



Full wwPDB EM Validation Report ⓘ

Mar 18, 2024 – 04:10 pm GMT

PDB ID : 8Q91
EMDB ID : EMD-18267
Title : Structure of the human 20S U5 snRNP core
Authors : Schneider, S.; Galej, W.P.
Deposited on : 2023-08-19
Resolution : 3.10 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>.

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

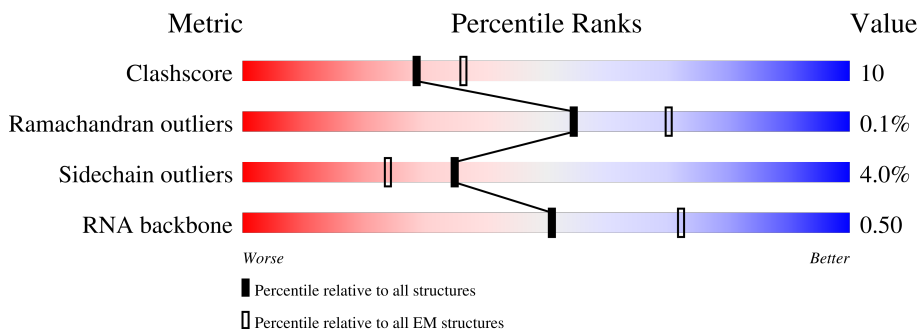
EMDB validation analysis : 0.0.1.dev92
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

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 3.10 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.



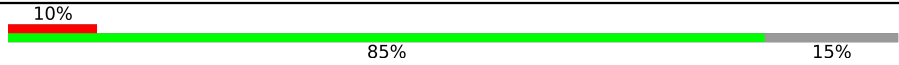
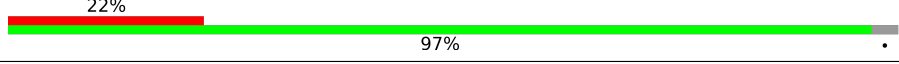
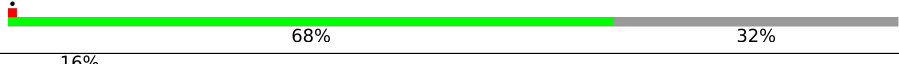
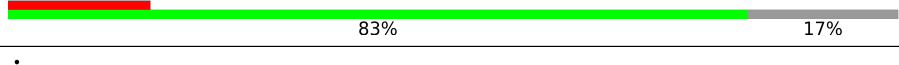

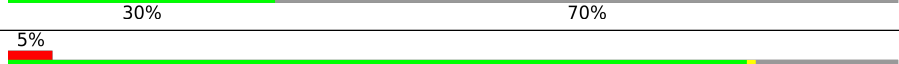
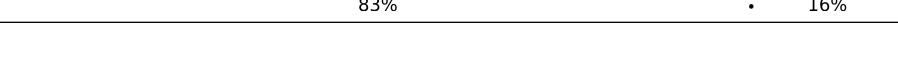
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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 $\leq 5\%$. 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	F	341	
2	A	2335	
3	5	117	
4	E	941	
5	D	820	
6	C	972	
7	B	2136	

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Mol	Chain	Length	Quality of chain
8	m	86	
9	n	76	
10	i	119	
11	j	118	
12	k	126	
13	h	240	
14	l	92	

2 Entry composition [i](#)

There are 15 unique types of molecules in this entry. The entry contains 26706 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 CD2 antigen cytoplasmic tail-binding protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	F	140	887	552	165	169	1	0	0

- Molecule 2 is a protein called Pre-mRNA-processing-splicing factor 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	A	1627	13247	8535	2321	2333	58	0	0

- Molecule 3 is a RNA chain called U5 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	5	104	2192	983	372	734	103	0	0

- Molecule 4 is a protein called Pre-mRNA-processing factor 6.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	E	60	300	180	60	60	0	0

- Molecule 5 is a protein called Probable ATP-dependent RNA helicase DDX23.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
5	D	54	455	294	78	83	0	0

- Molecule 6 is a protein called 116 kDa U5 small nuclear ribonucleoprotein component.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	C	847	6629	4238	1108	1250	33	0	0

- Molecule 7 is a protein called U5 small nuclear ribonucleoprotein 200 kDa helicase.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	B	27	201	123	38	39	1	0	0

- Molecule 8 is a protein called Small nuclear ribonucleoprotein F.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
8	m	73	356	210	73	73	0	0

- Molecule 9 is a protein called Small nuclear ribonucleoprotein G.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
9	n	74	364	215	74	75	0	0

- Molecule 10 is a protein called Small nuclear ribonucleoprotein Sm D1.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
10	i	81	401	239	81	81	0	0

- Molecule 11 is a protein called Small nuclear ribonucleoprotein Sm D2.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
11	j	98	487	291	98	98	0	0

- Molecule 12 is a protein called Small nuclear ribonucleoprotein Sm D3.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
12	k	84	414	246	84	84	0	0

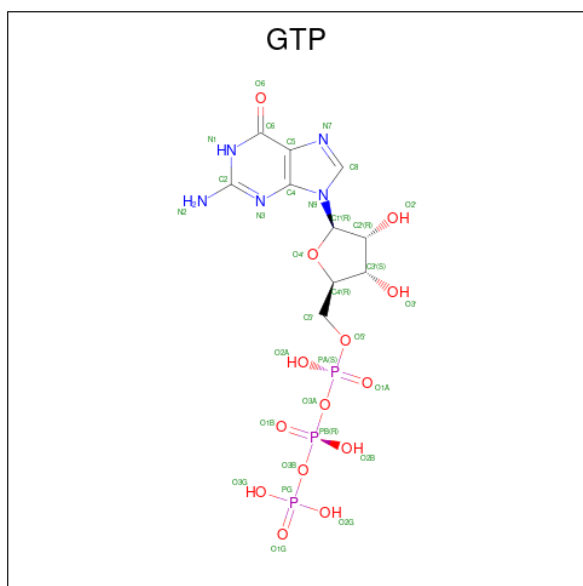
- Molecule 13 is a protein called Small nuclear ribonucleoprotein-associated proteins B and B'.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
13	h	73	360	214	73	73	0	0

- Molecule 14 is a protein called Small nuclear ribonucleoprotein E.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
14	1	77	381	227	77	77	0	0

- Molecule 15 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$) (labeled as "Ligand of Interest" by depositor).

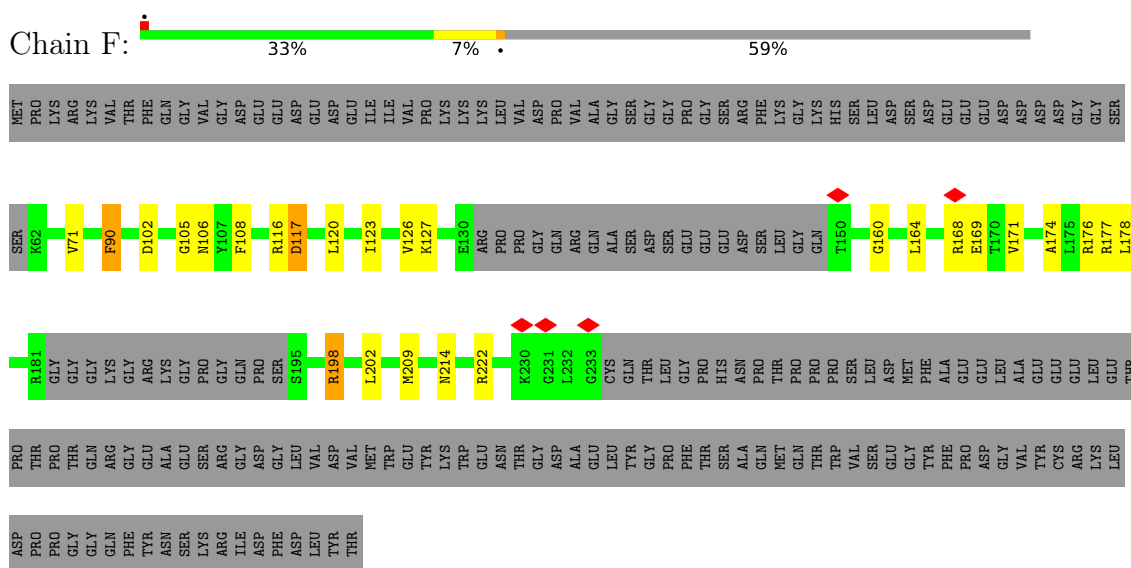


Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
15	C	1	32	10	5	14	3	0

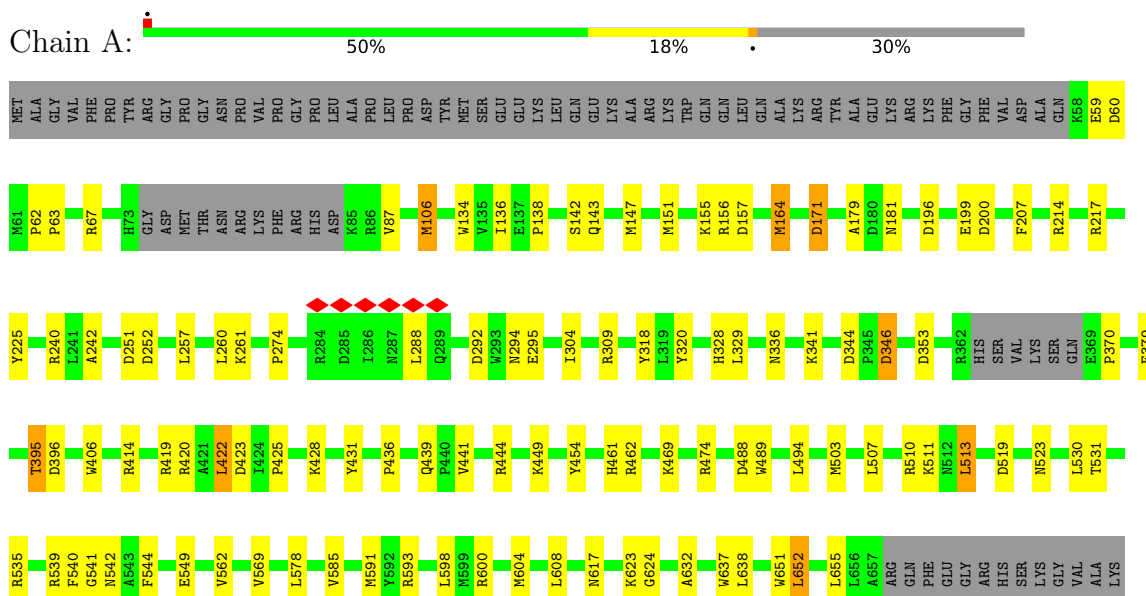
3 Residue-property plots [i](#)

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 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: CD2 antigen cytoplasmic tail-binding protein 2



- Molecule 2: Pre-mRNA-processing-splicing factor 8



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	76918	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40.5	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	3500	Depositor
Magnification	130000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	1.051	Depositor
Minimum map value	-0.392	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.016	Depositor
Recommended contour level	0.12	Depositor
Map size (Å)	526.6296, 526.6296, 526.6296	wwPDB
Map dimensions	504, 504, 504	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.0449, 1.0449, 1.0449	Depositor

5 Model quality i

5.1 Standard geometry i

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

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	F	0.29	0/896	0.57	0/1224
2	A	0.27	0/13608	0.53	2/18483 (0.0%)
3	5	0.24	0/2444	0.89	6/3798 (0.2%)
4	E	0.22	0/298	0.35	0/414
5	D	0.31	0/464	0.56	0/620
6	C	0.28	0/6777	0.51	2/9214 (0.0%)
7	B	0.31	0/202	0.66	0/268
8	m	0.29	0/355	0.57	0/490
9	n	0.24	0/363	0.50	0/501
10	i	0.34	0/400	0.51	0/556
11	j	0.24	0/485	0.51	0/674
12	k	0.27	0/413	0.49	0/573
13	h	0.26	0/358	0.51	0/495
14	l	0.25	0/380	0.62	1/528 (0.2%)
All	All	0.27	0/27443	0.57	11/37838 (0.0%)

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	5	57	G	O4'-C1'-N9	7.73	114.38	108.20
3	5	23	C	C2-N1-C1'	7.18	126.70	118.80
3	5	23	C	N1-C2-O2	6.71	122.92	118.90
2	A	1692	MET	CA-CB-CG	6.02	123.54	113.30
3	5	23	C	N3-C2-O2	-6.01	117.69	121.90
2	A	1070	ASP	CB-CG-OD1	5.91	123.61	118.30
6	C	144	CYS	N-CA-CB	5.48	120.47	110.60
14	l	15	VAL	C-N-CA	5.42	135.25	121.70
6	C	793	ASP	CB-CG-OD1	5.38	123.14	118.30
3	5	58	U	O5'-P-OP2	-5.11	101.11	105.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	5	23	C	C6-N1-C2	-5.08	118.27	120.30

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	F	887	0	714	27	0
2	A	13247	0	12877	324	0
3	5	2192	0	1111	43	0
4	E	300	0	132	0	0
5	D	455	0	450	13	0
6	C	6629	0	6607	113	0
7	B	201	0	214	10	0
8	m	356	0	156	0	0
9	n	364	0	160	0	0
10	i	401	0	165	0	0
11	j	487	0	199	0	0
12	k	414	0	185	0	0
13	h	360	0	149	0	0
14	l	381	0	159	0	0
15	C	32	0	12	1	0
All	All	26706	0	23290	496	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 10.

All (496) 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)
2:A:885:LEU:HD21	2:A:922:LEU:HD21	1.53	0.89
2:A:813:THR:HG21	2:A:996:LEU:HD11	1.59	0.84
2:A:1237:MET:HG2	2:A:1284:LEU:HD13	1.66	0.78
2:A:975:VAL:HG11	2:A:1153:VAL:HG21	1.66	0.78

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:C:829:GLU:HG3	6:C:907:VAL:HG22	1.66	0.77
2:A:1366:PRO:HD2	2:A:1474:MET:HE3	1.67	0.76
2:A:1314:VAL:HG13	2:A:1478:LEU:HD23	1.67	0.76
2:A:1368:LEU:HD11	2:A:1467:LEU:HD23	1.67	0.76
2:A:200:ASP:OD1	2:A:240:ARG:NH2	2.19	0.75
5:D:243:LYS:HG3	5:D:244:SER:H	1.52	0.75
2:A:1032:ARG:HD3	2:A:1445:TYR:HE2	1.50	0.74
2:A:1622:MET:O	2:A:1687:TYR:OH	2.05	0.74
2:A:1171:GLU:OE2	2:A:1171:GLU:N	2.18	0.73
2:A:1622:MET:SD	2:A:1622:MET:N	2.62	0.73
2:A:292:ASP:OD2	2:A:1130:ASN:ND2	2.22	0.72
2:A:370:PRO:HG2	6:C:304:LEU:HD21	1.69	0.72
6:C:406:GLU:OE1	6:C:406:GLU:N	2.22	0.72
2:A:530:LEU:HG	2:A:535:ARG:HG3	1.71	0.72
2:A:1701:VAL:HA	2:A:1716:GLY:HA3	1.70	0.72
2:A:585:VAL:HG11	2:A:637:TRP:CZ2	2.25	0.72
2:A:1573:LEU:HA	2:A:1576:ILE:HG22	1.72	0.72
5:D:243:LYS:HG3	5:D:244:SER:N	2.05	0.71
2:A:329:LEU:HB3	6:C:177:ARG:HD3	1.72	0.71
1:F:164:LEU:O	1:F:198:ARG:NH2	2.23	0.70
2:A:974:ASN:OD1	2:A:1100:ARG:NH1	2.25	0.70
3:5:19:A:N3	3:5:21:A:N6	2.40	0.69
2:A:1543:ASN:O	2:A:1563:HIS:ND1	2.25	0.69
2:A:1576:ILE:HG23	2:A:1577:PHE:HD1	1.57	0.69
2:A:1626:CYS:SG	2:A:1627:ALA:N	2.66	0.69
2:A:1289:VAL:HG21	7:B:42:SER:HA	1.72	0.69
2:A:776:LEU:HA	2:A:779:LEU:HD12	1.74	0.68
6:C:147:ASP:HA	6:C:150:ILE:HB	1.75	0.68
2:A:1544:ARG:HG3	2:A:1672:ASP:OD2	1.93	0.68
6:C:846:VAL:HG22	6:C:887:LEU:HD11	1.75	0.68
2:A:549:GLU:HB3	2:A:591:MET:HG2	1.75	0.68
2:A:1493:THR:HA	2:A:1747:ILE:HD11	1.75	0.68
2:A:1660:TYR:OH	2:A:1717:ASN:O	2.09	0.67
1:F:117:ASP:OD2	2:A:541:GLY:N	2.27	0.66
2:A:877:ALA:O	2:A:881:ILE:HG12	1.96	0.65
2:A:1032:ARG:HD3	2:A:1445:TYR:CE2	2.32	0.65
5:D:275:GLU:OE1	5:D:275:GLU:N	2.30	0.65
2:A:1069:ASN:OD1	2:A:1075:GLN:NE2	2.28	0.65
2:A:171:ASP:OD2	2:A:523:ASN:ND2	2.30	0.64
6:C:159:LYS:NZ	6:C:160:ARG:O	2.29	0.64
2:A:341:LYS:O	5:D:301:ARG:NH1	2.30	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1625:SER:OG	2:A:1663:ASP:OD2	2.14	0.64
2:A:1631:LEU:HD12	2:A:1660:TYR:HB3	1.80	0.64
6:C:436:GLN:OE1	6:C:437:HIS:NE2	2.30	0.64
2:A:855:ARG:HH12	2:A:857:ASN:HB3	1.62	0.64
2:A:992:LEU:HD13	2:A:996:LEU:HD23	1.80	0.64
6:C:137:HIS:O	6:C:142:LYS:NZ	2.31	0.64
2:A:881:ILE:HD12	2:A:918:THR:HA	1.80	0.63
2:A:1474:MET:HE2	2:A:1474:MET:HA	1.78	0.63
2:A:1411:SER:HA	2:A:1414:ARG:HD3	1.80	0.63
1:F:102:ASP:OD1	1:F:106:ASN:N	2.28	0.63
1:F:105:GLY:HA3	2:A:1532:ARG:HD2	1.79	0.63
2:A:1737:ASN:HB3	2:A:1740:LEU:HB2	1.80	0.63
1:F:168:ARG:H	1:F:222:ARG:HD3	1.64	0.62
2:A:143:GLN:NE2	2:A:207:PHE:O	2.27	0.62
2:A:1544:ARG:HG2	2:A:1546:ASN:H	1.64	0.62
2:A:813:THR:HG21	2:A:996:LEU:CD1	2.30	0.62
6:C:215:VAL:HG11	6:C:242:LEU:HD22	1.82	0.62
1:F:120:LEU:HD22	2:A:539:ARG:HD2	1.82	0.62
2:A:1712:HIS:HB3	2:A:1734:MET:HE1	1.81	0.61
6:C:143:THR:O	6:C:144:CYS:C	2.39	0.61
2:A:474:ARG:NH2	3:5:14:U:OP2	2.33	0.61
2:A:1555:LEU:HD11	2:A:1574:ILE:HD11	1.82	0.61
6:C:685:ILE:HD11	6:C:808:ILE:HD11	1.83	0.61
2:A:856:LEU:O	2:A:861:ARG:NH2	2.34	0.60
6:C:144:CYS:HB3	6:C:312:SER:HB2	1.83	0.60
6:C:335:ASN:ND2	6:C:338:GLU:OE1	2.34	0.60
2:A:1687:TYR:O	2:A:1693:SER:OG	2.20	0.60
6:C:697:ALA:O	6:C:701:GLU:HG2	2.01	0.60
2:A:1342:TRP:CZ2	2:A:1353:PHE:HB2	2.36	0.60
2:A:309:ARG:NH1	5:D:285:ASP:OD2	2.29	0.59
2:A:1434:LYS:O	2:A:1439:ARG:NH2	2.28	0.59
6:C:473:PRO:HB2	6:C:571:ASN:HD21	1.67	0.59
2:A:1342:TRP:CE2	2:A:1353:PHE:HB2	2.38	0.59
2:A:1427:ARG:HD3	2:A:1428:HIS:H	1.68	0.59
6:C:512:GLU:OE1	6:C:562:THR:OG1	2.21	0.59
2:A:772:CYS:O	2:A:776:LEU:HG	2.03	0.58
2:A:881:ILE:HG23	2:A:918:THR:HG23	1.85	0.58
6:C:407:GLU:OE1	6:C:418:LEU:HD21	2.03	0.58
6:C:170:ILE:HG22	6:C:536:ARG:HE	1.68	0.58
6:C:473:PRO:O	6:C:498:SER:OG	2.20	0.58
2:A:608:LEU:HD13	2:A:632:ALA:HB1	1.84	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:585:VAL:HG11	2:A:637:TRP:HZ2	1.69	0.58
2:A:1082:ALA:O	2:A:1083:HIS:ND1	2.37	0.58
2:A:304:ILE:HG21	5:D:250:ILE:HD13	1.86	0.58
6:C:140:HIS:NE2	6:C:233:GLU:OE1	2.36	0.58
2:A:1536:LEU:O	2:A:1539:SER:OG	2.18	0.57
6:C:144:CYS:O	6:C:148:CYS:N	2.29	0.57
2:A:507:LEU:HD11	2:A:652:LEU:HD11	1.86	0.57
2:A:1703:ILE:HG12	2:A:1714:ALA:HB2	1.86	0.57
5:D:285:ASP:OD1	5:D:287:ASN:N	2.37	0.57
6:C:169:ASP:HB3	6:C:174:GLU:HB3	1.87	0.57
2:A:1444:GLN:HG3	2:A:1445:TYR:HD1	1.69	0.57
3:5:67:A:H2'	3:5:68:C:C6	2.39	0.57
5:D:282:THR:HG22	5:D:283:SER:H	1.69	0.57
2:A:252:ASP:OD1	2:A:252:ASP:N	2.38	0.57
2:A:147:MET:O	2:A:151:MET:HG3	2.04	0.57
2:A:1218:ASN:HB3	2:A:1221:THR:HG22	1.86	0.57
5:D:245:LYS:H	5:D:245:LYS:HD2	1.69	0.57
2:A:856:LEU:HD13	2:A:860:GLN:HB3	1.87	0.56
2:A:1676:ILE:HD13	2:A:1706:ASP:HB2	1.87	0.56
3:5:57:G:O2'	3:5:58:U:O5'	2.16	0.56
2:A:899:MET:HB2	2:A:906:VAL:HG13	1.86	0.56
2:A:1607:GLU:N	2:A:1632:PHE:O	2.37	0.56
2:A:1610:GLN:NE2	2:A:1612:GLU:OE1	2.37	0.56
2:A:1410:ASP:OD1	2:A:1410:ASP:N	2.34	0.56
3:5:17:U:H2'	3:5:18:C:C6	2.40	0.56
2:A:1474:MET:HA	2:A:1474:MET:CE	2.34	0.56
2:A:1090:ARG:NH1	2:A:1091:TYR:O	2.38	0.56
2:A:544:PHE:HA	2:A:651:TRP:CH2	2.41	0.56
3:5:111:A:H2'	3:5:112:A:C8	2.41	0.56
2:A:776:LEU:O	2:A:780:THR:HG23	2.06	0.55
2:A:1560:ILE:HG21	2:A:1573:LEU:HD13	1.88	0.55
2:A:1307:MET:CE	2:A:1307:MET:H	2.19	0.55
6:C:455:GLY:O	6:C:459:SER:OG	2.23	0.55
6:C:573:GLU:OE1	6:C:573:GLU:N	2.31	0.55
1:F:117:ASP:HB3	1:F:120:LEU:HB3	1.87	0.55
2:A:1076:ASP:OD1	2:A:1077:ILE:N	2.40	0.55
2:A:1597:PHE:HE1	2:A:1604:LEU:HD12	1.72	0.55
6:C:394:ARG:NH1	6:C:394:ARG:HB3	2.22	0.55
1:F:209:MET:CE	1:F:214:ASN:HB3	2.38	0.54
2:A:531:THR:O	2:A:535:ARG:N	2.40	0.54
2:A:827:PHE:HD2	2:A:1005:ILE:HD11	1.72	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1093:ASP:N	2:A:1093:ASP:OD1	2.40	0.54
2:A:1747:ILE:HD12	2:A:1748:ARG:N	2.23	0.54
6:C:479:THR:HA	6:C:562:THR:HG22	1.90	0.54
2:A:494:LEU:HD21	2:A:562:VAL:HG21	1.89	0.54
2:A:899:MET:HB2	2:A:906:VAL:CG1	2.38	0.54
2:A:1630:LEU:HD21	2:A:1696:PRO:HG3	1.90	0.54
6:C:159:LYS:HG3	6:C:164:ASP:HA	1.89	0.54
2:A:1579:ALA:O	2:A:1584:LYS:NZ	2.40	0.54
2:A:1311:PHE:HE1	2:A:1315:VAL:HG21	1.72	0.54
6:C:173:THR:O	6:C:177:ARG:HG2	2.08	0.54
2:A:996:LEU:HB3	2:A:1043:TYR:HE2	1.71	0.54
1:F:123:ILE:O	1:F:127:LYS:N	2.40	0.53
2:A:156:ARG:NH1	2:A:157:ASP:OD1	2.41	0.53
1:F:71:VAL:HG23	2:A:1575:GLN:HB2	1.90	0.53
2:A:1127:GLY:O	2:A:1170:TRP:NE1	2.34	0.53
3:5:47:A:O2'	3:5:48:A:O5'	2.26	0.53
2:A:939:TRP:NE1	2:A:1049:ASP:OD2	2.40	0.53
6:C:724:TRP:HZ3	6:C:732:ILE:HD11	1.73	0.53
2:A:1333:VAL:HG23	7:B:40:VAL:HG13	1.89	0.53
2:A:805:GLU:O	2:A:809:VAL:HG12	2.08	0.53
2:A:950:LEU:HD12	2:A:1379:PHE:CD1	2.43	0.53
2:A:1002:ASP:OD2	2:A:1004:ASN:ND2	2.42	0.53
1:F:90:PHE:CD1	2:A:1574:ILE:HG13	2.44	0.53
2:A:1334:LEU:HD13	2:A:1364:LEU:HD23	1.91	0.53
2:A:946:GLU:OE1	2:A:951:LEU:HD23	2.08	0.53
2:A:67:ARG:HD3	2:A:179:ALA:HB2	1.91	0.52
2:A:1586:HIS:NE2	2:A:1628:ASP:OD2	2.41	0.52
2:A:1031:ILE:HB	2:A:1034:LEU:HG	1.91	0.52
6:C:945:GLU:OE2	6:C:946:ASP:HB2	2.10	0.52
2:A:1313:PRO:HG2	2:A:1335:ILE:HD12	1.91	0.52
6:C:133:THR:HG21	6:C:219:LEU:HD23	1.92	0.52
2:A:1019:TYR:O	2:A:1021:ASP:N	2.42	0.52
2:A:1368:LEU:HD11	2:A:1467:LEU:CD2	2.37	0.52
2:A:940:ILE:HD11	2:A:1046:LEU:HB2	1.92	0.52
3:5:69:A:H2'	3:5:70:A:O4'	2.09	0.52
3:5:109:G:H2'	3:5:110:C:C6	2.44	0.52
6:C:177:ARG:HG3	6:C:177:ARG:HH11	1.73	0.52
2:A:1612:GLU:HG2	2:A:1627:ALA:HB3	1.90	0.52
2:A:1661:TRP:NE1	2:A:1697:SER:O	2.42	0.52
2:A:436:PRO:HG2	2:A:439:GLN:HG3	1.92	0.52
6:C:692:LEU:HD22	6:C:696:LEU:HD23	1.90	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:549:GLU:CB	2:A:591:MET:HG2	2.39	0.52
2:A:1094:ARG:HH22	2:A:1190:CYS:H	1.58	0.52
6:C:780:CYS:O	6:C:941:LYS:NZ	2.43	0.52
6:C:391:SER:O	6:C:391:SER:OG	2.25	0.51
2:A:425:PRO:HB2	2:A:428:LYS:HB2	1.92	0.51
2:A:1368:LEU:HG	2:A:1372:ILE:HD11	1.92	0.51
1:F:176:ARG:NE	2:A:59:GLU:HB3	2.26	0.51
2:A:1017:ILE:HD11	2:A:1026:ASN:HB2	1.92	0.51
2:A:1391:LEU:O	2:A:1394:GLN:HG3	2.11	0.51
2:A:1607:GLU:HB2	2:A:1634:SER:HB3	1.93	0.51
2:A:379:GLU:OE1	2:A:379:GLU:N	2.42	0.51
2:A:923:ASP:OD2	2:A:1439:ARG:NH1	2.32	0.51
2:A:1641:ARG:HG2	2:A:1642:PRO:HD2	1.92	0.51
7:B:62:GLN:N	7:B:62:GLN:OE1	2.43	0.51
6:C:147:ASP:C	6:C:149:LEU:H	2.14	0.51
2:A:946:GLU:HG3	2:A:950:LEU:HD22	1.93	0.51
2:A:1061:MET:HE1	2:A:1088:PHE:HB3	1.93	0.51
2:A:1188:ASN:HD21	2:A:1233:ASP:CG	2.15	0.51
2:A:1447:VAL:HG12	2:A:1449:LYS:H	1.76	0.51
2:A:134:TRP:HZ2	3:5:58:U:OP2	1.94	0.50
2:A:919:ASP:OD2	2:A:1012:LYS:NZ	2.41	0.50
2:A:1678:ARG:HH12	2:A:1681:ARG:HD3	1.77	0.50
2:A:837:LYS:O	2:A:841:LEU:HG	2.11	0.50
2:A:1465:TRP:HD1	2:A:1467:LEU:HD11	1.76	0.50
6:C:147:ASP:C	6:C:149:LEU:N	2.62	0.50
2:A:1504:GLU:N	2:A:1504:GLU:OE1	2.45	0.50
2:A:1559:GLY:HA2	2:A:1622:MET:HE1	1.94	0.50
2:A:420:ARG:NH1	3:5:57:G:H5"	2.27	0.50
2:A:1257:THR:HG21	2:A:1320:LYS:HE3	1.93	0.50
2:A:1322:LEU:HD12	2:A:1498:TRP:CZ2	2.45	0.50
2:A:1482:GLU:CD	2:A:1483:GLY:N	2.65	0.50
2:A:461:HIS:HD2	3:5:27:U:H3	1.59	0.50
2:A:1129:ASN:ND2	2:A:1173:SER:O	2.43	0.50
2:A:1193:GLU:HB3	2:A:1231:ARG:HB2	1.94	0.50
6:C:692:LEU:HD21	6:C:744:ILE:HD12	1.94	0.50
2:A:106:MET:HE2	2:A:578:LEU:HD13	1.93	0.50
2:A:1013:ASN:HA	2:A:1031:ILE:HG12	1.94	0.50
2:A:1283:GLU:N	2:A:1283:GLU:OE1	2.45	0.50
6:C:620:LYS:NZ	6:C:622:GLU:OE1	2.45	0.50
2:A:841:LEU:HD21	2:A:1429:THR:HG22	1.93	0.49
2:A:865:GLY:O	2:A:868:GLU:HG3	2.12	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:C:145:PHE:HA	6:C:148:CYS:HB2	1.93	0.49
2:A:318:TYR:O	6:C:645:ARG:NH1	2.45	0.49
2:A:815:HIS:HA	2:A:818:GLU:OE1	2.11	0.49
2:A:1641:ARG:HH21	2:A:1651:VAL:HG22	1.76	0.49
3:5:17:U:H3	3:5:60:G:H1	1.59	0.49
2:A:1392:LYS:O	2:A:1395:GLU:HG3	2.12	0.49
3:5:56:C:H2'	3:5:57:G:H5'	1.94	0.49
3:5:65:G:O6	3:5:66:A:N6	2.46	0.49
2:A:142:SER:HA	2:A:242:ALA:HB2	1.94	0.49
2:A:419:ARG:NH2	2:A:423:ASP:O	2.46	0.49
2:A:829:PRO:HD2	2:A:832:TYR:CD2	2.46	0.49
2:A:1576:ILE:HG23	2:A:1577:PHE:CD1	2.43	0.49
6:C:158:ARG:HH12	6:C:160:ARG:CG	2.26	0.49
2:A:779:LEU:HA	2:A:782:LEU:HD12	1.94	0.49
2:A:1728:GLN:O	2:A:1732:LYS:HG2	2.12	0.49
1:F:209:MET:HE1	1:F:214:ASN:HB3	1.94	0.49
2:A:530:LEU:HG	2:A:535:ARG:CG	2.42	0.49
3:5:36:C:O2	3:5:44:A:N6	2.46	0.49
2:A:1629:ILE:HB	2:A:1662:ILE:HB	1.94	0.49
2:A:1318:THR:HB	2:A:1324:GLY:HA3	1.95	0.49
6:C:561:LYS:NZ	6:C:615:PRO:O	2.43	0.49
2:A:1061:MET:CE	2:A:1088:PHE:HB3	2.43	0.48
2:A:778:ARG:O	2:A:782:LEU:HG	2.12	0.48
2:A:1560:ILE:HD13	2:A:1573:LEU:HD13	1.95	0.48
3:5:37:G:N7	3:5:38:C:O2'	2.44	0.48
6:C:148:CYS:SG	6:C:312:SER:HB2	2.53	0.48
2:A:469:LYS:NZ	3:5:59:G:N7	2.59	0.48
2:A:1300:LYS:HG2	2:A:1311:PHE:CD2	2.48	0.48
1:F:71:VAL:HG22	2:A:1574:ILE:HG22	1.94	0.48
2:A:1597:PHE:HZ	2:A:1719:PHE:HZ	1.59	0.48
6:C:362:THR:OG1	6:C:363:SER:N	2.47	0.48
1:F:174:ALA:HA	1:F:177:ARG:HG2	1.96	0.48
2:A:1125:ILE:HD13	2:A:1147:VAL:HG11	1.95	0.48
2:A:1393:ARG:O	2:A:1397:ILE:HG13	2.13	0.48
6:C:674:CYS:SG	6:C:818:SER:HB2	2.53	0.48
2:A:651:TRP:NE1	2:A:655:LEU:HD22	2.28	0.48
2:A:867:ILE:HD12	2:A:868:GLU:N	2.29	0.48
6:C:177:ARG:HG3	6:C:177:ARG:NH1	2.28	0.48
6:C:720:THR:HG23	6:C:721:LYS:HD3	1.96	0.48
2:A:976:MET:HG2	2:A:1187:PHE:HB3	1.96	0.48
2:A:1368:LEU:HD12	2:A:1368:LEU:HA	1.52	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:C:603:MET:HB2	6:C:651:ILE:HD11	1.95	0.48
2:A:944:ASP:OD2	2:A:1435:GLY:N	2.40	0.48
2:A:1672:ASP:OD1	2:A:1673:SER:HB3	2.14	0.48
3:5:12:U:H3	3:5:65:G:H1	1.60	0.48
6:C:357:THR:OG1	6:C:359:LYS:O	2.32	0.48
2:A:136:ILE:HG22	2:A:138:PRO:HD2	1.96	0.47
2:A:1013:ASN:O	2:A:1026:ASN:ND2	2.39	0.47
6:C:696:LEU:HD13	6:C:722:TYR:CE2	2.49	0.47
2:A:979:SER:OG	2:A:980:ARG:N	2.47	0.47
2:A:1090:ARG:HG2	2:A:1091:TYR:O	2.14	0.47
2:A:1621:LYS:HD3	2:A:1624:SER:OG	2.14	0.47
6:C:212:SER:O	6:C:216:THR:HG23	2.13	0.47
2:A:274:PRO:HA	5:D:282:THR:HG22	1.96	0.47
3:5:63:A:H2'	3:5:64:G:H8	1.79	0.47
6:C:483:SER:HB2	6:C:490:PHE:CE2	2.49	0.47
2:A:288:LEU:O	2:A:1136:ARG:NH2	2.48	0.47
6:C:110:PRO:HD2	6:C:537:TYR:CE2	2.50	0.47
6:C:236:MET:O	6:C:239:THR:OG1	2.29	0.47
2:A:1137:ASP:OD1	2:A:1137:ASP:N	2.48	0.47
2:A:1342:TRP:CG	2:A:1482:GLU:OE1	2.68	0.47
2:A:1544:ARG:HH21	2:A:1671:TYR:HB3	1.79	0.47
2:A:1625:SER:OG	2:A:1626:CYS:N	2.47	0.47
6:C:146:VAL:CG1	6:C:186:VAL:HG21	2.45	0.47
6:C:213:ASP:OD1	6:C:213:ASP:N	2.47	0.47
6:C:320:LEU:HD21	6:C:344:TRP:HB2	1.97	0.47
6:C:534:VAL:HG12	6:C:535:ALA:H	1.79	0.47
2:A:913:PRO:HA	2:A:916:LYS:HB2	1.96	0.47
2:A:1606:ILE:HG12	2:A:1637:TRP:HZ2	1.80	0.47
6:C:449:ILE:HD12	6:C:465:MET:HE3	1.97	0.47
6:C:670:SER:HB2	6:C:822:MET:HB2	1.97	0.47
2:A:1209:HIS:O	7:B:51:ARG:NH1	2.48	0.47
2:A:1433:ASP:HB3	2:A:1460:HIS:HE1	1.79	0.47
2:A:344:ASP:HB3	2:A:346:ASP:OD1	2.14	0.47
2:A:488:ASP:OD1	2:A:489:TRP:N	2.48	0.47
2:A:1653:ASP:HB3	2:A:1655:THR:HG22	1.97	0.47
6:C:727:LEU:O	6:C:731:SER:OG	2.20	0.47
2:A:260:LEU:HD21	2:A:454:TYR:CZ	2.50	0.46
2:A:997:LEU:O	2:A:1001:VAL:HG12	2.14	0.46
6:C:146:VAL:HG11	6:C:186:VAL:HG21	1.96	0.46
2:A:1474:MET:HE2	2:A:1474:MET:CA	2.45	0.46
6:C:167:TYR:HA	6:C:536:ARG:CZ	2.46	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:C:687:MET:HE1	6:C:816:VAL:HG22	1.98	0.46
6:C:830:PRO:HG2	6:C:877:ALA:HB3	1.97	0.46
2:A:1103:ALA:O	2:A:1107:ARG:HG3	2.14	0.46
2:A:1559:GLY:HA2	2:A:1622:MET:CE	2.44	0.46
2:A:1660:TYR:OH	2:A:1701:VAL:HB	2.15	0.46
2:A:1066:GLN:OE1	2:A:1066:GLN:N	2.48	0.46
2:A:511:LYS:HB2	2:A:513:LEU:CD2	2.45	0.46
1:F:116:ARG:CZ	2:A:542:ASN:HD21	2.28	0.46
2:A:908:VAL:HG11	2:A:1448:LEU:CD2	2.46	0.46
2:A:1330:MET:HE2	2:A:1330:MET:HA	1.98	0.46
2:A:1426:ASP:OD2	2:A:1459:ARG:NH1	2.46	0.46
2:A:1615:HIS:ND1	2:A:1617:ARG:HG3	2.30	0.46
3:5:12:U:H2'	3:5:13:C:C6	2.51	0.46
2:A:164:MET:HG2	2:A:569:VAL:HG11	1.98	0.46
2:A:1560:ILE:HG12	2:A:1668:TRP:CD1	2.51	0.46
2:A:1581:LEU:HD12	2:A:1746:ARG:HH11	1.81	0.46
3:5:49:A:H2'	3:5:50:G:H8	1.81	0.46
2:A:214:ARG:HG3	2:A:225:TYR:CD1	2.51	0.46
2:A:828:PRO:HG3	2:A:925:TYR:CE2	2.51	0.46
2:A:1179:SER:O	2:A:1201:ARG:NH1	2.38	0.46
6:C:144:CYS:O	6:C:145:PHE:C	2.54	0.46
2:A:864:LEU:O	2:A:867:ILE:HD12	2.16	0.45
2:A:896:ILE:HD12	2:A:896:ILE:O	2.16	0.45
2:A:1064:PRO:HB2	2:A:1066:GLN:OE1	2.16	0.45
2:A:1202:THR:O	2:A:1202:THR:HG22	2.16	0.45
3:5:66:A:HO2'	3:5:67:A:H8	1.62	0.45
1:F:178:LEU:HD21	1:F:198:ARG:HB3	1.98	0.45
2:A:993:LEU:O	2:A:997:LEU:HG	2.16	0.45
2:A:1365:ILE:HG13	2:A:1474:MET:HE1	1.99	0.45
2:A:1537:TRP:HD1	2:A:1538:TRP:NE1	2.15	0.45
2:A:1559:GLY:HA3	2:A:1582:TRP:CH2	2.51	0.45
3:5:63:A:H2'	3:5:64:G:C8	2.52	0.45
3:5:96:A:O2'	3:5:97:G:OP1	2.29	0.45
1:F:169:GLU:OE2	1:F:177:ARG:HD3	2.17	0.45
3:5:16:U:H2'	3:5:17:U:C6	2.52	0.45
2:A:948:PRO:O	2:A:951:LEU:HB2	2.17	0.45
2:A:1600:GLU:HG2	2:A:1725:LEU:HD13	1.98	0.45
6:C:139:HIS:HE1	6:C:178:GLY:O	2.00	0.45
2:A:1374:PRO:HG3	7:B:52:MET:HB3	1.99	0.45
2:A:1567:PRO:O	2:A:1571:ILE:HG22	2.18	0.45
2:A:1644:LEU:HD11	2:A:1678:ARG:NH2	2.31	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:C:148:CYS:SG	6:C:312:SER:O	2.75	0.45
1:F:102:ASP:HB3	1:F:108:PHE:CE2	2.52	0.44
2:A:395:THR:HG22	2:A:396:ASP:H	1.81	0.44
3:5:23:C:H5''	3:5:24:G:H2'	1.98	0.44
2:A:809:VAL:O	2:A:813:THR:HG22	2.16	0.44
2:A:1624:SER:CB	2:A:1692:MET:HG3	2.47	0.44
1:F:171:VAL:HG23	1:F:202:LEU:HD11	1.99	0.44
2:A:336:ASN:O	6:C:262:ARG:NH2	2.50	0.44
2:A:598:LEU:HD12	2:A:598:LEU:HA	1.75	0.44
2:A:1482:GLU:OE1	2:A:1482:GLU:C	2.56	0.44
6:C:192:ASP:N	6:C:196:LYS:O	2.49	0.44
7:B:41:LEU:HD23	7:B:41:LEU:HA	1.76	0.44
2:A:1365:ILE:HG13	2:A:1474:MET:CE	2.47	0.44
6:C:534:VAL:HG12	6:C:535:ALA:N	2.33	0.44
2:A:835:ASP:OD1	2:A:836:THR:N	2.51	0.44
2:A:1076:ASP:OD1	2:A:1078:ALA:N	2.30	0.44
2:A:1589:ILE:HA	2:A:1733:ILE:HD11	1.99	0.44
2:A:1552:GLN:HG2	2:A:1563:HIS:CD2	2.52	0.44
6:C:614:TYR:HB2	6:C:617:LEU:HB2	1.98	0.44
6:C:230:ASP:HB3	6:C:233:GLU:HB2	1.99	0.44
6:C:733:TRP:NE1	6:C:747:ASP:OD2	2.51	0.44
2:A:1276:GLU:OE1	2:A:1375:TRP:N	2.50	0.44
2:A:1585:ILE:HD13	2:A:1739:ALA:HB1	2.00	0.44
3:5:34:U:H2'	3:5:35:U:C6	2.53	0.44
2:A:329:LEU:HB3	6:C:177:ARG:CD	2.43	0.43
2:A:962:LEU:HB2	2:A:965:VAL:HB	2.00	0.43
3:5:110:C:H2'	3:5:111:A:H8	1.83	0.43
5:D:254:TYR:OH	6:C:657:ASP:OD2	2.34	0.43
6:C:713:LYS:O	6:C:716:GLU:HG2	2.18	0.43
6:C:724:TRP:CZ3	6:C:732:ILE:HD11	2.51	0.43
2:A:260:LEU:HD21	2:A:454:TYR:CE2	2.53	0.43
2:A:922:LEU:HD13	2:A:922:LEU:HA	1.86	0.43
2:A:934:ARG:HB3	2:A:934:ARG:CZ	2.49	0.43
2:A:1049:ASP:OD1	2:A:1090:ARG:HD3	2.17	0.43
2:A:1469:ASN:HB2	7:B:57:GLN:HG2	2.01	0.43
6:C:715:GLY:HA2	6:C:729:ALA:HB1	1.99	0.43
2:A:1346:THR:OG1	2:A:1348:VAL:HG12	2.18	0.43
6:C:158:ARG:HD3	6:C:158:ARG:O	2.19	0.43
1:F:102:ASP:OD1	1:F:105:GLY:N	2.52	0.43
2:A:428:LYS:HA	2:A:431:TYR:CE2	2.54	0.43
2:A:1382:SER:HA	2:A:1415:GLY:HA2	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1427:ARG:NH1	2:A:1428:HIS:HB2	2.34	0.43
2:A:1730:MET:O	2:A:1733:ILE:HG22	2.18	0.43
3:5:8:G:C2'	3:5:9:G:H5'	2.49	0.43
3:5:113:G:H2'	3:5:114:G:H8	1.83	0.43
2:A:996:LEU:HB3	2:A:1043:TYR:CE2	2.52	0.43
2:A:1639:VAL:HG11	2:A:1699:THR:HG21	2.00	0.43
3:5:17:U:H2'	3:5:18:C:H6	1.83	0.43
6:C:109:LEU:CD2	6:C:116:MET:HG3	2.48	0.43
2:A:1448:LEU:HD23	2:A:1448:LEU:HA	1.78	0.43
2:A:1559:GLY:HA3	2:A:1582:TRP:CZ2	2.54	0.43
3:5:9:G:H8	3:5:9:G:OP2	2.01	0.43
3:5:94:U:HO2'	3:5:95:G:P	2.41	0.43
6:C:181:ILE:HG22	6:C:182:LYS:HG3	2.01	0.43
6:C:818:SER:O	6:C:822:MET:HG2	2.19	0.43
1:F:164:LEU:HB3	1:F:202:LEU:HD23	2.00	0.43
2:A:1418:ARG:O	2:A:1421:THR:HG22	2.19	0.43
2:A:196:ASP:HB3	2:A:199:GLU:HG2	2.01	0.42
2:A:422:LEU:H	2:A:422:LEU:HD23	1.82	0.42
2:A:1308:PRO:HB3	2:A:1548:TYR:CE1	2.54	0.42
1:F:164:LEU:HD23	1:F:202:LEU:CA	2.49	0.42
1:F:176:ARG:HE	2:A:59:GLU:HB3	1.83	0.42
2:A:804:GLU:HA	2:A:807:VAL:HG22	2.00	0.42
2:A:1056:HIS:O	2:A:1060:GLU:HG3	2.20	0.42
2:A:638:LEU:HD23	2:A:638:LEU:HA	1.90	0.42
2:A:1010:THR:HA	2:A:1013:ASN:OD1	2.19	0.42
2:A:1180:LYS:O	2:A:1201:ARG:NH2	2.52	0.42
2:A:1322:LEU:HD23	2:A:1484:ILE:HD13	2.01	0.42
2:A:1531:ASN:OD1	2:A:1531:ASN:N	2.52	0.42
5:D:273:VAL:HG23	5:D:273:VAL:O	2.19	0.42
2:A:1615:HIS:HB3	2:A:1617:ARG:NH1	2.34	0.42
6:C:719:GLN:HG2	6:C:724:TRP:O	2.19	0.42
1:F:117:ASP:OD2	2:A:540:PHE:N	2.53	0.42
2:A:876:GLU:OE1	2:A:880:ARG:NH1	2.52	0.42
3:5:60:G:H2'	3:5:61:A:C8	2.54	0.42
2:A:171:ASP:O	2:A:519:ASP:HB2	2.19	0.42
2:A:507:LEU:HD11	2:A:652:LEU:CD1	2.47	0.42
2:A:1310:ARG:NH2	2:A:1336:PRO:HG2	2.34	0.42
3:5:112:A:H2'	3:5:113:G:C8	2.54	0.42
2:A:164:MET:HB3	2:A:164:MET:HE3	1.81	0.42
2:A:934:ARG:HB3	2:A:934:ARG:NH1	2.35	0.42
2:A:1593:LEU:HD12	2:A:1593:LEU:HA	1.87	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:62:PRO:HA	2:A:63:PRO:HD3	1.97	0.42
2:A:719:CYS:O	2:A:723:ASN:N	2.53	0.42
2:A:810:TYR:O	2:A:814:VAL:HG13	2.20	0.42
2:A:1017:ILE:HD11	2:A:1026:ASN:CB	2.49	0.42
6:C:446:LYS:HB3	6:C:447:PRO:HD3	2.00	0.42
2:A:406:TRP:CZ2	6:C:266:GLU:HG2	2.55	0.42
2:A:462:ARG:NH2	3:5:51:A:OP2	2.53	0.42
3:5:76:A:H2'	3:5:77:G:C8	2.55	0.42
6:C:186:VAL:HG22	6:C:535:ALA:HB2	2.01	0.42
6:C:254:THR:HB	6:C:433:MET:SD	2.60	0.42
2:A:1022:MET:SD	2:A:1023:ASN:N	2.93	0.41
3:5:51:A:H2'	3:5:52:U:C6	2.55	0.41
6:C:738:ASP:OD1	6:C:775:ARG:NH2	2.47	0.41
6:C:836:VAL:HG22	6:C:897:SER:HB3	2.02	0.41
1:F:160:GLY:O	1:F:164:LEU:HB2	2.20	0.41
2:A:320:TYR:OH	6:C:881:PHE:HB3	2.20	0.41
2:A:1639:VAL:HG21	2:A:1699:THR:HG21	2.02	0.41
5:D:285:ASP:O	5:D:291:LYS:HD3	2.20	0.41
6:C:676:ALA:HB3	6:C:815:VAL:HB	2.01	0.41
6:C:946:ASP:OD1	6:C:947:VAL:N	2.51	0.41
2:A:1394:GLN:HA	2:A:1397:ILE:HD11	2.02	0.41
3:5:7:U:C2	3:5:8:G:C8	3.07	0.41
2:A:881:ILE:O	2:A:885:LEU:HD23	2.20	0.41
6:C:687:MET:HE3	6:C:687:MET:HB3	1.81	0.41
2:A:1624:SER:HB3	2:A:1692:MET:HG3	2.01	0.41
6:C:166:CYS:O	6:C:168:THR:N	2.54	0.41
6:C:370:VAL:HA	6:C:374:LEU:HB2	2.02	0.41
2:A:261:LYS:HD2	2:A:328:HIS:HB3	2.03	0.41
2:A:1006:ALA:O	2:A:1010:THR:HG23	2.20	0.41
3:5:29:A:H2'	3:5:30:A:H8	1.86	0.41
6:C:531:TRP:HB3	6:C:538:HIS:HB3	2.01	0.41
6:C:863:ILE:HD11	6:C:870:THR:HG23	2.03	0.41
2:A:1031:ILE:O	2:A:1032:ARG:HG2	2.21	0.41
2:A:1320:LYS:HA	2:A:1324:GLY:O	2.20	0.41
2:A:1393:ARG:HA	2:A:1403:LEU:HD21	2.02	0.41
2:A:1394:GLN:O	2:A:1397:ILE:HD12	2.21	0.41
2:A:1585:ILE:O	2:A:1589:ILE:HG23	2.21	0.41
2:A:1680:ALA:HB2	2:A:1704:ALA:HB3	2.01	0.41
2:A:617:ASN:HB3	2:A:623:LYS:HD2	2.03	0.41
2:A:811:THR:HA	2:A:814:VAL:HG22	2.02	0.41
2:A:1013:ASN:HA	2:A:1031:ILE:CG1	2.50	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1465:TRP:CD1	2:A:1467:LEU:HD11	2.55	0.41
2:A:1498:TRP:HA	2:A:1501:LEU:HD23	2.02	0.41
6:C:434:CYS:O	6:C:438:ILE:HB	2.20	0.41
6:C:589:LYS:HG3	6:C:628:VAL:HG13	2.02	0.41
2:A:155:LYS:NZ	2:A:624:GLY:O	2.46	0.41
2:A:257:LEU:HD12	2:A:257:LEU:HA	1.93	0.41
2:A:1369:TYR:O	7:B:52:MET:HG3	2.20	0.41
2:A:1412:TRP:CE3	2:A:1412:TRP:HA	2.56	0.41
2:A:1589:ILE:HD12	2:A:1590:VAL:N	2.35	0.41
2:A:1723:LYS:HB3	2:A:1724:PRO:HD3	2.01	0.41
3:5:96:A:H2	3:5:97:G:C4	2.39	0.41
3:5:111:A:H2'	3:5:112:A:H8	1.84	0.41
6:C:299:ILE:O	6:C:306:ASN:ND2	2.54	0.41
6:C:308:CYS:HB2	6:C:433:MET:HE2	2.03	0.41
6:C:399:LEU:HB2	6:C:401:ILE:HD12	2.03	0.41
6:C:925:PRO:HD2	6:C:928:HIS:NE2	2.36	0.41
2:A:946:GLU:HG3	2:A:950:LEU:HB3	2.04	0.40
2:A:994:ASN:HA	2:A:1010:THR:HG21	2.03	0.40
2:A:1345:GLN:OE1	2:A:1711:LEU:HA	2.21	0.40
6:C:147:ASP:O	6:C:149:LEU:N	2.54	0.40
6:C:302:PRO:HG2	6:C:344:TRP:CD2	2.56	0.40
6:C:751:PRO:HA	6:C:756:LYS:HD3	2.02	0.40
2:A:1045:GLY:HA3	2:A:1090:ARG:CZ	2.51	0.40
2:A:1555:LEU:HD21	2:A:1574:ILE:HD12	2.03	0.40
2:A:1645:LEU:HB2	2:A:1714:ALA:H	1.86	0.40
6:C:145:PHE:CA	6:C:148:CYS:HB2	2.51	0.40
1:F:90:PHE:HD1	1:F:90:PHE:HA	1.76	0.40
2:A:441:VAL:HG23	2:A:444:ARG:HH21	1.85	0.40
2:A:820:ARG:NH1	2:A:1063:GLY:O	2.43	0.40
2:A:938:PRO:HB2	2:A:1071:PHE:HA	2.02	0.40
2:A:1016:VAL:HA	2:A:1025:THR:HA	2.03	0.40
7:B:48:GLU:HG2	7:B:49:GLY:N	2.37	0.40
7:B:51:ARG:N	7:B:54:ASP:OD2	2.45	0.40
2:A:295:GLU:HG3	2:A:1144:LYS:HG3	2.03	0.40
2:A:901:LEU:H	2:A:901:LEU:HD22	1.86	0.40
2:A:1276:GLU:CD	2:A:1375:TRP:H	2.24	0.40
2:A:1403:LEU:HD13	2:A:1403:LEU:HA	1.93	0.40
6:C:122:LEU:HD23	6:C:122:LEU:HA	1.93	0.40
6:C:343:LEU:HD13	6:C:373:ILE:HD11	2.04	0.40
2:A:449:LYS:HA	2:A:449:LYS:HD3	1.87	0.40
6:C:313:GLN:HB2	15:C:1001:GTP:C6	2.57	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	F	134/341 (39%)	123 (92%)	10 (8%)	1 (1%)	22	57
2	A	1615/2335 (69%)	1558 (96%)	56 (4%)	1 (0%)	51	83
4	E	56/941 (6%)	56 (100%)	0	0	100	100
5	D	50/820 (6%)	49 (98%)	1 (2%)	0	100	100
6	C	845/972 (87%)	813 (96%)	31 (4%)	1 (0%)	51	83
7	B	25/2136 (1%)	25 (100%)	0	0	100	100
8	m	71/86 (83%)	68 (96%)	3 (4%)	0	100	100
9	n	72/76 (95%)	64 (89%)	8 (11%)	0	100	100
10	i	79/119 (66%)	73 (92%)	6 (8%)	0	100	100
11	j	94/118 (80%)	84 (89%)	10 (11%)	0	100	100
12	k	82/126 (65%)	78 (95%)	4 (5%)	0	100	100
13	h	69/240 (29%)	67 (97%)	2 (3%)	0	100	100
14	l	75/92 (82%)	72 (96%)	3 (4%)	0	100	100
All	All	3267/8402 (39%)	3130 (96%)	134 (4%)	3 (0%)	54	83

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	A	1020	LYS
6	C	148	CYS
1	F	126	VAL

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	F	58/281 (21%)	55 (95%)	3 (5%)	23	55
2	A	1384/2108 (66%)	1325 (96%)	59 (4%)	29	62
5	D	48/721 (7%)	43 (90%)	5 (10%)	7	27
6	C	737/866 (85%)	717 (97%)	20 (3%)	44	74
7	B	22/1908 (1%)	19 (86%)	3 (14%)	3	16
All	All	2249/5884 (38%)	2159 (96%)	90 (4%)	35	65

All (90) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	90	PHE
1	F	117	ASP
1	F	198	ARG
2	A	60	ASP
2	A	87	VAL
2	A	106	MET
2	A	164	MET
2	A	171	ASP
2	A	181	ASN
2	A	217	ARG
2	A	251	ASP
2	A	294	ASN
2	A	346	ASP
2	A	353	ASP
2	A	395	THR
2	A	414	ARG
2	A	422	LEU
2	A	503	MET
2	A	510	ARG
2	A	513	LEU
2	A	593	ARG
2	A	600	ARG
2	A	604	MET

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Mol	Chain	Res	Type
2	A	652	LEU
2	A	773	LYS
2	A	832	TYR
2	A	869	GLN
2	A	871	TYR
2	A	981	PHE
2	A	984	MET
2	A	1023	ASN
2	A	1024	HIS
2	A	1044	TYR
2	A	1055	LEU
2	A	1070	ASP
2	A	1094	ARG
2	A	1172	ASN
2	A	1210	LYS
2	A	1217	GLN
2	A	1234	ASP
2	A	1249	MET
2	A	1298	ARG
2	A	1307	MET
2	A	1310	ARG
2	A	1311	PHE
2	A	1327	MET
2	A	1330	MET
2	A	1341	ARG
2	A	1410	ASP
2	A	1427	ARG
2	A	1441	ASP
2	A	1482	GLU
2	A	1597	PHE
2	A	1617	ARG
2	A	1622	MET
2	A	1630	LEU
2	A	1635	TYR
2	A	1668	TRP
2	A	1672	ASP
2	A	1686	ASP
2	A	1728	GLN
2	A	1730	MET
5	D	245	LYS
5	D	252	GLU
5	D	253	ARG

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Mol	Chain	Res	Type
5	D	279	SER
5	D	280	GLU
6	C	107	GLN
6	C	109	LEU
6	C	147	ASP
6	C	158	ARG
6	C	162	ASP
6	C	296	GLU
6	C	298	LEU
6	C	323	PHE
6	C	342	ARG
6	C	352	LYS
6	C	357	THR
6	C	498	SER
6	C	520	GLU
6	C	525	CYS
6	C	543	ARG
6	C	620	LYS
6	C	730	ARG
6	C	735	PHE
6	C	770	PHE
6	C	944	SER
7	B	39	GLU
7	B	47	LEU
7	B	51	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
6	C	139	HIS

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
3	5	101/117 (86%)	34 (33%)	4 (3%)

All (34) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
3	5	4	C

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Mol	Chain	Res	Type
3	5	5	U
3	5	6	C
3	5	9	G
3	5	20	G
3	5	21	A
3	5	22	U
3	5	23	C
3	5	24	G
3	5	25	C
3	5	26	A
3	5	28	A
3	5	36	C
3	5	38	C
3	5	47	A
3	5	48	A
3	5	57	G
3	5	58	U
3	5	59	G
3	5	66	A
3	5	67	A
3	5	69	A
3	5	71	C
3	5	75	G
3	5	78	U
3	5	86	C
3	5	94	U
3	5	95	G
3	5	97	G
3	5	98	G
3	5	105	U
3	5	106	U
3	5	107	U
3	5	108	G

All (4) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
3	5	57	G
3	5	58	U
3	5	96	A
3	5	105	U

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](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

1 ligand is modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
15	GTP	C	1001	-	26,34,34	1.06	3 (11%)	32,54,54	0.75	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
15	GTP	C	1001	-	-	2/18/38/38	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
15	C	1001	GTP	C5-C6	-2.73	1.41	1.47
15	C	1001	GTP	C8-N7	-2.18	1.31	1.35
15	C	1001	GTP	C5-C4	-2.03	1.37	1.43

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

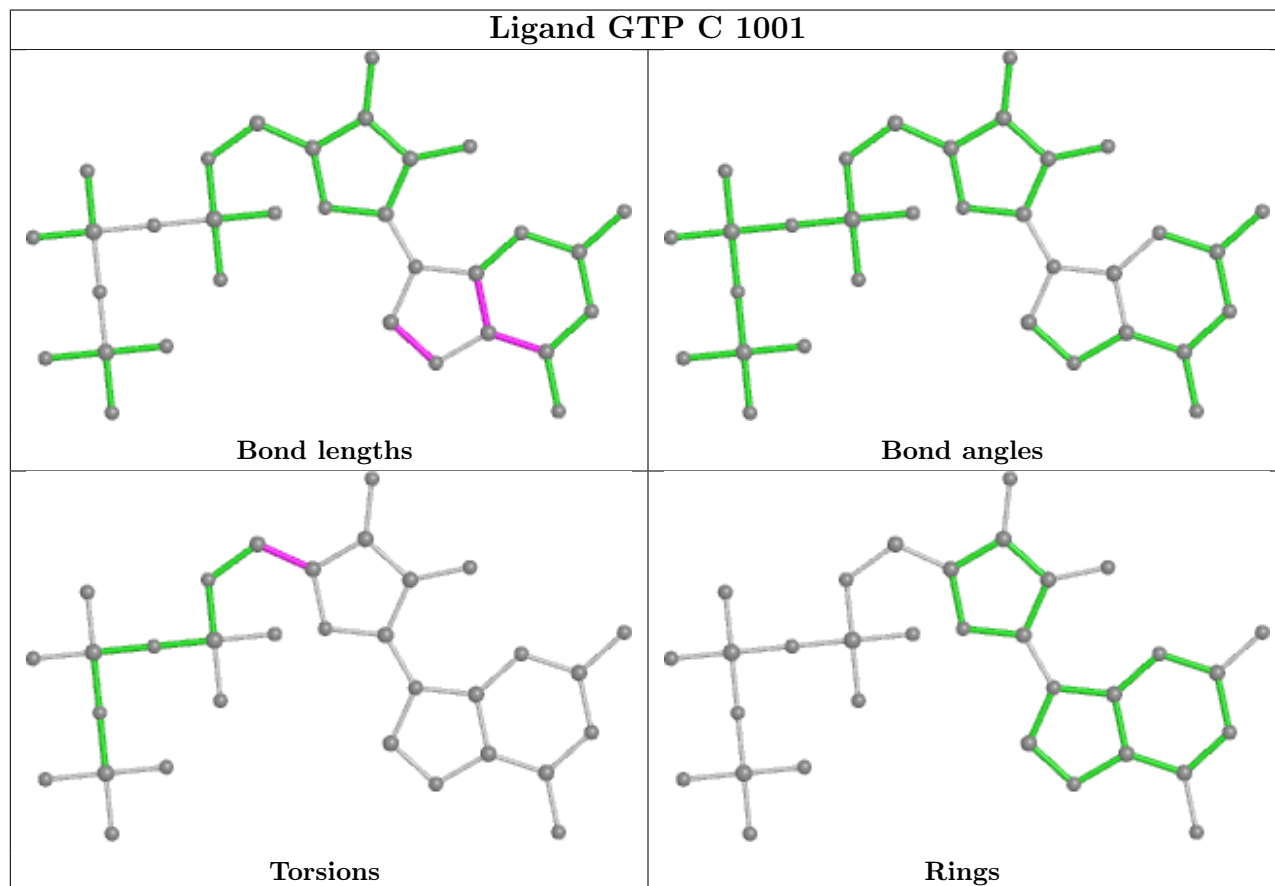
Mol	Chain	Res	Type	Atoms
15	C	1001	GTP	O4'-C4'-C5'-O5'
15	C	1001	GTP	C3'-C4'-C5'-O5'

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
15	C	1001	GTP	1	0

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

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

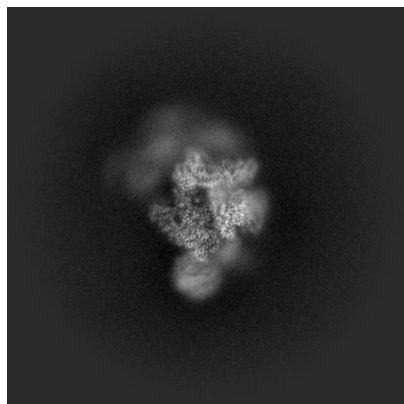
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-18267. These allow visual inspection of the internal detail of the map and identification of artifacts.

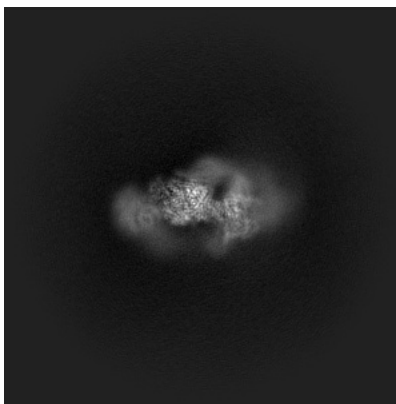
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

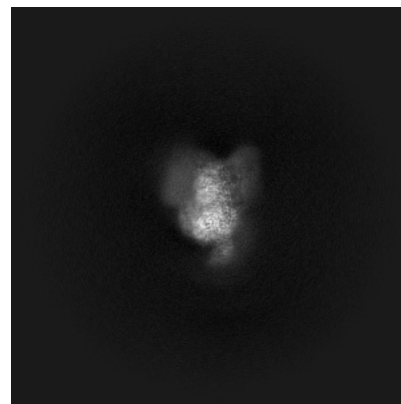
6.1.1 Primary map



X

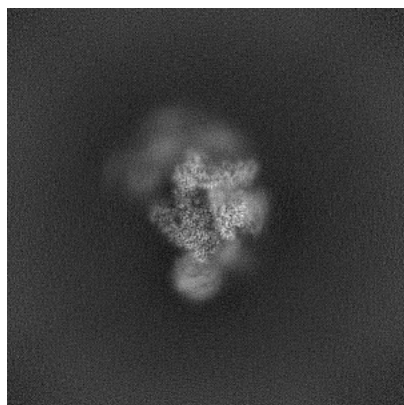


Y

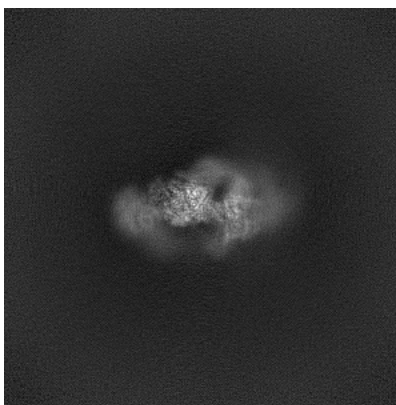


Z

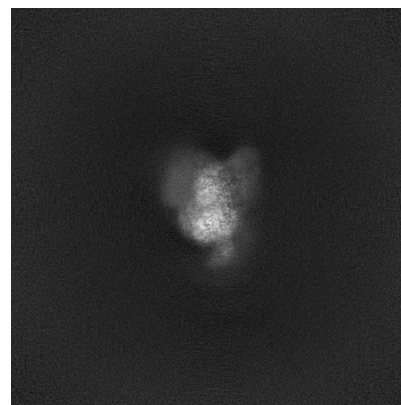
6.1.2 Raw map



X



Y

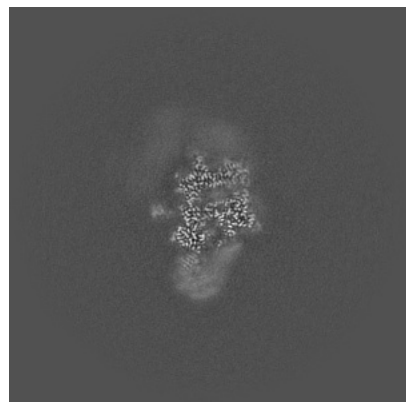


Z

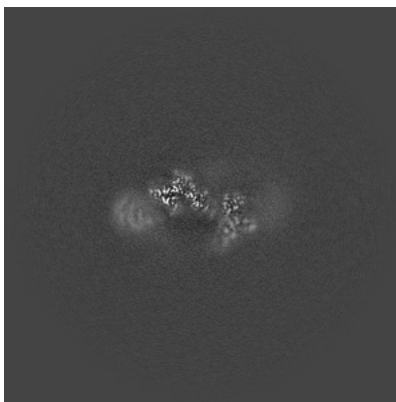
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

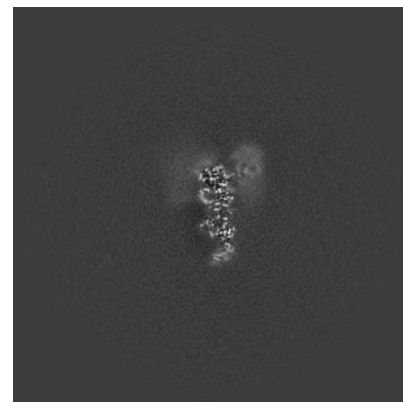
6.2.1 Primary map



X Index: 252

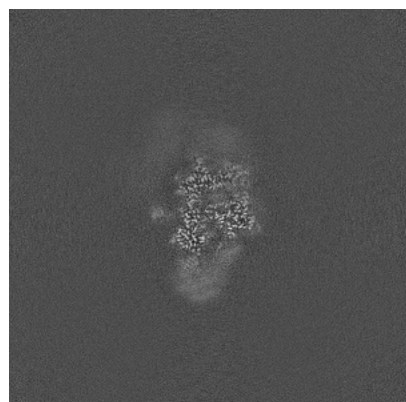


Y Index: 252

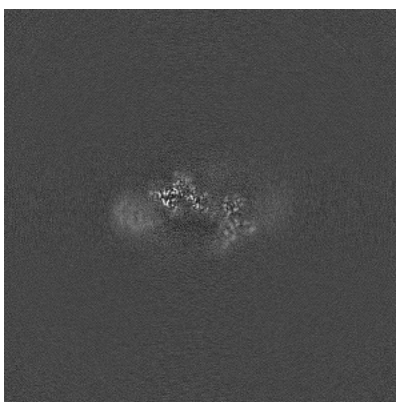


Z Index: 252

6.2.2 Raw map



X Index: 252



Y Index: 252

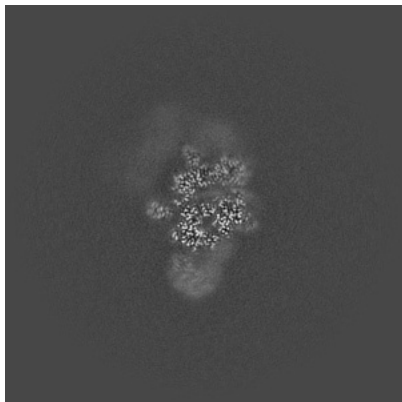


Z Index: 252

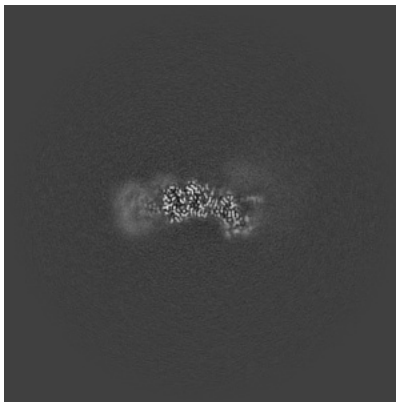
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

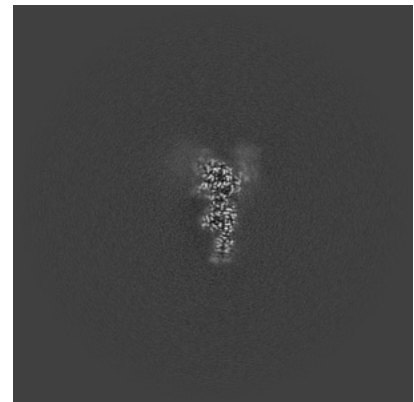
6.3.1 Primary map



X Index: 256

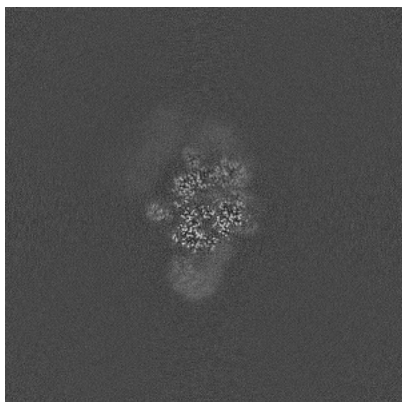


Y Index: 228

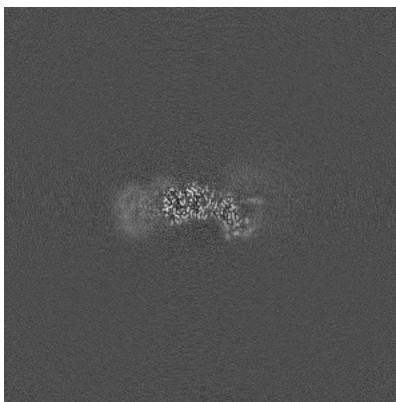


Z Index: 241

6.3.2 Raw map



X Index: 256



Y Index: 228

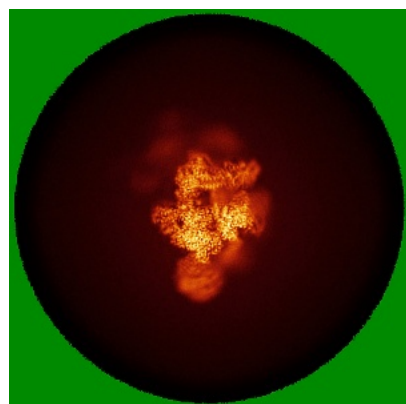


Z Index: 241

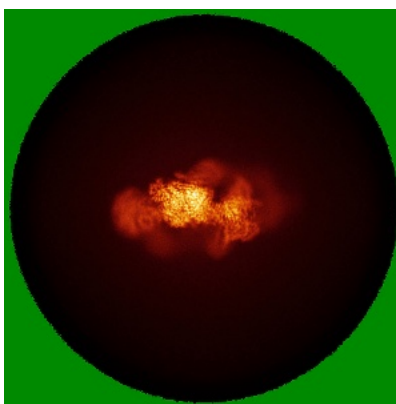
The images above show the largest variance slices of the map in three orthogonal directions.

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

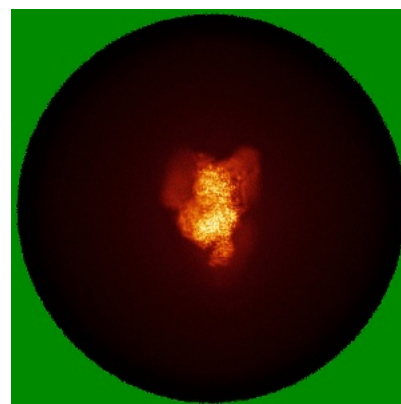
6.4.1 Primary map



X

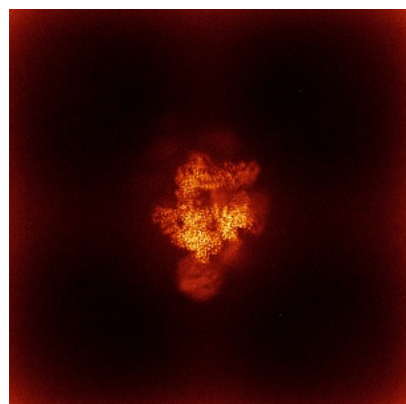


Y

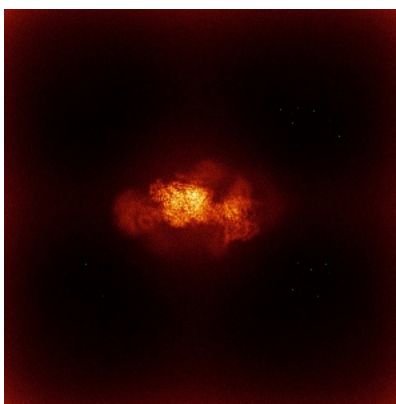


Z

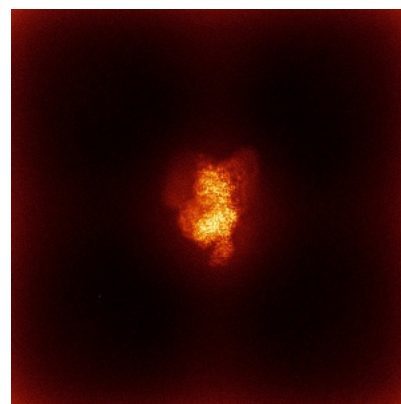
6.4.2 Raw map



X



Y

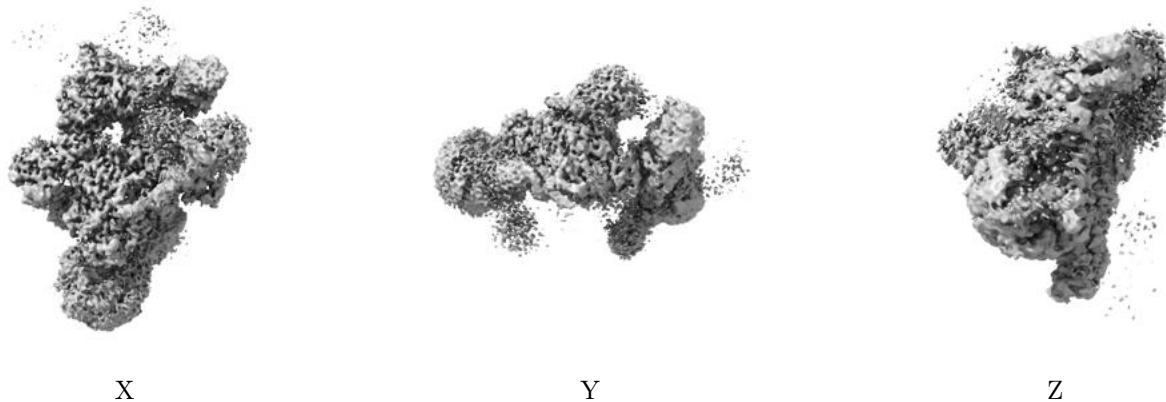


Z

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.

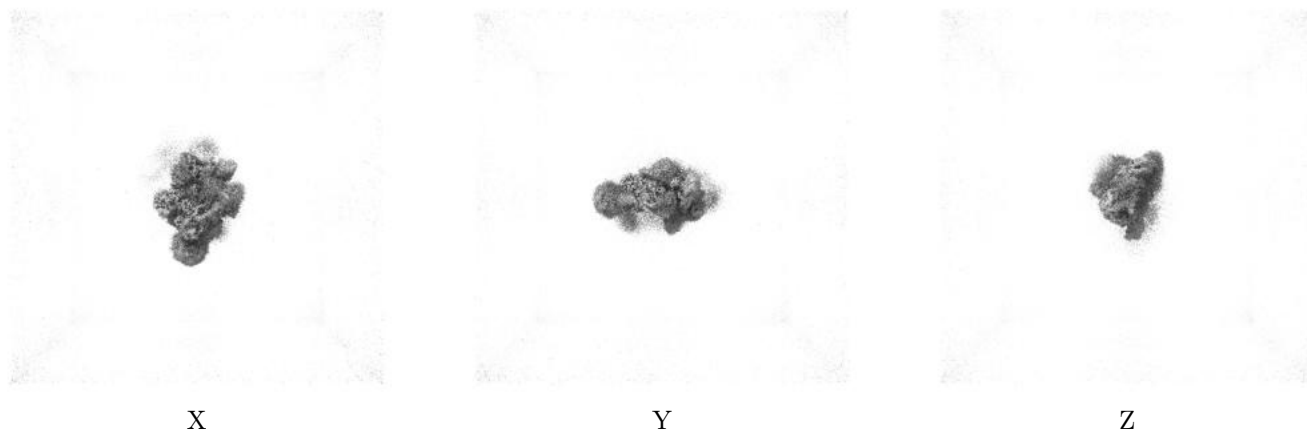
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.12. 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



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.

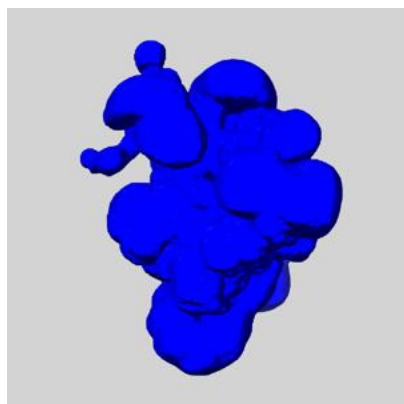
6.6 Mask visualisation [i](#)

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

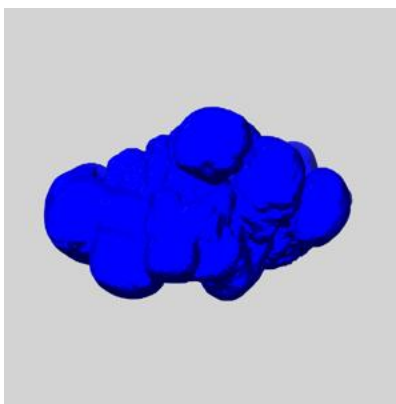
A mask typically either:

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

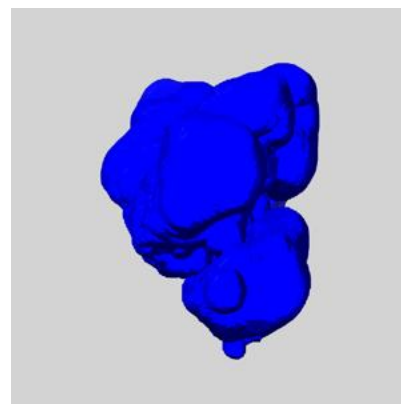
6.6.1 emd_18267_msk_1.map [i](#)



X



Y

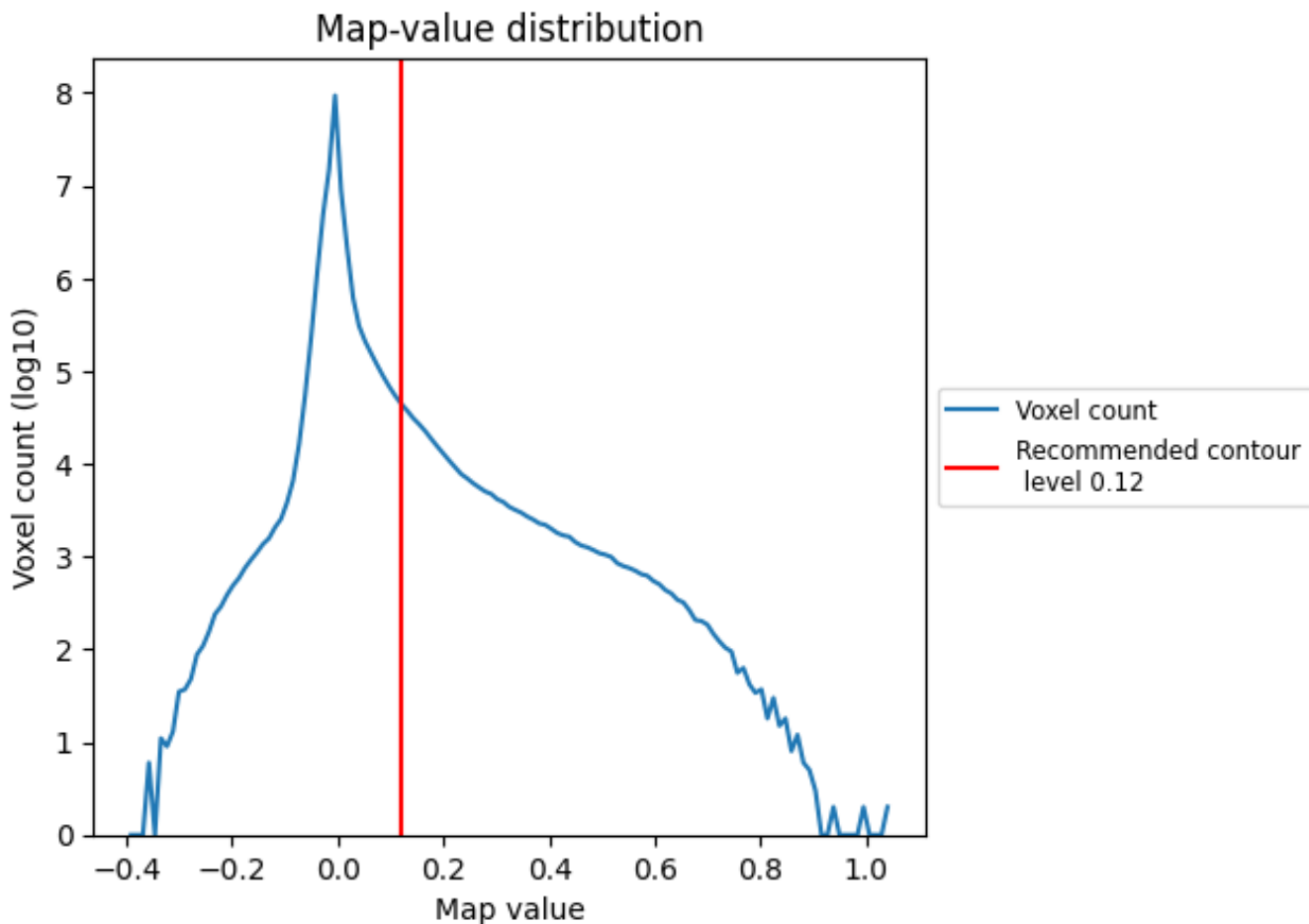


Z

7 Map analysis [i](#)

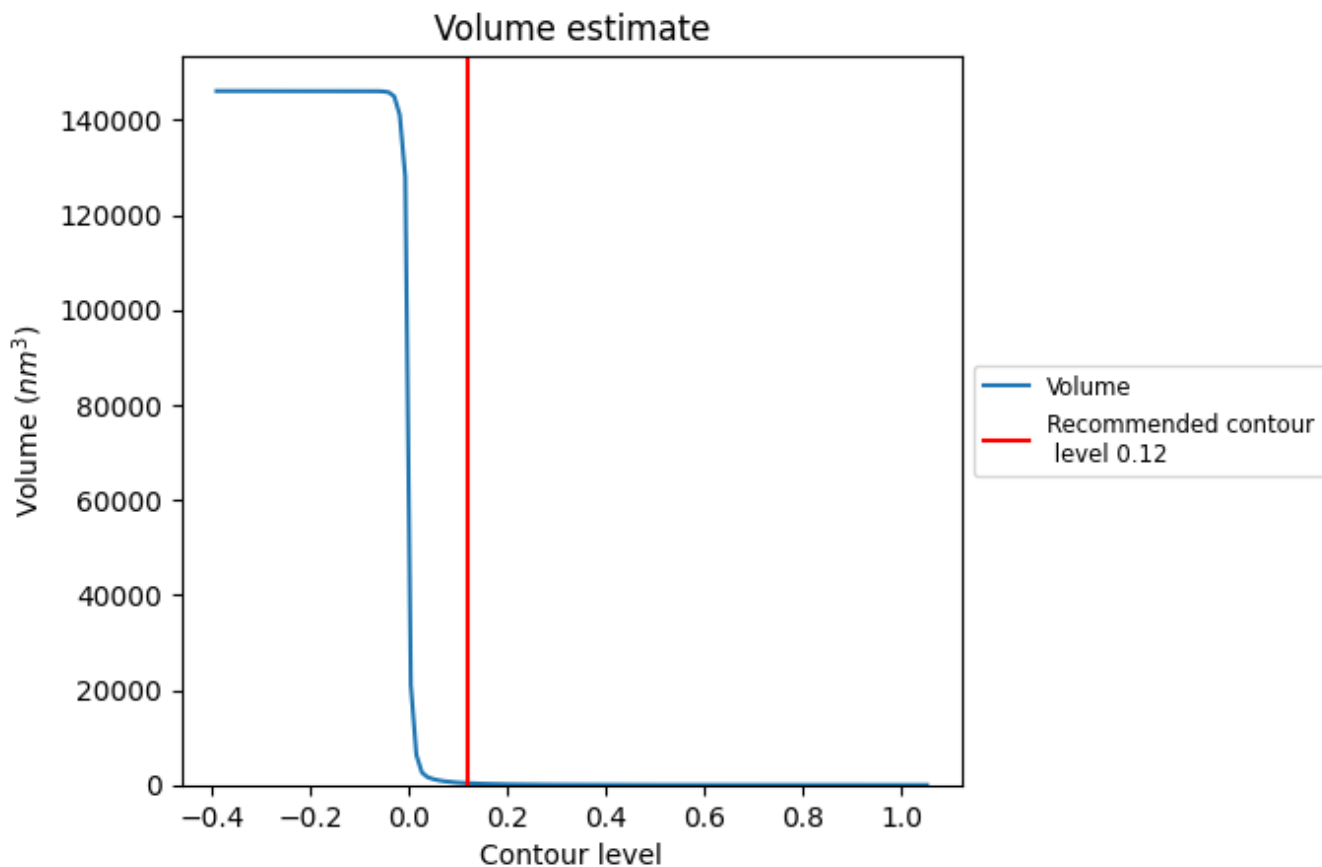
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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.

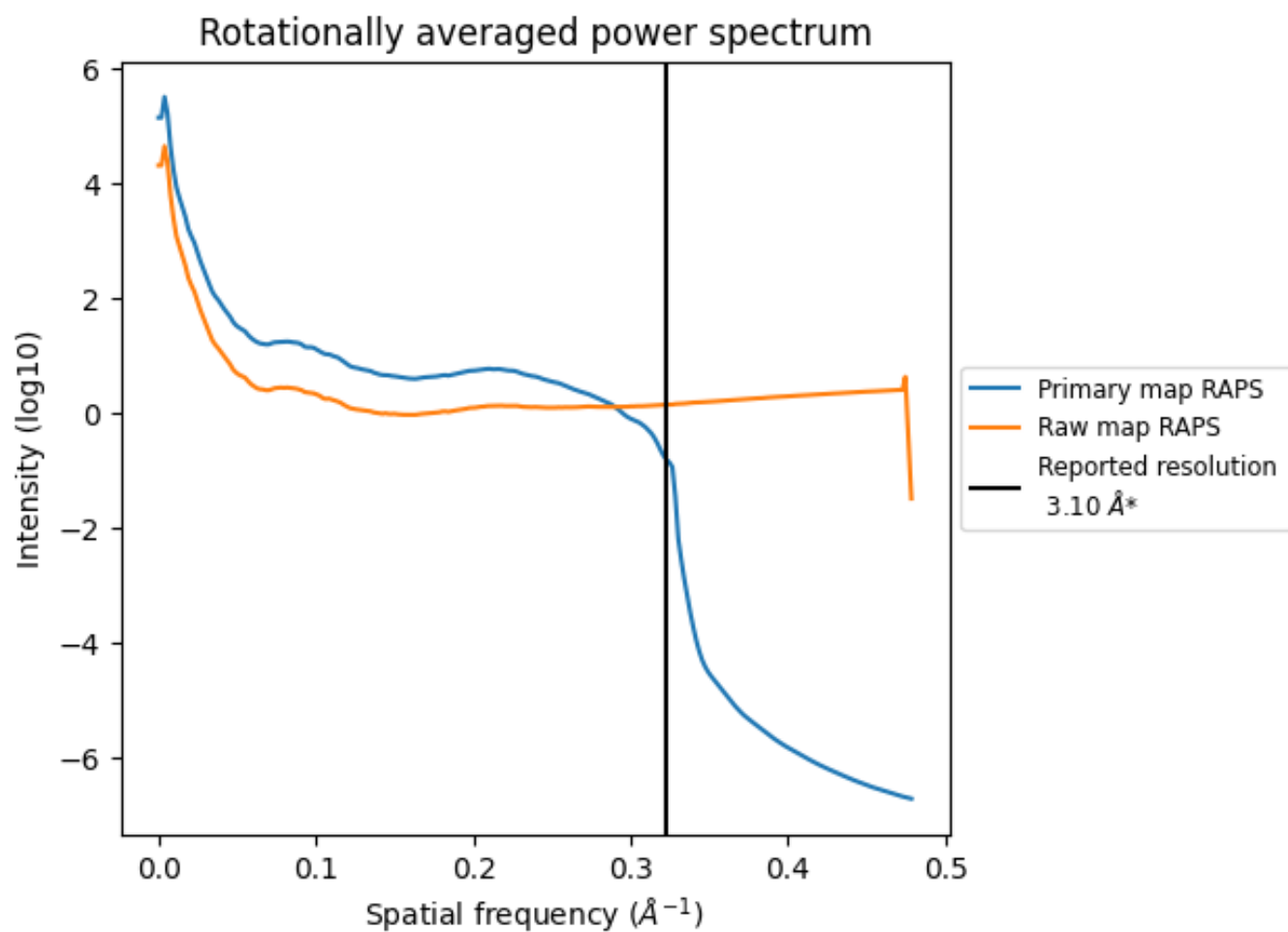
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 362 nm^3 ; this corresponds to an approximate mass of 327 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](#)

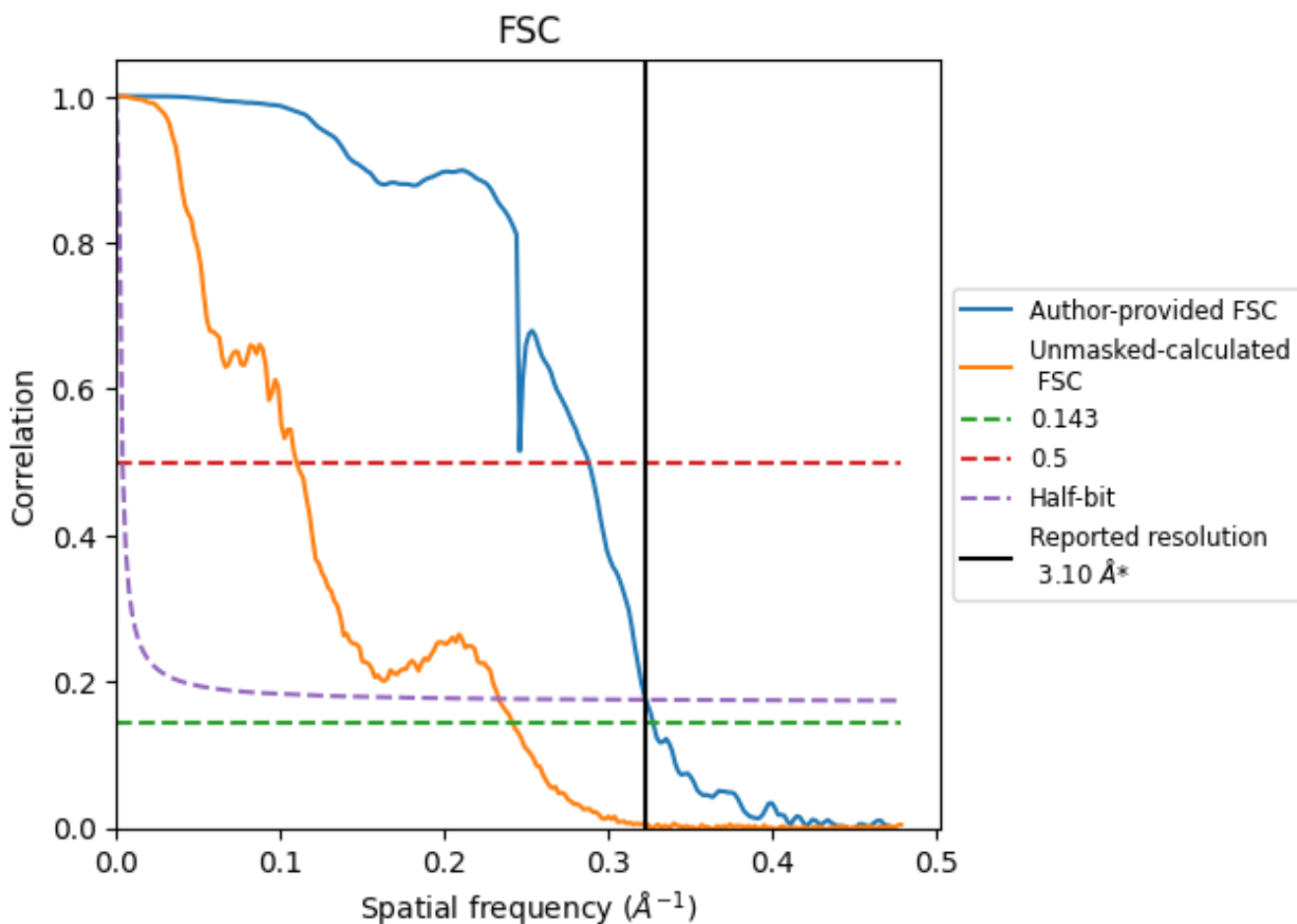


*Reported resolution corresponds to spatial frequency of 0.323 Å⁻¹

8 Fourier-Shell correlation [i](#)

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 [i](#)



*Reported resolution corresponds to spatial frequency of 0.323 \AA^{-1}

8.2 Resolution estimates [i](#)

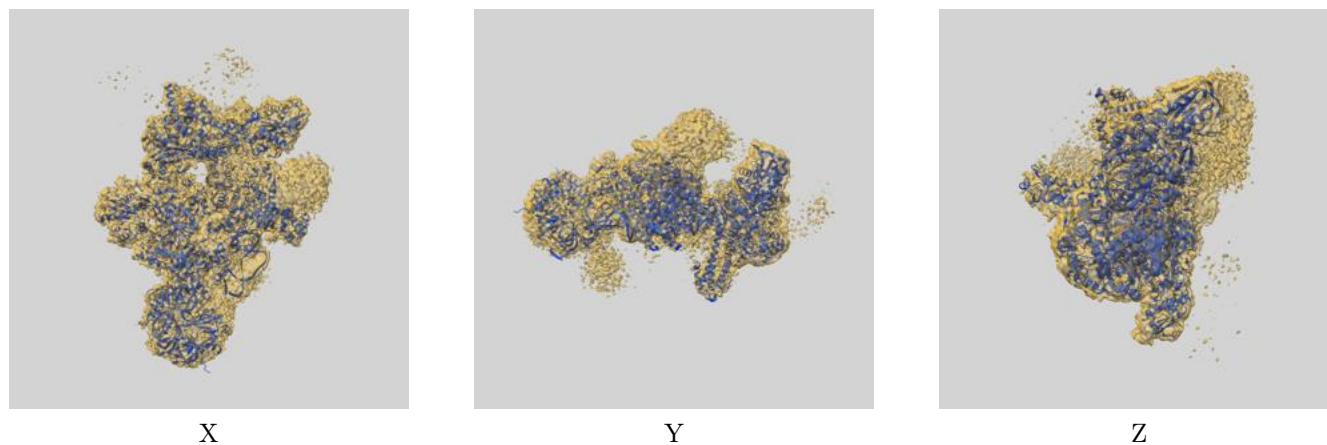
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.10	-	-
Author-provided FSC curve	3.06	3.47	3.10
Unmasked-calculated*	4.14	9.11	4.29

*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 4.14 differs from the reported value 3.1 by more than 10 %

9 Map-model fit [i](#)

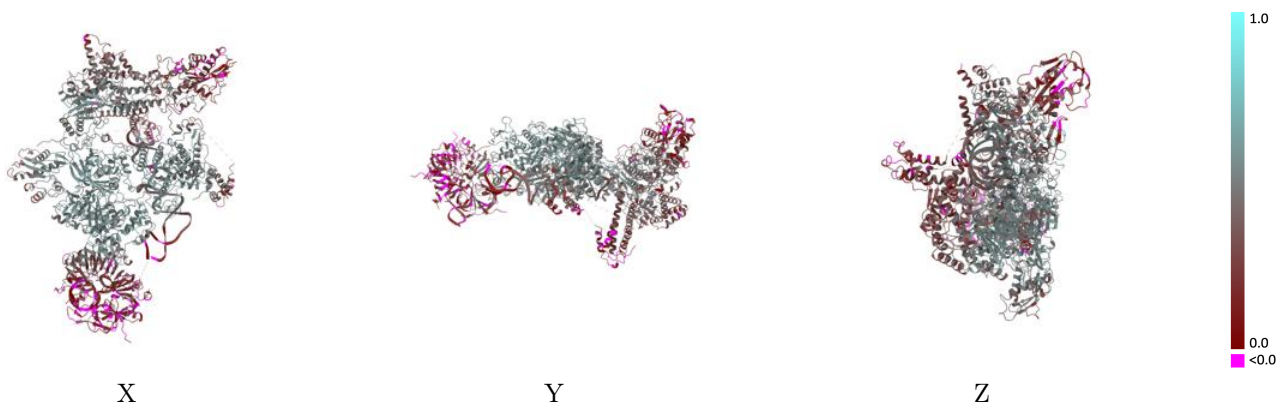
This section contains information regarding the fit between EMDB map EMD-18267 and PDB model 8Q91. Per-residue inclusion information can be found in section [3](#) on page [7](#).

9.1 Map-model overlay [i](#)



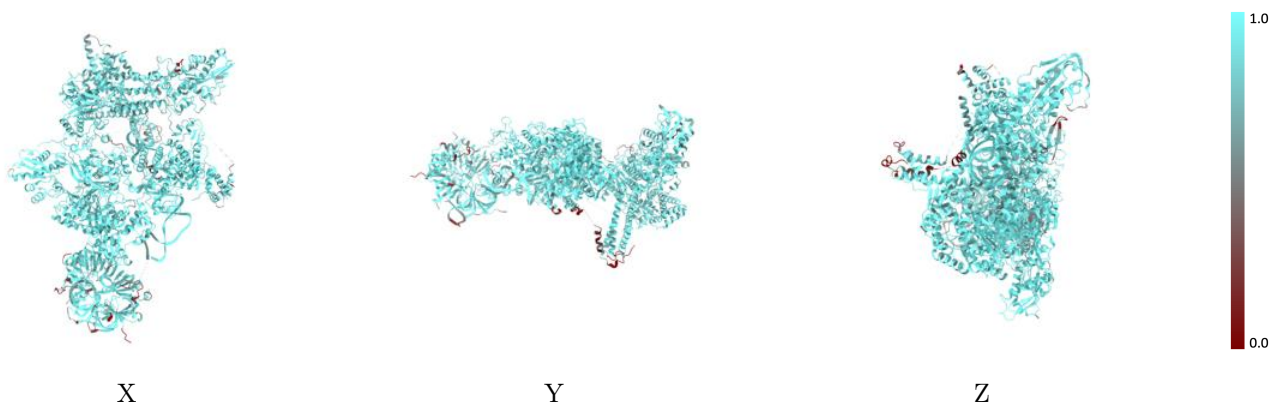
The images above show the 3D surface view of the map at the recommended contour level 0.12 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



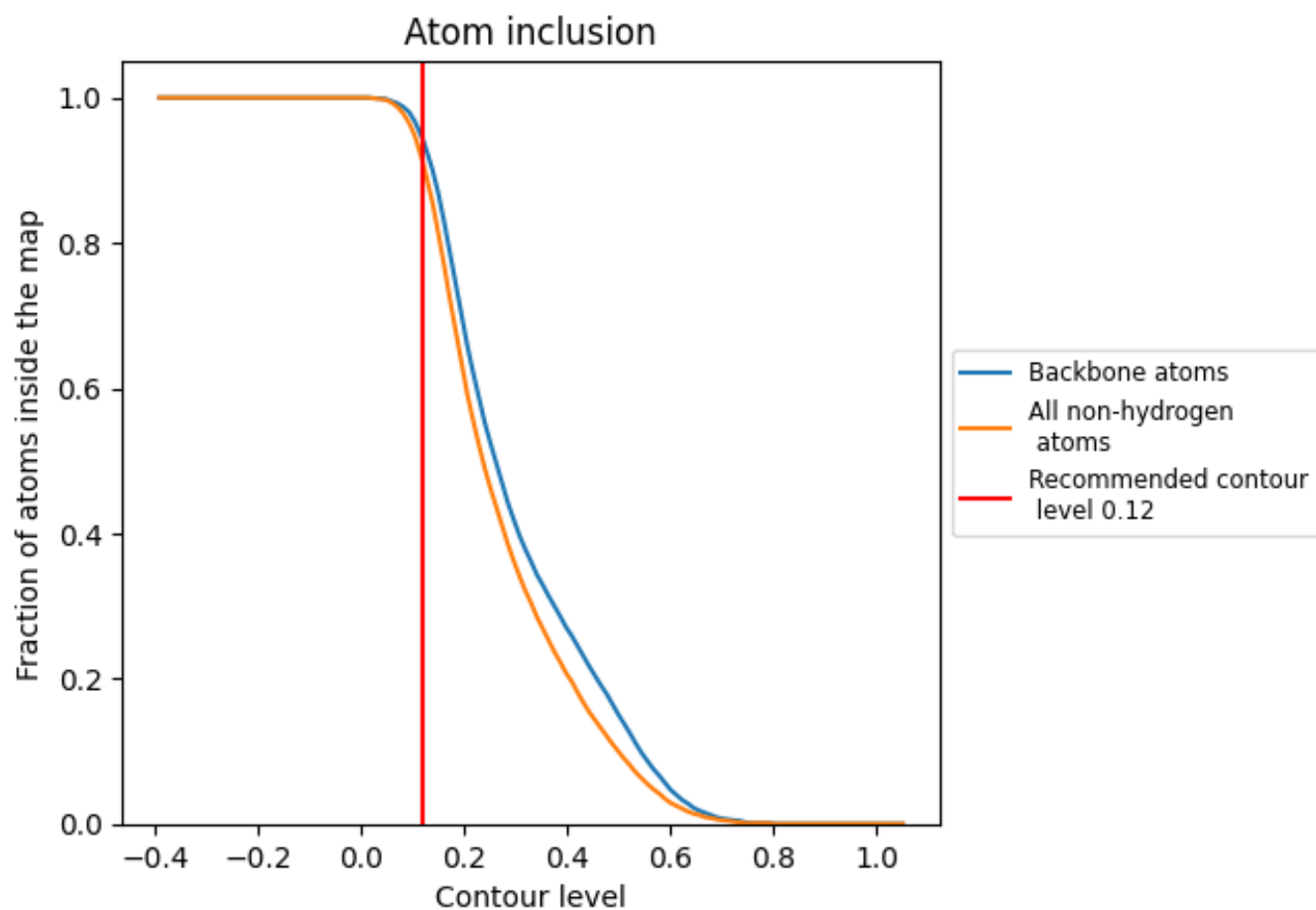
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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](#)



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 (0.12).































9.4 Atom inclusion [i](#)



At the recommended contour level, 94% of all backbone atoms, 91% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.12) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9100	 0.4170
5	 0.8850	 0.2720
A	 0.9190	 0.4350
B	 0.7870	 0.4280
C	 0.9590	 0.5270
D	 0.8880	 0.5120
E	 0.4570	 0.2020
F	 0.8490	 0.3660
h	 0.8940	 0.2550
i	 0.9250	 0.1800
j	 0.7700	 0.0980
k	 0.9350	 0.3980
l	 0.8920	 0.1310
m	 0.8480	 0.0930
n	 0.7450	 0.2620

