



Full wwPDB EM Validation Report ⓘ

Mar 29, 2026 – 10:09 PM UTC

PDB ID : 8Z4L / pdb_00008z4l
EMDB ID : EMD-39767
Title : Cryo-EM structure of CTR-bound type VII CRISPR-Cas complex at substrate-engaged state I
Authors : Zhang, H.; Deng, Z.; Li, X.
Deposited on : 2024-04-17
Resolution : 2.85 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.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

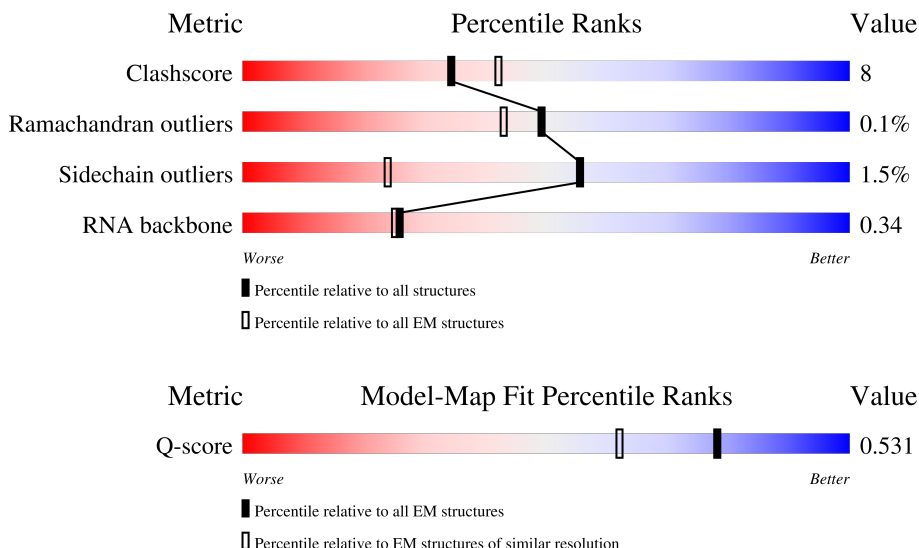
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.85 Å.

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



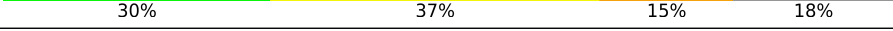
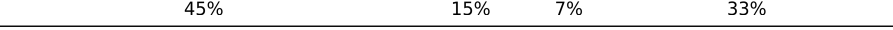
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	11965 (2.35 - 3.35)

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	A	200	
1	B	200	
1	C	200	

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Mol	Chain	Length	Quality of chain
1	D	200	 74%26%
1	E	200	 80%19%
1	F	200	 81%16%.
1	J	200	 78%20%. .
2	G	240	 27%69%23%. . 5%
3	H	609	 5%70%21%9%
3	I	609	 21%6%74%
3	K	609	 32%6%61%
3	L	609	 21%5%74%
4	M	60	 5%30%37%15%18%
5	N	60	 45%15%7%33%

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 22713 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 a protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	154	Total	C	N	O	S	0	0
			1107	697	189	213	8		
1	B	199	Total	C	N	O	S	0	0
			1523	951	275	289	8		
1	C	199	Total	C	N	O	S	0	0
			1543	963	278	294	8		
1	D	199	Total	C	N	O	S	0	0
			1543	962	277	296	8		
1	E	199	Total	C	N	O	S	0	0
			1537	959	274	296	8		
1	F	194	Total	C	N	O	S	0	0
			1467	916	262	281	8		
1	J	199	Total	C	N	O	S	0	0
			1543	963	278	294	8		

- Molecule 2 is a protein called a protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	G	229	Total	C	N	O	S	0	0
			1598	1023	274	297	4		

- Molecule 3 is a protein called a protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	H	556	Total	C	N	O	S	0	0
			4394	2814	739	826	15		
3	I	161	Total	C	N	O	S	0	0
			1349	865	230	247	7		
3	K	235	Total	C	N	O	S	0	0
			1917	1242	318	350	7		
3	L	159	Total	C	N	O	S	0	0
			1303	837	223	238	5		

- Molecule 4 is a RNA chain called RNA (49-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
4	M	49	Total	C	N	O	P	0	0
			1023	457	167	350	49		

- Molecule 5 is a RNA chain called RNA (40-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
5	N	40	Total	C	N	O	P	0	0
			857	384	162	271	40		

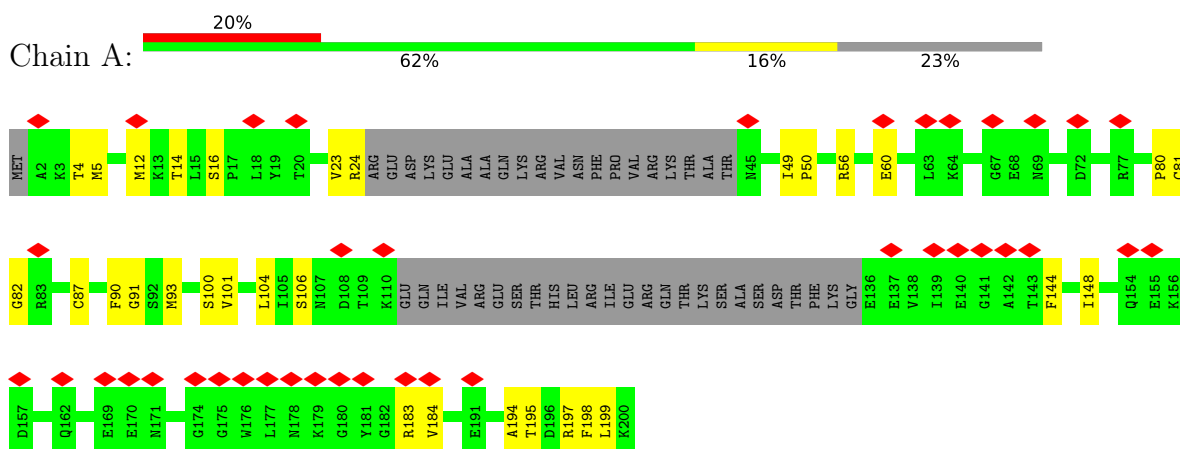
- Molecule 6 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
6	A	1	Total	Zn	0
			1	1	
6	B	1	Total	Zn	0
			1	1	
6	C	1	Total	Zn	0
			1	1	
6	D	1	Total	Zn	0
			1	1	
6	E	1	Total	Zn	0
			1	1	
6	F	1	Total	Zn	0
			1	1	
6	G	1	Total	Zn	0
			1	1	
6	H	1	Total	Zn	0
			1	1	
6	J	1	Total	Zn	0
			1	1	

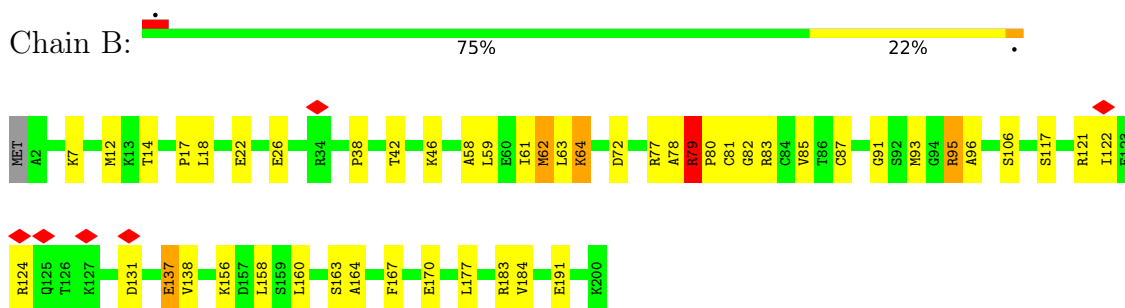
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry 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.

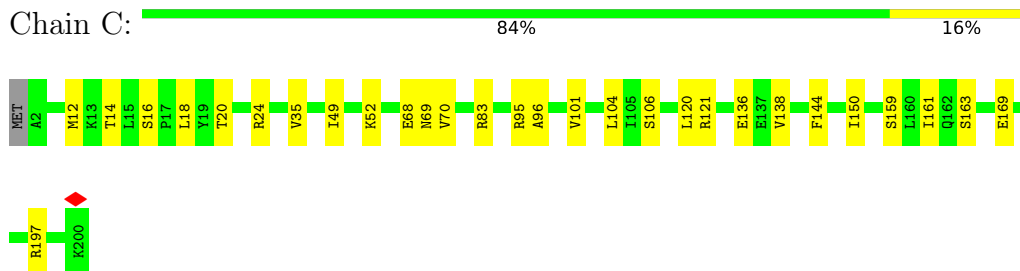
- Molecule 1: a protein



- Molecule 1: a protein

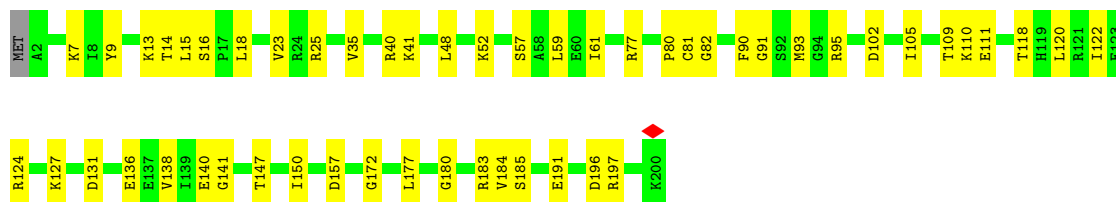


- Molecule 1: a protein



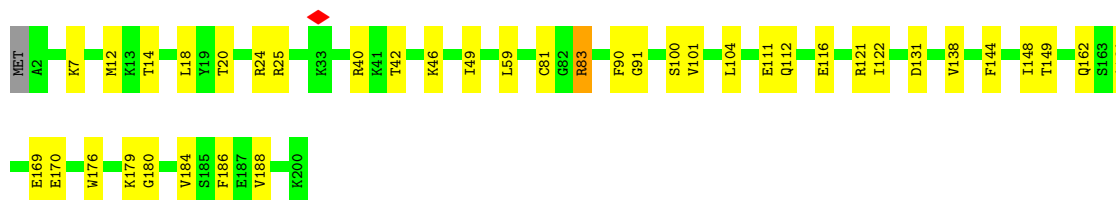
- Molecule 1: a protein

Chain D:  74% 26%



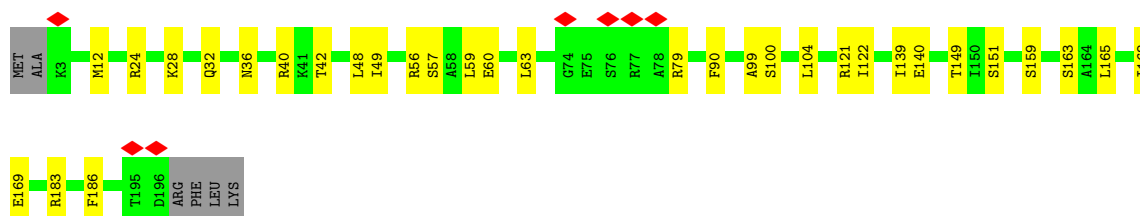
- Molecule 1: a protein

Chain E:  80% 19%



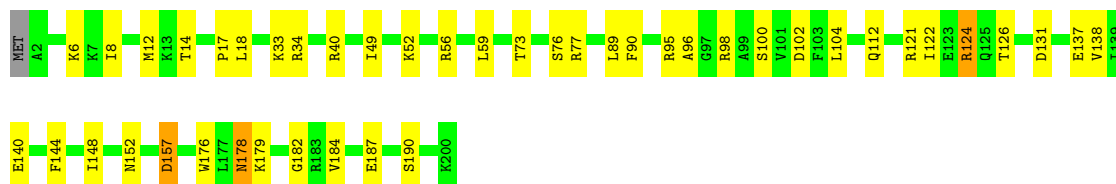
- Molecule 1: a protein

Chain F:  81% 16%



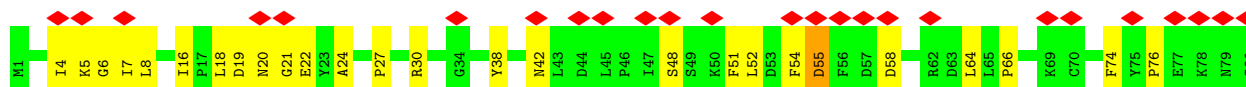
- Molecule 1: a protein

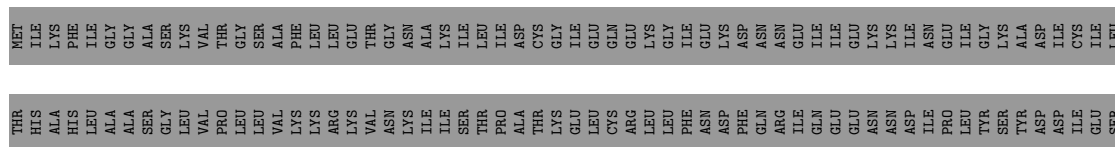
Chain J:  78% 20%



- Molecule 2: a protein

Chain G:  27% 69% 23% 5%







4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	96774	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	JEOL CRYO ARM 300	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.393	Depositor
Minimum map value	-1.274	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.050	Depositor
Recommended contour level	0.18	Depositor
Map size ($\text{\AA}$)	285.0, 285.0, 285.0	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	0.95, 0.95, 0.95	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: ZN

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	0.32	0/1120	0.69	0/1514
1	B	0.47	2/1542 (0.1%)	0.86	6/2071 (0.3%)
1	C	0.33	0/1562	0.62	0/2094
1	D	0.32	0/1562	0.66	0/2095
1	E	0.37	2/1556 (0.1%)	0.70	0/2088
1	F	0.40	0/1485	0.73	0/1997
1	J	0.52	1/1562 (0.1%)	0.80	1/2094 (0.0%)
2	G	0.76	7/1624 (0.4%)	1.06	8/2203 (0.4%)
3	H	0.50	4/4471 (0.1%)	0.84	8/6044 (0.1%)
3	I	0.34	0/1380	0.70	0/1861
3	K	0.39	0/1954	0.71	1/2636 (0.0%)
3	L	0.34	0/1334	0.72	0/1806
4	M	0.40	0/1139	0.70	0/1770
5	N	0.30	0/959	0.57	0/1490
All	All	0.44	16/23250 (0.1%)	0.77	24/31763 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	2
1	C	0	1
1	E	0	1
1	J	0	2
2	G	0	1
All	All	0	8

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	105	LEU	C-N	10.53	1.48	1.33
3	H	30	GLY	C-N	9.79	1.45	1.33
3	H	31	ILE	C-N	9.36	1.46	1.33
3	H	507	ASP	C-N	8.44	1.45	1.33
1	J	33	LYS	C-N	8.15	1.44	1.33
2	G	54	PHE	C-N	-7.67	1.23	1.33
2	G	104	GLY	C-N	7.56	1.44	1.33
2	G	119	SER	C-N	7.15	1.42	1.33
2	G	120	ILE	C-N	6.74	1.41	1.33
2	G	101	MET	C-N	-6.46	1.24	1.33
2	G	100	ILE	C-N	-6.34	1.24	1.33
3	H	429	ILE	C-N	-5.64	1.26	1.33
1	B	78	ALA	C-N	-5.47	1.25	1.33
1	E	25	ARG	C-N	-5.26	1.27	1.33
1	E	24	ARG	C-N	5.25	1.40	1.33
1	B	79	ARG	C-N	-5.18	1.26	1.33

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	105	LEU	CA-C-N	-8.49	111.48	122.77
2	G	105	LEU	C-N-CA	-8.49	111.48	122.77
1	B	72	ASP	CB-CA-C	-8.05	100.72	111.82
1	B	79	ARG	CA-C-N	7.41	127.39	119.76
1	B	79	ARG	C-N-CA	7.41	127.39	119.76
2	G	104	GLY	O-C-N	7.16	129.23	122.50
3	H	31	ILE	CA-C-N	-6.37	113.70	122.93
3	H	31	ILE	C-N-CA	-6.37	113.70	122.93
1	B	61	ILE	N-CA-C	-6.02	105.85	111.45
3	H	572	THR	CA-C-N	5.92	128.53	120.54
3	H	572	THR	C-N-CA	5.92	128.53	120.54
3	H	244	ASN	N-CA-C	-5.48	108.37	114.62
3	H	180	TYR	CA-C-O	-5.37	113.98	119.08
2	G	142	GLY	CA-C-O	-5.35	118.00	122.33
1	B	64	LYS	N-CA-C	-5.30	106.66	113.02
3	H	252	TYR	CB-CA-C	-5.29	102.00	110.14
3	K	438	ASN	CA-CB-CG	5.14	117.74	112.60
2	G	55	ASP	CA-C-N	5.12	127.15	120.28
2	G	55	ASP	C-N-CA	5.12	127.15	120.28
3	H	241	THR	N-CA-C	-5.12	105.35	111.03
1	J	157	ASP	CA-CB-CG	5.12	117.72	112.60
2	G	58	ASP	CA-C-N	5.07	131.10	121.97
2	G	58	ASP	C-N-CA	5.07	131.10	121.97

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	170	GLU	CA-CB-CG	5.06	124.22	114.10

There are no chirality outliers.

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	197	ARG	Sidechain
1	B	79	ARG	Sidechain
1	B	95	ARG	Sidechain
1	C	83	ARG	Sidechain
1	E	83	ARG	Sidechain
2	G	103	ARG	Sidechain
1	J	124	ARG	Sidechain
1	J	34	ARG	Sidechain

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1107	0	1061	23	0
1	B	1523	0	1546	34	0
1	C	1543	0	1582	17	0
1	D	1543	0	1575	38	0
1	E	1537	0	1564	25	0
1	F	1467	0	1482	26	0
1	J	1543	0	1582	28	0
2	G	1598	0	1442	45	0
3	H	4394	0	4292	76	0
3	I	1349	0	1311	24	0
3	K	1917	0	1858	28	0
3	L	1303	0	1233	23	0
4	M	1023	0	518	36	0
5	N	857	0	436	13	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0
6	C	1	0	0	0	0
6	D	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	E	1	0	0	0	0
6	F	1	0	0	0	0
6	G	1	0	0	0	0
6	H	1	0	0	0	0
6	J	1	0	0	0	0
All	All	22713	0	21482	354	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 8.

All (354) 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:B:59:LEU:HG	1:B:164:ALA:HB2	1.55	0.88
2:G:4:ILE:HD12	2:G:120:ILE:HD11	1.65	0.79
2:G:139:LEU:HD13	2:G:139:LEU:O	1.88	0.72
3:I:530:ARG:HH22	5:N:16:U:H5''	1.55	0.72
1:D:9:TYR:HD1	1:D:147:THR:HG22	1.56	0.70
3:K:510:HIS:CE1	3:K:597:LYS:HZ1	2.10	0.70
3:H:459:ILE:HD11	3:K:453:MET:HE3	1.74	0.69
2:G:139:LEU:HD13	2:G:139:LEU:C	2.18	0.69
1:B:91:GLY:HA3	4:M:27:U:H5''	1.76	0.68
3:H:446:ASN:OD1	3:H:450:TYR:N	2.26	0.68
1:E:18:LEU:HB3	1:E:138:VAL:HB	1.77	0.67
1:B:18:LEU:HB3	1:B:138:VAL:HB	1.77	0.66
1:A:14:THR:HA	1:A:184:VAL:HG12	1.79	0.65
1:J:89:LEU:HD11	1:J:157:ASP:HB2	1.79	0.65
3:H:1:MET:O	3:H:18:LEU:HD12	1.97	0.65
1:B:93:MET:HG2	4:M:27:U:H1'	1.78	0.64
3:K:530:ARG:HH22	5:N:22:A:H5''	1.63	0.64
1:B:12:MET:HE3	1:B:184:VAL:HG11	1.78	0.64
2:G:6:GLY:HA3	2:G:118:LEU:HB3	1.79	0.63
1:B:14:THR:HA	1:B:184:VAL:HG12	1.81	0.63
3:I:443:ASN:ND2	3:I:600:ASN:OD1	2.32	0.63
1:D:109:THR:HG22	1:D:111:GLU:HG2	1.80	0.62
3:H:93:CYS:HA	3:H:96:LEU:HB2	1.81	0.62
3:H:391:TYR:HH	3:H:428:GLU:N	1.97	0.62
1:J:52:LYS:NZ	4:M:16:U:OP1	2.32	0.62
3:H:27:ILE:HD11	3:H:157:ILE:HD11	1.81	0.61
1:F:169:GLU:HG3	1:F:186:PHE:HD2	1.64	0.61
3:L:459:ILE:HG12	3:L:468:ILE:HG13	1.83	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:H:16:PHE:HB2	3:H:27:ILE:HB	1.83	0.61
1:E:91:GLY:HA3	4:M:3:U:H5''	1.83	0.60
1:C:35:VAL:HG11	1:C:136:GLU:HG3	1.84	0.60
3:I:474:PHE:HE1	3:L:452:LEU:HD11	1.66	0.60
2:G:100:ILE:HD11	2:G:109:GLU:OE1	2.00	0.60
1:F:49:ILE:HB	1:F:104:LEU:HB2	1.85	0.59
3:H:436:VAL:HG21	3:H:465:ARG:HH21	1.68	0.59
3:H:416:ARG:NH1	3:K:188:ASN:OD1	2.35	0.59
1:F:40:ARG:NH2	2:G:153:TYR:OH	2.35	0.58
2:G:38:TYR:O	2:G:42:ASN:HB2	2.04	0.58
3:L:530:ARG:NH1	3:L:548:TYR:OH	2.36	0.58
3:I:524:LYS:O	3:I:565:ASN:ND2	2.37	0.58
3:I:588:LEU:HA	3:I:591:ILE:HD12	1.85	0.58
1:F:24:ARG:NH2	2:G:112:GLU:OE1	2.37	0.58
1:E:112:GLN:NE2	3:L:472:ASN:CG	2.62	0.58
3:H:318:LEU:HD12	3:H:350:GLY:HA2	1.86	0.58
1:A:91:GLY:HA3	4:M:33:U:H5''	1.86	0.57
1:C:49:ILE:HB	1:C:104:LEU:HB2	1.85	0.57
3:H:446:ASN:OD1	3:H:450:TYR:C	2.47	0.57
1:D:25:ARG:NH1	1:E:116:GLU:OE1	2.37	0.57
1:D:9:TYR:CD1	1:D:147:THR:HG22	2.39	0.57
3:I:530:ARG:NH2	5:N:16:U:H5''	2.18	0.57
3:K:510:HIS:CE1	3:K:597:LYS:NZ	2.71	0.57
1:E:49:ILE:HB	1:E:104:LEU:HB2	1.87	0.57
3:H:526:LEU:HD21	3:H:587:LEU:HD11	1.87	0.57
1:A:50:PRO:HB2	4:M:35:G:H1'	1.87	0.57
1:D:18:LEU:HB3	1:D:138:VAL:HB	1.88	0.56
1:F:28:LYS:O	1:F:32:GLN:HG2	2.05	0.56
1:C:18:LEU:HB3	1:C:138:VAL:HB	1.87	0.56
3:H:444:MET:HG3	3:H:453:MET:HB2	1.87	0.56
1:B:82:GLY:HA2	1:B:87:CYS:HB3	1.88	0.56
1:E:100:SER:OG	1:F:183:ARG:NH2	2.38	0.56
2:G:16:ILE:HG13	2:G:24:ALA:HB3	1.88	0.56
1:D:91:GLY:HA3	4:M:9:G:H5''	1.89	0.55
3:I:520:LEU:HD23	3:I:523:ILE:HD11	1.88	0.55
1:C:121:ARG:HB2	4:M:28:G:H1'	1.88	0.55
3:H:442:ASP:OD1	3:H:442:ASP:N	2.33	0.55
1:J:121:ARG:HB3	1:J:131:ASP:HB2	1.88	0.55
1:E:101:VAL:HG22	1:E:148:ILE:HG23	1.88	0.55
3:H:446:ASN:HD21	3:H:449:SER:HA	1.72	0.54
3:I:444:MET:HG2	3:I:453:MET:HB2	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:56:ARG:NH2	1:A:87:CYS:SG	2.78	0.54
1:B:96:ALA:HB2	4:M:26:G:H4'	1.89	0.54
3:I:525:ILE:HD11	3:I:567:PRO:HG3	1.89	0.54
3:L:512:LYS:O	3:L:516:ASN:ND2	2.40	0.54
3:I:567:PRO:HG2	3:I:576:ILE:HG12	1.89	0.54
3:K:588:LEU:HD23	3:K:591:ILE:HD12	1.89	0.54
1:D:122:ILE:O	1:D:124:ARG:NH1	2.41	0.54
3:H:226:LEU:O	3:H:228:PRO:HD3	2.07	0.54
3:K:462:LYS:HB2	3:K:465:ARG:HG2	1.90	0.54
1:B:17:PRO:HB3	1:B:137:GLU:HG3	1.90	0.53
3:L:530:ARG:NH2	3:L:563:ASN:O	2.40	0.53
3:K:524:LYS:O	3:K:565:ASN:ND2	2.41	0.53
1:E:7:LYS:HG2	1:E:149:THR:HG23	1.89	0.53
1:D:15:LEU:HD11	1:D:185:SER:HB3	1.91	0.53
3:H:269:ASN:ND2	3:H:276:LEU:O	2.40	0.53
3:H:513:ILE:HG21	3:H:590:LEU:HD13	1.90	0.53
3:H:104:GLN:HG2	3:H:111:PRO:HA	1.91	0.53
3:K:166:PHE:HA	3:K:193:ILE:HB	1.90	0.53
1:B:77:ARG:NH2	3:H:564:TRP:O	2.42	0.53
1:A:12:MET:HE2	1:A:184:VAL:HG11	1.91	0.52
2:G:103:ARG:HG2	4:M:-1:U:H4'	1.90	0.52
3:H:524:LYS:O	3:H:565:ASN:ND2	2.34	0.52
1:D:40:ARG:HD2	1:D:48:LEU:HB3	1.91	0.52
1:J:124:ARG:NH2	4:M:23:U:OP2	2.37	0.52
1:C:52:LYS:HB2	1:C:101:VAL:HB	1.92	0.52
1:D:59:LEU:HD12	1:D:90:PHE:HE2	1.75	0.52
3:L:526:LEU:HD21	3:L:587:LEU:HD11	1.91	0.52
3:H:27:ILE:HD13	3:H:59:ILE:HB	1.92	0.52
3:L:546:ILE:HG23	3:L:588:LEU:HD11	1.92	0.52
1:A:24:ARG:HA	1:B:117:SER:HA	1.91	0.52
1:A:104:LEU:HB3	1:A:144:PHE:HB3	1.92	0.52
2:G:188:ASP:OD1	2:G:188:ASP:N	2.36	0.52
3:H:251:VAL:HA	3:H:310:VAL:HB	1.91	0.52
2:G:190:VAL:HG13	2:G:205:ARG:HG2	1.92	0.52
3:H:567:PRO:HG2	3:H:576:ILE:HG12	1.91	0.52
1:J:12:MET:HB3	1:J:144:PHE:HB2	1.92	0.51
2:G:148:LYS:HB3	2:G:151:LYS:HD2	1.92	0.51
1:B:121:ARG:HB3	4:M:34:C:H1'	1.93	0.51
2:G:194:LYS:N	4:M:-8:U:OP1	2.42	0.51
3:H:525:ILE:HD11	3:H:567:PRO:HG3	1.93	0.51
1:J:14:THR:HA	1:J:184:VAL:HG12	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:K:534:PHE:HD1	3:K:549:ILE:HD11	1.76	0.51
1:B:95:ARG:HG3	1:J:126:THR:HB	1.93	0.51
3:H:12:THR:OG1	3:H:13:GLY:N	2.44	0.51
3:H:344:GLN:O	3:H:351:ARG:NH1	2.44	0.51
3:H:148:HIS:O	3:H:175:GLN:NE2	2.43	0.50
3:H:435:VAL:HA	3:H:466:ILE:O	2.11	0.50
3:I:461:GLU:HA	3:I:466:ILE:HA	1.93	0.50
1:D:197:ARG:NH2	1:E:170:GLU:OE1	2.43	0.50
3:I:452:LEU:C	3:I:452:LEU:HD12	2.36	0.50
1:E:121:ARG:HB3	1:E:131:ASP:HB2	1.94	0.50
3:K:552:VAL:HA	3:K:563:ASN:HB2	1.93	0.50
1:E:169:GLU:HG3	1:E:186:PHE:HD2	1.76	0.50
3:H:230:PHE:HA	5:N:-13:A:OP1	2.12	0.50
1:C:120:LEU:O	4:M:28:G:O2'	2.30	0.50
1:E:176:TRP:HB3	1:E:179:LYS:HE2	1.92	0.50
3:H:477:ILE:HD12	3:K:450:TYR:HE2	1.75	0.50
1:J:59:LEU:HD12	1:J:90:PHE:HE2	1.77	0.50
3:I:546:ILE:HD13	3:I:591:ILE:HD13	1.93	0.50
1:D:48:LEU:HD12	1:D:105:ILE:HG12	1.93	0.50
1:A:4:THR:HA	1:A:194:ALA:HA	1.93	0.50
1:F:42:THR:HG23	1:F:48:LEU:HD22	1.93	0.50
2:G:139:LEU:C	2:G:139:LEU:CD1	2.84	0.49
3:H:596:ASN:OD1	3:K:443:ASN:ND2	2.43	0.49
3:K:516:ASN:HB2	3:K:586:THR:HG21	1.93	0.49
1:F:99:ALA:O	2:G:150:SER:OG	2.28	0.49
3:H:317:MET:HE1	5:N:-15:A:C4	2.47	0.49
1:C:14:THR:HA	1:C:184:VAL:HG12	1.94	0.49
2:G:18:LEU:HD12	2:G:22:GLU:HG3	1.95	0.49
3:I:447:PHE:O	3:I:450:TYR:HB2	2.12	0.49
1:C:193:VAL:HB	1:C:197:ARG:HD3	1.94	0.49
1:D:7:LYS:HB2	1:D:191:GLU:HG2	1.95	0.49
1:E:112:GLN:NE2	3:L:472:ASN:OD1	2.45	0.49
3:H:433:LYS:HG2	3:H:464:ASP:HA	1.95	0.49
1:A:198:PHE:O	1:B:163:SER:HB2	2.12	0.49
1:J:140:GLU:OE1	1:J:140:GLU:N	2.44	0.49
3:H:469:ASN:HB3	3:H:473:TRP:CB	2.42	0.48
1:A:60:GLU:OE1	1:B:124:ARG:NE	2.43	0.48
1:F:122:ILE:CD1	4:M:5:U:H2'	2.43	0.48
3:L:578:LYS:O	3:L:582:THR:OG1	2.27	0.48
1:J:124:ARG:HH12	4:M:23:U:P	2.36	0.48
1:D:120:LEU:O	4:M:16:U:O2'	2.30	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:G:99:ASN:HA	2:G:108:LYS:HG3	1.94	0.48
3:H:561:ARG:HH22	5:N:9:C:H1'	1.78	0.48
1:J:95:ARG:NH1	1:J:96:ALA:O	2.45	0.48
2:G:30:ARG:NH2	4:M:-7:U:OP2	2.39	0.48
3:H:216:LYS:HA	3:H:247:PHE:HE1	1.79	0.48
3:K:445:CYS:N	3:K:452:LEU:O	2.46	0.48
3:L:534:PHE:HD1	3:L:549:ILE:HD11	1.79	0.48
3:H:127:GLU:HG3	3:H:540:LYS:HD3	1.95	0.48
1:A:199:LEU:HD11	1:B:63:LEU:HG	1.95	0.47
3:H:49:ILE:HG13	3:H:73:LEU:HD23	1.96	0.47
1:A:81:CYS:SG	1:A:82:GLY:N	2.87	0.47
1:J:178:ASN:ND2	4:M:21:A:OP1	2.47	0.47
1:J:8:ILE:HB	1:J:148:ILE:HB	1.97	0.47
3:K:470:ASP:OD1	3:K:470:ASP:N	2.48	0.47
1:A:49:ILE:HB	1:A:104:LEU:HB2	1.97	0.47
1:J:49:ILE:HB	1:J:104:LEU:HB2	1.95	0.47
1:C:20:THR:HG21	1:C:49:ILE:HG12	1.97	0.47
1:D:23:VAL:CG1	4:M:12:G:H5'	2.44	0.47
3:H:60:LEU:HD11	3:H:71:VAL:HG21	1.97	0.47
3:H:238:VAL:HG12	3:H:312:ILE:HD13	1.97	0.47
3:H:251:VAL:HG13	3:H:290:TYR:HA	1.97	0.47
3:L:530:ARG:NH2	5:N:28:C:OP1	2.39	0.47
1:B:93:MET:HE2	4:M:26:G:N2	2.30	0.47
3:H:62:HIS:HB2	3:H:149:ILE:HD11	1.97	0.47
3:H:191:TYR:HB3	3:H:394:PHE:HE1	1.80	0.47
1:B:22:GLU:HB3	1:B:38:PRO:HG2	1.97	0.46
3:I:553:HIS:O	3:I:562:ARG:NH1	2.45	0.46
1:J:122:ILE:HD13	4:M:23:U:H2'	1.96	0.46
1:C:106:SER:HA	1:C:144:PHE:HA	1.97	0.46
1:F:159:SER:O	1:F:163:SER:OG	2.29	0.46
1:F:57:SER:HA	1:F:60:GLU:HG3	1.97	0.46
1:A:80:PRO:HG2	1:A:93:MET:HG2	1.97	0.46
3:K:410:ILE:HD11	3:K:415:ILE:HD12	1.97	0.46
1:B:93:MET:HE2	1:B:93:MET:HB3	1.60	0.46
1:D:150:ILE:HD13	1:D:157:ASP:HB3	1.97	0.46
1:F:100:SER:HA	2:G:150:SER:HA	1.97	0.46
2:G:134:ILE:O	2:G:138:ILE:HG12	2.16	0.46
1:B:79:ARG:HA	1:B:80:PRO:HD2	1.78	0.46
1:D:77:ARG:HE	3:L:566:PRO:HD3	1.80	0.46
3:H:207:ASP:H	3:H:369:SER:HB2	1.81	0.46
2:G:18:LEU:N	2:G:22:GLU:O	2.45	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:H:392:LYS:HD3	3:H:418:GLU:HB2	1.98	0.46
3:H:458:PHE:N	3:H:469:ASN:O	2.41	0.46
1:E:81:CYS:HB2	1:E:83:ARG:NH1	2.31	0.45
2:G:97:LEU:HG	2:G:110:VAL:HG22	1.97	0.45
1:F:36:ASN:ND2	5:N:33:G:OP2	2.48	0.45
1:F:59:LEU:HD12	1:F:90:PHE:HE2	1.81	0.45
4:M:-4:A:N1	4:M:-3:A:N6	2.65	0.45
1:F:79:ARG:HA	1:F:79:ARG:HD3	1.70	0.45
1:D:57:SER:O	1:D:61:ILE:HG13	2.17	0.45
1:F:56:ARG:NH1	4:M:-3:A:OP1	2.49	0.45
3:H:248:ASN:OD1	3:H:248:ASN:N	2.49	0.45
1:A:100:SER:OG	1:B:183:ARG:NH2	2.49	0.45
2:G:48:SER:HA	2:G:51:PHE:HB2	1.99	0.45
3:H:391:TYR:HB2	3:K:391:TYR:HD1	1.81	0.45
1:A:101:VAL:HG22	1:A:148:ILE:HG23	1.98	0.45
1:D:14:THR:HA	1:D:184:VAL:HG12	1.99	0.45
3:H:103:ILE:HG12	5:N:-13:A:N7	2.32	0.45
1:D:196:ASP:OD1	1:D:196:ASP:N	2.39	0.45
1:E:42:THR:OG1	1:E:46:LYS:N	2.40	0.45
2:G:7:ILE:HG13	2:G:159:LYS:HB2	1.97	0.45
2:G:8:LEU:HD13	2:G:64:LEU:HD21	1.99	0.45
1:B:122:ILE:O	1:B:124:ARG:NH1	2.48	0.45
1:F:63:LEU:HD23	1:F:63:LEU:HA	1.87	0.45
3:H:270:ILE:HA	3:H:277:ARG:HG2	1.99	0.45
1:J:176:TRP:HB3	1:J:179:LYS:HE2	1.99	0.45
1:B:62:MET:SD	1:B:167:PHE:HB2	2.57	0.45
3:H:460:VAL:HG22	3:K:452:LEU:HD12	1.98	0.45
2:G:27:PRO:HG2	2:G:64:LEU:HB3	1.99	0.44
1:B:156:LYS:HG2	1:B:160:LEU:HG	1.99	0.44
1:F:12:MET:HE1	1:F:49:ILE:HD12	1.98	0.44
3:H:84:ILE:HD11	3:H:128:ILE:HG12	1.99	0.44
3:L:520:LEU:HD23	3:L:523:ILE:HD11	1.98	0.44
4:M:-1:U:H1'	4:M:1:C:C5	2.51	0.44
1:A:12:MET:HB3	1:A:144:PHE:HB2	1.98	0.44
2:G:176:LEU:HD23	2:G:176:LEU:HA	1.87	0.44
1:J:77:ARG:NH2	3:K:562:ARG:O	2.50	0.44
1:B:121:ARG:HD2	1:B:131:ASP:HB2	1.99	0.44
1:A:56:ARG:HH11	1:A:90:PHE:HB2	1.82	0.44
1:F:59:LEU:O	1:F:63:LEU:HB2	2.18	0.44
1:J:40:ARG:NH1	4:M:18:G:OP1	2.44	0.44
1:A:23:VAL:HG22	4:M:36:C:H5'	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:106:SER:HA	1:A:144:PHE:HA	2.00	0.44
1:D:41:LYS:HD3	1:D:110:LYS:HD3	2.00	0.44
1:D:183:ARG:NH2	1:J:100:SER:OG	2.51	0.44
2:G:8:LEU:HD22	2:G:156:PHE:HB3	2.00	0.44
3:H:287:ASN:O	3:H:288:ASN:C	2.61	0.43
3:H:552:VAL:HA	3:H:563:ASN:HB2	2.00	0.43
1:B:93:MET:HE3	4:M:27:U:C2	2.53	0.43
1:D:16:SER:HB3	1:D:183:ARG:HB2	2.00	0.43
1:E:12:MET:HE2	1:E:144:PHE:HB2	2.00	0.43
1:F:100:SER:HB3	1:F:149:THR:HB	1.99	0.43
2:G:76:PRO:HA	2:G:83:LEU:HG	2.00	0.43
3:H:553:HIS:O	3:H:562:ARG:NH1	2.45	0.43
1:J:18:LEU:HB3	1:J:138:VAL:HB	2.00	0.43
1:E:59:LEU:HG	1:E:164:ALA:HB2	1.99	0.43
1:F:165:LEU:HD23	1:F:168:ILE:HD12	2.01	0.43
1:D:82:GLY:O	1:D:95:ARG:NH2	2.51	0.43
3:H:78:ARG:NH2	1:J:112:GLN:O	2.51	0.43
3:H:376:GLN:HG2	3:H:406:LEU:HD13	1.99	0.43
3:L:486:ARG:HE	3:L:486:ARG:HB3	1.53	0.43
1:B:81:CYS:SG	1:B:83:ARG:HB2	2.59	0.43
3:H:555:LYS:NZ	3:H:577:GLU:OE1	2.51	0.43
3:K:510:HIS:ND1	3:K:597:LYS:NZ	2.66	0.43
4:M:12:G:H1'	4:M:13:G:C8	2.53	0.43
1:C:24:ARG:NH2	1:J:137:GLU:OE1	2.43	0.43
1:C:96:ALA:HB2	4:M:20:A:H4'	2.00	0.43
1:D:102:ASP:HA	1:E:180:GLY:HA2	2.00	0.43
3:L:514:ILE:HD11	3:L:601:ILE:HG12	2.01	0.43
3:H:514:ILE:HD11	3:H:601:ILE:HG12	2.01	0.43
1:B:124:ARG:NH1	4:M:35:G:OP1	2.52	0.42
3:H:469:ASN:HB3	3:H:473:TRP:HB2	2.00	0.42
3:I:442:ASP:O	3:I:453:MET:SD	2.77	0.42
1:E:162:GLN:HG2	1:E:188:VAL:HG21	2.00	0.42
3:H:184:MET:HE3	3:H:184:MET:HB2	1.77	0.42
1:A:5:MET:HE2	1:A:195:THR:HG22	2.01	0.42
3:K:608:LYS:NZ	5:N:27:G:OP1	2.52	0.42
3:H:374:ALA:HB1	3:H:378:GLU:HB2	2.00	0.42
3:L:444:MET:HE3	3:L:444:MET:HB2	1.83	0.42
1:D:131:ASP:OD1	1:J:76:SER:OG	2.32	0.42
1:B:59:LEU:O	1:B:63:LEU:HB2	2.19	0.42
1:C:69:ASN:OD1	1:C:69:ASN:N	2.52	0.42
1:C:169:GLU:HG3	1:C:186:PHE:HD2	1.84	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:52:LYS:HD3	1:E:179:LYS:HG2	2.02	0.42
1:D:118:THR:OG1	5:N:20:G:N2	2.50	0.42
1:D:127:LYS:HB2	1:D:127:LYS:HE2	1.71	0.42
3:H:274:LYS:HE2	3:H:274:LYS:HB3	1.90	0.42
1:D:35:VAL:HG21	1:D:136:GLU:HG3	2.02	0.42
1:D:81:CYS:SG	1:D:82:GLY:N	2.92	0.42
2:G:93:GLY:O	2:G:96:VAL:HG12	2.19	0.42
2:G:105:LEU:HD11	4:M:-3:A:C4	2.55	0.42
3:I:478:TRP:CG	3:K:471:LYS:HD3	2.55	0.42
3:H:446:ASN:OD1	3:H:450:TYR:O	2.37	0.42
1:C:95:ARG:HD2	1:C:95:ARG:HA	1.89	0.42
1:F:140:GLU:OE2	1:F:140:GLU:N	2.43	0.42
1:F:151:SER:OG	2:G:42:ASN:OD1	2.30	0.42
2:G:204:ILE:H	2:G:204:ILE:HG13	1.58	0.42
3:H:553:HIS:CE1	3:H:581:GLU:HA	2.54	0.42
3:H:587:LEU:O	3:H:591:ILE:HG13	2.20	0.42
3:K:438:ASN:HA	3:K:468:ILE:HB	2.02	0.42
1:B:46:LYS:NZ	1:B:106:SER:O	2.40	0.41
1:D:13:LYS:HE3	1:D:141:GLY:HA2	2.02	0.41
3:L:456:SER:O	3:L:456:SER:OG	2.33	0.41
1:B:7:LYS:HB2	1:B:191:GLU:HG3	2.01	0.41
1:D:140:GLU:OE1	1:D:140:GLU:N	2.48	0.41
3:H:131:ARG:HD3	3:H:183:ASP:OD2	2.20	0.41
3:H:141:ILE:HA	3:H:156:PHE:O	2.19	0.41
3:H:477:ILE:HD12	3:K:450:TYR:CE2	2.54	0.41
3:L:596:ASN:OD1	3:L:600:ASN:ND2	2.48	0.41
4:M:-1:U:H1'	4:M:1:C:H5	1.85	0.41
2:G:97:LEU:HA	2:G:109:GLU:O	2.20	0.41
3:H:534:PHE:HD1	3:H:549:ILE:HD11	1.84	0.41
3:I:514:ILE:HD11	3:I:601:ILE:HG12	2.02	0.41
3:K:564:TRP:HH2	3:K:587:LEU:HD12	1.85	0.41
3:L:525:ILE:HD11	3:L:567:PRO:HG3	2.01	0.41
1:E:59:LEU:HD12	1:E:90:PHE:HE2	1.85	0.41
3:I:535:TRP:HH2	3:I:595:LYS:HG3	1.86	0.41
2:G:92:TYR:HB3	2:G:93:GLY:H	1.73	0.41
1:E:59:LEU:HD23	1:E:59:LEU:HA	1.85	0.41
2:G:94:SER:O	2:G:95:SER:C	2.63	0.41
1:J:6:LYS:HE3	1:J:190:SER:HB2	2.02	0.41
5:N:17:U:H2'	5:N:18:U:C6	2.56	0.41
1:A:100:SER:OG	1:B:177:LEU:O	2.32	0.41
1:E:14:THR:HA	1:E:184:VAL:HG12	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:H:18:LEU:HD23	3:H:157:ILE:HG21	2.02	0.41
3:I:451:ARG:HB2	3:L:461:GLU:HB2	2.03	0.41
3:L:599:TYR:O	3:L:603:ILE:HB	2.21	0.41
1:F:121:ARG:HH21	5:N:33:G:N2	2.18	0.41
2:G:51:PHE:HD1	2:G:51:PHE:HA	1.81	0.41
2:G:179:ASP:OD1	2:G:179:ASP:N	2.54	0.41
1:D:118:THR:HG21	4:M:18:G:C6	2.56	0.41
1:E:20:THR:HG23	1:E:40:ARG:HB3	2.02	0.41
1:F:122:ILE:HD11	4:M:5:U:H2'	2.02	0.41
2:G:94:SER:C	2:G:96:VAL:N	2.79	0.41
1:J:98:ARG:NH1	1:J:152:ASN:O	2.53	0.41
1:F:56:ARG:NH1	1:F:90:PHE:O	2.53	0.41
3:H:456:SER:HB2	3:I:481:GLU:HG2	2.03	0.41
1:J:17:PRO:O	1:J:182:GLY:N	2.47	0.41
1:B:26:GLU:OE1	1:B:26:GLU:N	2.45	0.40
1:B:58:ALA:O	1:B:62:MET:HB2	2.21	0.40
1:C:150:ILE:HD11	1:C:161:ILE:HD12	2.03	0.40
2:G:20:ASN:O	2:G:21:GLY:C	2.64	0.40
3:K:144:TYR:HB2	3:K:154:SER:HB2	2.03	0.40
1:D:80:PRO:HG2	1:D:93:MET:HG2	2.04	0.40
1:E:111:GLU:CD	1:E:111:GLU:H	2.30	0.40
2:G:74:PHE:HB3	2:G:83:LEU:HB3	2.04	0.40
3:I:523:ILE:HD12	3:I:579:LEU:HD13	2.02	0.40
3:I:534:PHE:HD1	3:I:549:ILE:HD11	1.86	0.40
3:K:553:HIS:O	3:K:562:ARG:NH1	2.42	0.40
3:L:596:ASN:O	3:L:600:ASN:ND2	2.54	0.40
2:G:5:LYS:HB2	2:G:162:SER:OG	2.21	0.40
2:G:19:ASP:N	4:M:-7:U:O4	2.54	0.40
1:C:159:SER:O	1:C:163:SER:OG	2.35	0.40
1:D:172:GLY:HA3	1:D:177:LEU:HD22	2.03	0.40
3:H:62:HIS:CD2	3:H:148:HIS:HD2	2.40	0.40
1:A:16:SER:HB3	1:A:183:ARG:HB2	2.03	0.40
1:D:41:LYS:HE3	1:D:41:LYS:HB2	1.84	0.40
1:D:180:GLY:HA2	1:J:102:ASP:HA	2.04	0.40
2:G:66:PRO:HG2	2:G:74:PHE:HB2	2.04	0.40
3:H:245:TYR:O	3:H:246:ASN:C	2.65	0.40
3:H:288:ASN:O	3:H:290:TYR:HD2	2.04	0.40
3:I:566:PRO:HA	3:I:567:PRO:HD3	1.95	0.40
1:J:56:ARG:HH21	1:J:73:THR:HG21	1.87	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	148/200 (74%)	140 (95%)	8 (5%)	0	100	100
1	B	197/200 (98%)	190 (96%)	7 (4%)	0	100	100
1	C	197/200 (98%)	191 (97%)	6 (3%)	0	100	100
1	D	197/200 (98%)	191 (97%)	6 (3%)	0	100	100
1	E	197/200 (98%)	191 (97%)	6 (3%)	0	100	100
1	F	192/200 (96%)	186 (97%)	6 (3%)	0	100	100
1	J	197/200 (98%)	192 (98%)	5 (2%)	0	100	100
2	G	225/240 (94%)	202 (90%)	21 (9%)	2 (1%)	14	28
3	H	538/609 (88%)	507 (94%)	31 (6%)	0	100	100
3	I	157/609 (26%)	145 (92%)	12 (8%)	0	100	100
3	K	219/609 (36%)	210 (96%)	9 (4%)	0	100	100
3	L	155/609 (26%)	153 (99%)	2 (1%)	0	100	100
All	All	2619/4076 (64%)	2498 (95%)	119 (4%)	2 (0%)	49	68

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	G	55	ASP
2	G	92	TYR

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	111/170 (65%)	111 (100%)	0	100	100
1	B	163/170 (96%)	157 (96%)	6 (4%)	30	55
1	C	168/170 (99%)	164 (98%)	4 (2%)	43	67
1	D	168/170 (99%)	168 (100%)	0	100	100
1	E	167/170 (98%)	166 (99%)	1 (1%)	78	89
1	F	157/170 (92%)	156 (99%)	1 (1%)	78	89
1	J	168/170 (99%)	166 (99%)	2 (1%)	63	80
2	G	140/209 (67%)	135 (96%)	5 (4%)	31	56
3	H	471/556 (85%)	461 (98%)	10 (2%)	47	70
3	I	147/556 (26%)	147 (100%)	0	100	100
3	K	204/556 (37%)	201 (98%)	3 (2%)	57	77
3	L	137/556 (25%)	136 (99%)	1 (1%)	76	87
All	All	2201/3623 (61%)	2168 (98%)	33 (2%)	55	77

All (33) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	42	THR
1	B	62	MET
1	B	64	LYS
1	B	85	VAL
1	B	137	GLU
1	B	158	LEU
1	C	12	MET
1	C	16	SER
1	C	68	GLU
1	C	70	VAL
1	E	122	ILE
1	F	139	ILE
2	G	52	LEU
2	G	100	ILE
2	G	120	ILE
2	G	139	LEU
2	G	204	ILE
3	H	31	ILE
3	H	102	ARG
3	H	169	ASP
3	H	207	ASP
3	H	432	GLU

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Mol	Chain	Res	Type
3	H	456	SER
3	H	474	PHE
3	H	508	MET
3	H	588	LEU
3	H	603	ILE
1	J	178	ASN
1	J	187	GLU
3	K	439	ILE
3	K	488	GLN
3	K	578	LYS
3	L	452	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (39) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	45	ASN
1	A	171	ASN
1	B	32	GLN
1	B	112	GLN
1	B	178	ASN
1	C	45	ASN
1	D	162	GLN
1	E	112	GLN
1	E	162	GLN
1	E	171	ASN
2	G	20	ASN
3	H	22	ASN
3	H	81	ASN
3	H	104	GLN
3	H	107	ASN
3	H	145	ASN
3	H	244	ASN
3	H	304	ASN
3	H	373	HIS
3	H	397	HIS
3	H	402	GLN
3	H	516	ASN
3	H	522	ASN
3	H	529	ASN
3	H	558	ASN
3	H	585	ASN
3	H	606	ASN

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Mol	Chain	Res	Type
3	I	551	GLN
3	I	558	ASN
1	J	32	GLN
1	J	112	GLN
1	J	171	ASN
3	K	440	ASN
3	K	469	ASN
3	K	522	ASN
3	K	558	ASN
3	K	585	ASN
3	L	563	ASN
3	L	585	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
4	M	48/60 (80%)	15 (31%)	2 (4%)
5	N	38/60 (63%)	6 (15%)	0
All	All	86/120 (71%)	21 (24%)	2 (2%)

All (21) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
4	M	-8	U
4	M	-7	U
4	M	-3	A
4	M	-2	C
4	M	-1	U
4	M	4	C
4	M	6	C
4	M	12	G
4	M	17	C
4	M	19	A
4	M	20	A
4	M	24	A
4	M	29	C
4	M	36	C
4	M	37	G
5	N	-15	A
5	N	-14	G
5	N	-13	A

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Mol	Chain	Res	Type
5	N	-12	A
5	N	9	C
5	N	33	G

All (2) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
4	M	18	G
4	M	34	C

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 9 ligands modelled in this entry, 9 are monoatomic - leaving 0 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.

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.

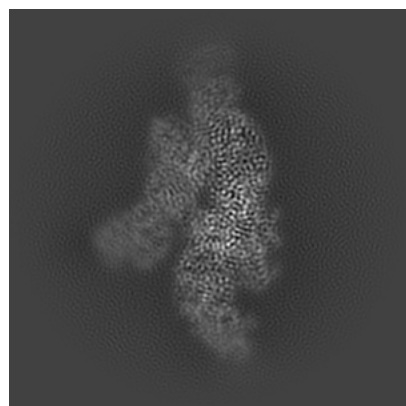
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-39767. These allow visual inspection of the internal detail of the map and identification of artifacts.

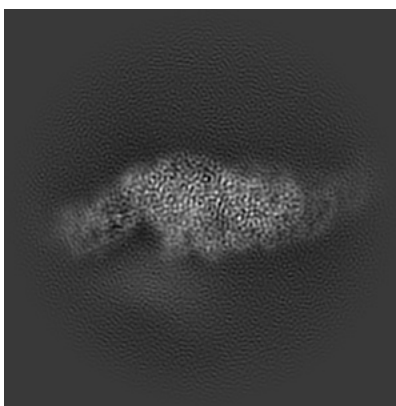
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

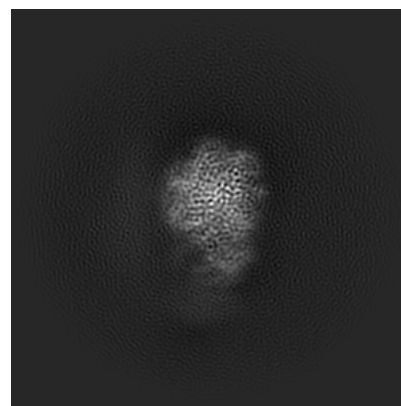
6.1.1 Primary map



X

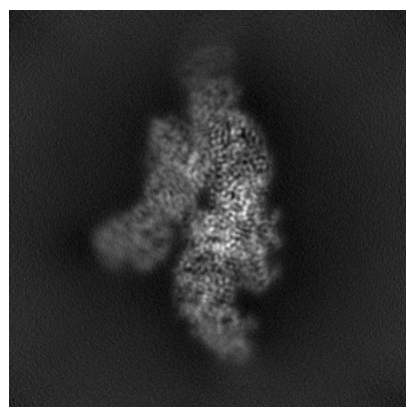


Y

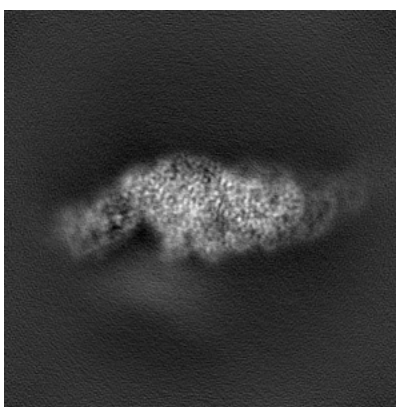


Z

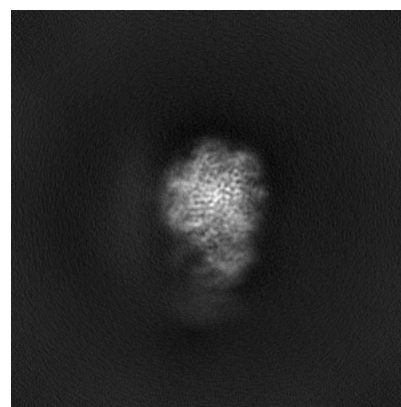
6.1.2 Raw map



X



Y

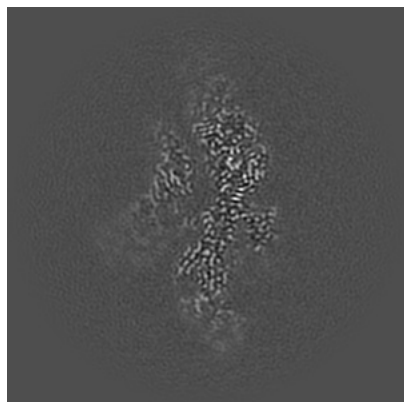


Z

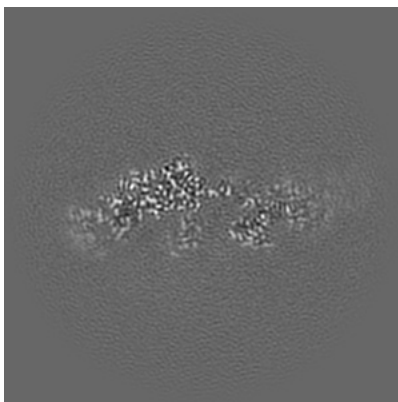
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

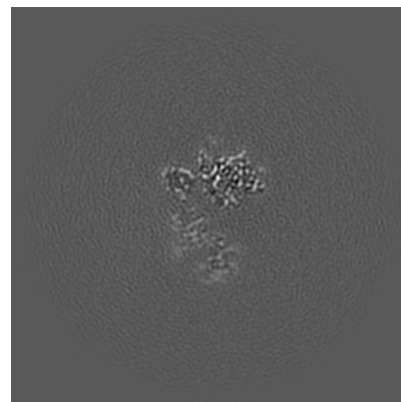
6.2.1 Primary map



X Index: 150

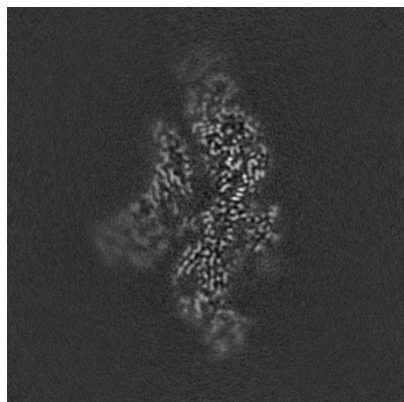


Y Index: 150

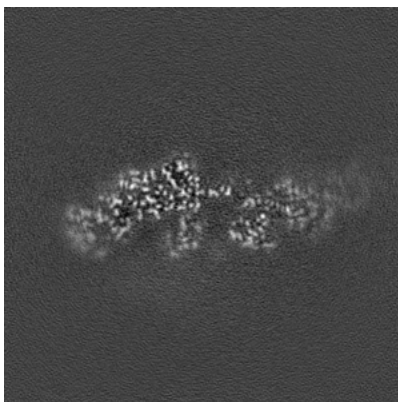


Z Index: 150

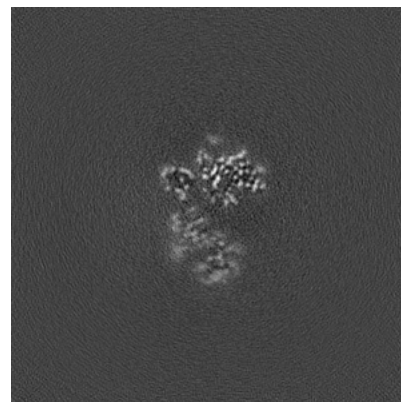
6.2.2 Raw map



X Index: 150



Y Index: 150

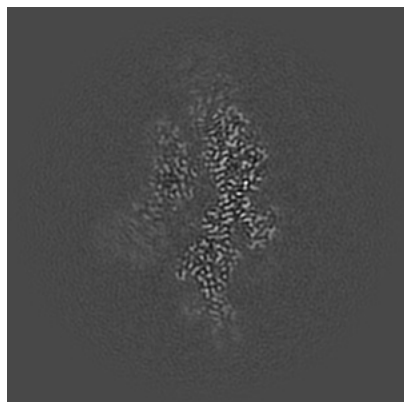


Z Index: 150

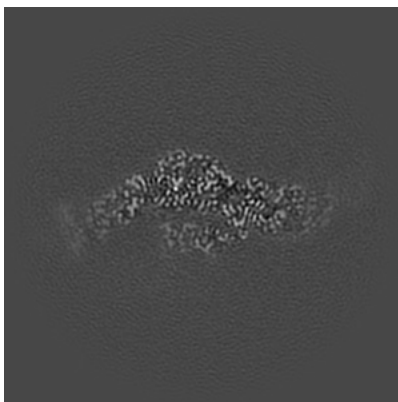
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

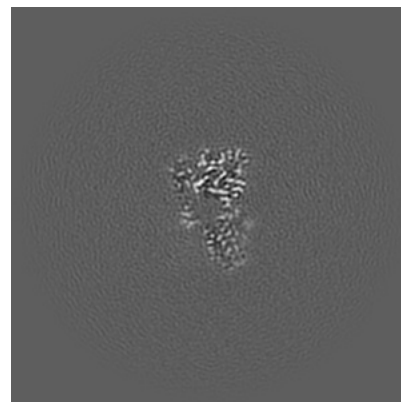
6.3.1 Primary map



X Index: 153

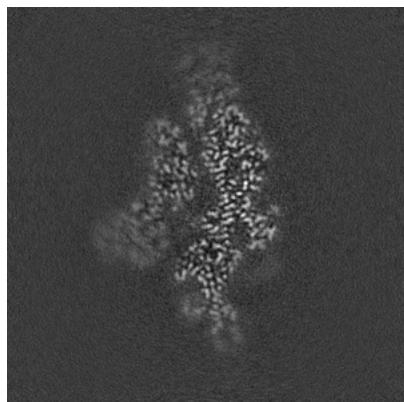


Y Index: 163

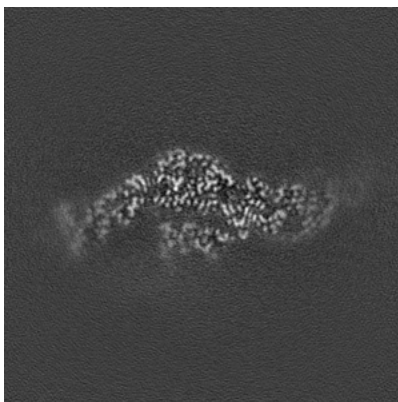


Z Index: 169

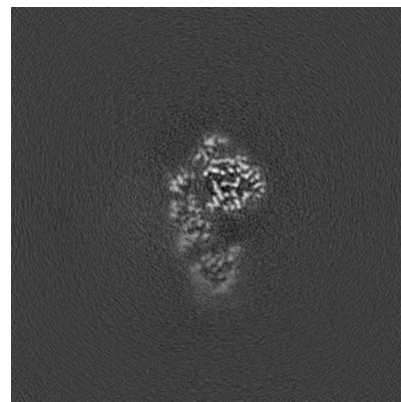
6.3.2 Raw map



X Index: 153



Y Index: 163

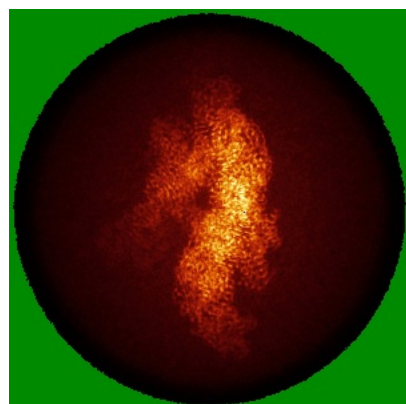


Z Index: 144

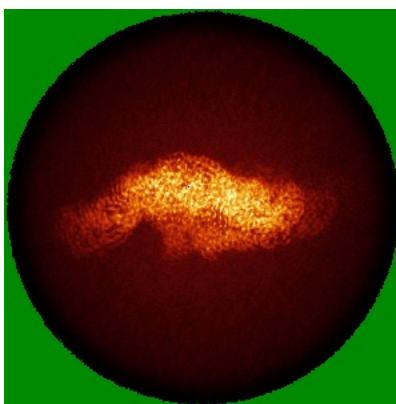
The images above show the largest variance slices of the map in three orthogonal directions.

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

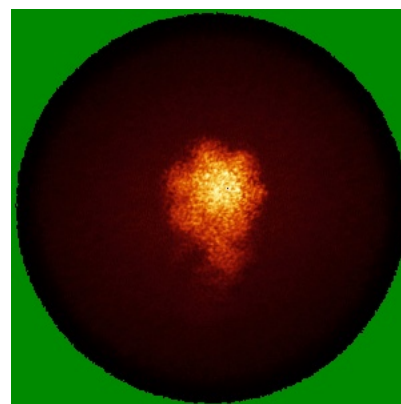
6.4.1 Primary map



X

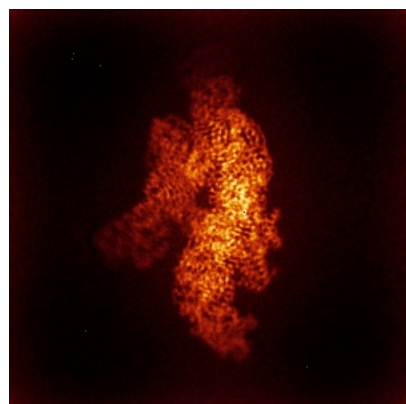


Y

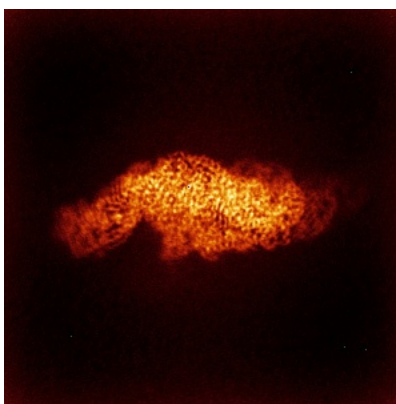


Z

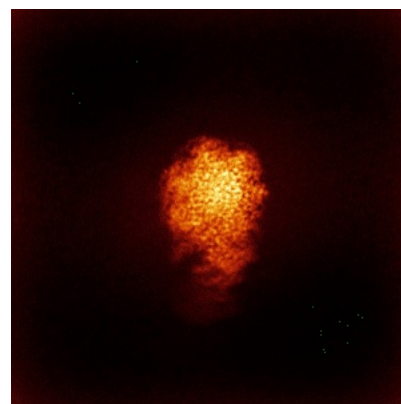
6.4.2 Raw map



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 0.18. 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.

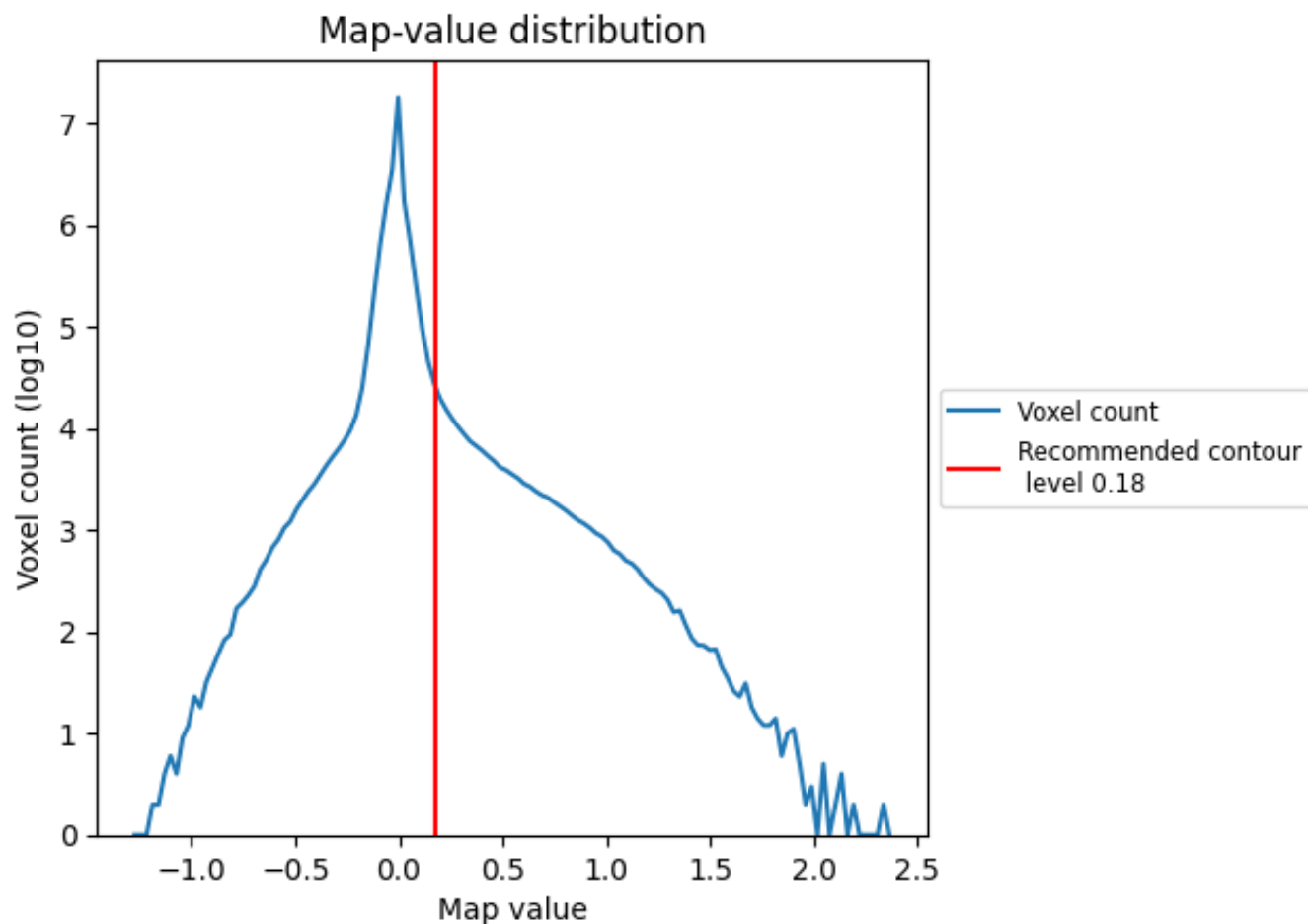
6.6 Mask visualisation [i](#)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis [i](#)

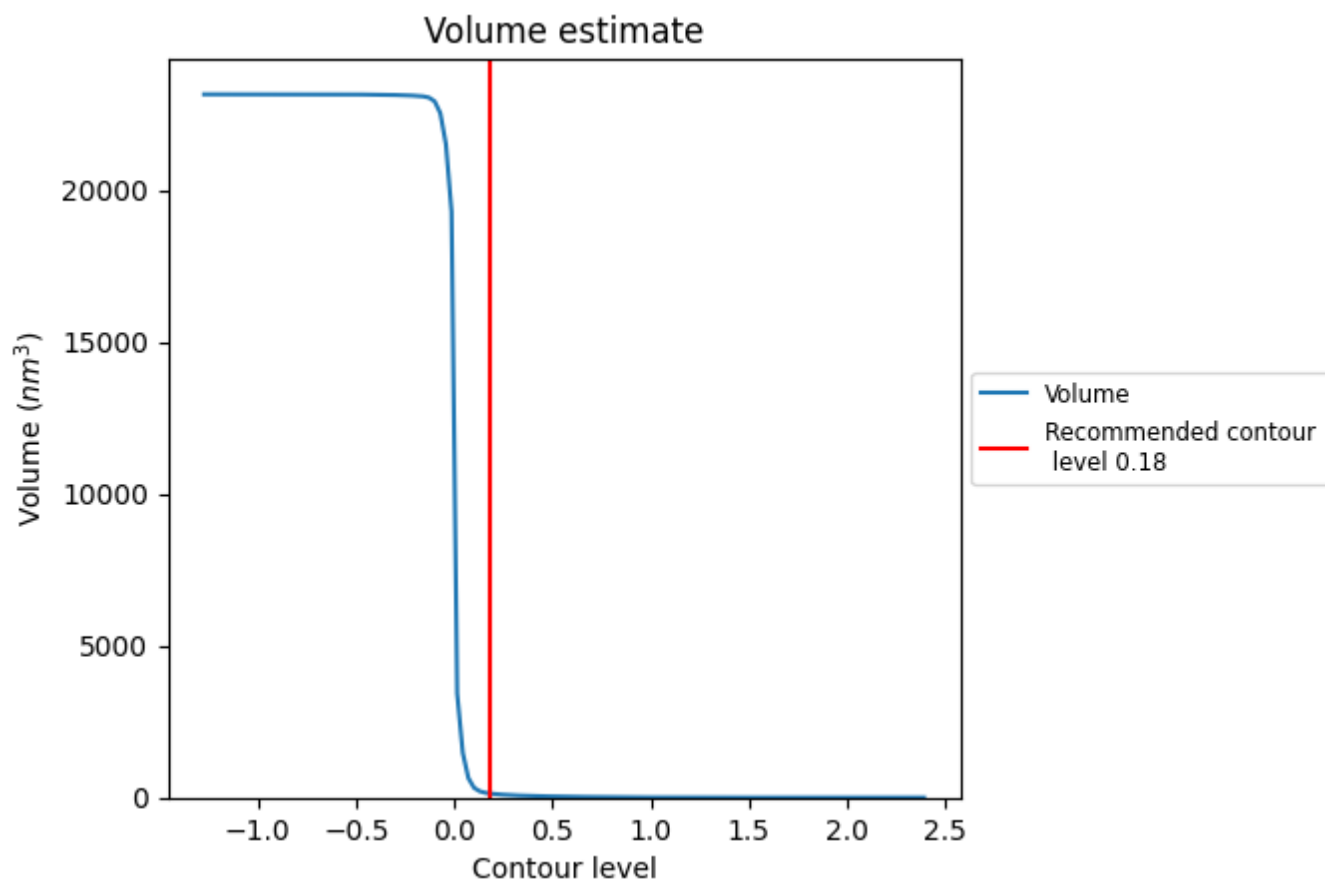
This section contains the results of statistical analysis of the map.

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.

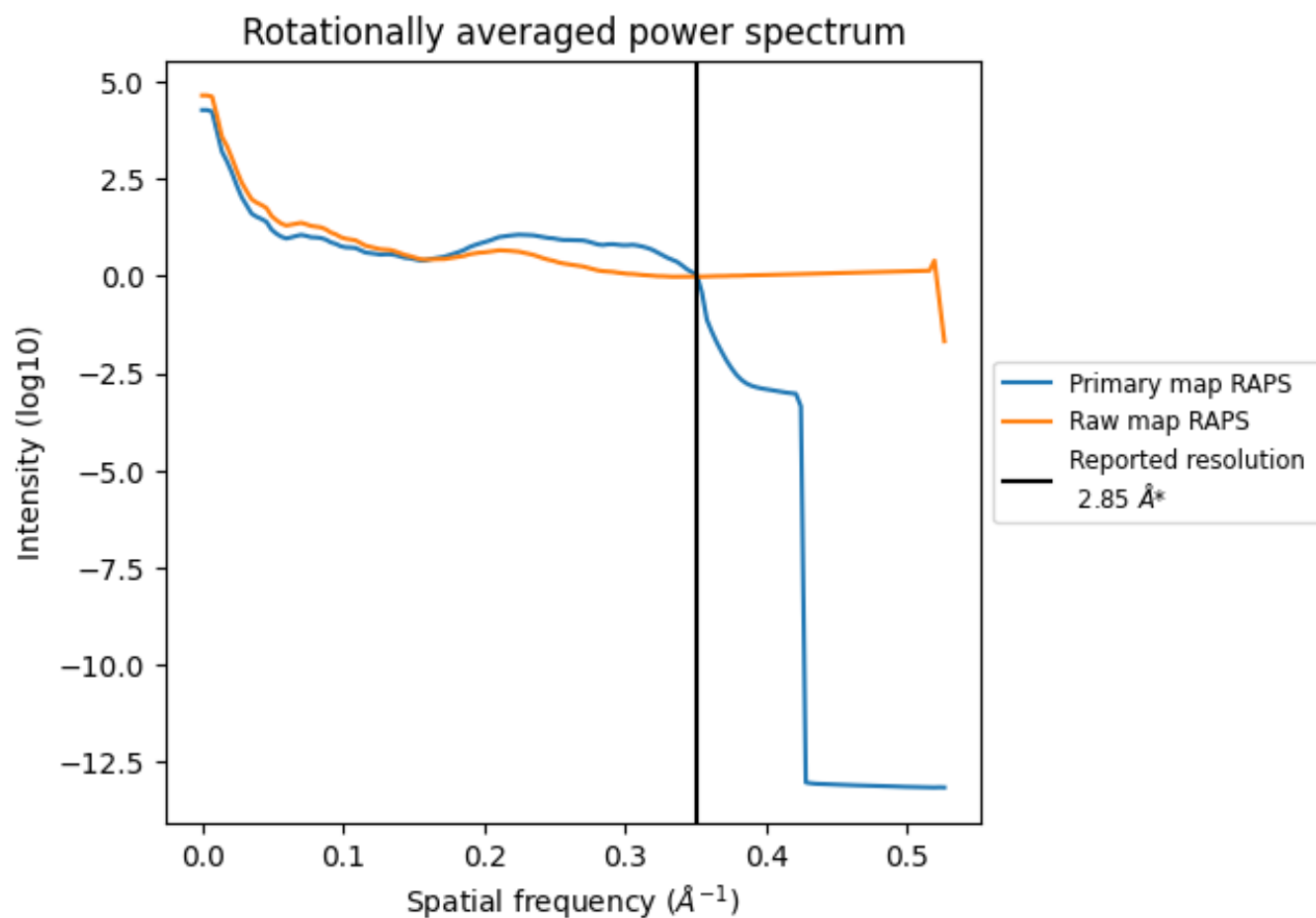
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 136 nm³; this corresponds to an approximate mass of 123 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 ⓘ

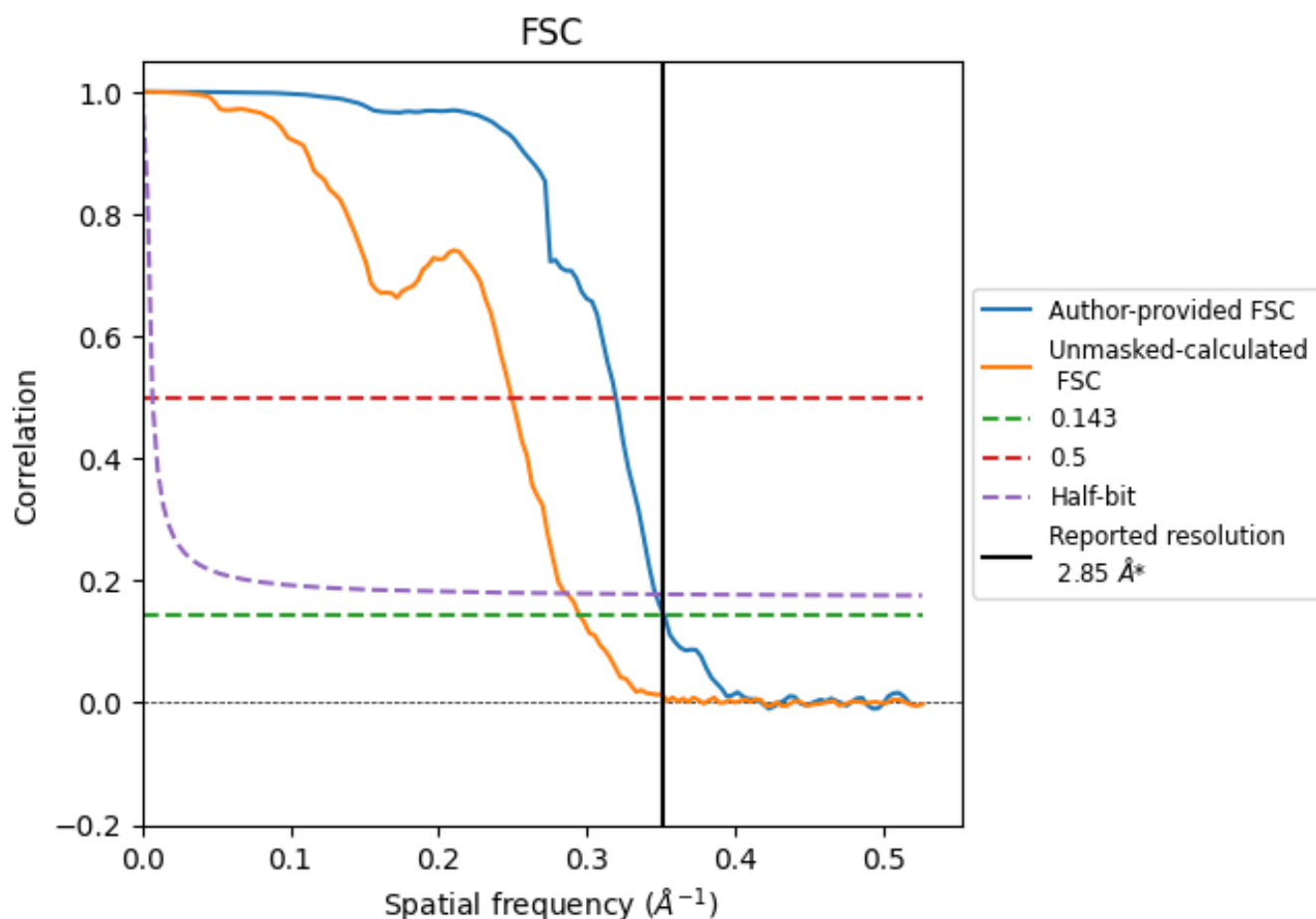


*Reported resolution corresponds to spatial frequency of 0.351 Å⁻¹

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 0.351 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.85	-	-
Author-provided FSC curve	2.84	3.13	2.89
Unmasked-calculated*	3.39	4.01	3.50

*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 3.39 differs from the reported value 2.85 by more than 10 %

9 Map-model fit [i](#)

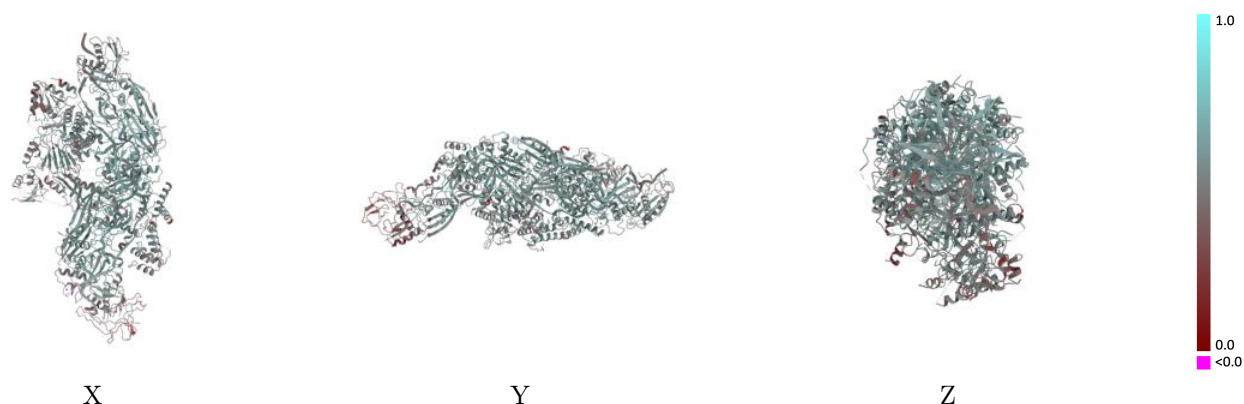
This section contains information regarding the fit between EMDB map EMD-39767 and PDB model 8Z4L. Per-residue inclusion information can be found in [section 3](#) on [page 6](#).

9.1 Map-model overlay [i](#)



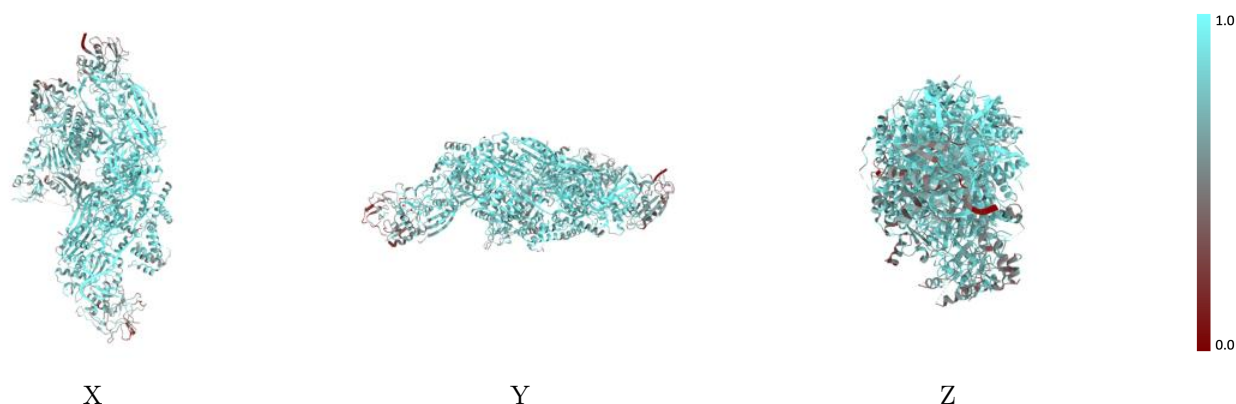
The images above show the 3D surface view of the map at the recommended contour level 0.18 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



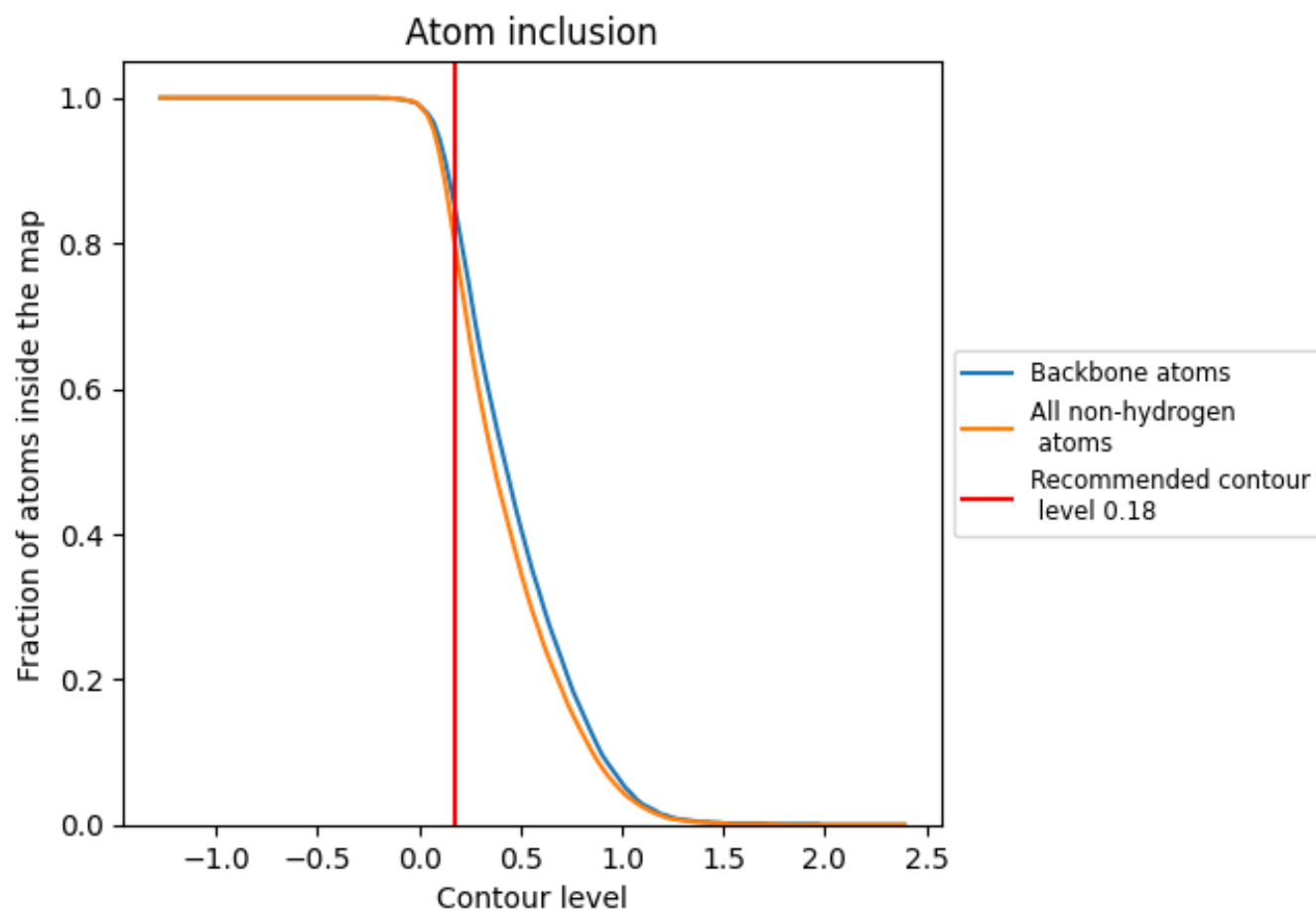
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.18).

9.4 Atom inclusion [i](#)



At the recommended contour level, 84% of all backbone atoms, 79% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.18) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7920	0.5310
A	0.5420	0.4940
B	0.8400	0.5500
C	0.8910	0.5830
D	0.9030	0.5910
E	0.8610	0.5750
F	0.7870	0.5240
G	0.5890	0.4270
H	0.7490	0.5080
I	0.7930	0.5190
J	0.9220	0.5950
K	0.7650	0.5080
L	0.7290	0.4910
M	0.8940	0.5680
N	0.9230	0.5650

