



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 29, 2021 – 03:09 pm GMT

PDB ID : 7OZ5  
Title : Crystal structure of HIV-1 reverse transcriptase with a double stranded DNA in complex with fragment 166 at the transient P-pocket.  
Authors : Martinez, S.E.; Singh, A.K.; Das, K.  
Deposited on : 2021-06-25  
Resolution : 3.37 Å(reported)

This is a Full wwPDB X-ray Structure 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/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.8.4 (270009), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.23.2  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0267  
CCP4 : 7.1.010 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.23.2

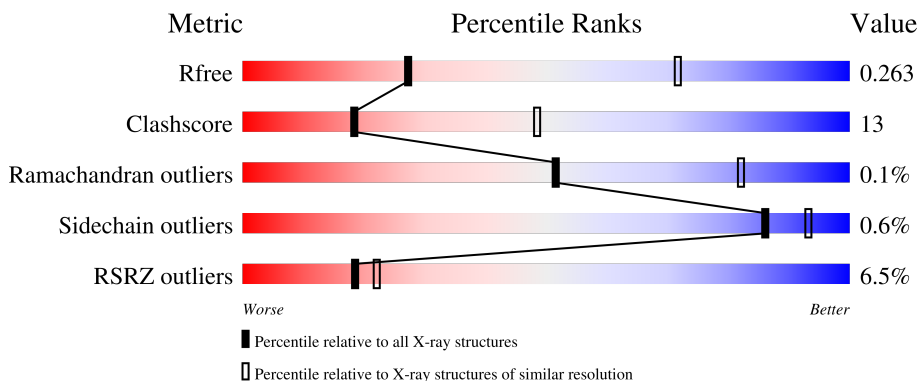
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.37 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.



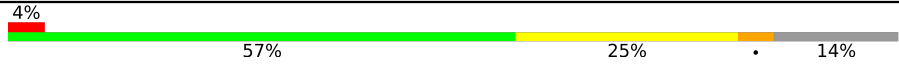


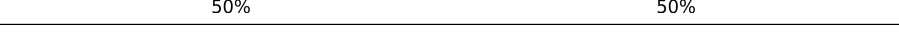
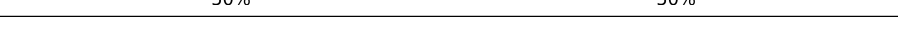
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1691 (3.46-3.30)
Clashscore	141614	1762 (3.46-3.30)
Ramachandran outliers	138981	1732 (3.46-3.30)
Sidechain outliers	138945	1731 (3.46-3.30)
RSRZ outliers	127900	1635 (3.46-3.30)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower 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  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	556	 7% 70% 30%
1	C	556	 7% 71% 28% ..
2	B	444	 4% 70% 23% • 6%
2	D	444	 8% 65% 26% • 9%
3	E	28	 36% 43% 21%

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Mol	Chain	Length	Quality of chain
3	T	28	 4% 57% 25% 14%
4	F	21	 43% 52% 5%
4	P	21	 71% 24% 5%
5	I	2	 50% 50%
5	J	2	 50% 50%

## 2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 17709 atoms, of which 12 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 Reverse transcriptase/ribonuclease H.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	555	Total	C	N	O	S	0	0	0
			4514	2921	751	834	8			
1	C	551	Total	C	N	O	S	0	0	0
			4486	2902	747	829	8			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	MET	-	initiating methionine	UNP P03366
A	0	VAL	-	expression tag	UNP P03366
A	63	CYS	ILE	conflict	UNP P03366
A	280	SER	CYS	conflict	UNP P03366
C	-1	MET	-	initiating methionine	UNP P03366
C	0	VAL	-	expression tag	UNP P03366
C	63	CYS	ILE	conflict	UNP P03366
C	280	SER	CYS	conflict	UNP P03366

- Molecule 2 is a protein called Gag-Pol polyprotein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	418	Total	C	N	O	S	0	0	0
			3466	2257	575	627	7			
2	D	406	Total	C	N	O	S	0	0	0
			3364	2193	553	611	7			

There are 34 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-15	MET	-	initiating methionine	UNP P03366
B	-14	ALA	-	expression tag	UNP P03366
B	-13	HIS	-	expression tag	UNP P03366
B	-12	HIS	-	expression tag	UNP P03366

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-11	HIS	-	expression tag	UNP P03366
B	-10	HIS	-	expression tag	UNP P03366
B	-9	HIS	-	expression tag	UNP P03366
B	-8	HIS	-	expression tag	UNP P03366
B	-7	ALA	-	expression tag	UNP P03366
B	-6	LEU	-	expression tag	UNP P03366
B	-5	GLU	-	expression tag	UNP P03366
B	-4	VAL	-	expression tag	UNP P03366
B	-3	LEU	-	expression tag	UNP P03366
B	-2	PHE	-	expression tag	UNP P03366
B	-1	GLN	-	expression tag	UNP P03366
B	0	GLY	-	expression tag	UNP P03366
B	280	SER	CYS	engineered mutation	UNP P03366
D	-15	MET	-	initiating methionine	UNP P03366
D	-14	ALA	-	expression tag	UNP P03366
D	-13	HIS	-	expression tag	UNP P03366
D	-12	HIS	-	expression tag	UNP P03366
D	-11	HIS	-	expression tag	UNP P03366
D	-10	HIS	-	expression tag	UNP P03366
D	-9	HIS	-	expression tag	UNP P03366
D	-8	HIS	-	expression tag	UNP P03366
D	-7	ALA	-	expression tag	UNP P03366
D	-6	LEU	-	expression tag	UNP P03366
D	-5	GLU	-	expression tag	UNP P03366
D	-4	VAL	-	expression tag	UNP P03366
D	-3	LEU	-	expression tag	UNP P03366
D	-2	PHE	-	expression tag	UNP P03366
D	-1	GLN	-	expression tag	UNP P03366
D	0	GLY	-	expression tag	UNP P03366
D	280	SER	CYS	engineered mutation	UNP P03366

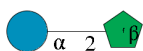
- Molecule 3 is a DNA chain called DNA (28-MER).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	T	24	Total	C	N	O	P	0	0	0
			496	233	97	142	24			
3	E	22	Total	C	N	O	P	0	0	0
			454	213	90	129	22			

- Molecule 4 is a DNA chain called DNA (5'-D(\*AP\*CP\*AP\*GP\*TP\*CP\*CP\*CP\*TP\*GP\*TP\*TP\*CP\*GP\*GP\*GP\*CP\*GP\*CP\*CP\*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	P	21	Total	C	N	O	P	0	0	0
			425	202	77	126	20			
4	F	20	Total	C	N	O	P	0	0	0
			407	192	72	123	20			

- Molecule 5 is an oligosaccharide called beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose.

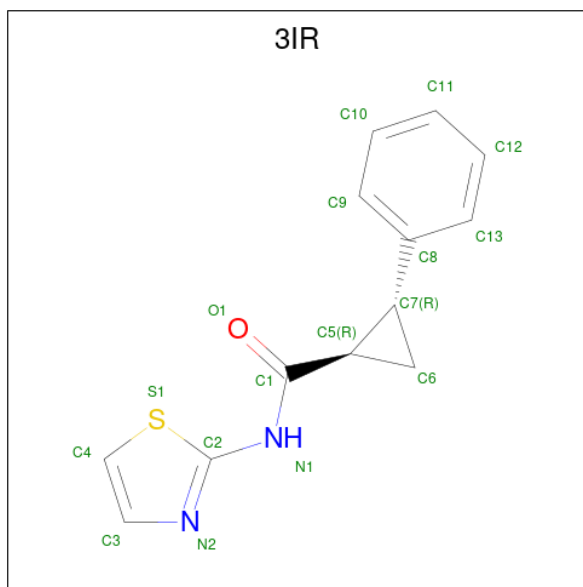


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
5	I	2	Total	C	O	0	0	0
			23	12	11			
5	J	2	Total	C	O	0	0	0
			23	12	11			

- Molecule 6 is CADMIUM ION (three-letter code: CD) (formula: Cd).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	3	Total	Cd	0	0
			3	3		
6	B	3	Total	Cd	0	0
			3	3		
6	T	2	Total	Cd	0	0
			2	2		
6	P	1	Total	Cd	0	0
			1	1		
6	C	3	Total	Cd	0	0
			3	3		
6	D	3	Total	Cd	0	0
			3	3		
6	E	2	Total	Cd	0	0
			2	2		
6	F	1	Total	Cd	0	0
			1	1		

- Molecule 7 is (1 {R},2 {R})-2-phenyl- {N}-(1,3-thiazol-2-yl)cyclopropane-1-carboxamide (three-letter code: 3IR) (formula: C<sub>13</sub>H<sub>12</sub>N<sub>2</sub>OS) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	H	N	O			S
7	F	1	29	13	12	2	1	1	0	0

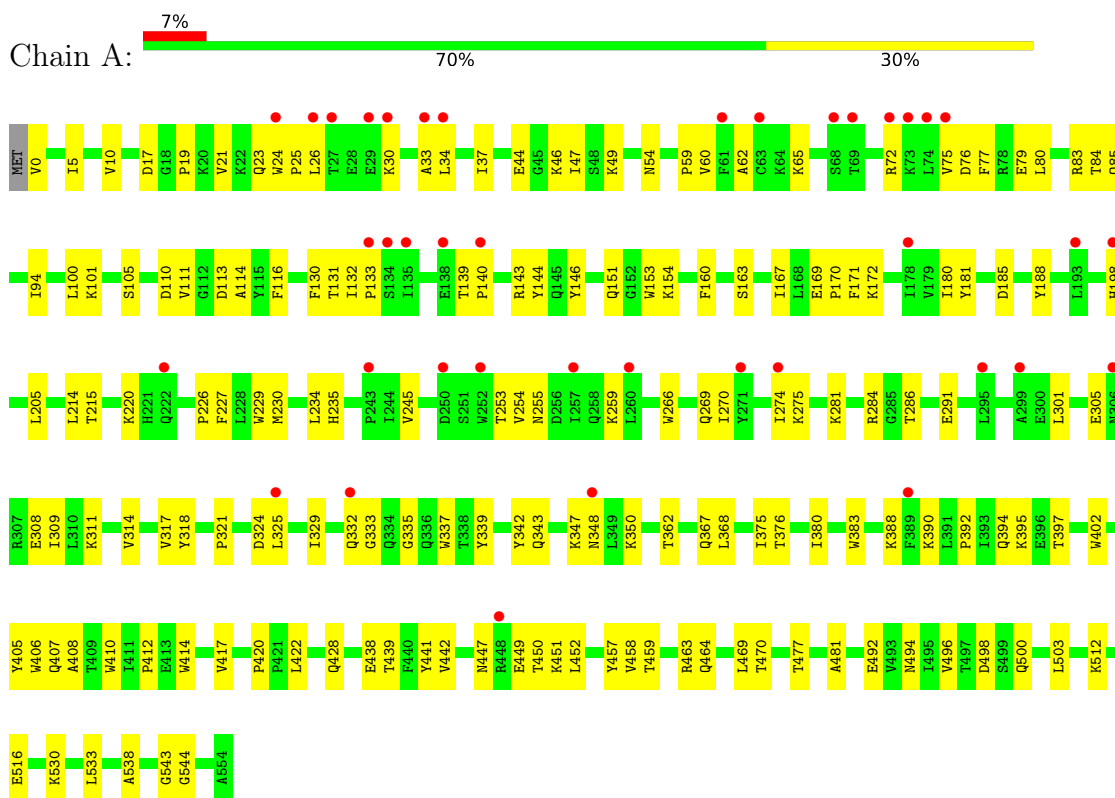
- Molecule 8 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	T	1	Total O 1 1	0	0
8	D	1	Total O 1 1	0	0
8	E	2	Total O 2 2	0	0

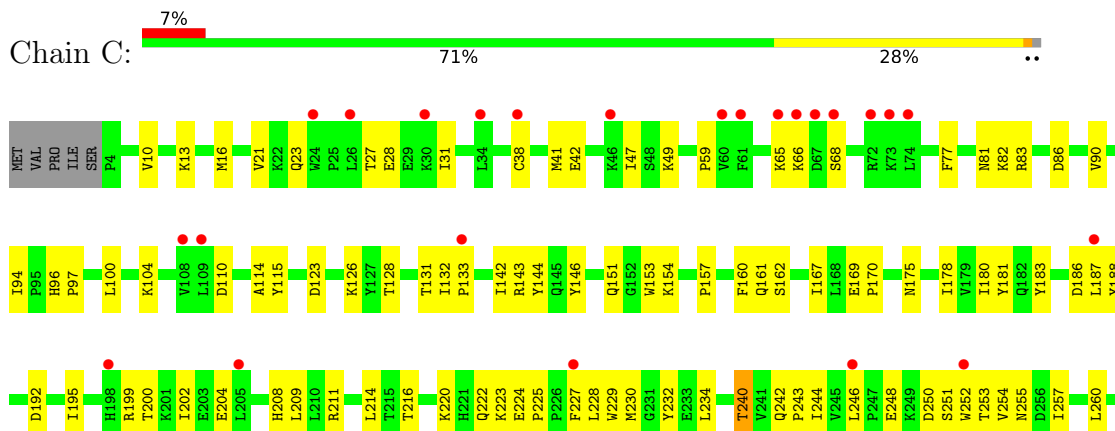
### 3 Residue-property plots [i](#)

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 electron 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 dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). 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.

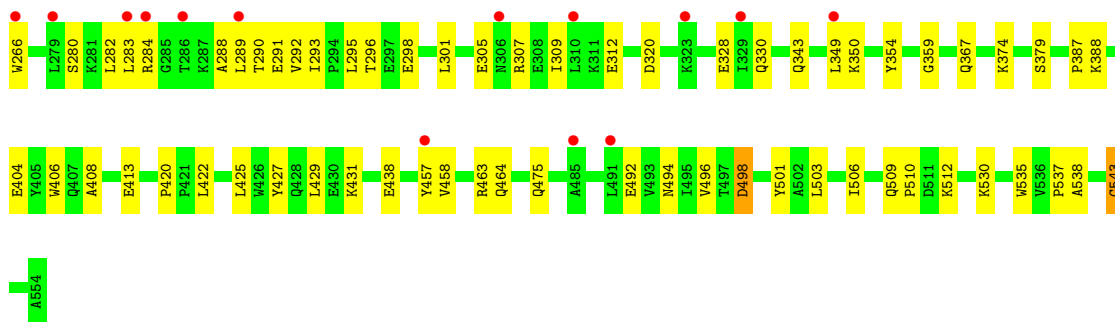
- Molecule 1: Reverse transcriptase/ribonuclease H



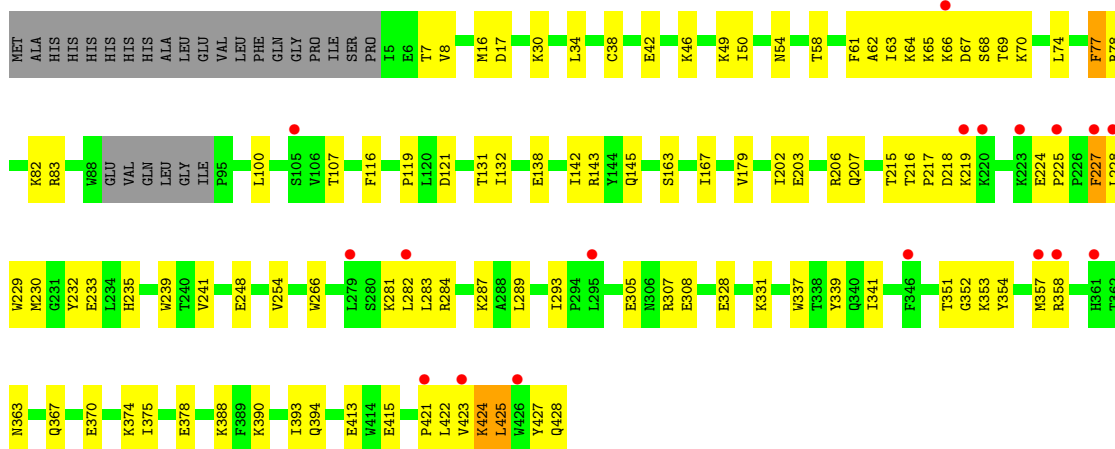
- Molecule 1: Reverse transcriptase/ribonuclease H



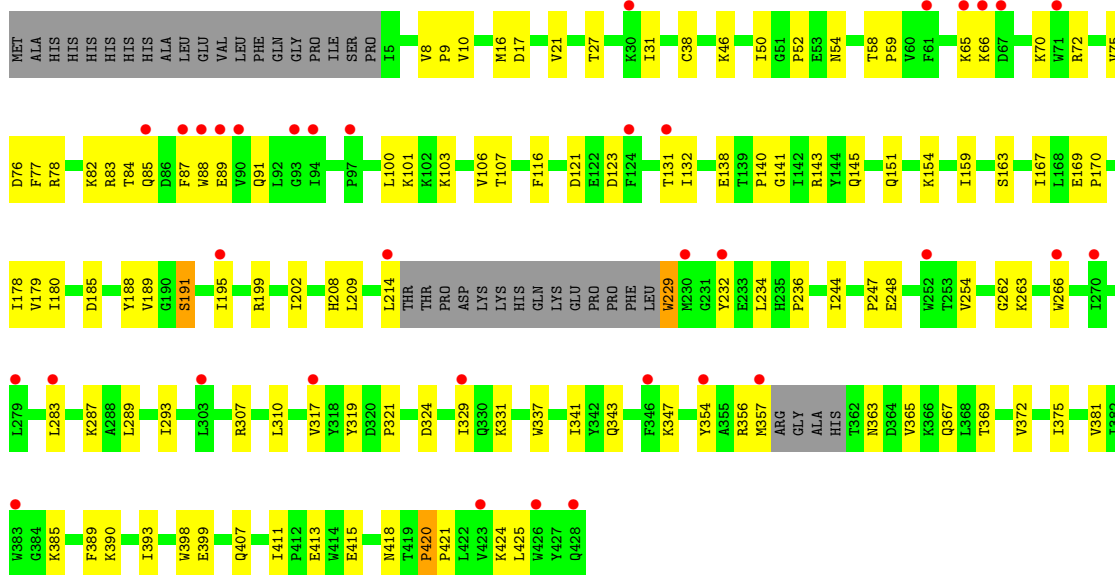




• Molecule 2: Gag-Pol polyprotein



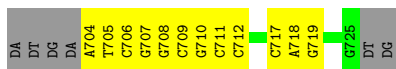
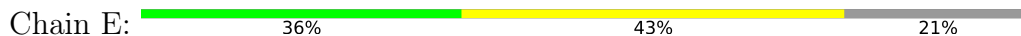
• Molecule 2: Gag-Pol polyprotein



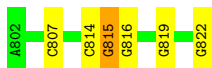
• Molecule 3: DNA (28-MER)



- Molecule 3: DNA (28-MER)



- Molecule 4: DNA (5'-D(\*AP\*CP\*AP\*GP\*TP\*CP\*CP\*CP\*TP\*GP\*TP\*TP\*CP\*GP\*GP\*GP\*CP\*GP\*CP\*CP\*G)-3')



- Molecule 4: DNA (5'-D(\*AP\*CP\*AP\*GP\*TP\*CP\*CP\*CP\*TP\*GP\*TP\*TP\*CP\*GP\*GP\*GP\*CP\*GP\*CP\*CP\*G)-3')



- Molecule 5: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose



- Molecule 5: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	310.75Å 62.06Å 169.29Å 90.00° 104.93° 90.00°	Depositor
Resolution (Å)	150.13 – 3.37 150.13 – 3.37	Depositor EDS
% Data completeness (in resolution range)	99.0 (150.13-3.37) 99.1 (150.13-3.37)	Depositor EDS
$R_{merge}$	0.33	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.44 (at 3.41Å)	Xtriage
Refinement program	PHENIX 1.19.1_4122	Depositor
R, $R_{free}$	0.227 , 0.265 0.229 , 0.263	Depositor DCC
$R_{free}$ test set	2214 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	100.5	Xtriage
Anisotropy	0.267	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	(Not available) , (Not available)	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.40$ , $\langle L^2 \rangle = 0.23$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	17709	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	97.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.83% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 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: FRU, CD, 3IR, GLC

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	0.30	0/4632	0.52	0/6294
1	C	0.32	0/4603	0.58	2/6252 (0.0%)
2	B	0.31	0/3568	0.56	0/4845
2	D	0.32	0/3459	0.55	0/4697
3	E	0.66	0/510	0.85	0/785
3	T	0.72	1/557 (0.2%)	0.82	0/858
4	F	0.65	0/454	0.92	0/698
4	P	0.61	0/475	0.82	1/731 (0.1%)
All	All	0.37	1/18258 (0.0%)	0.60	3/25160 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	T	711	DC	C4'-O4'	-5.68	1.39	1.45

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	240	THR	CB-CA-C	-7.07	92.53	111.60
4	P	815	DG	O4'-C4'-C3'	-5.45	102.32	104.50
1	C	498	ASP	CB-CG-OD1	5.20	122.98	118.30

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

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	4514	0	4573	136	0
1	C	4486	0	4539	143	0
2	B	3466	0	3495	86	0
2	D	3364	0	3394	101	0
3	E	454	0	245	12	0
3	T	496	0	268	5	1
4	F	407	0	225	9	1
4	P	425	0	237	8	0
5	I	23	0	21	1	0
5	J	23	0	21	1	0
6	A	3	0	0	0	0
6	B	3	0	0	0	0
6	C	3	0	0	0	0
6	D	3	0	0	0	0
6	E	2	0	0	0	0
6	F	1	0	0	0	0
6	P	1	0	0	0	0
6	T	2	0	0	0	0
7	F	17	12	0	0	0
8	D	1	0	0	0	0
8	E	2	0	0	0	0
8	T	1	0	0	0	0
All	All	17697	12	17018	462	1

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 13.

All (462) 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:C:131:THR:HG22	1:C:143:ARG:HG2	1.17	1.12
1:A:452:LEU:HD21	1:A:470:THR:HG22	1.40	1.04
2:D:89:GLU:HG3	2:D:154:LYS:HD2	1.49	0.94
1:A:452:LEU:HD23	1:A:470:THR:HA	1.49	0.94
1:A:181:TYR:CD1	2:B:138:GLU:HG3	2.05	0.91
1:C:248:GLU:HG3	1:C:307:ARG:NH2	1.88	0.89
2:D:82:LYS:HD3	2:D:413:GLU:OE2	1.72	0.88
2:D:214:LEU:HD22	2:D:229:TRP:HZ2	1.37	0.87
2:D:214:LEU:HD22	2:D:229:TRP:CZ2	2.08	0.87

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:226:PRO:HG3	1:A:235:HIS:CE1	2.11	0.86
2:D:10:VAL:HG13	2:D:88:TRP:HE1	1.40	0.86
1:A:0:VAL:HG21	1:A:215:THR:HG22	1.61	0.82
1:A:101:LYS:HE2	1:A:321:PRO:HG3	1.60	0.82
1:A:452:LEU:CD2	1:A:470:THR:HG22	2.10	0.81
1:C:114:ALA:HB1	1:C:160:PHE:CE2	2.15	0.81
2:D:421:PRO:HA	2:D:424:LYS:HE3	1.62	0.81
1:C:289:LEU:HD12	1:C:290:THR:HG23	1.62	0.80
2:B:354:TYR:CE1	2:B:374:LYS:HD3	2.16	0.80
2:D:232:TYR:CE2	2:D:234:LEU:HD21	2.17	0.80
1:C:110:ASP:HB3	1:C:220:LYS:HB3	1.64	0.79
1:A:30:LYS:HE2	1:A:62:ALA:O	1.83	0.79
1:A:406:TRP:CE3	2:B:421:PRO:HG3	2.19	0.78
2:B:354:TYR:CD1	2:B:374:LYS:HD3	2.19	0.78
1:A:65:LYS:HG2	1:A:72:ARG:HB2	1.64	0.77
1:C:131:THR:CG2	1:C:143:ARG:HG2	2.09	0.77
1:A:110:ASP:HB3	1:A:220:LYS:HB3	1.67	0.77
1:A:34:LEU:HD21	1:A:62:ALA:HB2	1.66	0.77
1:C:284:ARG:HG3	3:E:712:DC:H5 <sup>7</sup>	1.67	0.76
2:D:170:PRO:HB2	2:D:208:HIS:NE2	2.01	0.75
2:B:281:LYS:HG2	2:B:284:ARG:CZ	2.17	0.75
1:C:77:PHE:O	1:C:81:ASN:ND2	2.20	0.73
1:A:325:LEU:HD21	1:A:383:TRP:CE3	2.24	0.72
1:C:86:ASP:OD1	1:C:154:LYS:NZ	2.21	0.72
2:D:87:PHE:O	2:D:91:GLN:HB3	1.90	0.72
2:D:107:THR:OG1	2:D:202:ILE:HD11	1.89	0.71
1:C:81:ASN:OD1	1:C:154:LYS:N	2.22	0.71
2:B:68:SER:OG	2:B:70:LYS:HD2	1.89	0.71
2:B:227:PHE:CE2	2:B:358:ARG:HG2	2.26	0.71
2:D:101:LYS:O	2:D:236:PRO:HB2	1.90	0.70
1:A:84:THR:HB	1:A:154:LYS:HE2	1.72	0.70
2:B:254:VAL:HG13	2:B:283:LEU:HD22	1.73	0.69
1:A:275:LYS:NZ	1:A:332:GLN:HB2	2.08	0.69
1:A:543:GLY:HA2	2:B:283:LEU:O	1.92	0.69
1:C:252:TRP:CD1	1:C:295:LEU:HD11	2.28	0.69
2:D:365:VAL:O	2:D:369:THR:HG23	1.93	0.69
1:C:175:ASN:HB3	1:C:178:ILE:HG12	1.75	0.69
1:C:94:ILE:HD11	3:E:707:DG:H21	1.58	0.69
2:D:263:LYS:HA	2:D:425:LEU:HD22	1.76	0.68
1:A:0:VAL:HG21	1:A:215:THR:CG2	2.24	0.68
2:D:85:GLN:OE1	2:D:87:PHE:HB2	1.94	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:227:PHE:HB2	1:A:234:LEU:HB2	1.75	0.67
1:A:458:VAL:HG12	1:A:464:GLN:HG2	1.76	0.67
1:A:65:LYS:CG	1:A:72:ARG:HB2	2.25	0.67
2:D:66:LYS:NZ	2:D:232:TYR:HB2	2.10	0.67
2:D:421:PRO:HA	2:D:424:LYS:CE	2.24	0.67
1:C:97:PRO:HG3	1:C:232:TYR:CD2	2.30	0.67
2:B:305:GLU:CD	2:B:308:GLU:OE1	2.33	0.67
1:A:235:HIS:NE2	1:C:312:GLU:OE2	2.28	0.67
2:B:239:TRP:CZ3	2:B:378:GLU:HG2	2.29	0.66
1:C:298:GLU:N	1:C:298:GLU:OE1	2.27	0.66
1:A:23:GLN:HG2	1:A:133:PRO:HD3	1.79	0.65
2:B:341:ILE:HD11	2:B:375:ILE:HG23	1.79	0.65
1:A:21:VAL:HB	1:A:59:PRO:HD3	1.78	0.65
2:D:151:GLN:HB3	2:D:185:ASP:OD2	1.97	0.65
1:C:288:ALA:HB3	1:C:291:GLU:HB2	1.79	0.64
4:F:808:DC:H2'	4:F:809:DC:O5'	1.96	0.64
1:C:16:MET:HE2	1:C:83:ARG:HG2	1.77	0.64
1:A:26:LEU:HD11	1:A:60:VAL:O	1.96	0.64
2:B:206:ARG:HH12	2:B:218:ASP:HA	1.62	0.64
1:A:23:GLN:HG2	1:A:133:PRO:HG3	1.81	0.63
1:A:494:ASN:HB3	2:B:289:LEU:HD12	1.78	0.63
1:A:185:ASP:OD2	4:P:822:DG:H5'	1.98	0.63
2:D:195:ILE:O	2:D:199:ARG:HG3	1.97	0.63
2:D:363:ASN:O	2:D:367:GLN:HG3	1.99	0.63
1:A:75:VAL:HB	1:A:77:PHE:CE2	2.33	0.63
2:D:421:PRO:CA	2:D:424:LYS:HE3	2.29	0.62
2:D:254:VAL:HG21	2:D:287:LYS:HB2	1.82	0.62
1:C:254:VAL:CG1	1:C:289:LEU:HA	2.29	0.62
2:B:281:LYS:HG2	2:B:284:ARG:NH2	2.15	0.62
2:B:46:LYS:HE2	2:B:116:PHE:HB3	1.81	0.62
2:D:17:ASP:O	2:D:83:ARG:HD3	2.00	0.62
2:B:219:LYS:HG3	2:B:232:TYR:CE2	2.35	0.61
1:C:244:ILE:HD11	1:C:266:TRP:CD1	2.36	0.61
2:D:50:ILE:HD13	2:D:145:GLN:HB3	1.82	0.61
2:B:38:CYS:SG	2:B:132:ILE:HD11	2.41	0.61
2:D:16:MET:CE	2:D:83:ARG:HG2	2.31	0.61
1:C:169:GLU:HB3	1:C:170:PRO:HD3	1.83	0.60
2:B:131:THR:OG1	2:B:143:ARG:HG2	2.00	0.60
2:D:232:TYR:CD2	2:D:234:LEU:HD21	2.37	0.60
1:C:154:LYS:HG3	3:E:706:DC:OP1	2.01	0.60
2:B:227:PHE:CD2	2:B:358:ARG:HG2	2.37	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:181:TYR:CE1	2:B:138:GLU:HG3	2.36	0.60
3:E:704:DA:H2''	3:E:705:DT:H72	1.83	0.60
1:C:23:GLN:OE1	1:C:59:PRO:HA	2.02	0.60
2:B:61:PHE:CZ	2:B:74:LEU:HD23	2.37	0.59
2:B:239:TRP:CH2	2:B:378:GLU:HG2	2.36	0.59
1:A:130:PHE:CZ	1:A:144:TYR:HB2	2.37	0.59
2:D:107:THR:HG21	2:D:202:ILE:HD13	1.85	0.59
1:A:275:LYS:HZ2	1:A:332:GLN:HB2	1.66	0.59
1:C:162:SER:HB2	2:D:52:PRO:HG3	1.84	0.59
1:C:309:ILE:HG22	1:C:309:ILE:O	2.02	0.59
1:A:139:THR:HG23	1:A:140:PRO:HD2	1.84	0.58
1:A:503:LEU:HD12	1:A:533:LEU:CD2	2.33	0.58
1:C:458:VAL:HG12	1:C:464:GLN:HG2	1.85	0.58
2:D:369:THR:HG22	2:D:398:TRP:CH2	2.38	0.58
1:C:246:LEU:O	1:C:246:LEU:HD12	2.03	0.58
1:A:169:GLU:HB3	1:A:170:PRO:HD3	1.84	0.58
1:C:199:ARG:HA	1:C:202:ILE:HB	1.84	0.58
1:C:248:GLU:HG3	1:C:307:ARG:CZ	2.32	0.58
1:C:27:THR:O	1:C:31:ILE:HG13	2.04	0.58
1:C:195:ILE:HD11	1:C:199:ARG:HH12	1.68	0.58
1:C:42:GLU:OE2	1:C:49:LYS:HE3	2.03	0.58
1:A:376:THR:O	1:A:380:ILE:HG13	2.03	0.57
4:F:804:DA:H2''	4:F:805:DG:C8	2.39	0.57
1:A:94:ILE:HD11	4:P:819:DG:H21	1.69	0.57
2:B:305:GLU:OE1	2:B:308:GLU:OE1	2.22	0.57
2:D:100:LEU:HG	2:D:381:VAL:HG13	1.85	0.57
1:A:301:LEU:O	1:A:305:GLU:HG3	2.04	0.57
1:A:420:PRO:HA	1:A:422:LEU:HD12	1.86	0.57
1:C:250:ASP:OD1	1:C:251:SER:N	2.38	0.57
2:D:369:THR:HG22	2:D:398:TRP:CZ3	2.40	0.57
1:A:390:LYS:HE2	1:A:417:VAL:HG11	1.86	0.57
2:B:233:GLU:OE2	2:B:235:HIS:CE1	2.57	0.57
2:D:21:VAL:HB	2:D:59:PRO:HD3	1.86	0.57
2:D:65:LYS:HE2	2:D:72:ARG:HD2	1.87	0.56
2:D:372:VAL:HG13	2:D:389:PHE:CZ	2.40	0.56
1:C:27:THR:HG22	1:C:28:GLU:N	2.20	0.56
1:C:503:LEU:HD22	1:C:535:TRP:HB2	1.87	0.56
1:A:367:GLN:NE2	1:A:512:LYS:HD2	2.20	0.56
2:B:64:LYS:HE2	2:B:69:THR:HA	1.88	0.56
1:A:498:ASP:HB2	1:A:538:ALA:HB2	1.87	0.56
2:D:244:ILE:HB	2:D:310:LEU:HD22	1.87	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:21:VAL:HB	1:C:59:PRO:HD3	1.88	0.56
1:C:492:GLU:HG2	1:C:530:LYS:HB2	1.88	0.56
2:B:63:ILE:HD13	2:B:74:LEU:HD22	1.87	0.56
2:B:281:LYS:HG2	2:B:284:ARG:NH1	2.20	0.56
1:C:475:GLN:HB3	1:C:501:TYR:CE2	2.41	0.55
1:A:114:ALA:HB1	1:A:160:PHE:CZ	2.41	0.55
1:A:274:ILE:HD12	1:A:309:ILE:HD11	1.89	0.55
3:T:710:DG:H2'	3:T:711:DC:C6	2.42	0.55
1:C:47:ILE:CG2	1:C:144:TYR:HB3	2.37	0.55
1:A:85:GLN:O	1:A:154:LYS:HE3	2.06	0.55
2:B:67:ASP:HA	2:B:228:LEU:HD12	1.88	0.55
2:D:170:PRO:HB2	2:D:208:HIS:CE1	2.41	0.55
1:A:451:LYS:HE3	4:P:807:DC:OP1	2.07	0.55
2:B:225:PRO:HG2	2:B:228:LEU:HB2	1.89	0.55
2:D:390:LYS:HE2	2:D:415:GLU:OE2	2.07	0.55
1:A:72:ARG:NH1	1:A:151:GLN:HE22	2.05	0.54
2:D:9:PRO:HA	2:D:121:ASP:OD2	2.07	0.54
4:F:808:DC:H4'	4:F:809:DC:OP1	2.06	0.54
1:A:60:VAL:HG11	1:A:132:ILE:HD13	1.89	0.54
2:B:54:ASN:HB3	2:B:143:ARG:HH21	1.70	0.54
2:B:216:THR:HG23	2:B:217:PRO:HD2	1.88	0.54
1:A:19:PRO:HG3	1:A:80:LEU:HB2	1.88	0.54
1:A:111:VAL:HG11	1:A:214:LEU:HD22	1.88	0.54
1:C:404:GLU:OE1	1:C:431:LYS:HE3	2.07	0.54
1:A:266:TRP:CE2	4:P:819:DG:H4'	2.43	0.54
1:C:496:VAL:HG21	2:D:289:LEU:HD21	1.90	0.53
1:C:224:GLU:O	1:C:224:GLU:HG3	2.07	0.53
1:C:406:TRP:O	2:D:331:LYS:HB3	2.08	0.53
2:D:418:ASN:OD1	2:D:418:ASN:N	2.42	0.53
3:E:704:DA:H2''	3:E:705:DT:C7	2.38	0.53
1:A:503:LEU:HD12	1:A:533:LEU:HD23	1.91	0.53
1:A:94:ILE:HG23	1:A:230:MET:CE	2.39	0.53
1:C:186:ASP:OD1	1:C:187:LEU:N	2.41	0.53
2:D:420:PRO:HG2	2:D:421:PRO:HD3	1.89	0.53
2:B:227:PHE:HE1	2:B:230:MET:SD	2.31	0.53
2:D:169:GLU:HB3	2:D:170:PRO:HD3	1.91	0.53
1:A:23:GLN:HG2	1:A:133:PRO:CD	2.38	0.53
1:A:34:LEU:CD2	1:A:62:ALA:HB2	2.37	0.53
1:A:325:LEU:HD21	1:A:383:TRP:CD2	2.43	0.53
2:D:103:LYS:HD2	2:D:191:SER:CA	2.38	0.53
2:B:17:ASP:O	2:B:83:ARG:HD3	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:442:VAL:HG12	1:A:457:TYR:HB3	1.91	0.53
3:T:726:DT:H2''	3:T:727:DG:H5'	1.91	0.53
1:C:114:ALA:HB1	1:C:160:PHE:CZ	2.45	0.52
1:C:289:LEU:CD1	1:C:290:THR:HG23	2.35	0.52
1:A:266:TRP:O	1:A:269:GLN:HG2	2.10	0.52
3:T:704:DA:H2'	3:T:705:DT:C6	2.44	0.52
1:A:395:LYS:HD2	1:A:414:TRP:CZ2	2.45	0.52
1:A:406:TRP:CZ3	2:B:421:PRO:HG3	2.43	0.52
2:B:227:PHE:HE1	2:B:230:MET:CG	2.22	0.52
1:C:38:CYS:HB3	1:C:144:TYR:CE2	2.44	0.52
1:C:180:ILE:CG2	1:C:187:LEU:HD11	2.39	0.52
1:C:42:GLU:OE1	1:C:49:LYS:HE3	2.10	0.52
1:C:251:SER:O	1:C:252:TRP:CD1	2.63	0.52
2:B:305:GLU:OE2	2:B:308:GLU:OE1	2.26	0.52
2:B:390:LYS:NZ	2:B:415:GLU:OE2	2.40	0.52
1:C:13:LYS:HD2	1:C:82:LYS:O	2.09	0.52
2:D:66:LYS:HZ2	2:D:232:TYR:HB2	1.71	0.52
1:C:65:LYS:HG2	1:C:66:LYS:H	1.74	0.52
2:B:82:LYS:HD2	2:B:413:GLU:OE2	2.10	0.51
2:D:54:ASN:HB3	2:D:143:ARG:HH21	1.75	0.51
1:A:395:LYS:HD2	1:A:414:TRP:CH2	2.45	0.51
1:C:128:THR:OG1	1:C:146:TYR:HB2	2.11	0.51
1:C:222:GLN:HE22	1:C:228:LEU:HB2	1.75	0.51
1:C:425:LEU:HD13	1:C:509:GLN:OE1	2.11	0.51
2:D:10:VAL:HG13	2:D:88:TRP:NE1	2.19	0.51
2:D:254:VAL:HG13	2:D:283:LEU:HD22	1.92	0.51
1:A:308:GLU:O	1:A:311:LYS:HG2	2.11	0.51
4:P:815:DG:H2'	4:P:816:DG:C8	2.46	0.51
1:A:253:THR:HA	1:A:291:GLU:O	2.09	0.51
2:D:107:THR:CB	2:D:202:ILE:HD11	2.41	0.51
1:C:498:ASP:HB2	1:C:538:ALA:HB2	1.92	0.51
1:A:286:THR:HG23	1:A:291:GLU:OE1	2.10	0.50
1:A:342:TYR:HB3	1:A:348:ASN:HA	1.93	0.50
1:C:248:GLU:HG3	1:C:307:ARG:HH22	1.71	0.50
2:B:163:SER:O	2:B:167:ILE:HG13	2.11	0.50
2:B:206:ARG:NH1	2:B:218:ASP:HA	2.25	0.50
1:A:255:ASN:OD1	1:A:259:LYS:HE3	2.11	0.50
2:B:248:GLU:HG2	2:B:307:ARG:NH2	2.27	0.50
2:B:388:LYS:HE2	2:B:415:GLU:OE1	2.12	0.50
2:D:78:ARG:O	2:D:82:LYS:HG3	2.12	0.50
2:B:203:GLU:O	2:B:207:GLN:HG2	2.12	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:208:HIS:HA	1:C:211:ARG:NE	2.27	0.50
4:F:807:DC:H2'	4:F:808:DC:C6	2.46	0.50
1:A:469:LEU:HD12	1:A:477:THR:HG22	1.93	0.50
1:A:410:TRP:CZ2	1:A:412:PRO:HA	2.47	0.49
2:D:354:TYR:HB3	2:D:357:MET:SD	2.51	0.49
1:A:181:TYR:HB2	1:A:188:TYR:HB3	1.93	0.49
1:A:402:TRP:O	2:B:331:LYS:NZ	2.40	0.49
1:A:442:VAL:HB	1:A:481:ALA:HB1	1.95	0.49
1:C:225:PRO:HG3	1:C:227:PHE:CZ	2.47	0.49
1:C:309:ILE:O	1:C:309:ILE:CG2	2.61	0.49
1:A:439:THR:O	1:A:459:THR:HA	2.13	0.49
1:C:246:LEU:HD11	1:C:307:ARG:NH1	2.28	0.49
2:B:224:GLU:HB2	2:B:229:TRP:CZ3	2.47	0.49
1:C:282:LEU:HD22	1:C:296:THR:HG23	1.95	0.49
1:C:292:VAL:HG13	1:C:292:VAL:O	2.11	0.49
2:B:100:LEU:HB2	2:B:179:VAL:HG11	1.95	0.49
2:B:7:THR:HG22	2:B:119:PRO:HG2	1.94	0.49
1:C:254:VAL:N	1:C:293:ILE:HD11	2.28	0.49
2:D:103:LYS:HD2	2:D:191:SER:HA	1.94	0.49
1:C:23:GLN:HG2	1:C:133:PRO:HD3	1.95	0.48
1:C:104:LYS:HD2	1:C:192:ASP:O	2.13	0.48
1:C:229:TRP:CE3	1:C:234:LEU:HD11	2.48	0.48
2:D:248:GLU:HG2	2:D:307:ARG:NH2	2.28	0.48
1:A:274:ILE:HD12	1:A:309:ILE:CD1	2.43	0.48
1:A:500:GLN:HG2	2:B:422:LEU:HD12	1.95	0.48
2:B:58:THR:HG21	2:B:77:PHE:CD1	2.48	0.48
1:C:183:TYR:CD2	1:C:230:MET:HE3	2.48	0.48
1:C:195:ILE:HD11	1:C:199:ARG:NH1	2.28	0.48
2:D:27:THR:O	2:D:31:ILE:HG13	2.13	0.48
3:E:707:DG:H2'	3:E:708:DG:C8	2.48	0.48
1:A:339:TYR:CG	1:A:375:ILE:HD11	2.48	0.48
1:C:27:THR:HG22	1:C:28:GLU:H	1.78	0.48
1:A:21:VAL:CG2	1:A:79:GLU:HG3	2.43	0.48
1:A:47:ILE:HD13	1:A:146:TYR:HA	1.95	0.48
1:C:254:VAL:HG11	1:C:289:LEU:HA	1.94	0.48
1:A:23:GLN:HG2	1:A:133:PRO:CG	2.42	0.48
1:A:131:THR:OG1	1:A:143:ARG:HG2	2.13	0.48
2:B:331:LYS:HB2	2:B:337:TRP:CZ3	2.47	0.48
1:C:328:GLU:HG2	1:C:330:GLN:HE21	1.77	0.48
1:C:494:ASN:HB3	2:D:289:LEU:HD12	1.95	0.48
2:D:319:TYR:OH	2:D:385:LYS:HD2	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:30:LYS:NZ	2:B:62:ALA:O	2.43	0.48
2:D:399:GLU:OE2	5:J:2:FRU:H5	2.14	0.48
1:C:97:PRO:HG3	1:C:232:TYR:CG	2.49	0.48
2:D:84:THR:HG22	2:D:88:TRP:HD1	1.77	0.48
2:B:227:PHE:CE1	2:B:230:MET:HG3	2.49	0.47
1:A:450:THR:HG22	1:A:452:LEU:HB2	1.95	0.47
2:B:363:ASN:O	2:B:367:GLN:HG3	2.14	0.47
1:C:42:GLU:CD	1:C:49:LYS:HE3	2.34	0.47
2:D:324:ASP:O	2:D:343:GLN:HG2	2.14	0.47
1:C:246:LEU:HD22	1:C:260:LEU:HD11	1.97	0.47
1:C:251:SER:O	1:C:252:TRP:CG	2.67	0.47
1:C:379:SER:HB2	1:C:387:PRO:HD3	1.95	0.47
1:C:420:PRO:HA	1:C:422:LEU:HD12	1.96	0.47
2:B:65:LYS:HD2	2:B:70:LYS:HB2	1.96	0.47
1:C:246:LEU:CD1	1:C:307:ARG:NH1	2.77	0.47
1:A:492:GLU:HG2	1:A:530:LYS:HB2	1.96	0.47
2:D:66:LYS:HZ1	2:D:232:TYR:HB2	1.79	0.47
2:D:75:VAL:HG11	2:D:77:PHE:CZ	2.50	0.47
2:D:287:LYS:HD3	2:D:293:ILE:HD11	1.96	0.47
1:A:47:ILE:CG2	1:A:144:TYR:HB3	2.45	0.47
1:A:324:ASP:O	1:A:343:GLN:HG2	2.14	0.47
2:B:227:PHE:HE1	2:B:230:MET:HG3	1.80	0.47
1:C:253:THR:HG23	1:C:291:GLU:O	2.14	0.47
1:A:410:TRP:CH2	1:A:412:PRO:HA	2.50	0.47
2:B:132:ILE:HB	2:B:142:ILE:HG13	1.96	0.47
2:B:215:THR:HG22	2:B:216:THR:N	2.29	0.47
2:B:287:LYS:HD3	2:B:293:ILE:HD11	1.96	0.47
1:C:280:SER:O	1:C:283:LEU:HG	2.15	0.47
1:A:33:ALA:O	1:A:37:ILE:HG12	2.15	0.46
2:B:328:GLU:HG2	2:B:390:LYS:HD2	1.97	0.46
1:C:90:VAL:HG23	2:D:140:PRO:HB3	1.96	0.46
2:D:66:LYS:HB3	2:D:407:GLN:OE1	2.15	0.46
1:A:394:GLN:HB2	1:A:397:THR:OG1	2.15	0.46
2:B:16:MET:CE	2:B:83:ARG:HG2	2.45	0.46
2:B:50:ILE:HD13	2:B:145:GLN:HB3	1.97	0.46
1:C:537:PRO:CG	2:D:262:GLY:HA2	2.45	0.46
4:F:817:DG:H2'	4:F:818:DC:C6	2.50	0.46
4:F:818:DC:H2'	4:F:819:DG:C8	2.50	0.46
3:E:718:DA:H2''	3:E:719:DG:C8	2.50	0.46
2:B:8:VAL:O	2:B:121:ASP:HB2	2.15	0.46
1:C:284:ARG:CG	3:E:712:DC:H5''	2.41	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:420:PRO:CG	2:D:421:PRO:HD3	2.46	0.46
1:C:408:ALA:O	2:D:393:ILE:HG13	2.16	0.46
1:A:75:VAL:HB	1:A:77:PHE:CD2	2.51	0.46
1:A:405:TYR:CE2	1:A:407:GLN:HB2	2.50	0.46
2:D:85:GLN:CD	2:D:87:PHE:HB2	2.36	0.46
1:A:337:TRP:CZ3	1:A:368:LEU:HD13	2.50	0.46
2:D:121:ASP:OD1	2:D:123:ASP:OD1	2.34	0.46
1:A:172:LYS:HE2	1:A:180:ILE:HB	1.98	0.46
1:A:332:GLN:HG3	1:A:333:GLY:H	1.80	0.46
1:C:180:ILE:HG23	1:C:187:LEU:HD11	1.98	0.45
1:C:367:GLN:NE2	1:C:512:LYS:HD2	2.31	0.45
1:A:270:ILE:HG13	1:A:314:VAL:HG12	1.98	0.45
1:C:427:TYR:OH	1:C:510:PRO:HD2	2.16	0.45
2:D:38:CYS:SG	2:D:132:ILE:HD11	2.56	0.45
1:C:301:LEU:O	1:C:305:GLU:HG3	2.16	0.45
1:A:130:PHE:CE1	1:A:144:TYR:HB2	2.52	0.45
4:P:814:DC:H2''	4:P:815:DG:C8	2.51	0.45
1:A:24:TRP:HB2	1:A:25:PRO:HD2	1.99	0.45
1:A:49:LYS:HG2	1:A:144:TYR:CE1	2.51	0.45
1:A:516:GLU:CD	1:A:516:GLU:H	2.20	0.45
2:B:241:VAL:HA	2:B:351:THR:O	2.17	0.45
2:B:424:LYS:HE2	2:B:424:LYS:HB3	1.71	0.45
1:C:38:CYS:SG	1:C:132:ILE:HD11	2.57	0.45
1:C:181:TYR:HB2	1:C:188:TYR:HB3	1.97	0.45
1:A:44:GLU:HB3	1:A:46:LYS:HE2	1.99	0.45
1:A:17:ASP:O	1:A:83:ARG:HD3	2.16	0.45
1:A:496:VAL:HG21	2:B:289:LEU:HD21	1.99	0.45
1:C:429:LEU:HD11	1:C:506:ILE:HG22	1.99	0.45
2:B:354:TYR:HB3	2:B:357:MET:CE	2.45	0.45
1:A:54:ASN:O	1:A:143:ARG:NH2	2.48	0.45
1:A:105:SER:HB2	1:A:198:HIS:ND1	2.32	0.45
1:A:301:LEU:O	1:A:301:LEU:HD23	2.17	0.45
2:D:421:PRO:O	2:D:424:LYS:HE3	2.17	0.45
1:A:10:VAL:HG21	1:A:153:TRP:HH2	1.82	0.44
2:B:34:LEU:HD11	2:B:61:PHE:HA	1.99	0.44
1:C:104:LYS:HB2	1:C:192:ASP:HA	1.99	0.44
1:A:167:ILE:HD12	1:A:214:LEU:HD11	1.98	0.44
1:A:390:LYS:HE2	1:A:417:VAL:CG1	2.47	0.44
2:B:339:TYR:CE1	2:B:354:TYR:CD2	3.06	0.44
1:C:266:TRP:CD2	4:F:821:DC:H4'	2.52	0.44
2:D:178:ILE:CG2	2:D:189:VAL:HG23	2.47	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:180:ILE:HA	2:D:188:TYR:O	2.17	0.44
1:A:362:THR:HG21	1:A:367:GLN:HE21	1.81	0.44
2:B:78:ARG:NH1	5:I:1:GLC:H62	2.33	0.44
2:D:70:LYS:HE2	2:D:70:LYS:HB3	1.77	0.44
2:D:107:THR:O	2:D:189:VAL:HG12	2.17	0.44
2:D:247:PRO:O	2:D:307:ARG:NH2	2.49	0.44
1:C:328:GLU:HG2	1:C:330:GLN:NE2	2.33	0.44
1:C:388:LYS:HE2	1:C:413:GLU:OE1	2.17	0.44
2:B:425:LEU:H	2:B:425:LEU:HG	1.67	0.44
2:D:163:SER:O	2:D:167:ILE:HG13	2.18	0.44
2:B:339:TYR:CZ	2:B:352:GLY:HA3	2.52	0.44
1:C:320:ASP:O	1:C:343:GLN:NE2	2.51	0.44
2:B:353:LYS:NZ	2:B:427:TYR:CE1	2.86	0.44
1:C:157:PRO:O	1:C:161:GLN:HG3	2.18	0.44
1:C:254:VAL:HG13	1:C:255:ASN:N	2.33	0.44
1:A:24:TRP:HH2	1:A:76:ASP:HB2	1.82	0.44
1:A:101:LYS:CE	1:A:321:PRO:HG3	2.41	0.44
3:T:709:DC:H42	4:P:819:DG:H1	1.66	0.44
1:C:123:ASP:O	1:C:126:LYS:NZ	2.51	0.44
1:C:246:LEU:CD1	1:C:307:ARG:CZ	2.96	0.44
2:D:354:TYR:HD1	2:D:354:TYR:HA	1.60	0.43
1:A:406:TRP:O	2:B:331:LYS:HB3	2.18	0.43
2:D:209:LEU:O	2:D:214:LEU:N	2.51	0.43
3:E:717:DC:H2''	3:E:718:DA:C8	2.53	0.43
1:A:390:LYS:HB3	1:A:417:VAL:HG11	2.01	0.43
2:B:42:GLU:OE2	2:B:49:LYS:HG3	2.18	0.43
1:C:96:HIS:CE1	1:C:350:LYS:HD2	2.53	0.43
1:C:115:TYR:HD2	1:C:151:GLN:HG2	1.82	0.43
2:B:358:ARG:HG3	2:B:370:GLU:OE2	2.17	0.43
1:C:253:THR:HG22	1:C:289:LEU:O	2.18	0.43
1:A:245:VAL:HG13	1:A:245:VAL:O	2.19	0.43
1:C:266:TRP:CE3	4:F:821:DC:H4'	2.54	0.43
2:B:282:LEU:HB3	2:B:293:ILE:HG21	1.99	0.43
1:C:181:TYR:CD2	2:D:138:GLU:HA	2.53	0.43
1:C:242:GLN:HB3	1:C:243:PRO:HD2	2.01	0.43
4:P:815:DG:H2'	4:P:816:DG:H8	1.84	0.43
1:C:100:LEU:HD11	1:C:229:TRP:CZ3	2.53	0.43
2:B:206:ARG:HE	2:B:206:ARG:HB3	1.71	0.43
2:B:354:TYR:HB3	2:B:357:MET:HE1	2.01	0.43
2:D:131:THR:CG2	2:D:141:GLY:HA3	2.48	0.43
2:D:209:LEU:HB3	2:D:214:LEU:C	2.39	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:339:TYR:CE1	2:B:354:TYR:CE2	3.07	0.43
1:C:65:LYS:HB3	1:C:68:SER:HB3	2.01	0.43
1:C:209:LEU:HD12	1:C:216:THR:CG2	2.49	0.43
1:A:139:THR:CG2	1:A:140:PRO:HD2	2.47	0.43
1:A:350:LYS:HB2	1:A:350:LYS:HE2	1.84	0.43
1:A:100:LEU:HD11	1:A:229:TRP:CZ3	2.54	0.42
1:C:47:ILE:HD11	1:C:146:TYR:CE1	2.54	0.42
1:C:354:TYR:HD1	1:C:374:LYS:HD2	1.84	0.42
1:C:110:ASP:HB3	1:C:220:LYS:CB	2.42	0.42
1:A:281:LYS:HG3	1:A:284:ARG:HE	1.83	0.42
2:B:266:TRP:CZ3	2:B:425:LEU:HB3	2.54	0.42
1:C:200:THR:O	1:C:204:GLU:HG3	2.19	0.42
1:C:244:ILE:HD11	1:C:266:TRP:HD1	1.79	0.42
1:A:335:GLY:HA2	1:A:367:GLN:OE1	2.19	0.42
1:C:254:VAL:HG12	1:C:289:LEU:O	2.18	0.42
1:C:438:GLU:OE1	1:C:463:ARG:NH2	2.53	0.42
2:D:341:ILE:HD11	2:D:375:ILE:HG23	2.01	0.42
1:C:251:SER:HB2	1:C:292:VAL:HG23	2.01	0.42
1:C:253:THR:HG21	1:C:290:THR:HA	2.02	0.42
1:A:438:GLU:OE1	1:A:463:ARG:NH2	2.52	0.42
1:C:496:VAL:CG2	2:D:289:LEU:HD21	2.50	0.42
1:A:59:PRO:O	1:A:75:VAL:HG13	2.20	0.42
1:A:452:LEU:CD2	1:A:470:THR:HA	2.36	0.42
1:C:94:ILE:HD11	3:E:707:DG:N2	2.29	0.42
1:A:441:TYR:CG	1:A:544:GLY:HA3	2.55	0.42
2:B:107:THR:HG21	2:B:202:ILE:HG12	2.02	0.42
1:C:359:GLY:HA2	4:F:812:DT:OP2	2.20	0.42
1:C:422:LEU:HD12	1:C:422:LEU:N	2.34	0.42
2:D:46:LYS:HE2	2:D:116:PHE:HB3	2.02	0.42
2:D:319:TYR:CZ	2:D:321:PRO:HA	2.55	0.42
1:C:10:VAL:HG11	1:C:153:TRP:CZ2	2.55	0.42
2:D:179:VAL:O	2:D:189:VAL:HA	2.19	0.42
1:C:181:TYR:CE2	2:D:138:GLU:HB2	2.55	0.42
1:A:408:ALA:O	2:B:393:ILE:HG13	2.20	0.41
2:B:428:GLN:O	2:B:428:GLN:HG3	2.20	0.41
2:B:66:LYS:O	2:B:66:LYS:HG3	2.20	0.41
1:A:100:LEU:O	1:A:318:TYR:HB3	2.21	0.41
1:C:343:GLN:HG3	1:C:349:LEU:HD11	2.01	0.41
1:C:379:SER:CB	1:C:387:PRO:HD3	2.51	0.41
1:C:537:PRO:HG2	2:D:262:GLY:HA2	2.03	0.41
1:A:94:ILE:HG23	1:A:230:MET:HE1	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:388:LYS:HE2	1:C:413:GLU:CD	2.40	0.41
2:D:16:MET:HE2	2:D:83:ARG:HG2	2.00	0.41
3:T:725:DG:H2''	3:T:726:DT:O5'	2.20	0.41
2:D:106:VAL:O	2:D:234:LEU:N	2.37	0.41
3:E:709:DC:H2'	3:E:710:DG:C8	2.56	0.41
1:A:317:VAL:HG12	1:A:318:TYR:N	2.35	0.41
1:A:317:VAL:HG21	1:A:347:LYS:HB3	2.02	0.41
1:C:10:VAL:HG21	1:C:153:TRP:HH2	1.85	0.41
1:C:167:ILE:CD1	1:C:214:LEU:HD11	2.51	0.41
1:C:252:TRP:NE1	1:C:295:LEU:HD11	2.35	0.41
1:C:253:THR:O	1:C:257:ILE:HG12	2.20	0.41
1:C:457:TYR:HE1	1:C:463:ARG:HG2	1.86	0.41
2:D:329:ILE:HD11	2:D:375:ILE:HD12	2.02	0.41
1:C:223:LYS:HE3	1:C:223:LYS:HB2	1.91	0.41
1:C:229:TRP:O	1:C:230:MET:HB2	2.20	0.41
1:C:543:GLY:N	2:D:283:LEU:O	2.53	0.41
2:D:78:ARG:HD3	2:D:411:ILE:HG22	2.02	0.41
1:A:10:VAL:HG11	1:A:153:TRP:HZ2	1.85	0.41
1:A:270:ILE:HD12	1:A:270:ILE:HA	1.95	0.41
1:A:324:ASP:OD2	1:A:388:LYS:NZ	2.43	0.41
1:C:131:THR:HA	1:C:142:ILE:O	2.20	0.41
1:C:186:ASP:OD1	1:C:186:ASP:C	2.59	0.41
1:C:254:VAL:HG11	1:C:288:ALA:O	2.20	0.41
2:D:16:MET:HE3	2:D:16:MET:HB3	1.93	0.41
2:D:58:THR:HG23	2:D:76:ASP:O	2.21	0.41
2:D:372:VAL:HG13	2:D:389:PHE:CE1	2.56	0.41
3:E:710:DG:H2''	3:E:711:DC:OP1	2.19	0.41
1:A:60:VAL:HG23	1:A:75:VAL:HG22	2.02	0.41
1:A:113:ASP:HB3	1:A:116:PHE:HB2	2.03	0.41
1:A:171:PHE:CZ	1:A:205:LEU:HB2	2.56	0.41
2:D:8:VAL:HG21	2:D:159:ILE:HG23	2.02	0.41
1:A:5:ILE:HD13	1:A:163:SER:HB3	2.04	0.40
1:A:254:VAL:HG21	1:A:286:THR:HG22	2.02	0.40
1:C:41:MET:HE2	1:C:41:MET:HB3	1.97	0.40
2:D:317:VAL:HG13	2:D:347:LYS:HB3	2.04	0.40
1:A:329:ILE:O	1:A:392:PRO:HD3	2.21	0.40
1:A:447:ASN:OD1	1:A:449:GLU:N	2.53	0.40
2:D:266:TRP:CG	2:D:425:LEU:HD13	2.57	0.40
1:C:246:LEU:HD11	1:C:307:ARG:CZ	2.51	0.40
1:A:406:TRP:CE3	2:B:421:PRO:CG	2.97	0.40
1:A:47:ILE:HG23	1:A:144:TYR:HB3	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:88:TRP:HA	2:D:88:TRP:CE3	2.56	0.40
2:D:331:LYS:HB2	2:D:337:TRP:CZ3	2.57	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:T:727:DG:O3'	4:F:803:DC:OP2[3_545]	2.17	0.03

## 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 X-ray entries followed by that with respect to entries of similar resolution.

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	553/556 (100%)	539 (98%)	14 (2%)	0	100	100
1	C	549/556 (99%)	533 (97%)	15 (3%)	1 (0%)	47	78
2	B	414/444 (93%)	399 (96%)	15 (4%)	0	100	100
2	D	400/444 (90%)	386 (96%)	13 (3%)	1 (0%)	41	73
All	All	1916/2000 (96%)	1857 (97%)	57 (3%)	2 (0%)	51	82

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	543	GLY
2	D	420	PRO

### 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 X-ray entries followed by that with respect to entries of similar resolution.

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	496/497 (100%)	495 (100%)	1 (0%)	93	97
1	C	492/497 (99%)	491 (100%)	1 (0%)	93	97
2	B	381/403 (94%)	375 (98%)	6 (2%)	62	81
2	D	370/403 (92%)	367 (99%)	3 (1%)	81	91
All	All	1739/1800 (97%)	1728 (99%)	11 (1%)	86	93

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

Mol	Chain	Res	Type
1	A	428	GLN
2	B	77	PHE
2	B	227	PHE
2	B	394	GLN
2	B	423	VAL
2	B	424	LYS
2	B	425	LEU
1	C	240	THR
2	D	191	SER
2	D	229	TRP
2	D	356	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	407	GLN
1	C	221	HIS

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

## 5.5 Carbohydrates [i](#)

4 monosaccharides are modelled in this entry.

There are no bond length outliers.

There are no bond angle outliers.

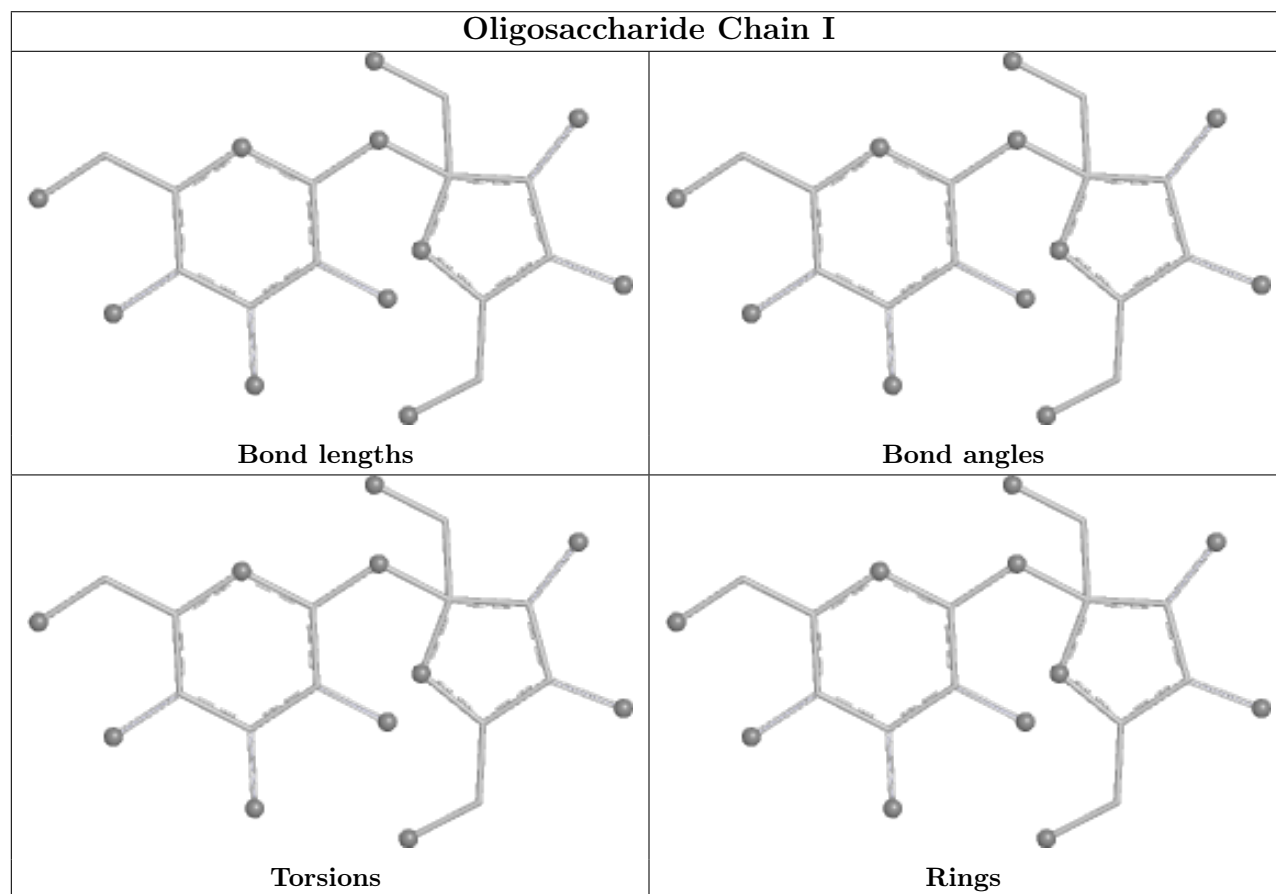
There are no chirality outliers.

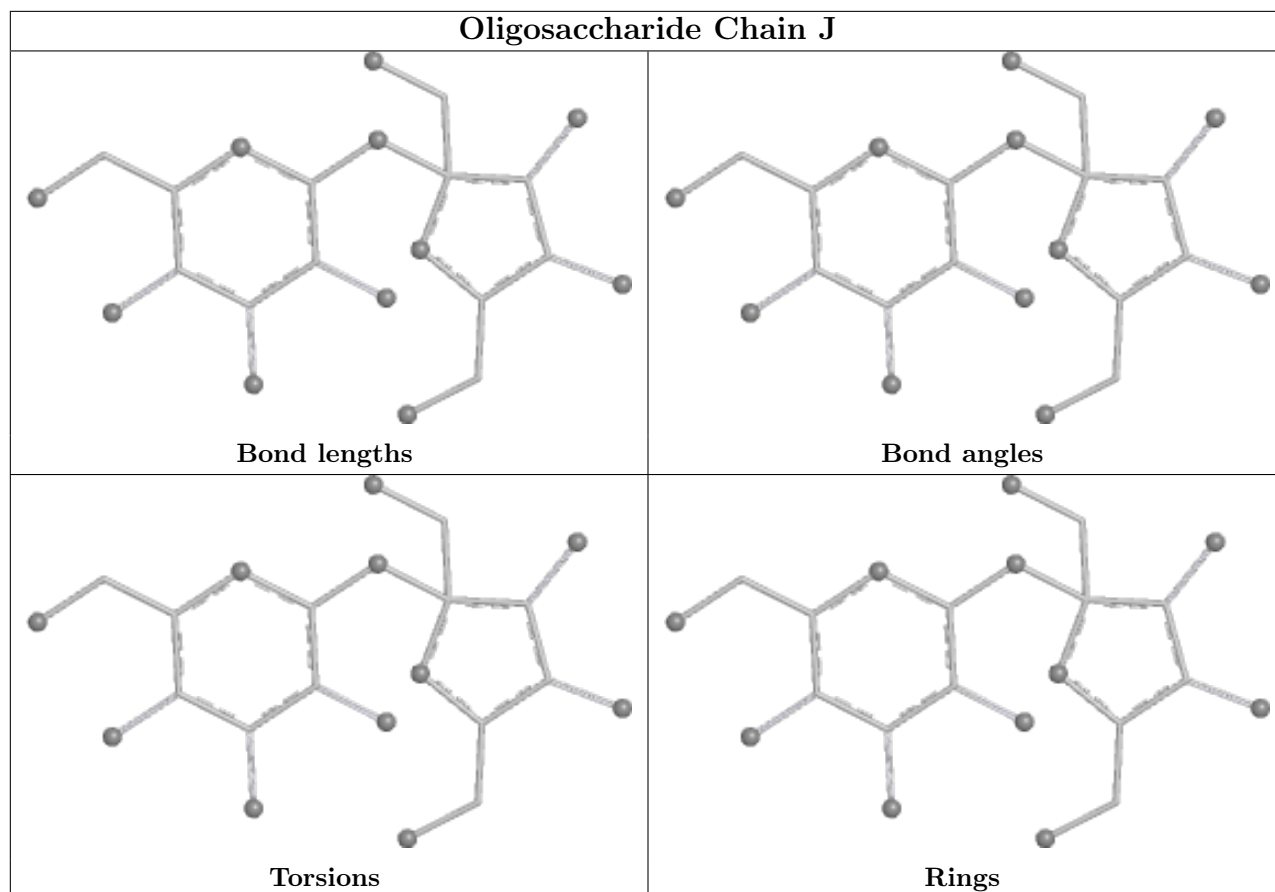
There are no torsion outliers.

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 oligosaccharide.





## 5.6 Ligand geometry [i](#)

Of 19 ligands modelled in this entry, 18 are monoatomic - leaving 1 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

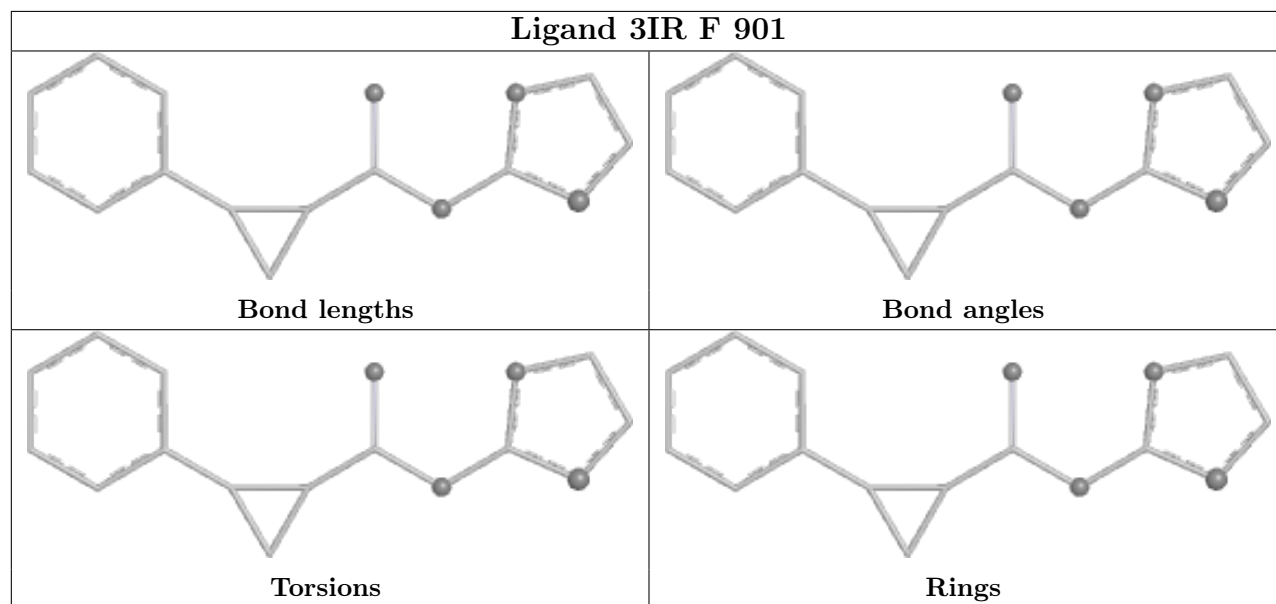
There are no torsion outliers.

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 than 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.



## 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.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	555/556 (99%)	0.61	39 (7%) 16 20	57, 87, 157, 199	0
1	C	551/556 (99%)	0.60	38 (6%) 16 20	56, 99, 154, 203	0
2	B	418/444 (94%)	0.41	18 (4%) 35 39	52, 84, 133, 168	0
2	D	406/444 (91%)	0.61	35 (8%) 10 13	58, 87, 140, 184	0
3	E	22/28 (78%)	-0.25	0 100 100	94, 130, 149, 175	0
3	T	24/28 (85%)	-0.07	1 (4%) 36 40	71, 110, 168, 193	0
4	F	20/21 (95%)	-0.39	0 100 100	101, 119, 162, 169	0
4	P	21/21 (100%)	-0.27	0 100 100	84, 95, 140, 158	0
All	All	2017/2098 (96%)	0.53	131 (6%) 18 22	52, 90, 149, 203	0

All (131) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	27	THR	11.5
1	A	73	LYS	8.3
1	A	26	LEU	6.6
1	A	134	SER	6.5
1	A	30	LYS	6.0
2	D	88	TRP	5.8
2	D	67	ASP	5.7
2	D	232	TYR	5.3
1	C	66	LYS	5.3
1	C	65	LYS	5.2
2	D	66	LYS	5.1
1	A	61	PHE	4.8
1	A	250	ASP	4.7
1	C	286	THR	4.7
1	C	306	ASN	4.3
1	C	24	TRP	4.2

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
2	B	361	HIS	4.2
2	D	428	GLN	4.0
2	B	227	PHE	3.9
1	A	133	PRO	3.9
1	A	138	GLU	3.9
2	B	225	PRO	3.9
1	C	67	ASP	3.8
1	A	63	CYS	3.8
1	A	29	GLU	3.8
1	A	74	LEU	3.8
1	C	283	LEU	3.6
1	A	252	TRP	3.6
2	B	66	LYS	3.5
2	D	93	GLY	3.5
1	A	140	PRO	3.5
1	A	24	TRP	3.5
2	B	421	PRO	3.5
2	D	85	GLN	3.2
1	A	325	LEU	3.2
2	B	357	MET	3.2
2	B	426	TRP	3.1
2	D	214	LEU	3.1
1	A	34	LEU	3.1
1	C	310	LEU	3.1
2	D	90	VAL	3.0
2	D	94	ILE	3.0
1	C	34	LEU	3.0
2	B	295	LEU	3.0
2	D	87	PHE	3.0
1	C	289	LEU	2.9
1	C	109	LEU	2.9
1	A	295	LEU	2.9
2	D	89	GLU	2.9
1	C	68	SER	2.9
1	C	279	LEU	2.9
1	C	205	LEU	2.9
2	D	423	VAL	2.9
1	C	73	LYS	2.9
2	D	65	LYS	2.9
1	A	198	HIS	2.8
1	C	108	VAL	2.8
1	C	252	TRP	2.8

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	348	ASN	2.8
1	A	260	LEU	2.8
1	A	306	ASN	2.8
2	D	270	ILE	2.7
2	B	223	LYS	2.7
1	A	72	ARG	2.7
1	C	329	ILE	2.6
2	D	230	MET	2.6
1	A	69	THR	2.6
1	A	68	SER	2.6
2	D	71	TRP	2.5
1	C	26	LEU	2.5
1	A	257	ILE	2.5
1	C	284	ARG	2.5
1	A	75	VAL	2.5
1	C	61	PHE	2.5
2	D	30	LYS	2.5
1	C	38	CYS	2.4
2	D	303	LEU	2.4
1	C	349	LEU	2.4
1	A	448	ARG	2.4
2	D	131	THR	2.4
2	D	329	ILE	2.4
3	T	725	DG	2.4
2	D	61	PHE	2.4
1	A	332	GLN	2.4
2	D	97	PRO	2.4
2	B	358	ARG	2.4
2	D	252	TRP	2.4
1	C	30	LYS	2.4
1	C	457	TYR	2.4
1	A	243	PRO	2.3
2	B	220	LYS	2.3
1	A	193	LEU	2.3
2	D	279	LEU	2.3
1	C	187	LEU	2.3
2	D	426	TRP	2.3
1	C	133	PRO	2.3
1	A	299	ALA	2.3
1	C	60	VAL	2.2
1	A	389	PHE	2.2
1	C	485	ALA	2.2

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Mol	Chain	Res	Type	RSRZ
2	D	283	LEU	2.2
2	B	282	LEU	2.2
1	C	246	LEU	2.2
1	C	323	LYS	2.2
1	A	274	ILE	2.2
1	C	72	ARG	2.2
1	A	178	ILE	2.2
2	D	195	ILE	2.2
2	D	317	VAL	2.2
2	D	357	MET	2.1
1	C	74	LEU	2.1
1	C	46	LYS	2.1
2	D	346	PHE	2.1
1	A	222	GLN	2.1
2	D	266	TRP	2.1
1	A	271	TYR	2.1
2	D	124	PHE	2.1
1	C	491	LEU	2.1
2	B	219	LYS	2.1
2	B	228	LEU	2.1
1	C	227	PHE	2.1
2	D	354	TYR	2.1
2	D	383	TRP	2.1
2	B	279	LEU	2.1
1	C	198	HIS	2.0
2	B	105	SER	2.0
2	B	423	VAL	2.0
1	A	33	ALA	2.0
1	C	266	TRP	2.0
1	A	135	ILE	2.0
2	B	346	PHE	2.0

## 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

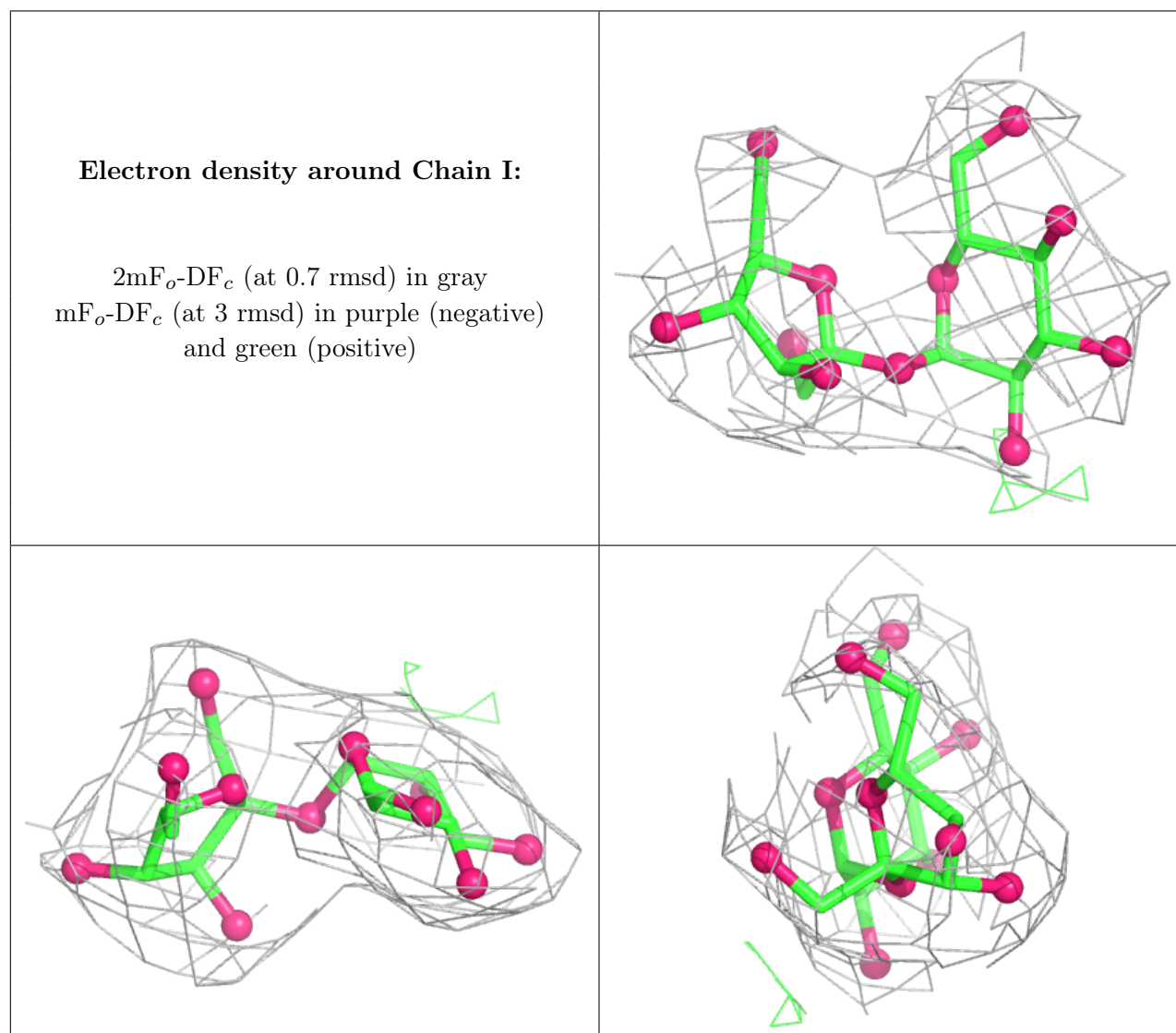
There are no non-standard protein/DNA/RNA residues in this entry.

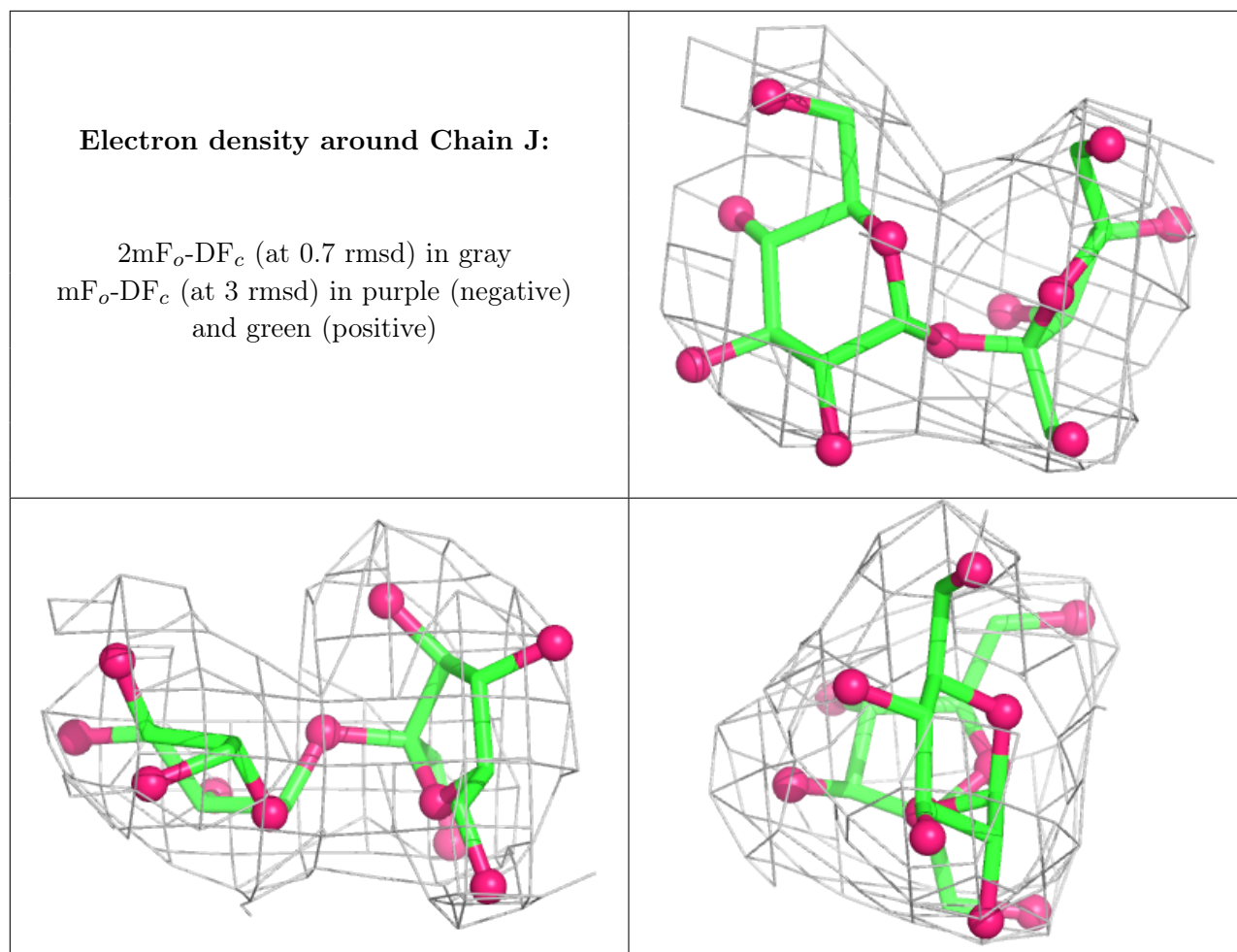
## 6.3 Carbohydrates [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
5	GLC	J	1	11/12	0.91	0.22	71,76,83,90	0
5	FRU	J	2	12/12	0.93	0.22	64,78,89,98	0
5	FRU	I	2	12/12	0.95	0.20	74,80,86,92	0
5	GLC	I	1	11/12	0.97	0.20	67,74,79,81	0

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.





## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists the number of atoms with occupancy less than 0.9.

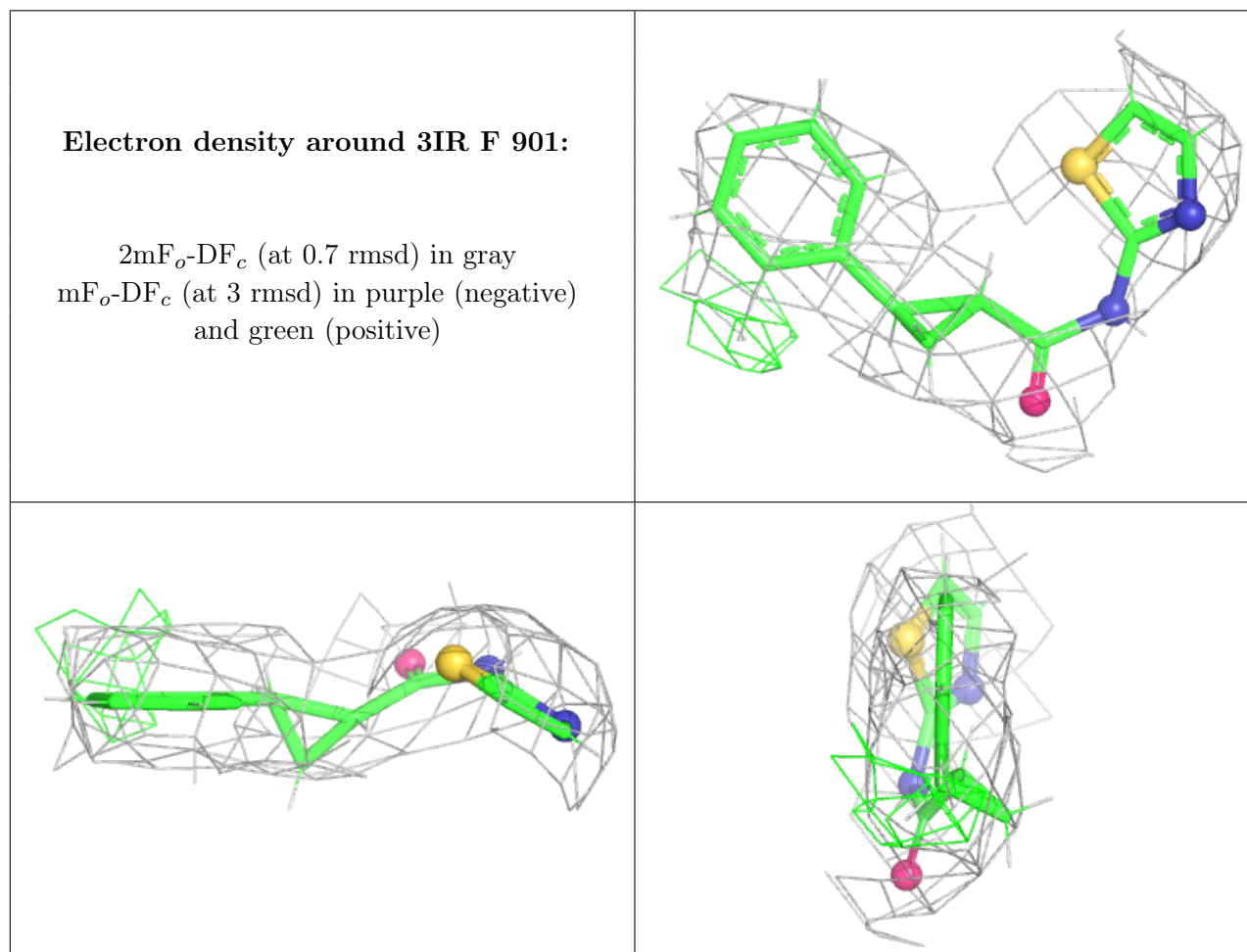
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
6	CD	T	802	1/1	0.66	0.07	173,173,173,173	0
6	CD	T	801	1/1	0.74	0.06	187,187,187,187	0
6	CD	C	602	1/1	0.85	0.09	144,144,144,144	0
6	CD	E	801	1/1	0.86	0.17	162,162,162,162	0
7	3IR	F	901	17/17	0.86	0.19	107,116,137,143	0
6	CD	F	902	1/1	0.90	0.18	141,141,141,141	0
6	CD	A	603	1/1	0.90	0.14	136,136,136,136	0
6	CD	B	502	1/1	0.93	0.12	159,159,159,159	0
6	CD	B	503	1/1	0.94	0.06	169,169,169,169	0
6	CD	A	602	1/1	0.94	0.21	97,97,97,97	0
6	CD	C	603	1/1	0.94	0.17	117,117,117,117	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
6	CD	D	503	1/1	0.96	0.13	119,119,119,119	0
6	CD	P	901	1/1	0.97	0.10	130,130,130,130	0
6	CD	E	802	1/1	0.97	0.09	157,157,157,157	0
6	CD	B	501	1/1	0.98	0.19	103,103,103,103	0
6	CD	C	601	1/1	0.99	0.24	77,77,77,77	0
6	CD	D	501	1/1	0.99	0.23	85,85,85,85	0
6	CD	D	502	1/1	0.99	0.13	104,104,104,104	0
6	CD	A	601	1/1	0.99	0.25	64,64,64,64	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.



## 6.5 Other polymers [\(i\)](#)

There are no such residues in this entry.