Full wwPDB EM Validation Report

Nov 28, 2024 – 04:34 PM JST

PDB ID	:	8ZP7
EMDB ID	:	EMD-60328
Title	:	Cryo-EM structure of Cas5-HNH Cascade bound with sDNA, Conf1
Authors	:	Liu, Y.N.; Wang, L.; Zhang, H.; Zhu, H.
Deposited on	:	2024-05-29
Resolution	:	3.00 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:

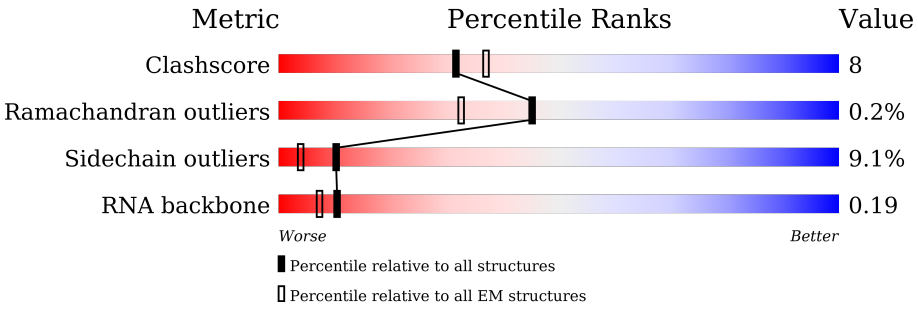
EMDB validation analysis	:	0.0.1.dev113
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

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 3.00 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	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	61	28% 43% 25%
2	C	546	58% 21% 19%
3	E	174	68% 23% 5%
4	F	378	77% 19%
4	G	378	48% 18% 33%
4	H	378	77% 21%
4	I	378	79% 19%

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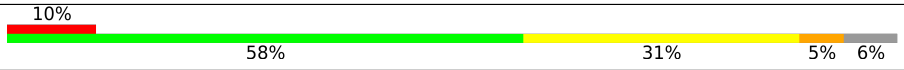
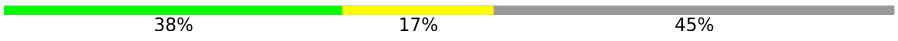
Mol	Chain	Length	Quality of chain
4	J	378	
4	K	378	
5	B	388	
6	D	272	
7	M	60	

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 27540 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 RNA chain called RNA (61-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	A	59	1258	562	225	413	58	0	0

- Molecule 2 is a protein called CRISPR-associated protein Cse1 (CRISPR_cse1).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	C	443	3495	2246	597	633	19	0	0

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-10	MET	-	initiating methionine	UNP A0A1V6F8D1
C	-9	HIS	-	expression tag	UNP A0A1V6F8D1
C	-8	HIS	-	expression tag	UNP A0A1V6F8D1
C	-7	HIS	-	expression tag	UNP A0A1V6F8D1
C	-6	HIS	-	expression tag	UNP A0A1V6F8D1
C	-5	HIS	-	expression tag	UNP A0A1V6F8D1
C	-4	HIS	-	expression tag	UNP A0A1V6F8D1
C	-3	HIS	-	expression tag	UNP A0A1V6F8D1
C	-2	HIS	-	expression tag	UNP A0A1V6F8D1
C	-1	HIS	-	expression tag	UNP A0A1V6F8D1
C	0	HIS	-	expression tag	UNP A0A1V6F8D1
C	1	VAL	-	expression tag	UNP A0A1V6F8D1

- Molecule 3 is a protein called CRISPR-associated protein Cse2 (CRISPR_cse2).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	E	165	1352	875	238	233	6	0	0

- Molecule 4 is a protein called CRISPR system Cascade subunit CasC.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	F	368	Total	C	N	O	S	0	0
			2819	1782	489	536	12		
4	H	375	Total	C	N	O	S	0	0
			2878	1812	503	551	12		
4	I	373	Total	C	N	O	S	0	0
			2854	1800	498	544	12		
4	J	374	Total	C	N	O	S	0	0
			2845	1794	496	543	12		
4	K	350	Total	C	N	O	S	0	0
			2701	1708	474	508	11		
4	G	255	Total	C	N	O	S	0	0
			1927	1220	336	363	8		

- Molecule 5 is a protein called CRISPR system Cascade subunit CasD.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	B	344	Total	C	N	O	S	0	0
			2701	1704	499	481	17		

- Molecule 6 is a protein called CRISPR-associated endoribonuclease Cse3.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	D	256	Total	C	N	O	S	0	0
			2039	1309	365	361	4		

- Molecule 7 is a DNA chain called DNA (60-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
7	M	33	Total	C	N	O	P	0	0
			669	319	119	198	33		

- Molecule 8 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

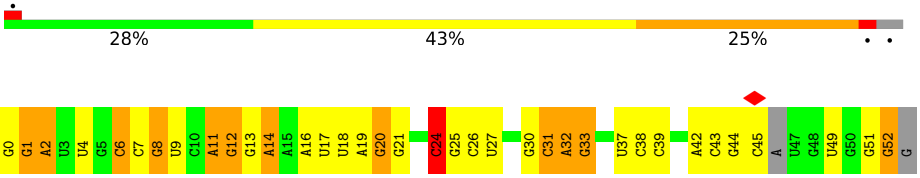
Mol	Chain	Residues	Atoms		AltConf
8	C	1	Total	Mg	0
			1	1	
8	B	1	Total	Mg	0
			1	1	

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.

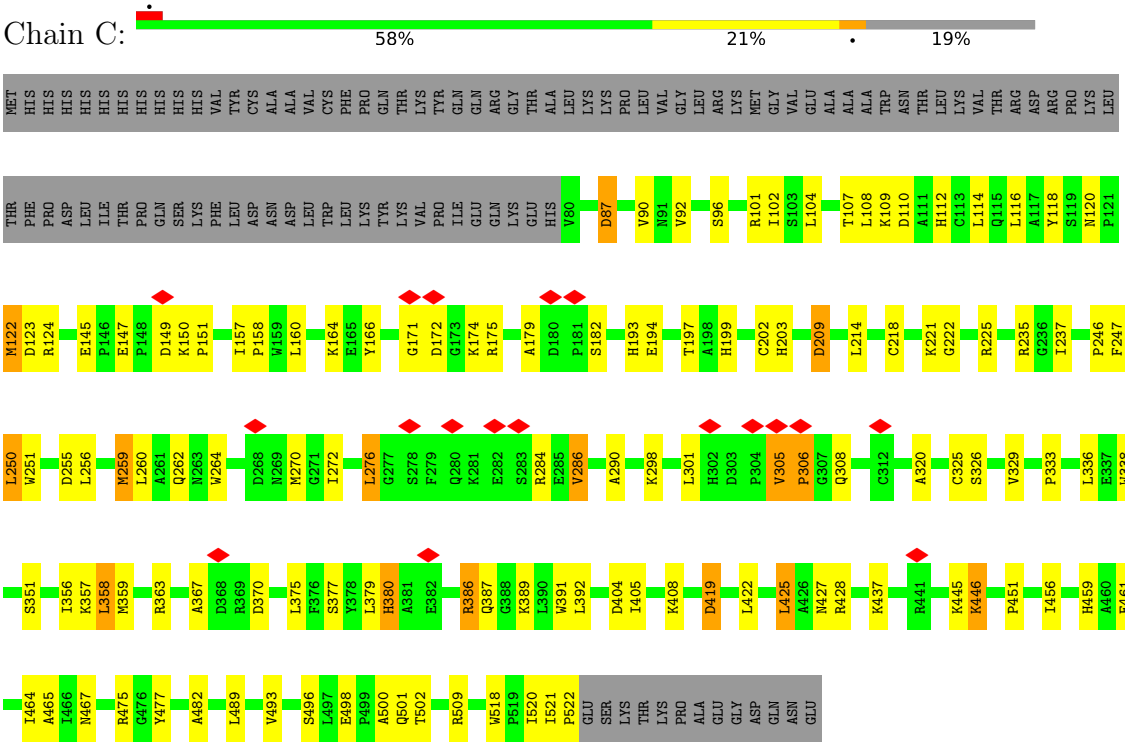
• Molecule 1: RNA (61-MER)

Chain A:



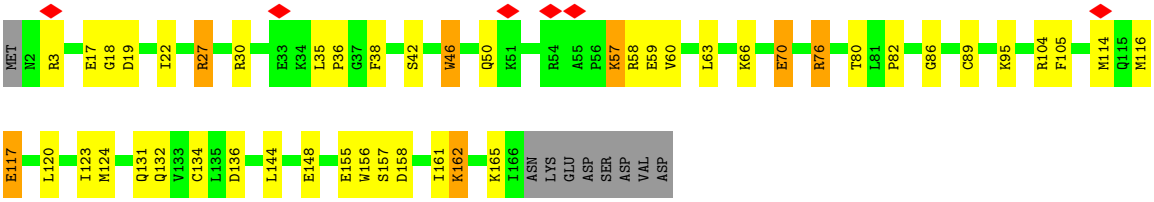
• Molecule 2: CRISPR-associated protein Cse1 (CRISPR_cse1)

Chain C:

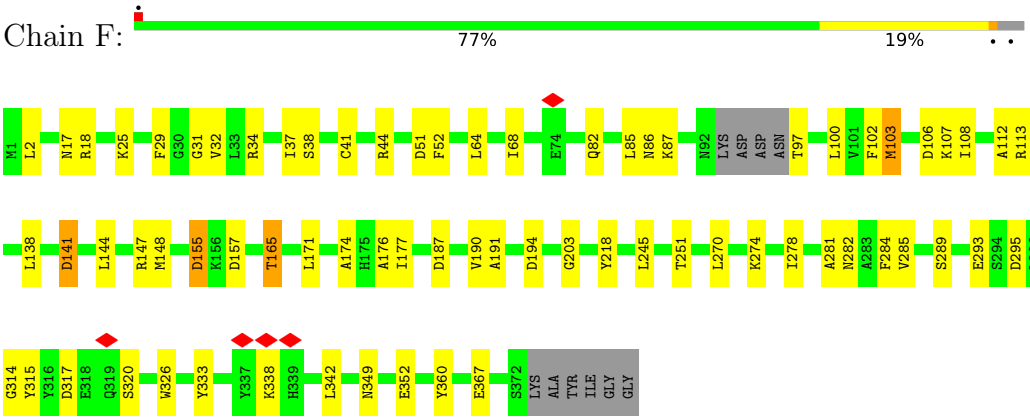


• Molecule 3: CRISPR-associated protein Cse2 (CRISPR_cse2)

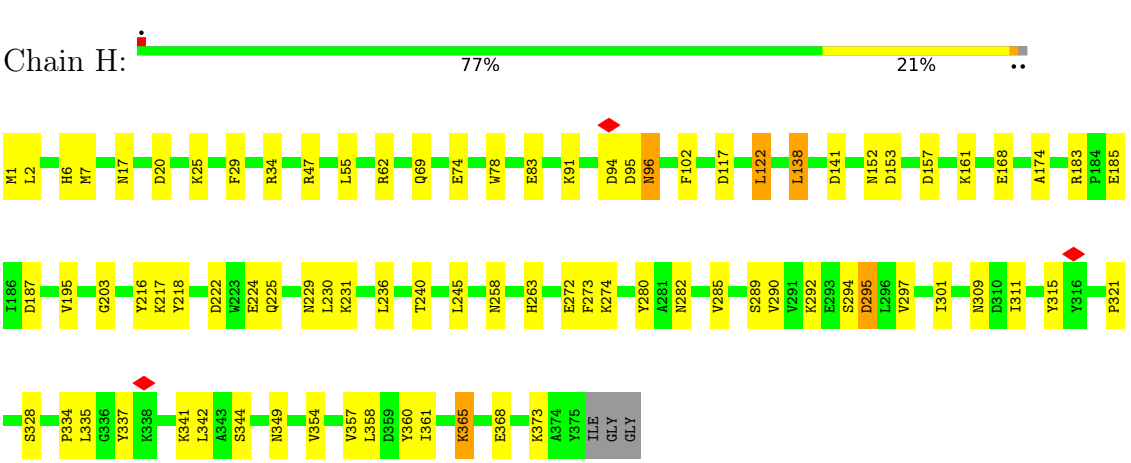
Chain E:



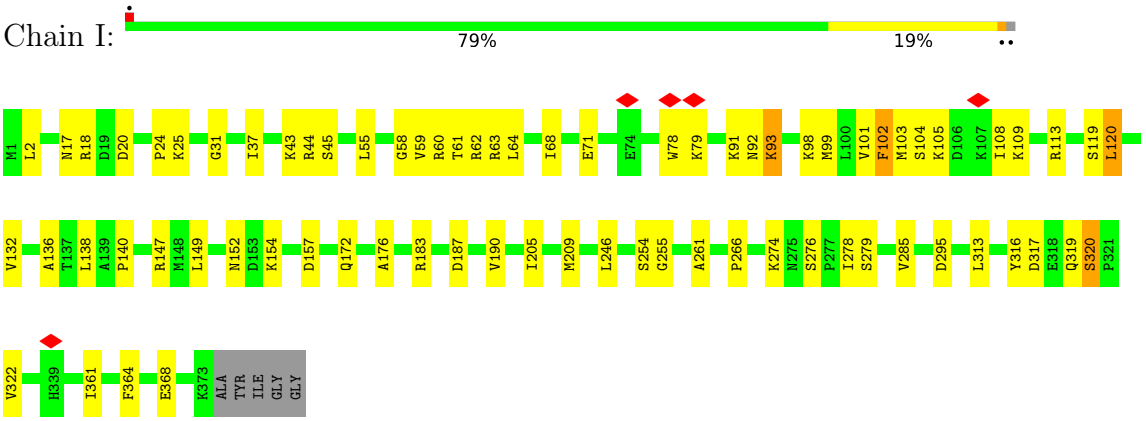
• Molecule 4: CRISPR system Cascade subunit CasC



• Molecule 4: CRISPR system Cascade subunit CasC

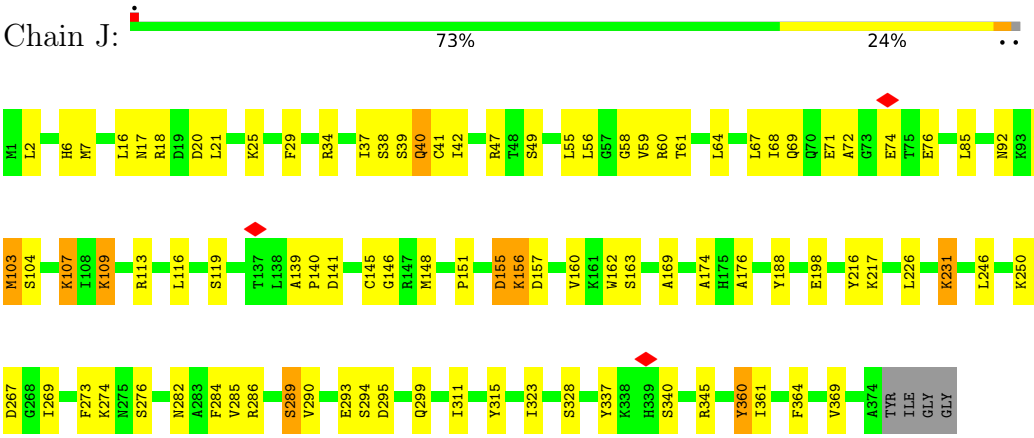


• Molecule 4: CRISPR system Cascade subunit CasC



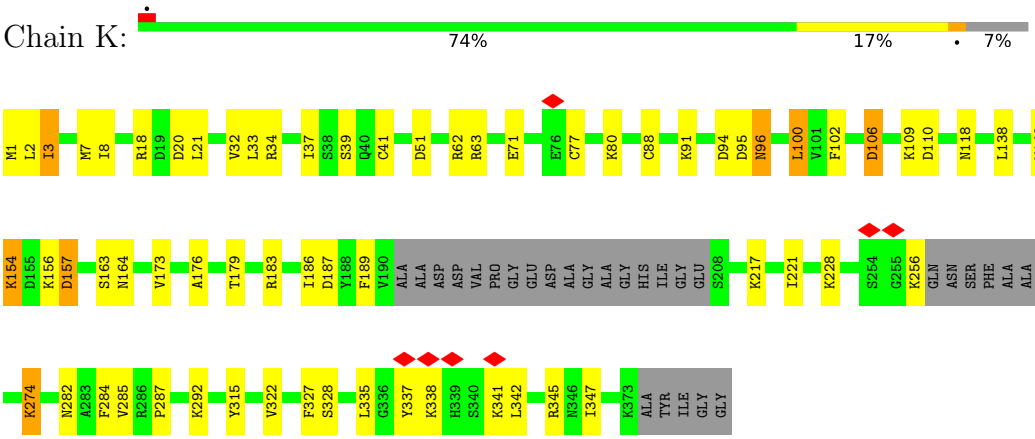
• Molecule 4: CRISPR system Cascade subunit CasC

Chain J:



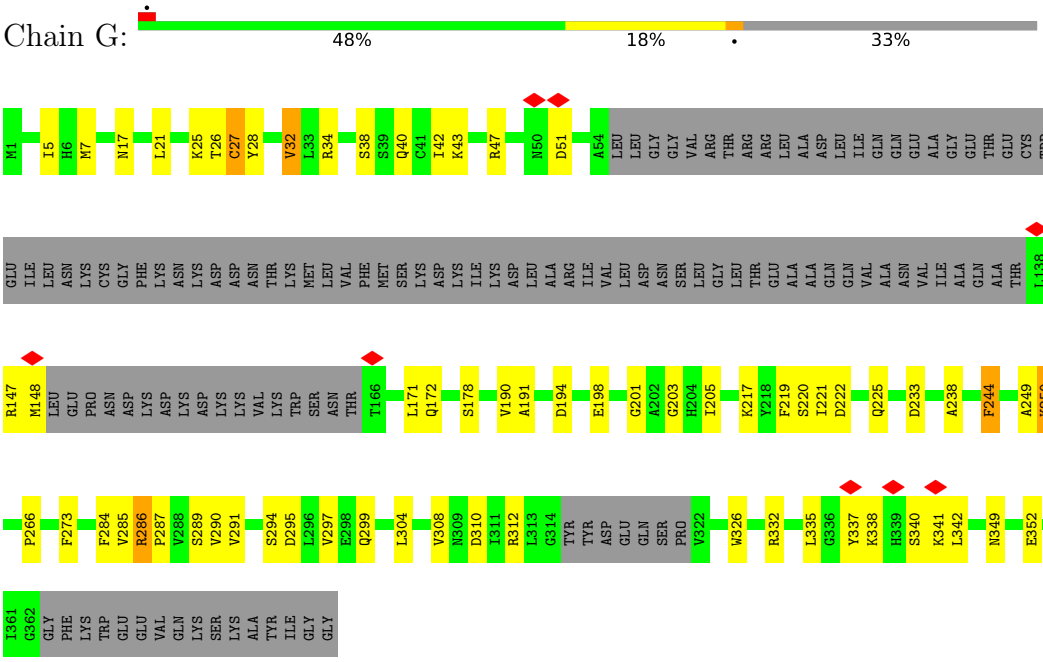
• Molecule 4: CRISPR system Cascade subunit CasC

Chain K:



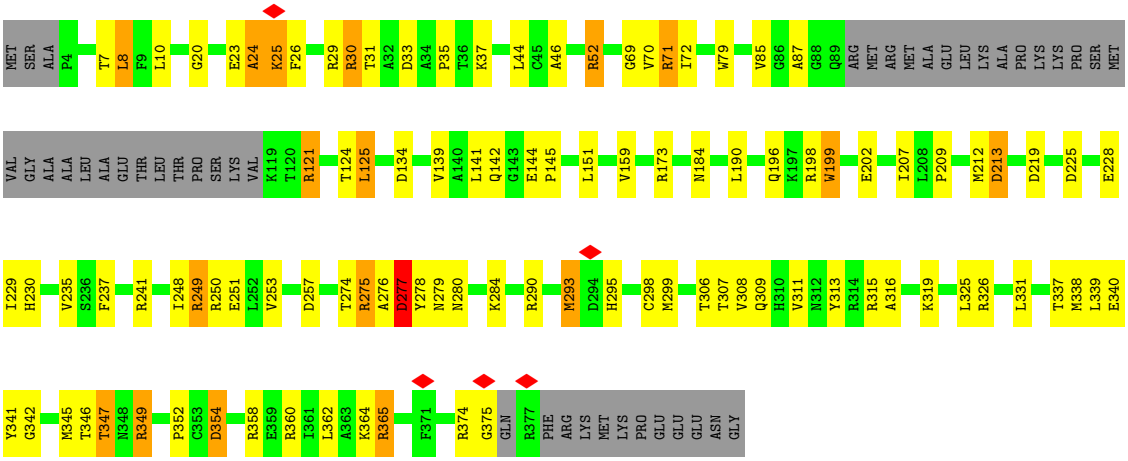
• Molecule 4: CRISPR system Cascade subunit CasC

Chain G:



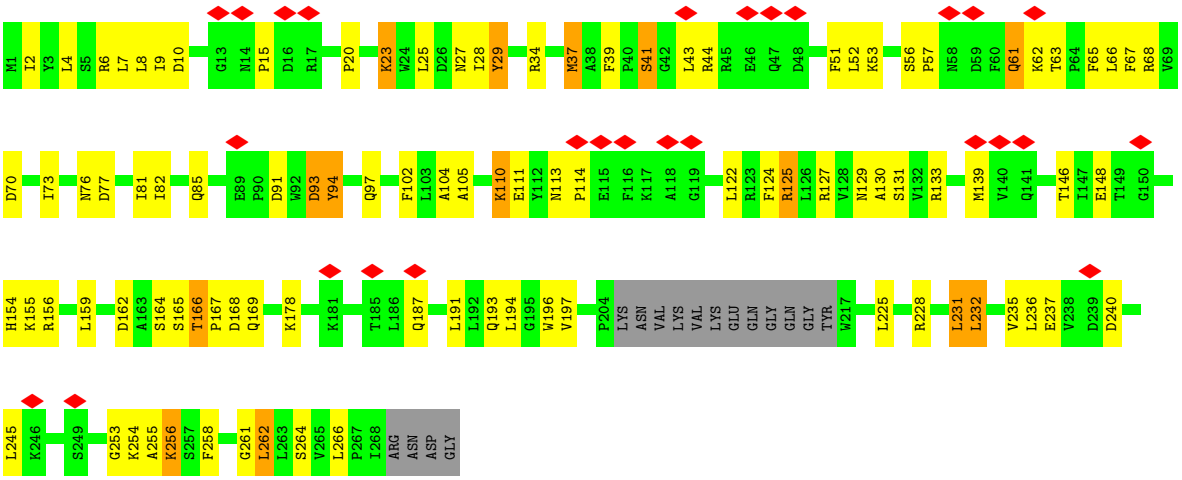
• Molecule 5: CRISPR system Cascade subunit CasD

Chain B:



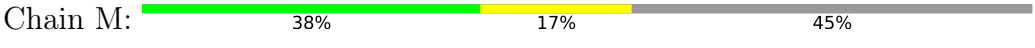
• Molecule 6: CRISPR-associated endoribonuclease Cse3

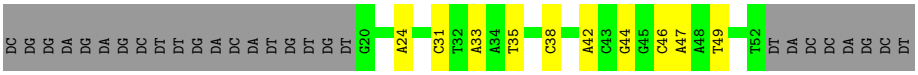
Chain D:



• Molecule 7: DNA (60-MER)

Chain M:





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	57434	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	60	Depositor
Minimum defocus (nm)	12000	Depositor
Maximum defocus (nm)	25000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	15.977	Depositor
Minimum map value	-0.130	Depositor
Average map value	0.011	Depositor
Map value standard deviation	0.667	Depositor
Recommended contour level	2.58	Depositor
Map size (Å)	290.88, 290.88, 290.88	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.808, 0.808, 0.808	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.29	0/1405	1.05	6/2187 (0.3%)
2	C	0.32	0/3596	0.67	3/4901 (0.1%)
3	E	0.31	0/1382	0.75	2/1862 (0.1%)
4	F	0.30	0/2875	0.58	2/3900 (0.1%)
4	G	0.32	0/1967	0.64	2/2670 (0.1%)
4	H	0.30	0/2934	0.58	2/3977 (0.1%)
4	I	0.30	0/2911	0.56	2/3949 (0.1%)
4	J	0.31	0/2901	0.60	3/3937 (0.1%)
4	K	0.29	0/2752	0.62	4/3726 (0.1%)
5	B	0.30	0/2769	0.65	2/3759 (0.1%)
6	D	0.29	0/2095	0.74	7/2845 (0.2%)
7	M	0.64	0/748	1.01	0/1150
All	All	0.32	0/28335	0.68	35/38863 (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
2	C	0	1
5	B	0	1
All	All	0	2

There are no bond length outliers.

All (35) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	276	LEU	CA-CB-CG	8.61	135.10	115.30
4	K	106	ASP	CB-CG-OD1	8.13	125.62	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	G	359	ASP	CB-CG-OD1	7.85	125.36	118.30
5	B	277	ASP	CB-CG-OD1	7.61	125.15	118.30
1	A	24	C	C2-N1-C1'	7.38	126.92	118.80
6	D	52	LEU	CA-CB-CG	7.38	132.28	115.30
4	K	157	ASP	CB-CG-OD1	7.37	124.93	118.30
4	H	117	ASP	CB-CG-OD1	7.36	124.92	118.30
4	I	120	LEU	CA-CB-CG	7.32	132.12	115.30
1	A	24	C	N1-C2-O2	7.08	123.15	118.90
3	E	116	MET	CA-CB-CG	6.57	124.46	113.30
3	E	57	LYS	CA-CB-CG	6.20	127.03	113.40
1	A	31	C	N1-C2-O2	6.03	122.52	118.90
4	F	116	LEU	CA-CB-CG	5.97	129.04	115.30
4	G	342	LEU	CA-CB-CG	5.83	128.71	115.30
4	I	99	MET	CB-CG-SD	5.76	129.67	112.40
4	F	342	LEU	CA-CB-CG	5.66	128.31	115.30
4	J	116	LEU	CA-CB-CG	5.65	128.28	115.30
1	A	24	C	N3-C2-O2	-5.60	117.98	121.90
6	D	4	LEU	CA-CB-CG	5.59	128.17	115.30
4	J	226	LEU	CA-CB-CG	5.55	128.06	115.30
1	A	31	C	C2-N1-C1'	5.51	124.86	118.80
6	D	37	MET	CA-CB-CG	5.41	122.50	113.30
6	D	232	LEU	CA-CB-CG	5.27	127.42	115.30
5	B	145	PRO	CA-N-CD	-5.23	104.17	111.50
1	A	24	C	C6-N1-C1'	-5.18	114.58	120.80
6	D	37	MET	CB-CG-SD	5.17	127.90	112.40
4	K	77	CYS	CA-CB-SG	5.15	123.28	114.00
4	K	228	LYS	CA-CB-CG	5.15	124.73	113.40
6	D	231	LEU	CA-CB-CG	5.13	127.10	115.30
2	C	425	LEU	CA-CB-CG	5.08	126.98	115.30
4	H	321	PRO	CA-N-CD	-5.07	104.41	111.50
6	D	262	LEU	CA-CB-CG	5.06	126.94	115.30
2	C	521	ILE	C-N-CD	5.04	138.99	128.40
4	J	155	ASP	CB-CA-C	5.03	120.45	110.40

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
5	B	24	ALA	Peptide
2	C	305	VAL	Peptide

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1258	0	638	35	0
2	C	3495	0	3405	65	0
3	E	1352	0	1387	30	0
4	F	2819	0	2745	47	0
4	G	1927	0	1854	41	0
4	H	2878	0	2805	46	0
4	I	2854	0	2766	48	0
4	J	2845	0	2746	53	0
4	K	2701	0	2651	33	0
5	B	2701	0	2679	65	0
6	D	2039	0	1995	59	0
7	M	669	0	372	11	0
8	B	1	0	0	0	0
8	C	1	0	0	0	0
All	All	27540	0	26043	453	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 (453) 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)
5:B:358:ARG:HH12	6:D:97:GLN:HE22	1.29	0.78
4:F:2:LEU:HB2	4:F:274:LYS:O	1.87	0.74
4:I:2:LEU:HB2	4:I:274:LYS:O	1.89	0.72
2:C:305:VAL:HG22	2:C:306:PRO:HD2	1.73	0.70
4:K:189:PHE:O	6:D:110:LYS:NZ	2.24	0.70
2:C:202:CYS:SG	5:B:121:ARG:NH2	2.65	0.70
5:B:207:ILE:HD11	5:B:251:GLU:HB3	1.75	0.69
2:C:246:PRO:HB3	2:C:351:SER:HB3	1.75	0.69
2:C:222:GLY:HA2	2:C:225:ARG:HD2	1.75	0.68
5:B:315:ARG:HB2	5:B:319:LYS:HG3	1.77	0.67
6:D:7:LEU:HB2	6:D:82:ILE:HB	1.77	0.67
4:G:34:ARG:NH2	4:G:284:PHE:O	2.28	0.66
5:B:8:LEU:HD22	5:B:151:LEU:HD13	1.79	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:-4:A:H2'	1:A:-3:A:H8	1.62	0.64
4:J:69:GLN:HE22	4:J:76:GLU:HA	1.63	0.64
4:J:2:LEU:HB2	4:J:274:LYS:O	1.98	0.64
4:F:29:PHE:HB3	4:F:34:ARG:HG3	1.81	0.63
5:B:20:GLY:HA2	5:B:31:THR:HA	1.81	0.63
2:C:122:MET:HG2	2:C:405:ILE:HG12	1.79	0.63
2:C:272:ILE:H	2:C:290:ALA:HB2	1.64	0.62
5:B:345:MET:HB3	5:B:349:ARG:HH11	1.64	0.62
4:G:26:THR:O	5:B:79:TRP:NE1	2.32	0.62
4:G:27:CYS:SG	4:G:28:TYR:N	2.73	0.62
1:A:33:G:N2	6:D:165:SER:O	2.33	0.62
2:C:110:ASP:O	2:C:112:HIS:ND1	2.31	0.61
5:B:72:ILE:HB	5:B:209:PRO:HG2	1.83	0.61
4:K:32:VAL:HG21	4:K:287:PRO:HG3	1.82	0.61
6:D:66:LEU:HD22	6:D:85:GLN:HE22	1.64	0.61
6:D:166:THR:HG23	6:D:168:ASP:H	1.65	0.61
4:I:295:ASP:HB3	4:J:286:ARG:HB3	1.83	0.61
1:A:24:C:H5'	4:J:40:GLN:HB2	1.82	0.61
6:D:253:GLY:O	6:D:256:LYS:NZ	2.28	0.61
2:C:333:PRO:HG2	2:C:336:LEU:HD11	1.81	0.61
1:A:49:U:OP2	6:D:254:LYS:NZ	2.34	0.61
4:J:155:ASP:OD1	4:J:156:LYS:N	2.31	0.60
5:B:8:LEU:HD23	5:B:141:LEU:HB2	1.83	0.60
4:J:17:ASN:HB3	4:J:25:LYS:HD2	1.82	0.60
4:K:95:ASP:OD1	4:K:95:ASP:N	2.35	0.60
4:I:20:ASP:N	4:I:20:ASP:OD1	2.34	0.60
5:B:358:ARG:NH2	6:D:97:GLN:OE1	2.30	0.60
1:A:8:G:O2'	4:F:18:ARG:NH2	2.34	0.60
4:H:94:ASP:N	4:H:94:ASP:OD1	2.35	0.60
1:A:21:G:H2'	4:J:148:MET:HG2	1.83	0.60
4:H:195:VAL:HG21	4:I:63:ARG:HB2	1.84	0.60
4:G:191:ALA:HB3	4:G:203:GLY:HA3	1.84	0.59
1:A:52:G:HO3'	6:D:29:TYR:HH	1.48	0.59
4:H:29:PHE:HB3	4:H:34:ARG:HG3	1.84	0.59
4:F:37:ILE:HB	4:F:176:ALA:HB3	1.84	0.59
4:H:74:GLU:N	4:H:74:GLU:OE1	2.35	0.59
7:M:46:DC:N3	7:M:47:DA:N6	2.50	0.59
3:E:57:LYS:HD2	3:E:58:ARG:N	2.17	0.59
1:A:52:G:OP1	6:D:62:LYS:NZ	2.35	0.59
6:D:66:LEU:HD21	6:D:261:GLY:H	1.68	0.59
2:C:520:ILE:HD13	2:C:522:PRO:HD2	1.85	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:-6:U:H3	5:B:52:ARG:HH21	1.52	0.58
2:C:147:GLU:N	2:C:147:GLU:OE2	2.37	0.58
4:I:274:LYS:HE3	4:I:278:ILE:HG12	1.85	0.58
2:C:118:TYR:HB2	2:C:124:ARG:HG3	1.86	0.58
4:J:60:ARG:HG2	4:J:100:LEU:HD22	1.86	0.58
4:J:293:GLU:N	4:J:293:GLU:OE2	2.35	0.58
4:K:345:ARG:HH21	4:K:347:ILE:HG21	1.69	0.58
4:F:31:GLY:HA3	4:G:290:VAL:HG21	1.85	0.58
4:K:163:SER:OG	4:K:164:ASN:N	2.38	0.57
2:C:120:ASN:HB3	2:C:123:ASP:HB2	1.86	0.57
6:D:23:LYS:H	6:D:23:LYS:HD2	1.70	0.57
5:B:37:LYS:NZ	5:B:213:ASP:OD2	2.37	0.57
5:B:229:ILE:O	5:B:230:HIS:ND1	2.37	0.57
5:B:248:ILE:HD12	5:B:250:ARG:HH12	1.69	0.57
6:D:111:GLU:OE2	6:D:113:ASN:ND2	2.37	0.57
3:E:17:GLU:OE1	3:E:17:GLU:N	2.38	0.57
3:E:50:GLN:HG2	5:B:278:TYR:HB2	1.86	0.57
4:F:187:ASP:OD1	4:H:25:LYS:NZ	2.33	0.57
4:J:94:ASP:OD1	4:J:94:ASP:N	2.38	0.57
4:K:7:MET:HG2	4:K:217:LYS:HB2	1.87	0.57
4:K:34:ARG:NH2	4:K:284:PHE:O	2.38	0.57
4:I:93:LYS:NZ	7:M:33:DA:OP2	2.37	0.56
4:J:323:ILE:HG12	4:J:360:TYR:HE2	1.70	0.56
3:E:50:GLN:O	5:B:279:ASN:ND2	2.38	0.56
4:J:273:PHE:HD1	4:J:323:ILE:HD11	1.69	0.56
4:K:96:ASN:C	4:K:96:ASN:HD22	2.08	0.56
4:K:154:LYS:NZ	7:M:24:DA:OP2	2.38	0.56
4:G:47:ARG:HD3	4:G:145:CYS:HB2	1.87	0.56
5:B:10:LEU:HD11	5:B:44:LEU:HD21	1.88	0.56
5:B:295:HIS:HE1	6:D:56:SER:HA	1.70	0.56
1:A:17:U:OP1	4:I:43:LYS:NZ	2.37	0.56
4:G:34:ARG:NH1	4:G:178:SER:O	2.38	0.56
6:D:41:SER:OG	6:D:44:ARG:NH1	2.39	0.56
4:F:106:ASP:OD1	4:F:106:ASP:N	2.37	0.56
4:H:96:ASN:OD1	4:H:96:ASN:N	2.39	0.56
5:B:35:PRO:HD2	5:B:70:VAL:HG11	1.88	0.56
5:B:276:ALA:HB2	5:B:316:ALA:HB1	1.86	0.56
6:D:122:LEU:HB3	6:D:236:LEU:HB3	1.88	0.56
4:J:103:MET:O	4:J:107:LYS:NZ	2.40	0.55
4:K:39:SER:HB2	4:K:173:VAL:HG13	1.88	0.55
4:F:297:VAL:HG23	4:H:285:VAL:HG11	1.88	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:H:297:VAL:HG23	4:I:285:VAL:HG11	1.88	0.55
4:G:201:GLY:HA3	7:M:44:DG:H8	1.70	0.55
6:D:77:ASP:N	6:D:77:ASP:OD1	2.39	0.55
4:H:187:ASP:OD1	4:I:25:LYS:NZ	2.37	0.55
5:B:33:ASP:OD1	5:B:33:ASP:N	2.39	0.55
4:I:37:ILE:HB	4:I:176:ALA:HB3	1.89	0.55
4:K:186:ILE:HD12	4:K:186:ILE:H	1.72	0.55
4:I:295:ASP:OD1	4:I:295:ASP:N	2.39	0.55
4:K:154:LYS:H	4:K:154:LYS:HD2	1.72	0.55
3:E:161:ILE:HG23	3:E:165:LYS:HE3	1.88	0.55
5:B:354:ASP:OD1	5:B:354:ASP:N	2.37	0.55
4:F:68:ILE:HD13	4:F:116:LEU:HD21	1.89	0.54
4:G:47:ARG:HH11	4:G:145:CYS:HB2	1.72	0.54
3:E:30:ARG:HD2	5:B:342:GLY:HA3	1.89	0.54
4:J:68:ILE:O	4:J:72:ALA:HB2	2.06	0.54
4:G:171:LEU:HD11	4:G:219:PHE:HD2	1.71	0.54
6:D:129:ASN:OD1	6:D:129:ASN:N	2.40	0.54
4:I:108:ILE:HG23	4:I:132:VAL:HG22	1.89	0.54
3:E:158:ASP:O	3:E:162:LYS:NZ	2.38	0.54
4:G:349:ASN:HB3	4:G:352:GLU:HG2	1.89	0.54
1:A:6:C:O2'	4:F:41:CYS:SG	2.64	0.54
2:C:459:HIS:HD2	2:C:489:LEU:HD11	1.72	0.54
4:I:58:GLY:H	4:I:105:LYS:HB2	1.71	0.54
4:K:187:ASP:OD1	4:K:187:ASP:N	2.40	0.54
4:G:190:VAL:HG12	4:G:205:ILE:HG23	1.89	0.54
4:J:58:GLY:HA2	4:J:104:SER:HB2	1.90	0.54
4:F:295:ASP:N	4:F:295:ASP:OD1	2.41	0.54
4:K:34:ARG:NH1	4:K:179:THR:O	2.41	0.54
5:B:24:ALA:HB1	5:B:29:ARG:HA	1.90	0.54
4:I:101:VAL:HG13	4:I:149:LEU:HD22	1.90	0.53
2:C:344:VAL:HG13	2:C:377:SER:HB3	1.89	0.53
4:G:285:VAL:HG21	5:B:198:ARG:HD2	1.90	0.53
4:H:141:ASP:OD1	4:H:141:ASP:N	2.34	0.53
2:C:214:LEU:HD13	2:C:218:CYS:HB3	1.91	0.53
4:I:266:PRO:O	4:J:315:TYR:OH	2.21	0.53
4:K:2:LEU:HB3	4:K:274:LYS:O	2.08	0.53
5:B:70:VAL:HG22	5:B:139:VAL:HG22	1.90	0.53
4:H:69:GLN:HG3	4:H:78:TRP:HB2	1.90	0.53
4:K:20:ASP:N	4:K:20:ASP:OD1	2.40	0.53
3:E:63:LEU:HD23	3:E:66:LYS:HZ1	1.74	0.53
3:E:27:ARG:HA	3:E:66:LYS:HD2	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:H:185:GLU:OE2	4:H:185:GLU:N	2.42	0.52
4:I:55:LEU:HB3	4:I:140:PRO:HG2	1.92	0.52
4:J:92:ASN:ND2	4:J:94:ASP:O	2.41	0.52
4:K:8:ILE:O	4:K:267:ASP:N	2.42	0.52
4:H:203:GLY:O	4:I:62:ARG:NH1	2.42	0.52
6:D:70:ASP:OD2	6:D:125:ARG:NH2	2.41	0.52
1:A:21:G:OP2	4:I:18:ARG:NH2	2.42	0.52
4:F:282:ASN:HA	4:F:285:VAL:HG23	1.91	0.52
6:D:193:GLN:HB3	6:D:231:LEU:HB3	1.91	0.52
4:H:153:ASP:HB2	7:M:42:DA:H5"	1.91	0.52
4:I:102:PHE:HB3	4:I:147:ARG:HG2	1.91	0.52
2:C:104:LEU:O	2:C:108:LEU:HB2	2.10	0.52
4:I:261:ALA:HB3	4:J:174:ALA:HB2	1.92	0.52
6:D:8:LEU:HD23	6:D:105:ALA:HB3	1.91	0.52
1:A:-7:G:H4'	5:B:46:ALA:HB2	1.90	0.52
4:F:34:ARG:NH1	4:F:284:PHE:O	2.38	0.52
5:B:311:VAL:O	5:B:349:ARG:N	2.39	0.52
2:C:145:GLU:OE1	2:C:264:TRP:NE1	2.41	0.52
4:F:367:GLU:OE2	4:F:367:GLU:N	2.42	0.52
5:B:295:HIS:CE1	6:D:57:PRO:HD3	2.45	0.52
4:F:315:TYR:OH	4:G:266:PRO:O	2.25	0.52
4:I:104:SER:H	4:I:136:ALA:HB1	1.75	0.52
4:J:64:LEU:HD22	4:J:85:LEU:HD11	1.92	0.52
2:C:166:TYR:OH	2:C:276:LEU:HD13	2.10	0.51
6:D:73:ILE:HG13	6:D:81:ILE:HD11	1.92	0.51
2:C:182:SER:OG	2:C:326:SER:OG	2.23	0.51
3:E:57:LYS:HD2	3:E:58:ARG:H	1.74	0.51
5:B:199:TRP:CE2	5:B:202:GLU:HB3	2.46	0.51
6:D:34:ARG:HA	6:D:34:ARG:NH1	2.26	0.51
2:C:370:ASP:OD1	2:C:370:ASP:N	2.39	0.51
4:G:273:PHE:HZ	4:G:357:VAL:HG13	1.74	0.51
4:I:91:LYS:NZ	7:M:35:DT:OP1	2.44	0.51
4:J:146:GLY:H	4:J:169:ALA:HB2	1.75	0.51
5:B:339:LEU:HD12	5:B:364:LYS:HG3	1.91	0.51
6:D:187:GLN:NE2	6:D:237:GLU:OE2	2.42	0.51
1:A:4:U:H4'	4:F:147:ARG:HA	1.92	0.51
4:H:334:PRO:HG2	4:H:337:TYR:HE1	1.76	0.51
6:D:28:ILE:HD11	6:D:197:VAL:HG12	1.93	0.51
6:D:240:ASP:N	6:D:240:ASP:OD1	2.43	0.50
3:E:132:GLN:HA	3:E:132:GLN:NE2	2.26	0.50
1:A:1:G:OP2	4:G:40:GLN:NE2	2.45	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:G:32:VAL:HG12	4:G:34:ARG:HE	1.77	0.50
5:B:248:ILE:HB	5:B:250:ARG:HH22	1.77	0.50
5:B:346:THR:OG1	5:B:347:THR:N	2.43	0.50
4:K:37:ILE:HB	4:K:176:ALA:HB3	1.93	0.50
5:B:307:THR:OG1	5:B:308:VAL:N	2.43	0.50
1:A:-4:A:H2'	1:A:-3:A:C8	2.45	0.50
4:I:119:SER:OG	4:I:120:LEU:N	2.45	0.50
2:C:464:ILE:HG12	2:C:482:ALA:HB1	1.93	0.49
4:H:258:ASN:HA	4:I:172:GLN:HG2	1.94	0.49
4:J:55:LEU:HD22	4:J:140:PRO:HG2	1.94	0.49
4:H:2:LEU:HB3	4:H:274:LYS:O	2.11	0.49
3:E:63:LEU:HD22	3:E:117:GLU:HB3	1.94	0.49
4:G:17:ASN:HD22	4:G:38:SER:H	1.61	0.49
3:E:60:VAL:HG23	3:E:144:LEU:HD23	1.94	0.49
4:J:39:SER:HA	4:J:42:ILE:HD12	1.95	0.49
4:F:144:LEU:HD22	4:F:171:LEU:HB2	1.95	0.49
4:I:187:ASP:OD1	4:J:25:LYS:NZ	2.37	0.49
1:A:-1:C:H1'	5:B:85:VAL:HG13	1.94	0.49
1:A:16:A:HO2'	4:I:60:ARG:HH12	1.59	0.49
2:C:179:ALA:HB3	2:C:298:LYS:HD2	1.95	0.49
4:J:7:MET:HG2	4:J:269:ILE:HG12	1.95	0.48
4:G:221:ILE:HD11	4:G:244:PHE:CD2	2.47	0.48
4:K:3:ILE:HG23	4:K:221:ILE:HB	1.95	0.48
4:G:289:SER:O	4:G:299:GLN:NE2	2.46	0.48
6:D:164:SER:O	6:D:164:SER:OG	2.31	0.48
2:C:250:LEU:HD11	2:C:391:TRP:HE3	1.79	0.48
4:F:317:ASP:OD2	4:F:320:SER:OG	2.29	0.48
4:H:309:ASN:HB2	4:H:342:LEU:HD11	1.95	0.48
4:K:274:LYS:HD3	4:K:322:VAL:HG21	1.94	0.48
2:C:92:VAL:HG11	2:C:114:LEU:HD13	1.95	0.48
6:D:10:ASP:HB3	6:D:104:ALA:HB2	1.95	0.48
4:F:285:VAL:HG11	4:G:297:VAL:HG23	1.95	0.48
4:J:16:LEU:HD13	4:J:37:ILE:HD11	1.94	0.48
4:F:155:ASP:OD1	4:F:155:ASP:N	2.47	0.48
4:H:365:LYS:N	4:H:368:GLU:OE1	2.47	0.48
4:K:256:LYS:O	6:D:166:THR:OG1	2.32	0.48
5:B:7:THR:HG22	5:B:142:GLN:HG2	1.96	0.48
2:C:147:GLU:OE1	2:C:150:LYS:HG3	2.14	0.48
4:F:108:ILE:O	4:F:112:ALA:HB3	2.13	0.48
4:F:314:GLY:O	4:G:349:ASN:ND2	2.47	0.48
2:C:262:GLN:O	2:C:386:ARG:NH2	2.47	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:0:G:H22	5:B:124:THR:HG23	1.79	0.48
4:J:156:LYS:NZ	4:J:160:VAL:O	2.47	0.48
5:B:326:ARG:HG3	5:B:352:PRO:HD2	1.96	0.47
6:D:2:ILE:HG13	6:D:114:PRO:HD3	1.96	0.47
6:D:9:ILE:HG21	6:D:25:LEU:HD11	1.96	0.47
2:C:408:LYS:HE2	2:C:465:ALA:HB1	1.94	0.47
4:F:141:ASP:OD1	4:F:141:ASP:N	2.46	0.47
4:H:273:PHE:HZ	4:H:357:VAL:HG13	1.80	0.47
4:K:156:LYS:NZ	4:K:157:ASP:O	2.47	0.47
2:C:92:VAL:HG12	2:C:116:LEU:HD23	1.96	0.47
2:C:456:ILE:HD13	2:C:493:VAL:HG21	1.96	0.47
4:H:62:ARG:HH22	7:M:38:DC:H4'	1.79	0.47
4:K:282:ASN:HA	4:K:285:VAL:HG23	1.96	0.47
5:B:23:GLU:HG3	5:B:30:ARG:HD2	1.96	0.47
4:F:349:ASN:HB3	4:F:352:GLU:HB3	1.96	0.47
4:I:24:PRO:HD2	4:I:209:MET:HE2	1.96	0.47
5:B:8:LEU:HD13	5:B:151:LEU:HB3	1.96	0.47
1:A:2:A:H62	7:M:49:DT:H3	1.62	0.47
2:C:108:LEU:HD21	2:C:160:LEU:HD12	1.96	0.47
4:F:285:VAL:HG12	4:G:295:ASP:HB2	1.96	0.47
4:H:263:HIS:NE2	4:I:172:GLN:OE1	2.36	0.47
5:B:228:GLU:OE1	5:B:249:ARG:NH1	2.36	0.47
2:C:451:PRO:HB3	4:G:21:LEU:HB2	1.96	0.47
3:E:42:SER:O	3:E:46:TRP:HB2	2.15	0.47
6:D:133:ARG:HH21	6:D:156:ARG:HD3	1.79	0.47
1:A:32:A:C6	6:D:196:TRP:HB2	2.50	0.47
4:H:138:LEU:HD22	4:H:138:LEU:HA	1.79	0.47
5:B:374:ARG:NH1	6:D:15:PRO:O	2.38	0.47
2:C:501:GLN:O	3:E:157:SER:OG	2.29	0.47
5:B:173:ARG:HH22	5:B:196:GLN:HB3	1.79	0.47
6:D:255:ALA:HB1	6:D:258:PHE:HB2	1.95	0.46
4:G:254:SER:O	4:G:254:SER:OG	2.30	0.46
2:C:197:THR:H	2:C:199:HIS:CE1	2.33	0.46
4:F:295:ASP:OD2	4:F:333:TYR:OH	2.26	0.46
4:J:6:HIS:HB3	4:J:216:TYR:HE1	1.80	0.46
4:I:368:GLU:OE2	4:I:368:GLU:N	2.46	0.46
4:J:282:ASN:HA	4:J:285:VAL:HG23	1.97	0.46
4:I:92:ASN:OD1	4:I:92:ASN:N	2.42	0.46
5:B:134:ASP:OD1	5:B:198:ARG:NH1	2.48	0.46
3:E:76:ARG:HB3	3:E:134:CYS:HB2	1.96	0.46
1:A:-4:A:P	5:B:29:ARG:HH21	2.38	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:171:GLY:O	2:C:175:ARG:NH2	2.46	0.46
2:C:172:ASP:OD1	2:C:172:ASP:N	2.41	0.46
2:C:367:ALA:HB1	2:C:461:GLU:HG3	1.97	0.46
4:J:198:GLU:OE2	4:J:198:GLU:N	2.34	0.46
4:K:80:LYS:NZ	4:K:118:ASN:OD1	2.48	0.46
6:D:191:LEU:HD21	6:D:194:LEU:HD22	1.97	0.46
1:A:11:A:O2'	4:F:190:VAL:O	2.32	0.46
1:A:24:C:O2'	4:J:41:CYS:SG	2.62	0.46
2:C:194:GLU:OE1	5:B:25:LYS:HG2	2.16	0.46
3:E:27:ARG:HD3	3:E:70:GLU:HG3	1.97	0.46
3:E:148:GLU:HB3	4:G:291:VAL:HG12	1.98	0.46
1:A:20:G:H5'	4:I:255:GLY:HA2	1.98	0.46
5:B:274:THR:OG1	5:B:275:ARG:N	2.49	0.46
2:C:87:ASP:OD1	2:C:87:ASP:N	2.49	0.45
2:C:123:ASP:OD2	2:C:221:LYS:NZ	2.34	0.45
2:C:237:ILE:HG23	2:C:329:VAL:HG11	1.98	0.45
4:J:295:ASP:OD1	4:J:295:ASP:N	2.47	0.45
4:K:109:LYS:HA	4:K:109:LYS:HD3	1.80	0.45
2:C:379:LEU:HD12	2:C:422:LEU:HD11	1.98	0.45
4:F:103:MET:SD	4:F:108:ILE:HB	2.57	0.45
4:F:174:ALA:HB2	4:G:261:ALA:HB3	1.98	0.45
4:I:157:ASP:OD1	4:I:157:ASP:N	2.49	0.45
6:D:68:ARG:NE	6:D:262:LEU:HB3	2.32	0.45
4:H:7:MET:HE2	4:H:217:LYS:HD2	1.99	0.45
4:I:71:GLU:OE1	4:I:113:ARG:NE	2.45	0.45
4:J:37:ILE:HB	4:J:176:ALA:HB3	1.97	0.45
2:C:356:ILE:HA	2:C:356:ILE:HD13	1.84	0.45
3:E:105:PHE:HA	3:E:123:ILE:HD11	1.98	0.45
4:F:177:ILE:HD11	4:F:281:ALA:HB1	1.99	0.45
2:C:358:LEU:H	2:C:358:LEU:HG	1.50	0.45
2:C:427:ASN:OD1	2:C:427:ASN:N	2.50	0.45
4:J:21:LEU:HD22	5:B:375:GLY:HA3	1.99	0.45
3:E:38:PHE:CG	5:B:338:MET:HG3	2.51	0.45
4:J:157:ASP:OD1	4:J:157:ASP:N	2.50	0.45
5:B:298:CYS:SG	5:B:299:MET:N	2.89	0.45
4:I:152:ASN:OD1	4:I:154:LYS:N	2.44	0.45
4:J:47:ARG:HH12	4:J:60:ARG:HH21	1.64	0.45
6:D:93:ASP:O	6:D:97:GLN:HB3	2.17	0.45
6:D:130:ALA:HB1	6:D:159:LEU:HB3	1.99	0.45
2:C:209:ASP:OD1	2:C:209:ASP:N	2.49	0.44
4:H:294:SER:OG	4:H:295:ASP:N	2.50	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:G:222:ASP:OD1	4:G:225:GLN:HB3	2.17	0.44
4:G:304:LEU:O	4:G:308:VAL:HG23	2.16	0.44
5:B:309:GLN:HE22	5:B:337:THR:HG23	1.81	0.44
1:A:-6:U:H1'	1:A:-4:A:H1'	2.00	0.44
4:H:230:LEU:HD22	4:H:236:LEU:HD23	1.99	0.44
4:H:335:LEU:HD23	4:H:335:LEU:HA	1.85	0.44
4:J:141:ASP:OD1	4:J:141:ASP:N	2.49	0.44
4:G:172:GLN:HE22	4:G:220:SER:HB3	1.81	0.44
4:I:361:ILE:HG22	4:I:364:PHE:HE2	1.83	0.44
6:D:146:THR:OG1	6:D:148:GLU:OE2	2.29	0.44
2:C:375:LEU:HD12	2:C:425:LEU:HD12	1.99	0.44
4:H:20:ASP:OD1	4:H:20:ASP:N	2.44	0.44
4:I:64:LEU:O	4:I:68:ILE:HG12	2.18	0.44
4:G:198:GLU:OE2	4:G:198:GLU:N	2.35	0.44
6:D:62:LYS:HA	6:D:62:LYS:HD2	1.78	0.44
6:D:131:SER:HB2	6:D:156:ARG:HG2	2.00	0.44
2:C:251:TRP:HA	2:C:389:LYS:O	2.17	0.44
3:E:3:ARG:HD3	3:E:3:ARG:HA	1.77	0.44
4:H:174:ALA:HB3	4:H:218:TYR:HB3	1.98	0.44
4:F:295:ASP:HB2	4:H:285:VAL:HG12	2.00	0.44
4:J:231:LYS:HB2	4:J:231:LYS:HE2	1.74	0.44
3:E:80:THR:HG23	3:E:82:PRO:HD2	2.00	0.44
4:F:270:LEU:HG	4:F:326:TRP:HE3	1.83	0.44
4:I:254:SER:O	4:I:254:SER:OG	2.34	0.44
4:J:109:LYS:O	4:J:113:ARG:HG3	2.17	0.44
4:K:21:LEU:HD22	6:D:25:LEU:HD12	1.99	0.44
4:G:5:ILE:HB	4:G:219:PHE:HB2	2.00	0.44
1:A:30:G:O2'	4:K:41:CYS:SG	2.70	0.44
4:F:32:VAL:HG23	4:F:34:ARG:HE	1.83	0.44
4:J:38:SER:HB3	4:J:40:GLN:HG2	2.00	0.44
4:J:266:PRO:O	4:K:315:TYR:OH	2.31	0.44
2:C:445:LYS:HE2	2:C:445:LYS:HB2	1.68	0.44
4:J:40:GLN:HG2	4:J:40:GLN:H	1.58	0.44
5:B:248:ILE:HB	5:B:250:ARG:NH2	2.33	0.43
1:A:37:U:H6	1:A:38:C:H5	1.65	0.43
4:G:310:ASP:O	4:G:312:ARG:N	2.50	0.43
2:C:308:GLN:HB2	2:C:320:ALA:HA	1.99	0.43
4:F:194:ASP:OD2	4:H:47:ARG:NH2	2.45	0.43
4:H:297:VAL:O	4:H:301:ILE:HG13	2.19	0.43
4:K:71:GLU:N	4:K:71:GLU:OE1	2.51	0.43
5:B:71:ARG:HB2	5:B:190:LEU:HD22	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:184:ASN:OD1	5:B:184:ASN:N	2.47	0.43
5:B:293:MET:SD	5:B:293:MET:N	2.78	0.43
1:A:20:G:H22	7:M:31:DC:H5	1.66	0.43
4:F:174:ALA:HB3	4:F:218:TYR:HB3	2.00	0.43
4:J:59:VAL:H	4:J:104:SER:HA	1.82	0.43
2:C:262:GLN:OE1	2:C:386:ARG:NE	2.52	0.43
4:H:222:ASP:HB3	4:H:225:GLN:HB3	2.00	0.43
4:J:67:LEU:O	4:J:71:GLU:HG3	2.19	0.43
1:A:52:G:O3'	6:D:29:TYR:OH	2.27	0.43
2:C:286:VAL:HB	2:C:290:ALA:HB3	2.01	0.43
1:A:12:G:O2'	1:A:14:A:OP1	2.36	0.43
2:C:498:GLU:O	2:C:509:ARG:NH1	2.51	0.43
4:K:150:GLU:HA	4:K:151:PRO:HD3	1.81	0.43
5:B:362:LEU:HA	5:B:365:ARG:HG2	2.00	0.43
2:C:90:VAL:HB	2:C:102:ILE:HD12	2.00	0.43
4:H:83:GLU:HG2	4:H:122:LEU:HD11	2.00	0.43
4:J:289:SER:O	4:J:299:GLN:NE2	2.39	0.43
4:J:311:ILE:HD13	4:J:311:ILE:HA	1.91	0.43
6:D:91:ASP:N	6:D:91:ASP:OD1	2.51	0.43
1:A:-5:G:H3'	5:B:20:GLY:HA3	2.01	0.42
2:C:107:THR:HA	2:C:114:LEU:HD21	2.00	0.42
4:F:289:SER:O	4:F:299:GLN:NE2	2.44	0.42
4:H:282:ASN:HA	4:H:285:VAL:HG23	2.00	0.42
4:G:338:LYS:HA	4:G:338:LYS:HD3	1.85	0.42
6:D:61:GLN:NE2	6:D:63:THR:OG1	2.52	0.42
6:D:162:ASP:OD1	6:D:162:ASP:N	2.44	0.42
1:A:16:A:O2'	4:I:60:ARG:NH1	2.42	0.42
2:C:446:LYS:HE2	2:C:446:LYS:N	2.34	0.42
3:E:82:PRO:HG3	3:E:156:TRP:CD1	2.54	0.42
4:F:113:ARG:HD2	4:F:113:ARG:HA	1.76	0.42
4:H:311:ILE:O	4:H:315:TYR:HB2	2.18	0.42
4:I:93:LYS:HB2	4:I:98:LYS:HE2	2.02	0.42
6:D:122:LEU:N	6:D:236:LEU:O	2.46	0.42
2:C:500:ALA:HB1	2:C:502:THR:HG23	2.00	0.42
3:E:57:LYS:HE3	3:E:59:GLU:HB2	2.01	0.42
4:F:274:LYS:HD2	4:F:278:ILE:HG12	2.01	0.42
4:I:190:VAL:HG22	4:I:205:ILE:HG12	2.00	0.42
2:C:380:HIS:NE2	2:C:419:ASP:OD1	2.46	0.42
3:E:131:GLN:N	3:E:131:GLN:OE1	2.52	0.42
4:K:138:LEU:HD12	4:K:138:LEU:HA	1.87	0.42
4:G:286:ARG:HD2	4:G:286:ARG:HA	1.46	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:125:LEU:HD22	5:B:125:LEU:HA	1.90	0.42
2:C:116:LEU:HD23	2:C:116:LEU:HA	1.92	0.42
4:F:165:THR:O	4:F:165:THR:OG1	2.37	0.42
4:I:136:ALA:O	4:I:138:LEU:N	2.52	0.42
4:F:17:ASN:HB3	4:F:25:LYS:HG3	2.02	0.42
4:F:191:ALA:O	4:F:203:GLY:N	2.44	0.42
4:I:78:TRP:CD1	4:I:79:LYS:HG3	2.55	0.42
4:G:286:ARG:HA	4:G:287:PRO:HD2	1.97	0.42
5:B:277:ASP:OD1	5:B:280:ASN:ND2	2.29	0.42
4:H:55:LEU:HD13	4:H:240:THR:HA	2.02	0.42
3:E:18:GLY:O	3:E:22:ILE:HG23	2.19	0.42
4:K:33:LEU:HB2	6:D:76:ASN:HA	2.02	0.42
4:G:249:ALA:HB3	4:G:250:LYS:HZ1	1.85	0.42
5:B:290:ARG:NE	5:B:325:LEU:O	2.41	0.42
4:H:290:VAL:HG21	4:I:31:GLY:HA3	2.02	0.42
4:H:349:ASN:ND2	4:I:313:LEU:O	2.53	0.42
4:F:64:LEU:HB3	4:F:85:LEU:HD11	2.01	0.41
4:F:64:LEU:HD12	4:F:64:LEU:HA	1.79	0.41
4:F:100:LEU:HD23	4:F:100:LEU:HA	1.84	0.41
4:H:168:GLU:O	4:H:229:ASN:ND2	2.53	0.41
4:H:272:GLU:OE1	4:H:280:TYR:OH	2.33	0.41
4:H:358:LEU:HD23	4:H:361:ILE:HD12	2.02	0.41
6:D:68:ARG:HH22	6:D:127:ARG:N	2.17	0.41
2:C:193:HIS:H	2:C:225:ARG:NH1	2.18	0.41
4:J:56:LEU:HD12	4:J:56:LEU:HA	1.93	0.41
4:H:245:LEU:HD23	4:H:354:VAL:HG22	2.01	0.41
2:C:112:HIS:CE1	2:C:151:PRO:HG3	2.56	0.41
4:H:195:VAL:HG13	4:I:61:THR:HG21	2.02	0.41
7:M:46:DC:H2'	7:M:47:DA:C8	2.55	0.41
7:M:49:DT:H6	7:M:49:DT:H2'	1.69	0.41
4:F:107:LYS:HD2	4:F:107:LYS:HA	1.84	0.41
4:I:319:GLN:HB3	4:I:320:SER:H	1.64	0.41
4:J:34:ARG:NH1	4:J:284:PHE:O	2.54	0.41
4:G:326:TRP:CD2	4:G:335:LEU:HB2	2.55	0.41
1:A:33:G:C2	6:D:167:PRO:HD3	2.56	0.41
4:I:317:ASP:N	4:I:317:ASP:OD1	2.53	0.41
4:J:55:LEU:HB3	4:J:140:PRO:HG2	2.01	0.41
4:G:42:ILE:HG21	4:G:217:LYS:HZ3	1.85	0.41
6:D:51:PHE:HB3	6:D:97:GLN:HE21	1.85	0.41
3:E:120:LEU:O	3:E:124:MET:HG3	2.21	0.41
2:C:157:ILE:HG23	2:C:158:PRO:HD3	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:J:29:PHE:HB3	4:J:34:ARG:HG3	2.03	0.41
4:J:246:LEU:HD23	4:J:246:LEU:HA	1.91	0.41
4:K:62:ARG:HG3	4:K:100:LEU:HG	2.03	0.41
5:B:290:ARG:HH21	5:B:326:ARG:HE	1.68	0.41
2:C:445:LYS:HB2	2:C:446:LYS:HZ3	1.86	0.41
4:F:51:ASP:N	4:F:51:ASP:OD1	2.54	0.41
4:J:61:THR:HG21	4:J:67:LEU:HD11	2.02	0.41
4:G:341:LYS:HA	4:G:341:LYS:HD2	1.76	0.41
5:B:313:TYR:HE1	5:B:349:ARG:HG2	1.86	0.41
3:E:86:GLY:HA2	3:E:89:CYS:HB2	2.02	0.40
3:E:120:LEU:HD23	3:E:120:LEU:HA	1.87	0.40
4:H:224:GLU:OE2	4:H:224:GLU:N	2.36	0.40
4:J:361:ILE:HD13	4:J:361:ILE:HA	1.91	0.40
5:B:229:ILE:HD12	5:B:229:ILE:HA	1.86	0.40
6:D:139:MET:SD	6:D:146:THR:OG1	2.79	0.40
6:D:266:LEU:HD13	6:D:266:LEU:HA	1.91	0.40
2:C:108:LEU:HD12	2:C:108:LEU:HA	1.85	0.40
4:H:6:HIS:HB3	4:H:216:TYR:HE1	1.87	0.40
4:F:87:LYS:HE3	4:F:122:LEU:HG	2.02	0.40
1:A:6:C:C5	1:A:8:G:H5"	2.55	0.40
2:C:174:LYS:HE2	2:C:174:LYS:HB2	1.98	0.40
2:C:256:LEU:HA	2:C:259:MET:HB2	2.04	0.40
4:I:246:LEU:HD23	4:I:246:LEU:HA	1.97	0.40
6:D:20:PRO:HB2	6:D:102:PHE:HE1	1.86	0.40
6:D:194:LEU:HD12	6:D:194:LEU:HA	1.87	0.40
3:E:22:ILE:HD12	3:E:36:PRO:HB2	2.03	0.40
4:J:68:ILE:O	4:J:72:ALA:CB	2.70	0.40
4:G:238:ALA:HB1	4:G:358:LEU:HD22	2.04	0.40
5:B:69:GLY:HA3	5:B:190:LEU:HD11	2.03	0.40
6:D:51:PHE:HB2	6:D:94:TYR:HE1	1.85	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
2	C	441/546 (81%)	395 (90%)	44 (10%)	2 (0%)	25 61
3	E	163/174 (94%)	156 (96%)	7 (4%)	0	100 100
4	F	364/378 (96%)	343 (94%)	21 (6%)	0	100 100
4	G	247/378 (65%)	234 (95%)	13 (5%)	0	100 100
4	H	373/378 (99%)	350 (94%)	23 (6%)	0	100 100
4	I	371/378 (98%)	341 (92%)	29 (8%)	1 (0%)	37 70
4	J	372/378 (98%)	337 (91%)	33 (9%)	2 (0%)	25 61
4	K	344/378 (91%)	318 (92%)	26 (8%)	0	100 100
5	B	339/388 (87%)	315 (93%)	23 (7%)	1 (0%)	37 70
6	D	252/272 (93%)	232 (92%)	19 (8%)	1 (0%)	30 66
All	All	3266/3648 (90%)	3021 (92%)	238 (7%)	7 (0%)	45 77

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	C	306	PRO
4	J	151	PRO
2	C	301	LEU
5	B	87	ALA
4	I	322	VAL
6	D	235	VAL
4	J	139	ALA

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
2	C	370/470 (79%)	332 (90%)	38 (10%)	6 24
3	E	143/153 (94%)	130 (91%)	13 (9%)	7 30
4	F	295/313 (94%)	275 (93%)	20 (7%)	13 42

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
4	G	199/313 (64%)	180 (90%)	19 (10%)	7 28
4	H	302/313 (96%)	280 (93%)	22 (7%)	11 39
4	I	297/313 (95%)	284 (96%)	13 (4%)	24 58
4	J	293/313 (94%)	261 (89%)	32 (11%)	5 22
4	K	285/313 (91%)	259 (91%)	26 (9%)	7 30
5	B	282/322 (88%)	248 (88%)	34 (12%)	4 18
6	D	213/238 (90%)	185 (87%)	28 (13%)	3 15
All	All	2679/3061 (88%)	2434 (91%)	245 (9%)	10 30

All (245) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	C	87	ASP
2	C	96	SER
2	C	101	ARG
2	C	109	LYS
2	C	122	MET
2	C	149	ASP
2	C	164	LYS
2	C	203	HIS
2	C	209	ASP
2	C	235	ARG
2	C	247	PHE
2	C	250	LEU
2	C	255	ASP
2	C	259	MET
2	C	260	LEU
2	C	270	MET
2	C	284	ARG
2	C	286	VAL
2	C	325	CYS
2	C	338	TRP
2	C	357	LYS
2	C	358	LEU
2	C	359	MET
2	C	363	ARG
2	C	380	HIS
2	C	386	ARG
2	C	387	GLN
2	C	392	LEU

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Mol	Chain	Res	Type
2	C	404	ASP
2	C	419	ASP
2	C	428	ARG
2	C	437	LYS
2	C	446	LYS
2	C	467	ASN
2	C	475	ARG
2	C	477	TYR
2	C	496	SER
2	C	518	TRP
3	E	19	ASP
3	E	27	ARG
3	E	35	LEU
3	E	46	TRP
3	E	70	GLU
3	E	76	ARG
3	E	95	LYS
3	E	104	ARG
3	E	114	MET
3	E	117	GLU
3	E	136	ASP
3	E	155	GLU
3	E	162	LYS
4	F	38	SER
4	F	44	ARG
4	F	52	PHE
4	F	82	GLN
4	F	86	ASN
4	F	97	THR
4	F	102	PHE
4	F	103	MET
4	F	123	THR
4	F	138	LEU
4	F	141	ASP
4	F	148	MET
4	F	155	ASP
4	F	157	ASP
4	F	165	THR
4	F	245	LEU
4	F	251	THR
4	F	293	GLU
4	F	338	LYS

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Mol	Chain	Res	Type
4	F	360	TYR
4	H	1	MET
4	H	17	ASN
4	H	91	LYS
4	H	95	ASP
4	H	96	ASN
4	H	102	PHE
4	H	122	LEU
4	H	138	LEU
4	H	152	ASN
4	H	157	ASP
4	H	161	LYS
4	H	183	ARG
4	H	231	LYS
4	H	289	SER
4	H	292	LYS
4	H	295	ASP
4	H	328	SER
4	H	341	LYS
4	H	344	SER
4	H	360	TYR
4	H	365	LYS
4	H	373	LYS
4	I	17	ASN
4	I	44	ARG
4	I	45	SER
4	I	59	VAL
4	I	93	LYS
4	I	102	PHE
4	I	103	MET
4	I	109	LYS
4	I	183	ARG
4	I	276	SER
4	I	279	SER
4	I	316	TYR
4	I	320	SER
4	J	18	ARG
4	J	20	ASP
4	J	40	GLN
4	J	49	SER
4	J	74	GLU
4	J	102	PHE

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Mol	Chain	Res	Type
4	J	103	MET
4	J	107	LYS
4	J	109	LYS
4	J	119	SER
4	J	145	CYS
4	J	156	LYS
4	J	162	TRP
4	J	163	SER
4	J	188	TYR
4	J	217	LYS
4	J	231	LYS
4	J	250	LYS
4	J	251	THR
4	J	254	SER
4	J	267	ASP
4	J	276	SER
4	J	289	SER
4	J	290	VAL
4	J	294	SER
4	J	328	SER
4	J	337	TYR
4	J	340	SER
4	J	345	ARG
4	J	360	TYR
4	J	364	PHE
4	J	369	VAL
4	K	1	MET
4	K	3	ILE
4	K	18	ARG
4	K	51	ASP
4	K	63	ARG
4	K	88	CYS
4	K	91	LYS
4	K	94	ASP
4	K	96	ASN
4	K	100	LEU
4	K	102	PHE
4	K	106	ASP
4	K	110	ASP
4	K	148	MET
4	K	154	LYS
4	K	183	ARG

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Mol	Chain	Res	Type
4	K	265	TYR
4	K	274	LYS
4	K	292	LYS
4	K	327	PHE
4	K	328	SER
4	K	335	LEU
4	K	337	TYR
4	K	338	LYS
4	K	341	LYS
4	K	342	LEU
4	G	7	MET
4	G	25	LYS
4	G	27	CYS
4	G	32	VAL
4	G	43	LYS
4	G	51	ASP
4	G	147	ARG
4	G	148	MET
4	G	194	ASP
4	G	233	ASP
4	G	244	PHE
4	G	250	LYS
4	G	254	SER
4	G	286	ARG
4	G	294	SER
4	G	332	ARG
4	G	337	TYR
4	G	340	SER
4	G	360	TYR
5	B	8	LEU
5	B	25	LYS
5	B	26	PHE
5	B	30	ARG
5	B	52	ARG
5	B	71	ARG
5	B	121	ARG
5	B	125	LEU
5	B	144	GLU
5	B	159	VAL
5	B	199	TRP
5	B	212	MET
5	B	213	ASP

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Mol	Chain	Res	Type
5	B	219	ASP
5	B	225	ASP
5	B	235	VAL
5	B	237	PHE
5	B	241	ARG
5	B	249	ARG
5	B	253	VAL
5	B	257	ASP
5	B	275	ARG
5	B	277	ASP
5	B	284	LYS
5	B	293	MET
5	B	306	THR
5	B	331	LEU
5	B	340	GLU
5	B	341	TYR
5	B	347	THR
5	B	349	ARG
5	B	354	ASP
5	B	360	ARG
5	B	365	ARG
6	D	6	ARG
6	D	23	LYS
6	D	27	ASN
6	D	29	TYR
6	D	37	MET
6	D	39	PHE
6	D	41	SER
6	D	43	LEU
6	D	53	LYS
6	D	61	GLN
6	D	65	PHE
6	D	67	PHE
6	D	93	ASP
6	D	94	TYR
6	D	110	LYS
6	D	124	PHE
6	D	125	ARG
6	D	154	HIS
6	D	155	LYS
6	D	166	THR
6	D	169	GLN

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Mol	Chain	Res	Type
6	D	178	LYS
6	D	225	LEU
6	D	228	ARG
6	D	232	LEU
6	D	245	LEU
6	D	256	LYS
6	D	264	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
4	J	69	GLN
4	G	9	GLN
4	G	252	ASN
6	D	61	GLN
6	D	85	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	57/61 (93%)	30 (52%)	0

All (30) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	-6	U
1	A	-5	G
1	A	-3	A
1	A	1	G
1	A	2	A
1	A	6	C
1	A	7	C
1	A	8	G
1	A	9	U
1	A	11	A
1	A	12	G
1	A	13	G
1	A	14	A
1	A	18	U
1	A	19	A

Continued on next page...

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Mol	Chain	Res	Type
1	A	20	G
1	A	24	C
1	A	25	G
1	A	26	C
1	A	27	U
1	A	31	C
1	A	32	A
1	A	33	G
1	A	39	C
1	A	42	A
1	A	43	C
1	A	44	G
1	A	45	C
1	A	51	G
1	A	52	G

There are no RNA pucker outliers to report.

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 2 ligands modelled in this entry, 2 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.

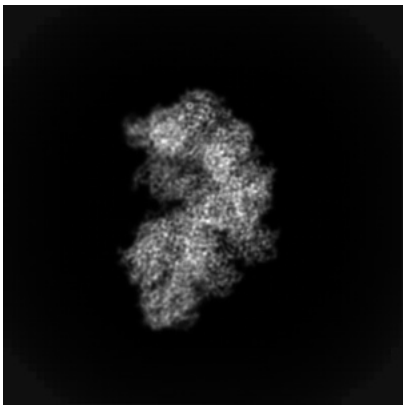
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-60328. These allow visual inspection of the internal detail of the map and identification of artifacts.

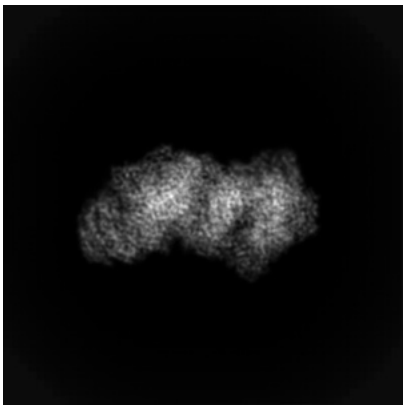
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

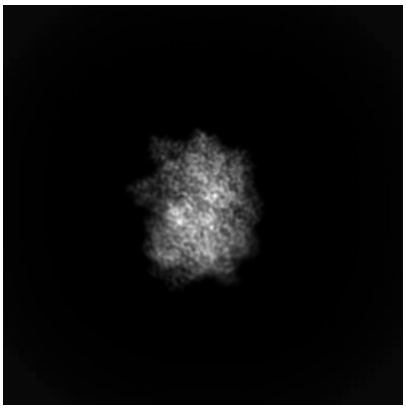
6.1.1 Primary map



X

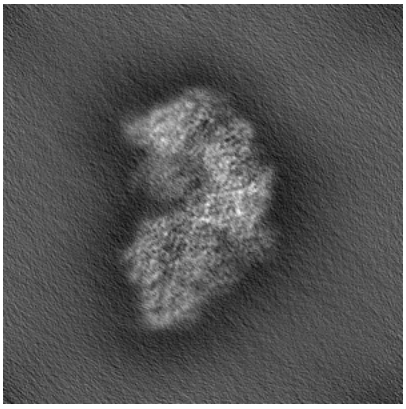


Y

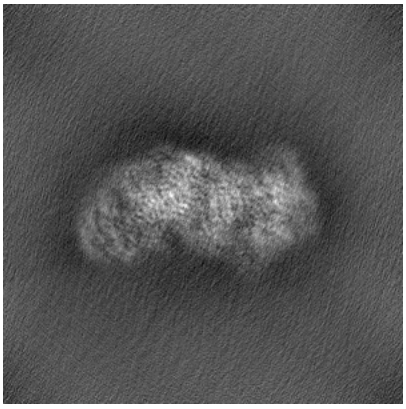


Z

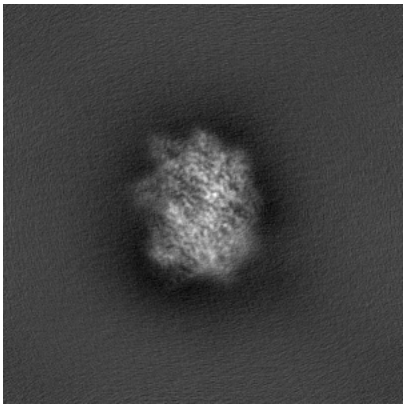
6.1.2 Raw map



X



Y

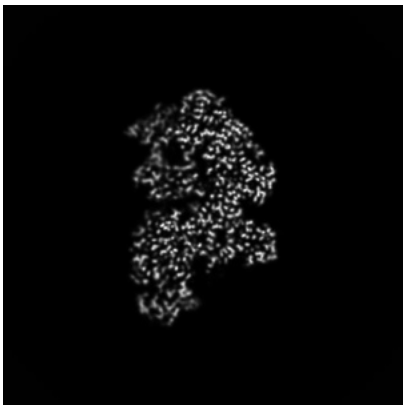


Z

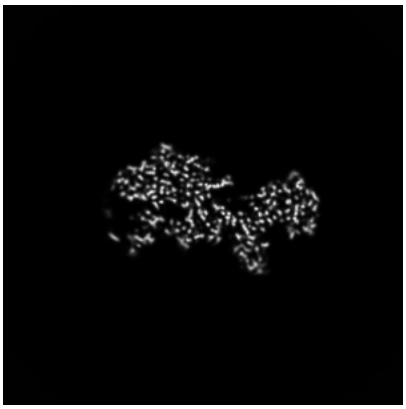
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

6.2.1 Primary map



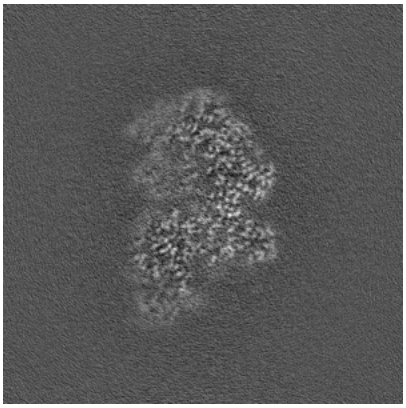
X Index: 180



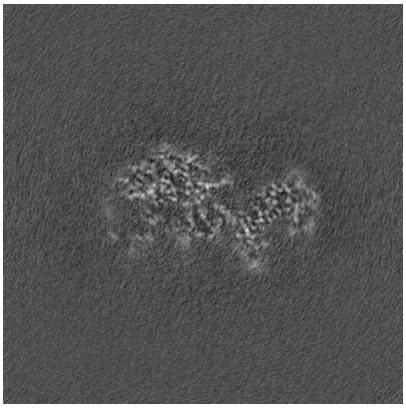
Y Index: 180

Z Index: 180

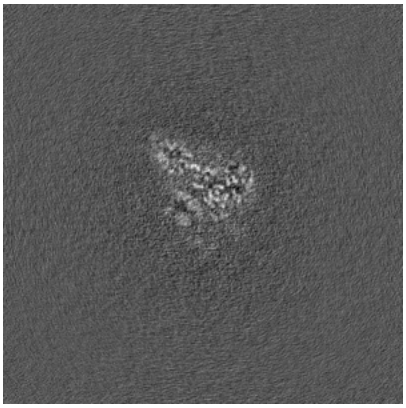
6.2.2 Raw map



X Index: 180



Y Index: 180



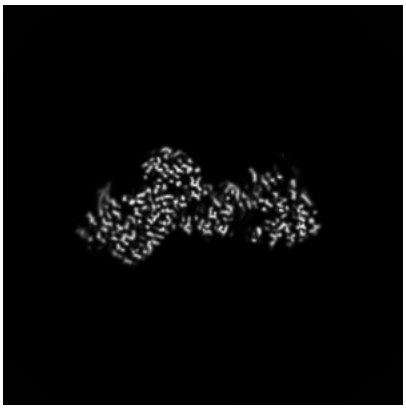
Z Index: 180

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

6.3 Largest variance slices (i)

6.3.1 Primary map

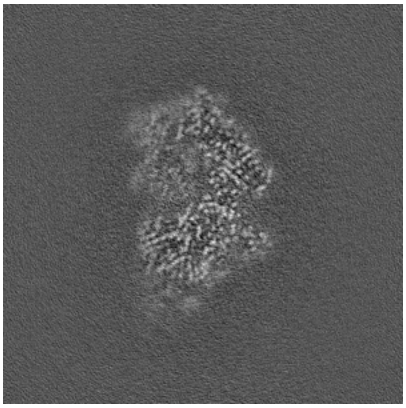
X Index: 182



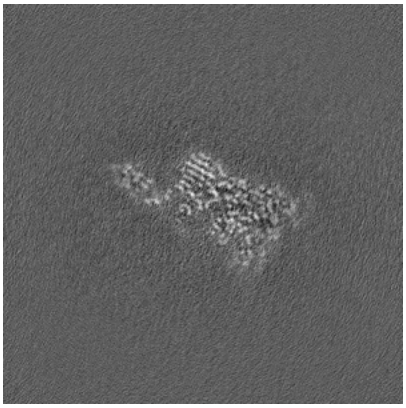
Y Index: 166

Z Index: 144

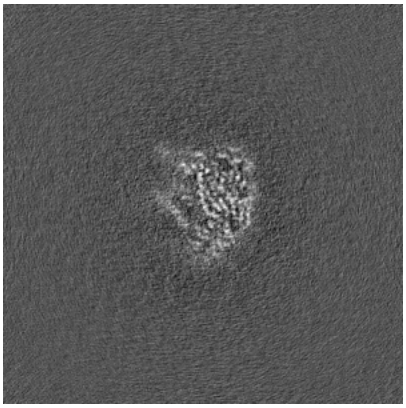
6.3.2 Raw map



X Index: 187



Y Index: 200

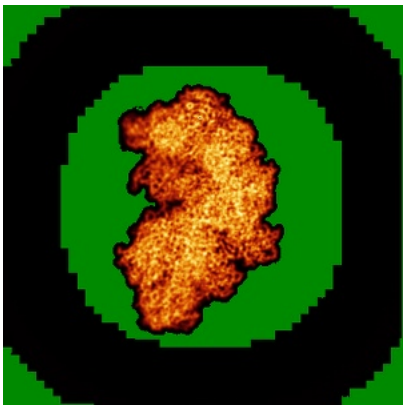


Z Index: 165

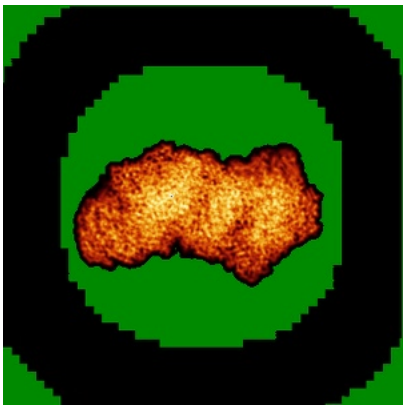
The images above show the largest variance slices of the map in three orthogonal directions.

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

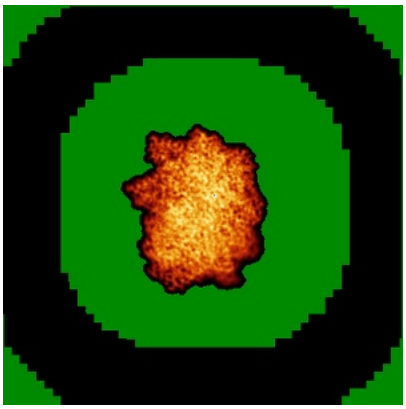
6.4.1 Primary map



X

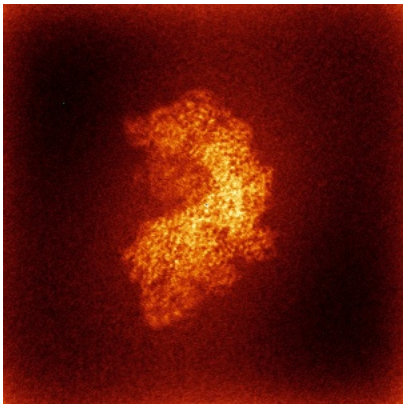


Y

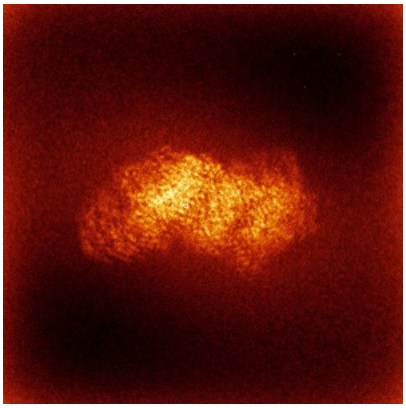


Z

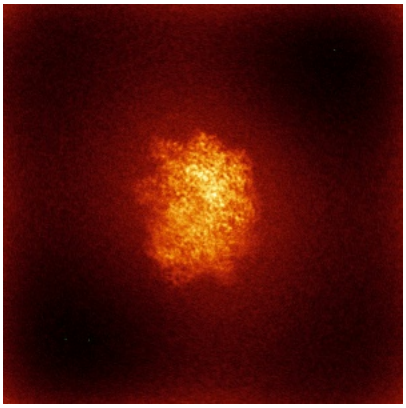
6.4.2 Raw map



X



Y



Z

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

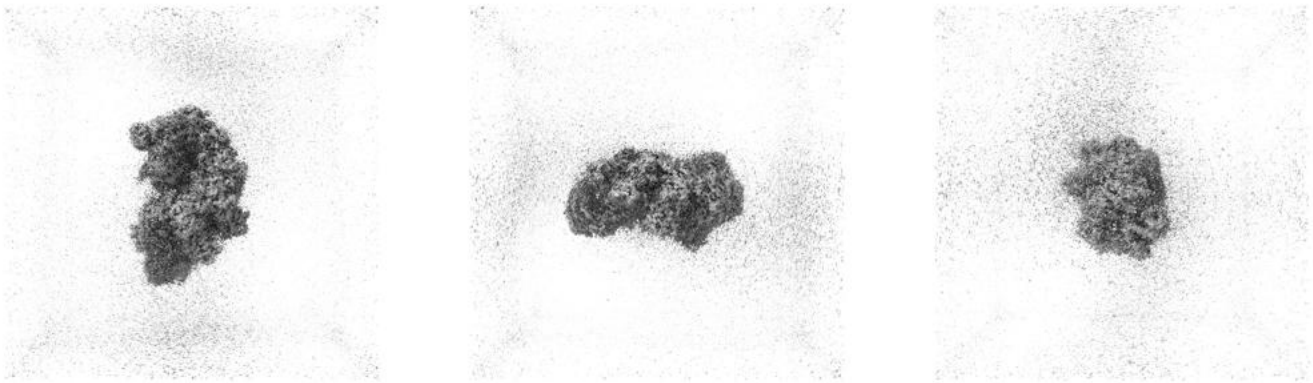
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 2.58. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

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

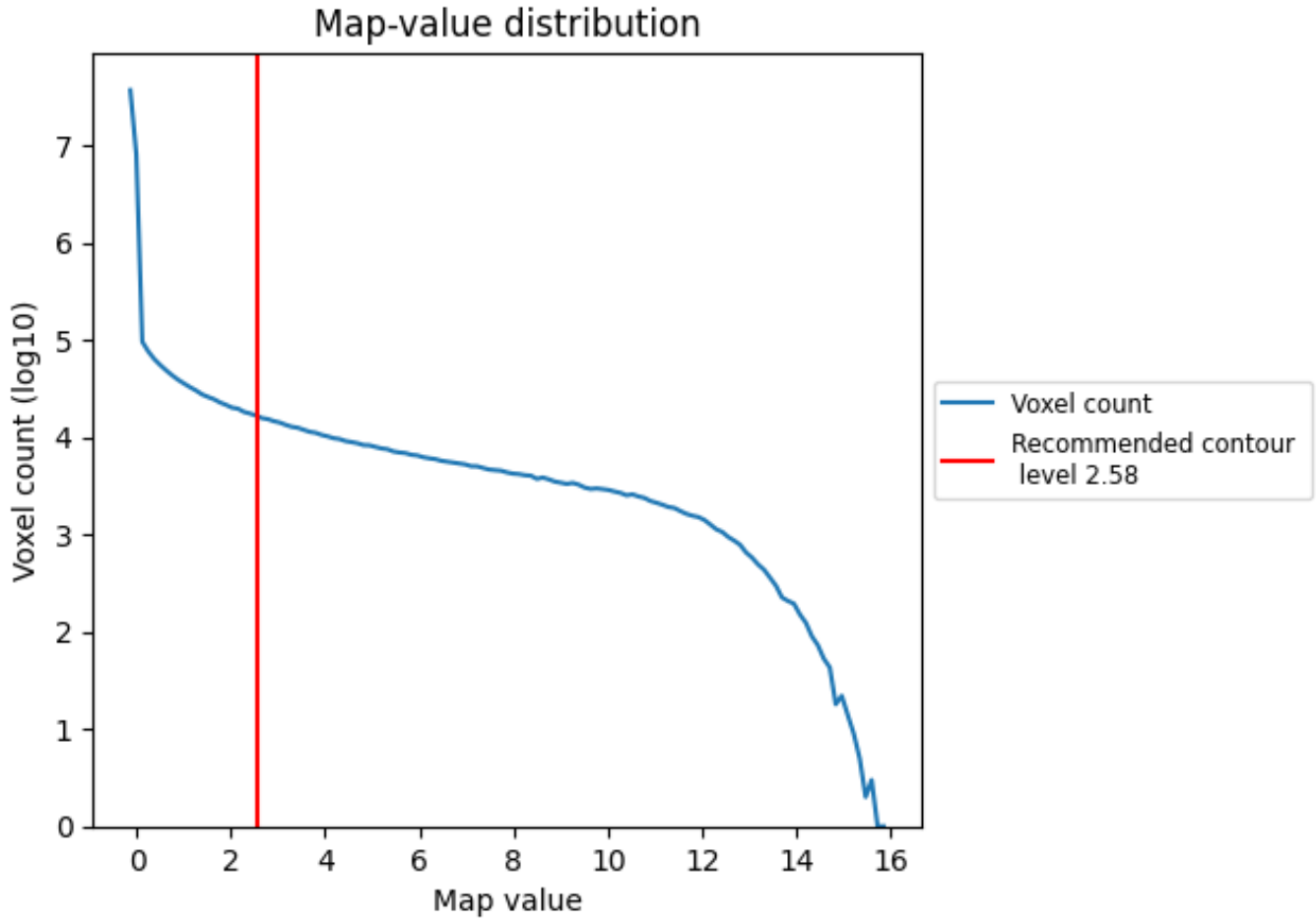
6.6 Mask visualisation (i)

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

7 Map analysis

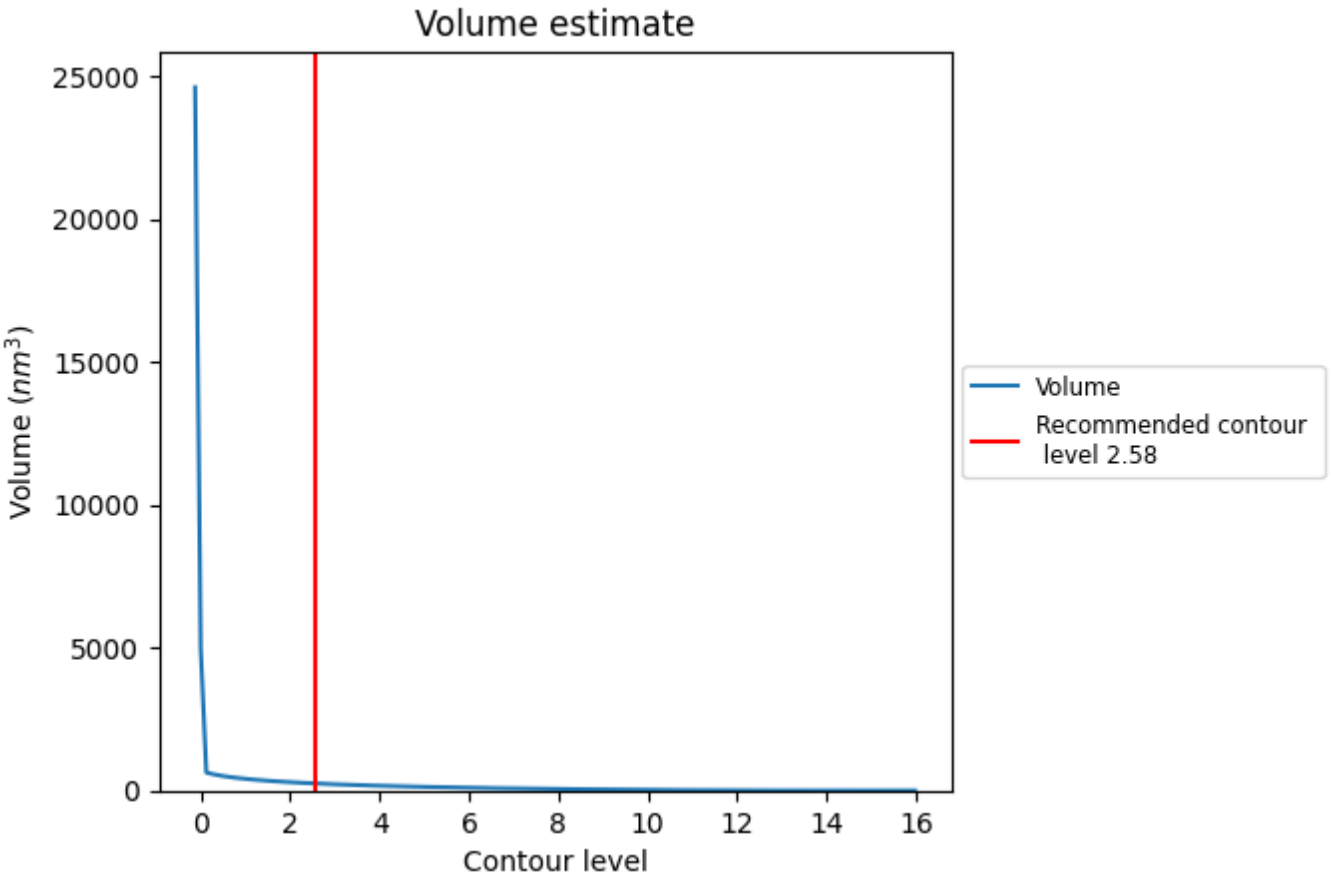
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

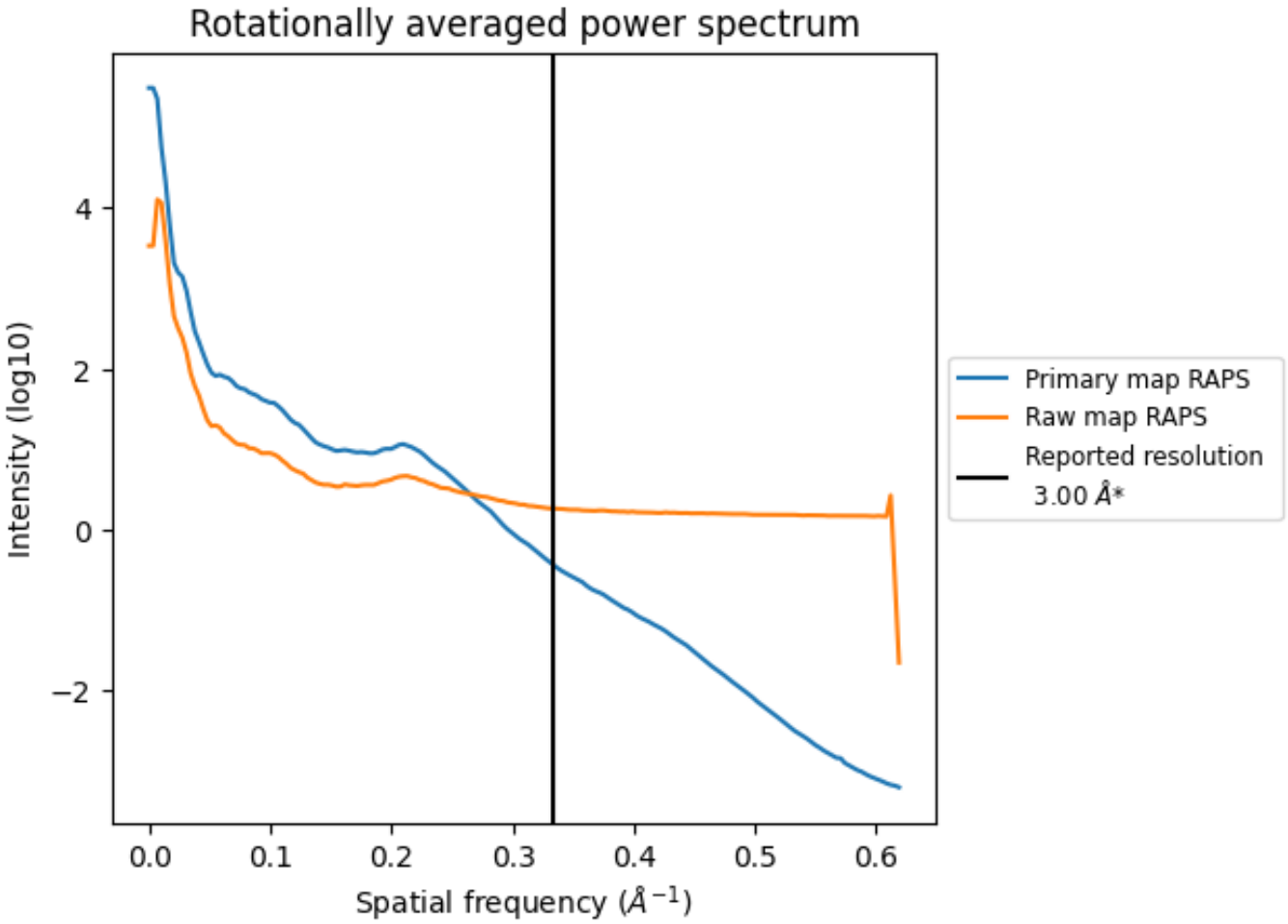
7.2 Volume estimate



The volume at the recommended contour level is 247 nm^3; this corresponds to an approximate mass of 223 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)

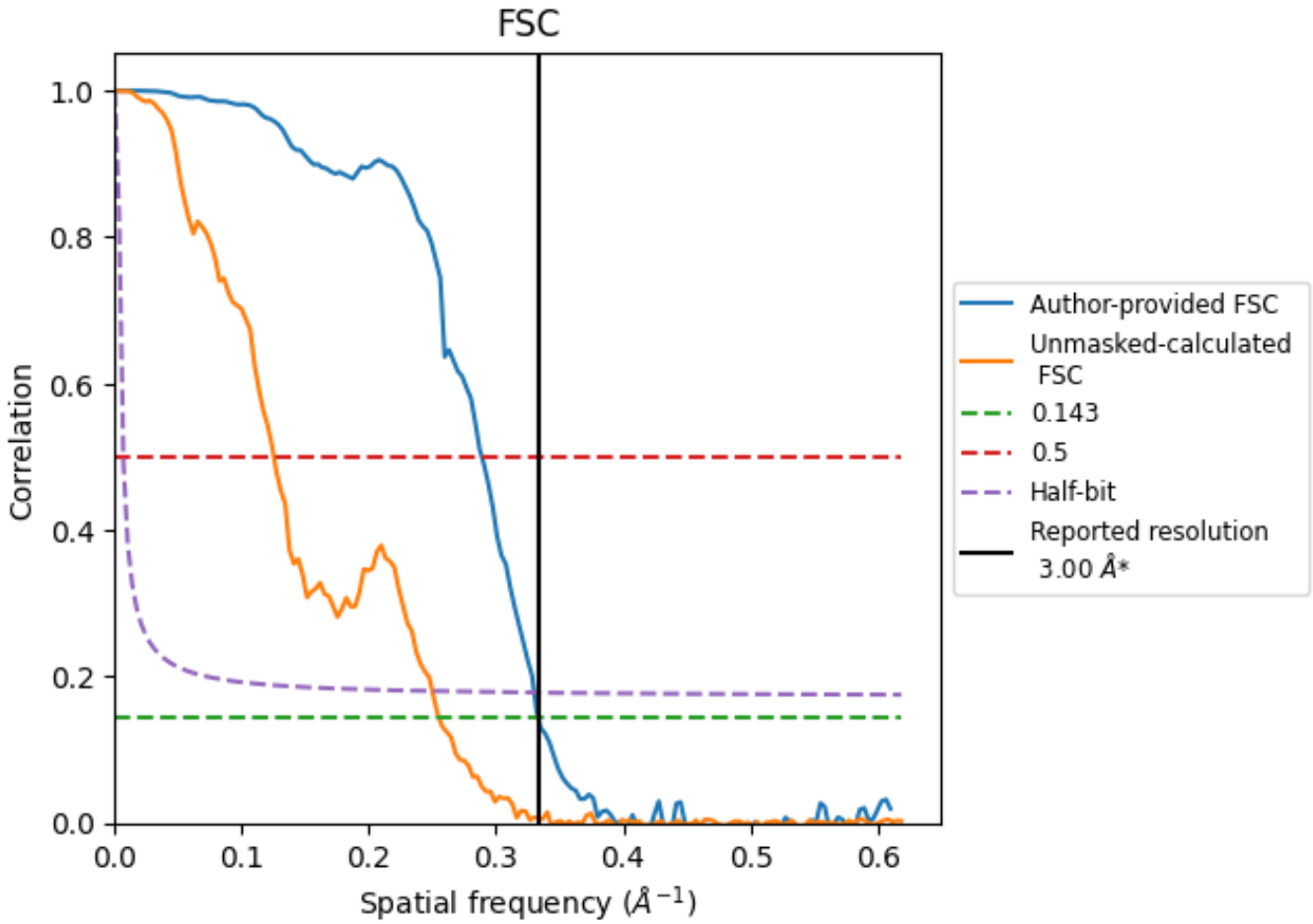


*Reported resolution corresponds to spatial frequency of 0.333 Å^{-1}

8 Fourier-Shell correlation

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

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.333 Å^{-1}

8.2 Resolution estimates (i)

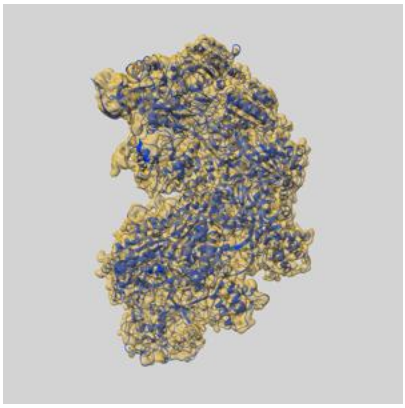
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.00	-	-
Author-provided FSC curve	3.00	3.46	3.03
Unmasked-calculated*	3.92	7.99	4.00

*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 3.92 differs from the reported value 3.0 by more than 10 %

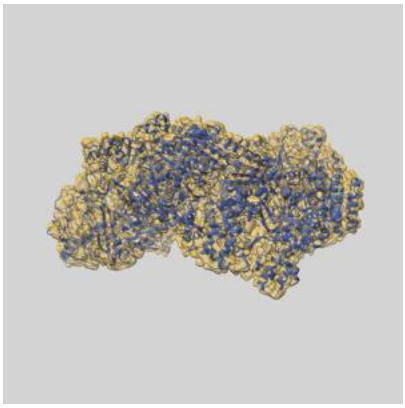
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-60328 and PDB model 8ZP7. Per-residue inclusion information can be found in section 3 on page 6.

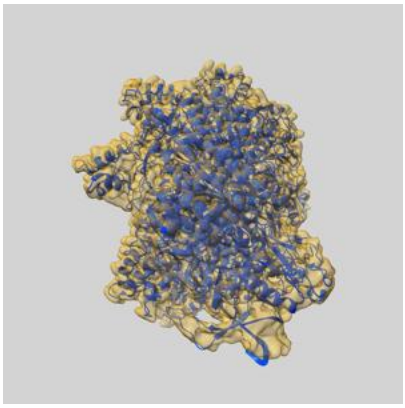
9.1 Map-model overlay



X



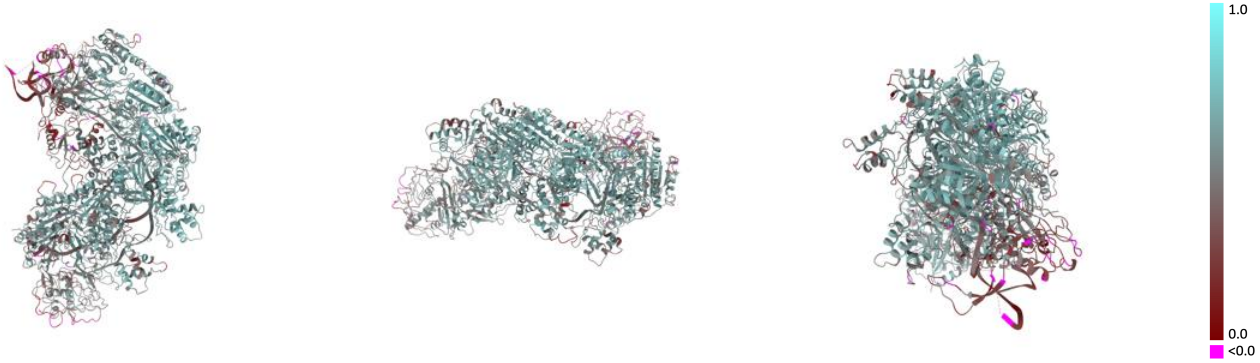
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 2.58 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

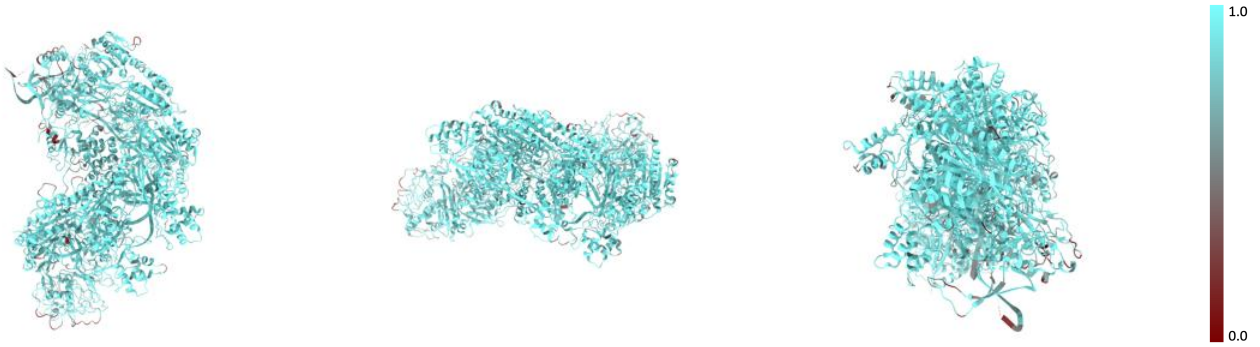
9.2 Q-score mapped to coordinate model (i)



X Y Z

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

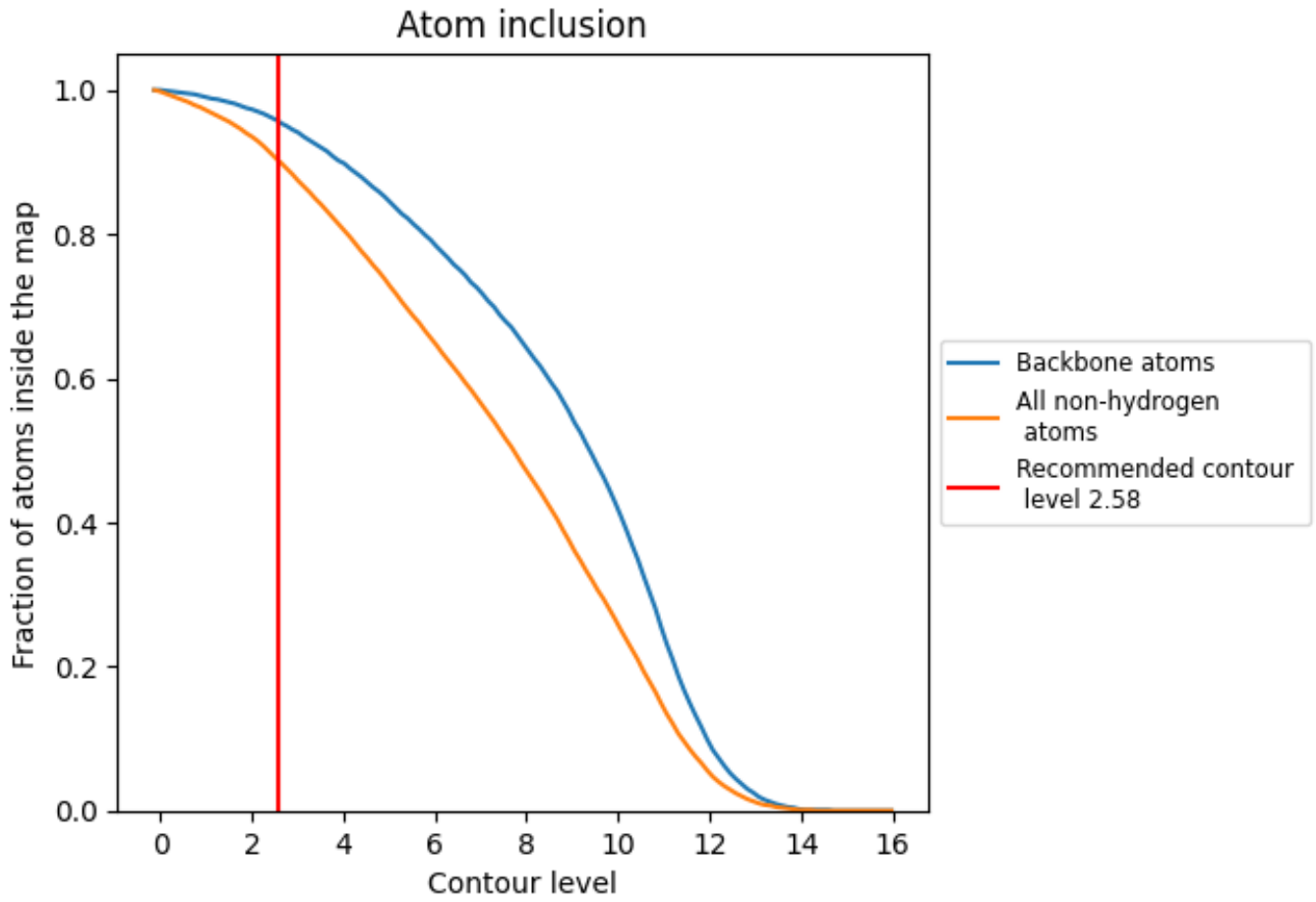
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (2.58).

9.4 Atom inclusion (i)



At the recommended contour level, 96% of all backbone atoms, 90% 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 (2.58) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9020	0.5170
A	0.8670	0.4030
B	0.9010	0.4910
C	0.8680	0.4590
D	0.7610	0.3010
E	0.8760	0.5200
F	0.9300	0.5560
G	0.9180	0.5430
H	0.9580	0.6190
I	0.9450	0.5990
J	0.9290	0.5630
K	0.8980	0.5340
M	0.9600	0.5140