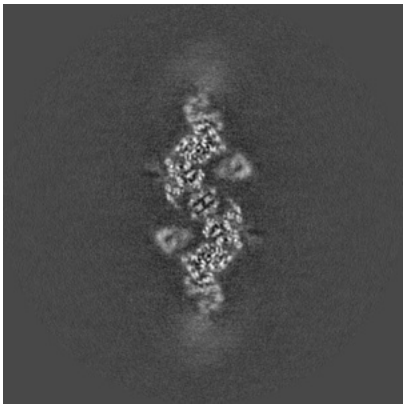
### 6.3.2 Raw map



X Index: 166



Y Index: 143

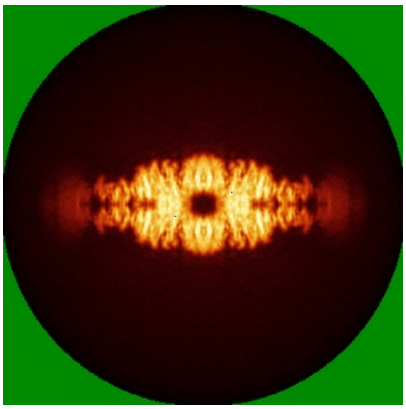


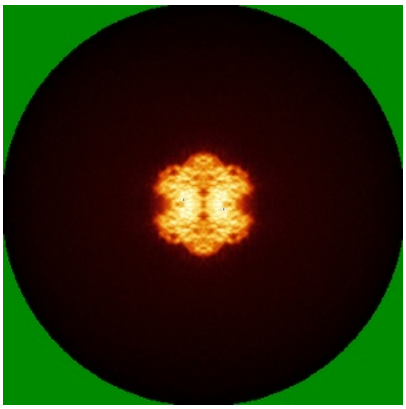
Z Index: 158

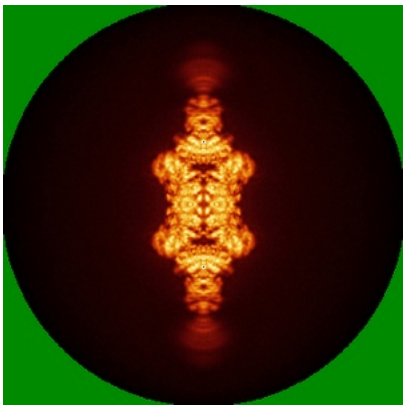
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal standard-deviation projections (False-color) (i)

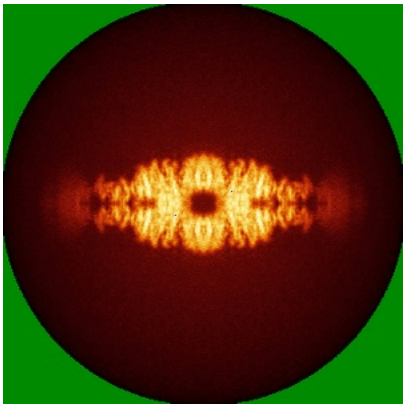
### 6.4.1 Primary map

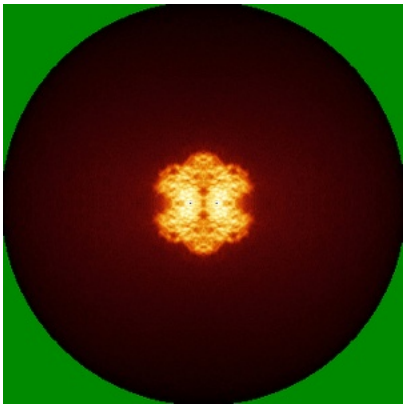

X

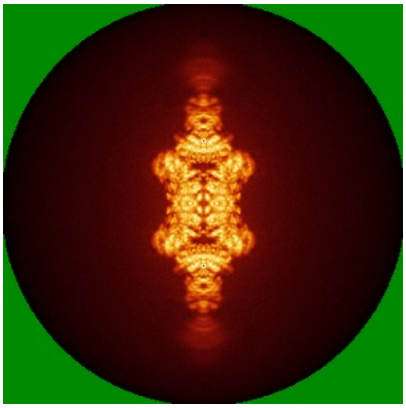

Y


Z

### 6.4.2 Raw map


X

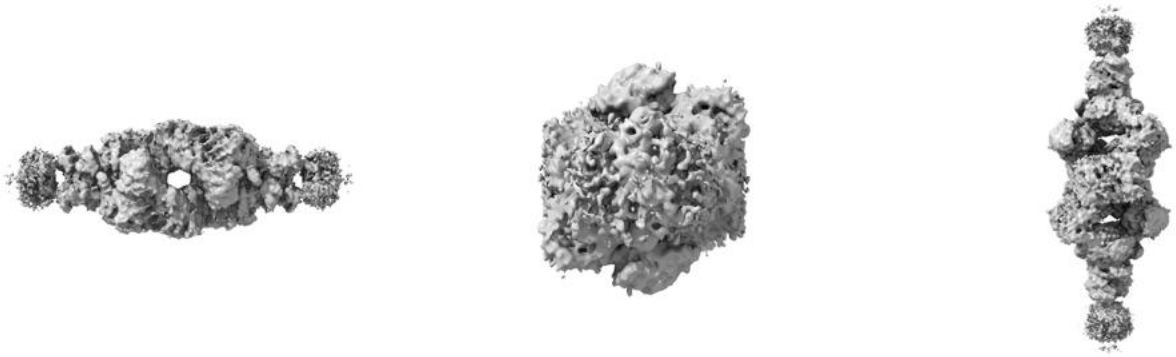

Y


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

## 6.5 Orthogonal surface views (i)

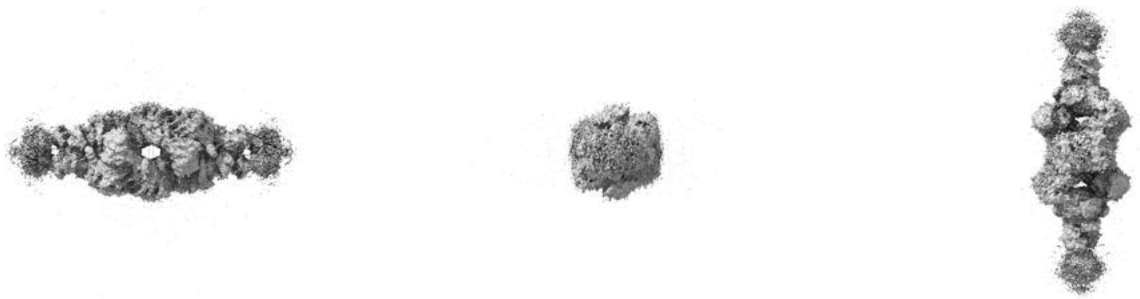
### 6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.005. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

## 6.6 Mask visualisation (i)

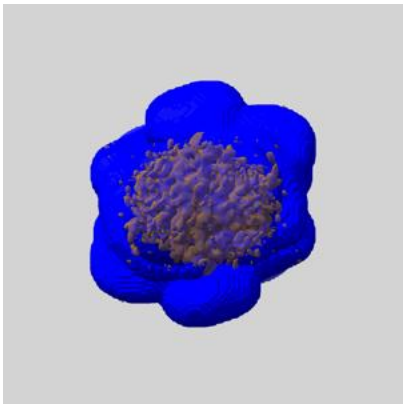
This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

A mask typically either:

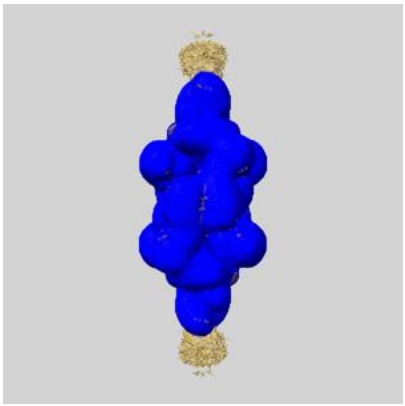
- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

### 6.6.1 emd_52420_msk_1.map (i)

X



Y

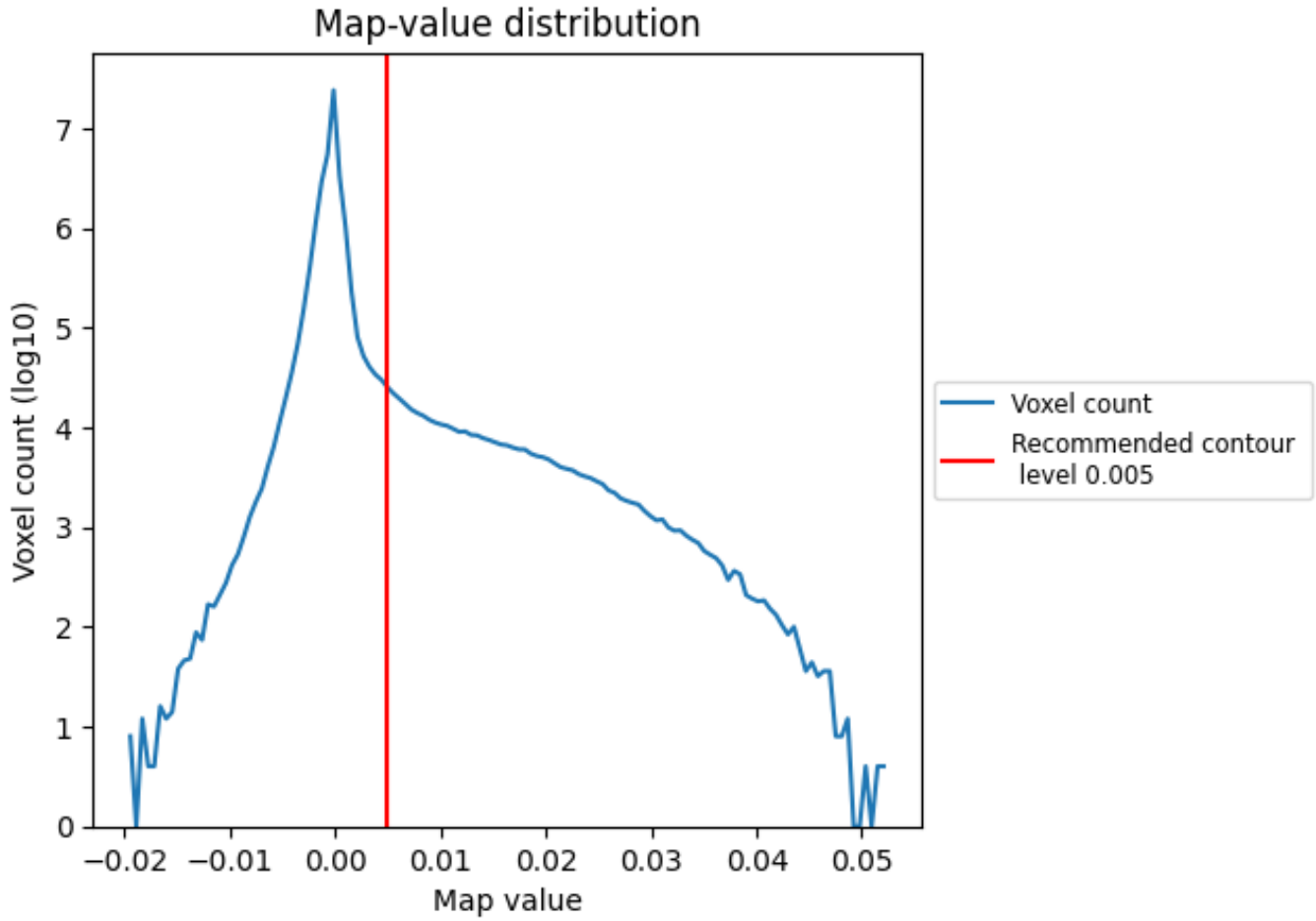


Z

# 7 Map analysis

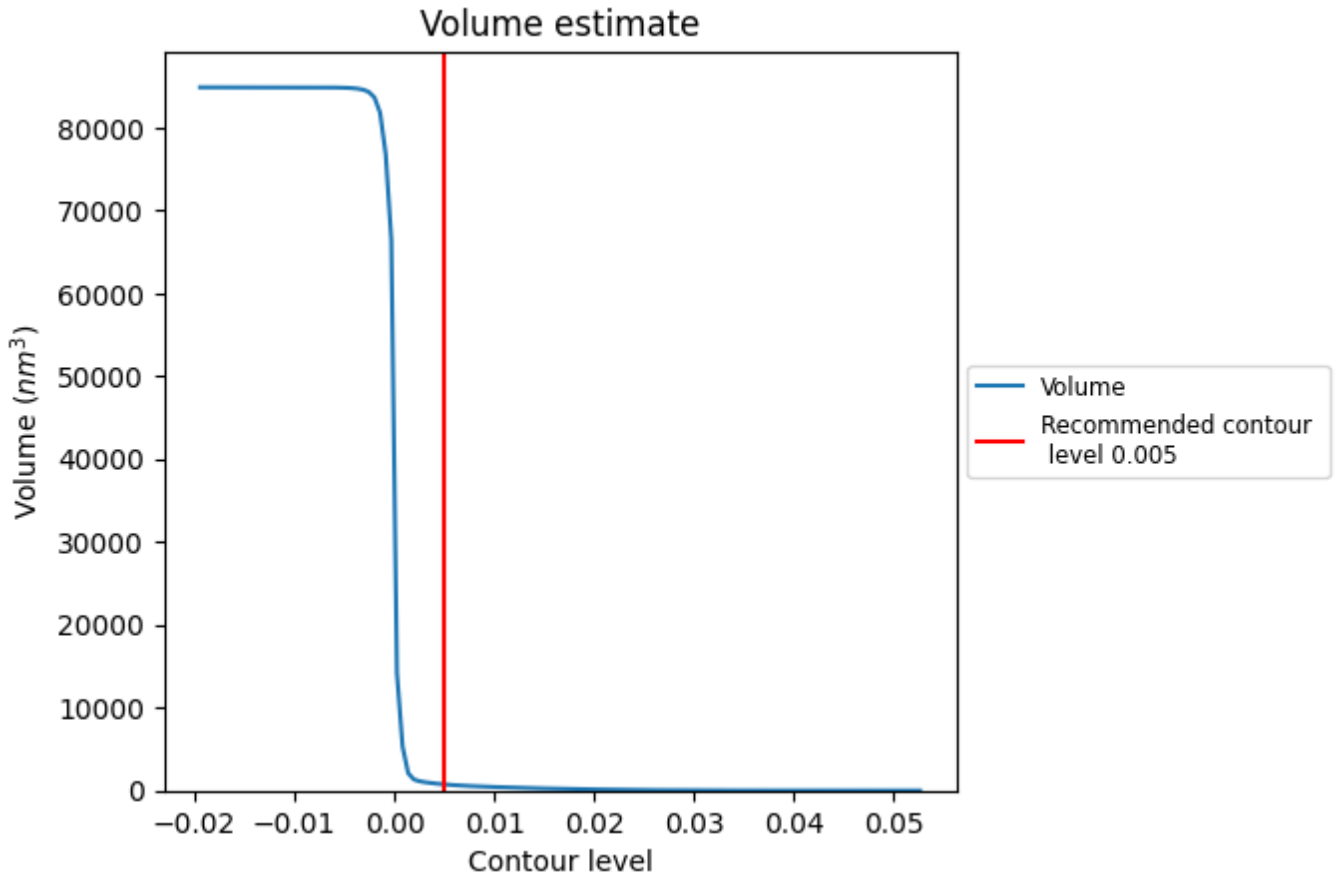
This section contains the results of statistical analysis of the map.

## 7.1 Map-value distribution




The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

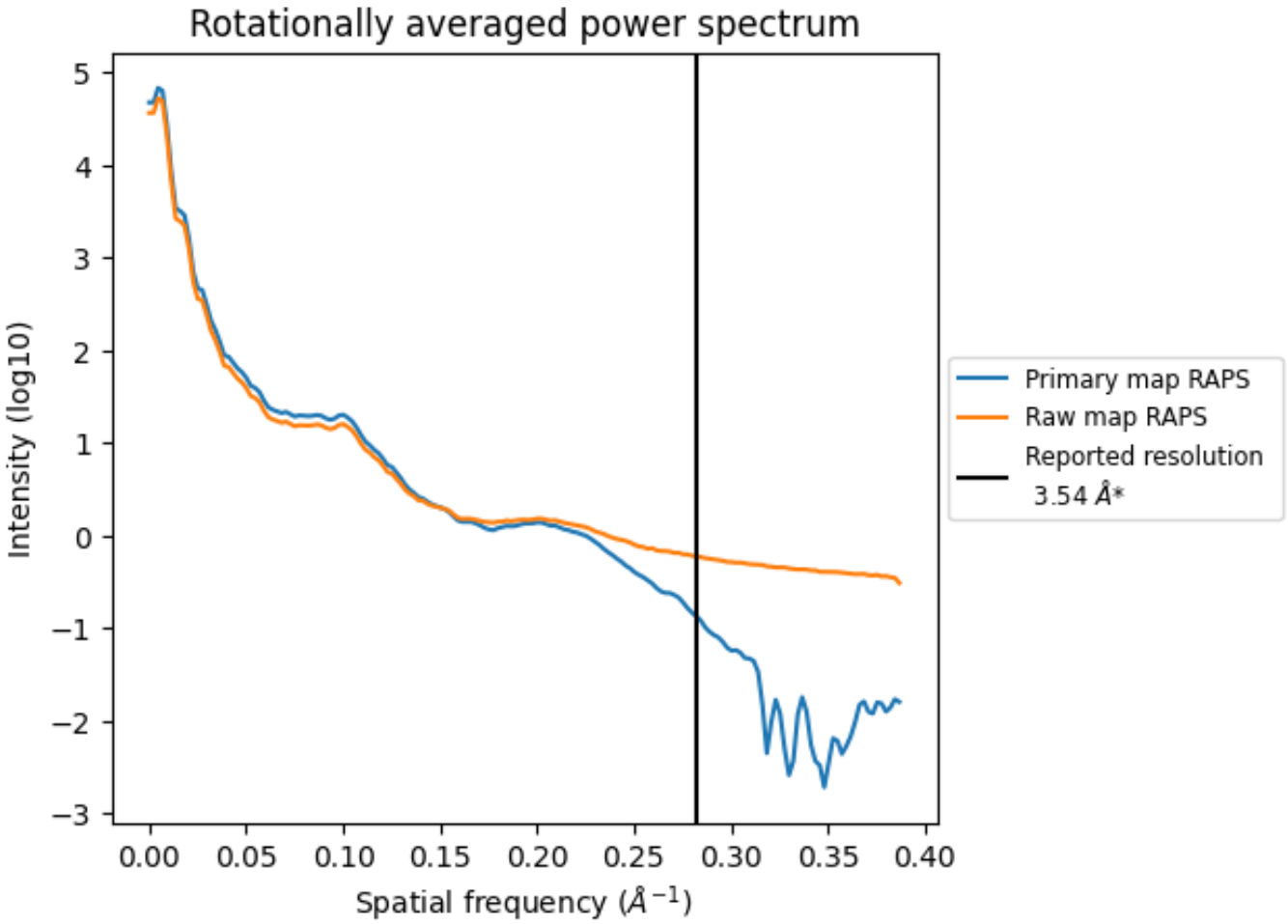
## 7.2 Volume estimate




The volume at the recommended contour level is 747 $nm^3$; this corresponds to an approximate mass of 675 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

## 7.3 Rotationally averaged power spectrum (i)

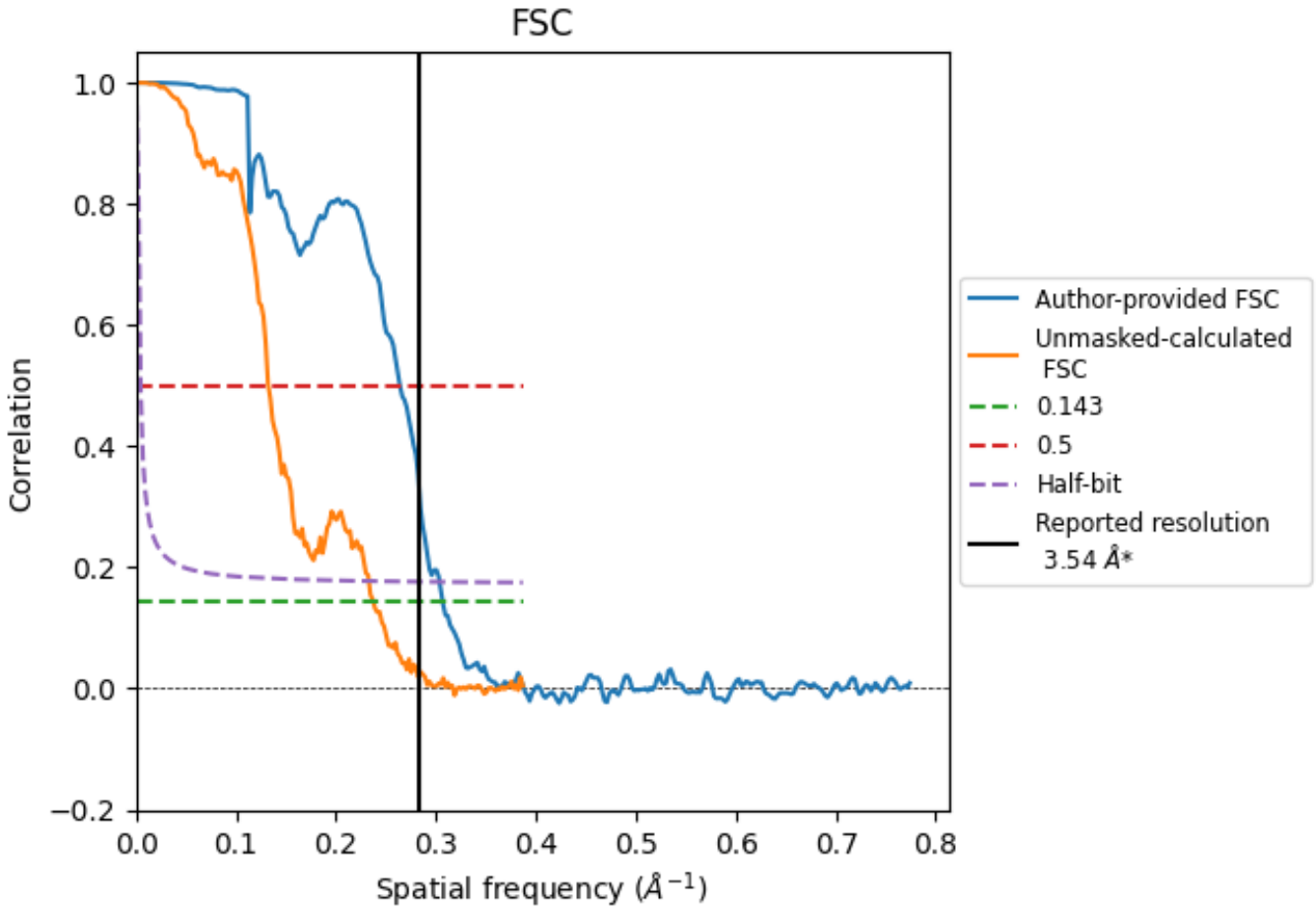



*Reported resolution corresponds to spatial frequency of 0.282 Å$^{-1}$

# 8 Fourier-Shell correlation

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

## 8.1 FSC




*Reported resolution corresponds to spatial frequency of 0.282 Å$^{-1}$

## 8.2 Resolution estimates (i)

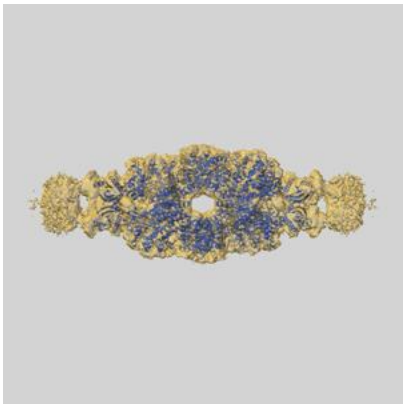
| Resolution estimate (Å) | Estimation criterion (FSC cut-off) | | |
|---|---|---|---|
| | 0.143 | 0.5 | Half-bit |
| Reported by author | 3.54 | - | - |
| Author-provided FSC curve | 3.26 | 3.79 | 3.29 |
| Unmasked-calculated* | 4.21 | 7.56 | 4.30 |

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.21 differs from the reported value 3.54 by more than 10 %

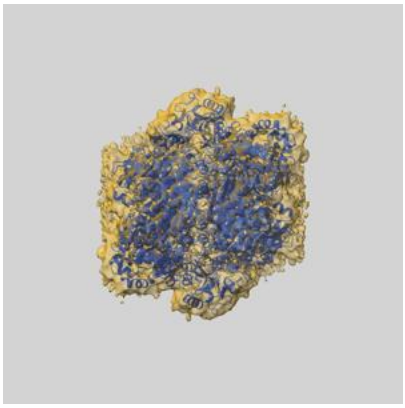
# 9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-52420 and PDB model 9HUY. Per-residue inclusion information can be found in section 3 on page 7.

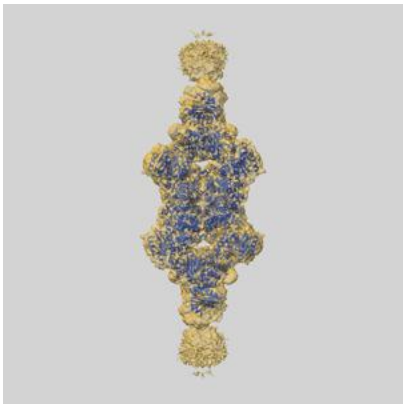
## 9.1 Map-model overlay



X



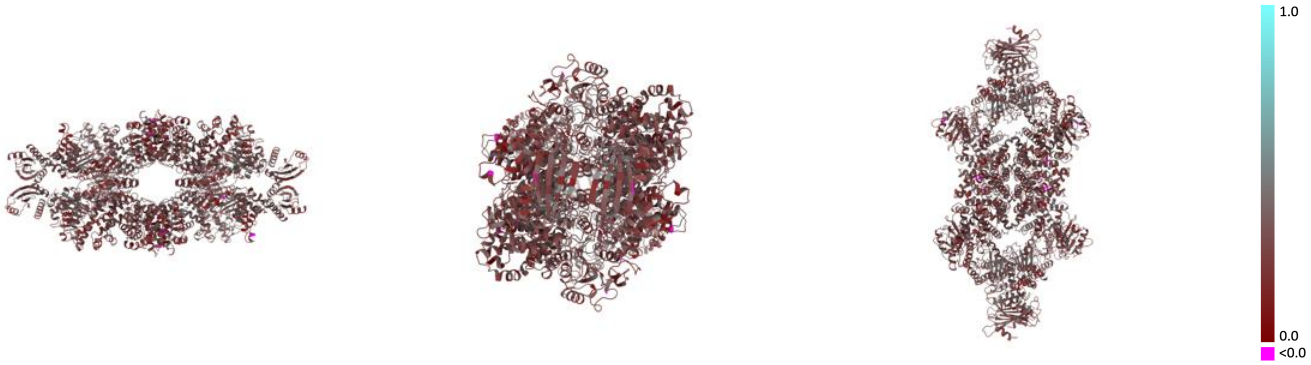
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.005 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

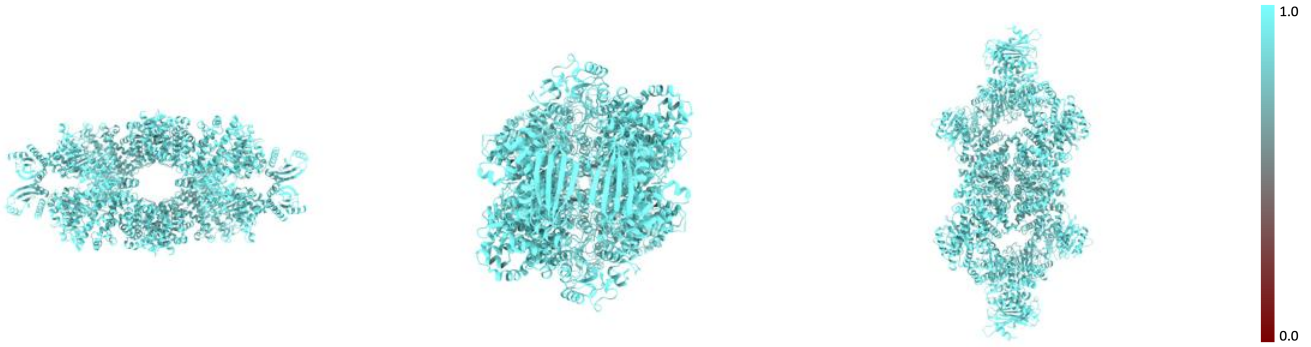
## 9.2 Q-score mapped to coordinate model (i)




X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

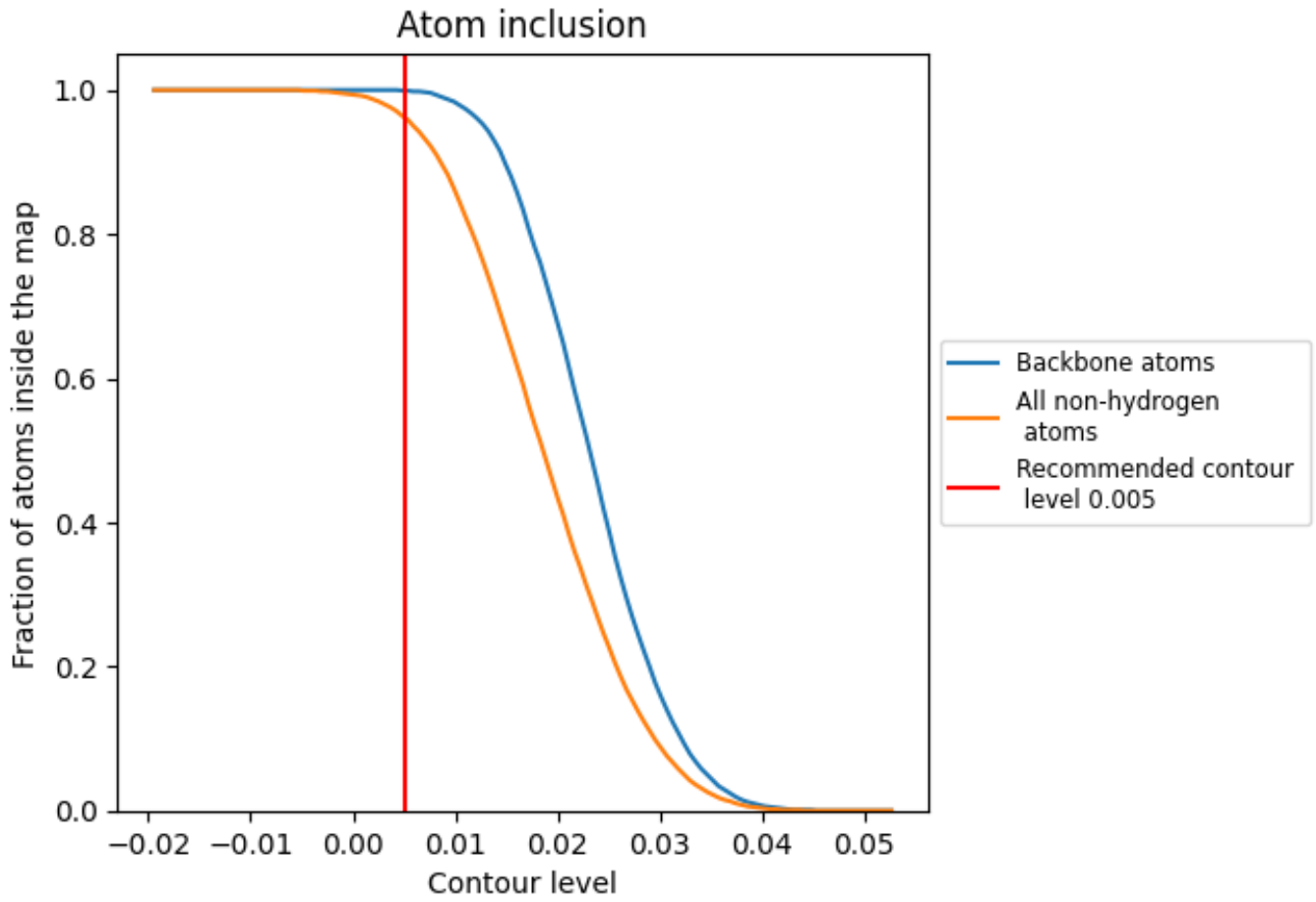
## 9.3 Atom inclusion mapped to coordinate model (i)




X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.005).

## 9.4 Atom inclusion (i)




At the recommended contour level, 100% of all backbone atoms, 96% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.005) and Q-score for the entire model and for each chain.


| Chain | Atom inclusion | Q-score |
|---|---|---|
| All | 0.9620 | 0.3000 |
| A | 0.9610 | 0.3020 |
| B | 0.9640 | 0.3030 |
| C | 0.9620 | 0.3000 |
| D | 0.9630 | 0.2960 |