



Full wwPDB EM Validation Report ⓘ

Aug 5, 2026 – 03:43 AM EDT

PDB ID : 8D3P / pdb_00008d3p
EMDB ID : EMD-27161
Title : Type I-C Cas4-Cas1-Cas2 complex bound to half-site integration intermediate (HSI)
Authors : Dhingra, Y.; Suresh, S.K.; Juneja, P.; Sashital, D.G.
Deposited on : 2022-06-01
Resolution : 4.26 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:

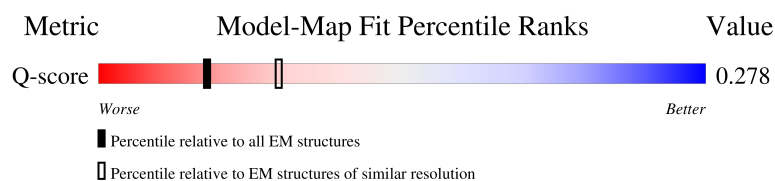
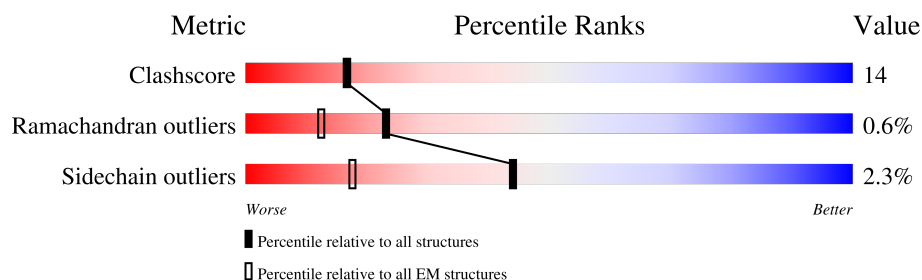
EMDB validation analysis : 0.0.1.dev133
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data 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) : 2.50

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 4.26 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.



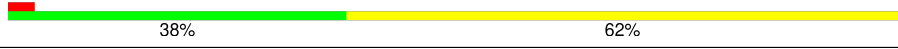
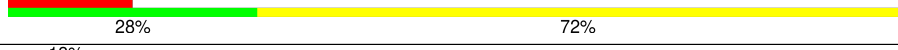
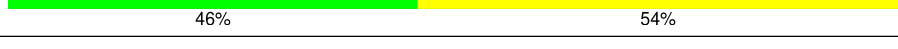
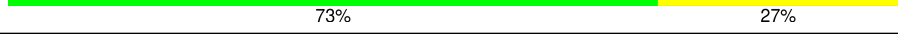
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	4601 (3.76 - 4.76)

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	347	
1	B	347	
1	C	347	
1	D	347	

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Mol	Chain	Length	Quality of chain
2	E	100	
2	F	100	
3	G	58	
4	H	36	
5	I	218	
6	K	41	
7	L	11	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
8	SF4	I	301	-	-	X	-

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 17389 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 CRISPR-associated endonuclease Cas1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	343	Total	C	N	O	S	0	0
			2768	1762	486	505	15		
1	B	346	Total	C	N	O	S	0	0
			2777	1766	488	508	15		
1	C	343	Total	C	N	O	S	0	0
			2768	1762	486	505	15		
1	D	342	Total	C	N	O	S	0	0
			2758	1756	484	503	15		

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	GLY	-	expression tag	UNP Q9KFX9
A	-2	ALA	-	expression tag	UNP Q9KFX9
A	-1	GLY	-	expression tag	UNP Q9KFX9
A	0	SER	-	expression tag	UNP Q9KFX9
B	-3	GLY	-	expression tag	UNP Q9KFX9
B	-2	ALA	-	expression tag	UNP Q9KFX9
B	-1	GLY	-	expression tag	UNP Q9KFX9
B	0	SER	-	expression tag	UNP Q9KFX9
C	-3	GLY	-	expression tag	UNP Q9KFX9
C	-2	ALA	-	expression tag	UNP Q9KFX9
C	-1	GLY	-	expression tag	UNP Q9KFX9
C	0	SER	-	expression tag	UNP Q9KFX9
D	-3	GLY	-	expression tag	UNP Q9KFX9
D	-2	ALA	-	expression tag	UNP Q9KFX9
D	-1	GLY	-	expression tag	UNP Q9KFX9
D	0	SER	-	expression tag	UNP Q9KFX9

- Molecule 2 is a protein called CRISPR-associated endonuclease Cas2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	E	100	Total	C	N	O	S	0	0
			780	489	134	153	4		
2	F	98	Total	C	N	O	S	0	0
			771	484	132	151	4		

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	-3	GLY	-	expression tag	UNP Q9KFX8
E	-2	ALA	-	expression tag	UNP Q9KFX8
E	-1	GLY	-	expression tag	UNP Q9KFX8
E	0	SER	-	expression tag	UNP Q9KFX8
F	-3	GLY	-	expression tag	UNP Q9KFX8
F	-2	ALA	-	expression tag	UNP Q9KFX8
F	-1	GLY	-	expression tag	UNP Q9KFX8
F	0	SER	-	expression tag	UNP Q9KFX8

- Molecule 3 is a DNA chain called HSI strand 2- integrated prespacer strand plus repeat.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	G	58	Total	C	N	O	P	0	0
			1187	568	203	359	57		

- Molecule 4 is a DNA chain called HSI strand 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	H	36	Total	C	N	O	P	0	0
			732	353	124	220	35		

- Molecule 5 is a protein called CRISPR-associated exonuclease Cas4.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	I	218	Total	C	N	O	S	0	0
			1775	1118	318	324	15		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	2	ALA	-	expression tag	UNP A0A4Y7WTW2
I	11	MET	LEU	conflict	UNP A0A4Y7WTW2
I	101	SER	CYS	conflict	UNP A0A4Y7WTW2

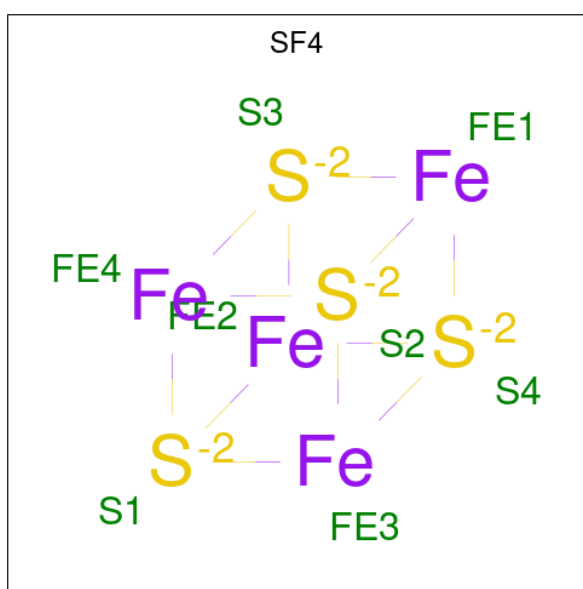
- Molecule 6 is a DNA chain called HSI strand 3 bottom strand leader-repeat.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	K	41	Total	C	N	O	P	0	0
			839	397	164	237	41		

- Molecule 7 is a DNA chain called HSI strand 4 top leader strand.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	L	11	Total	C	N	O	P	0	0
			225	108	36	70	11		

- Molecule 8 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe_4S_4) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
8	I	1	Total	Fe	S	0
			8	4	4	

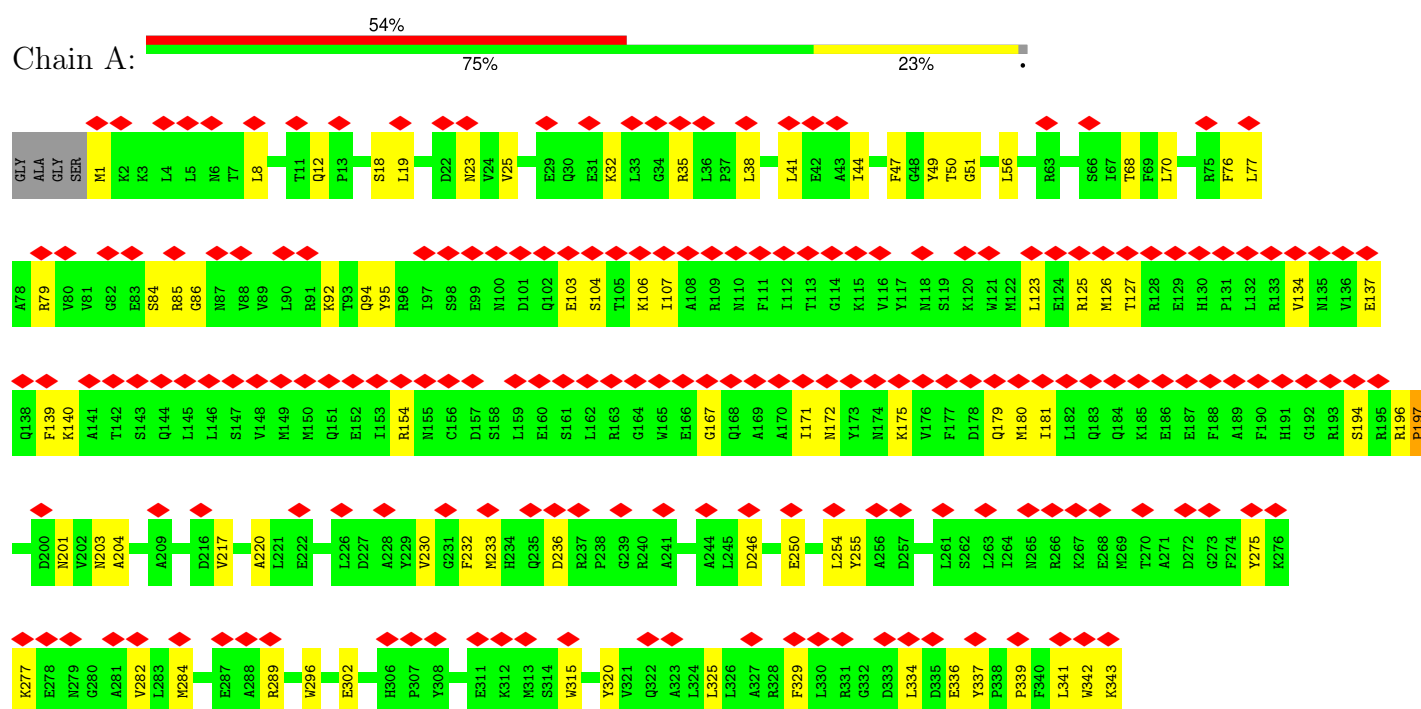
- Molecule 9 is MANGANESE (II) ION (CCD ID: MN) (formula: Mn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
9	I	1	Total	Mn	0
			1	1	

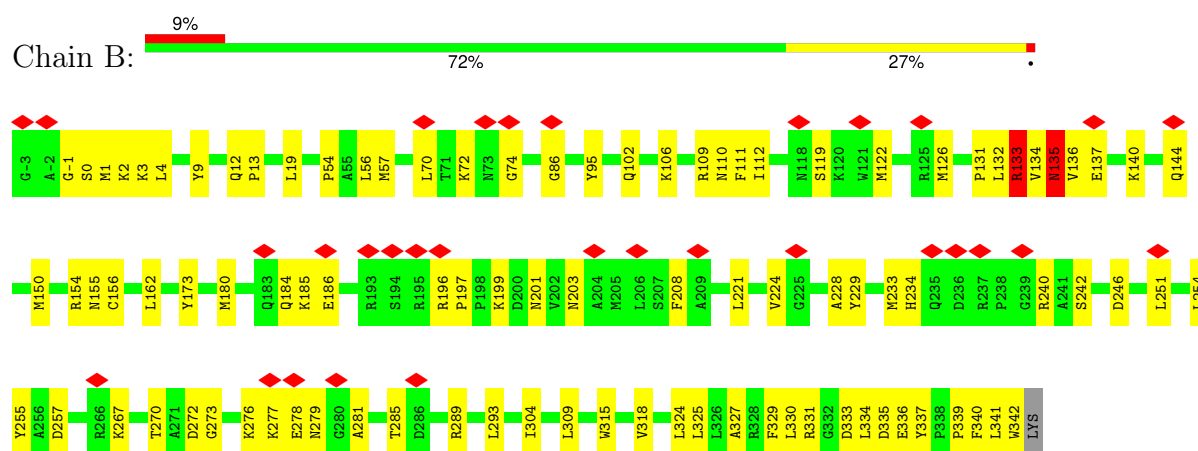
3 Residue-property plots

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.

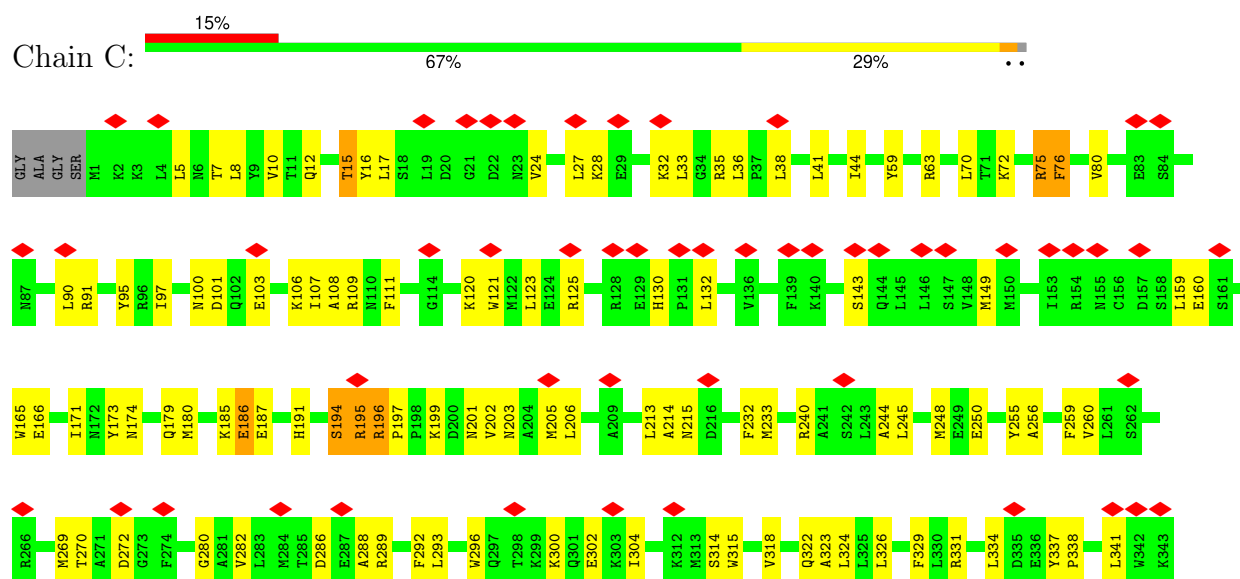
• Molecule 1: CRISPR-associated endonuclease Cas1



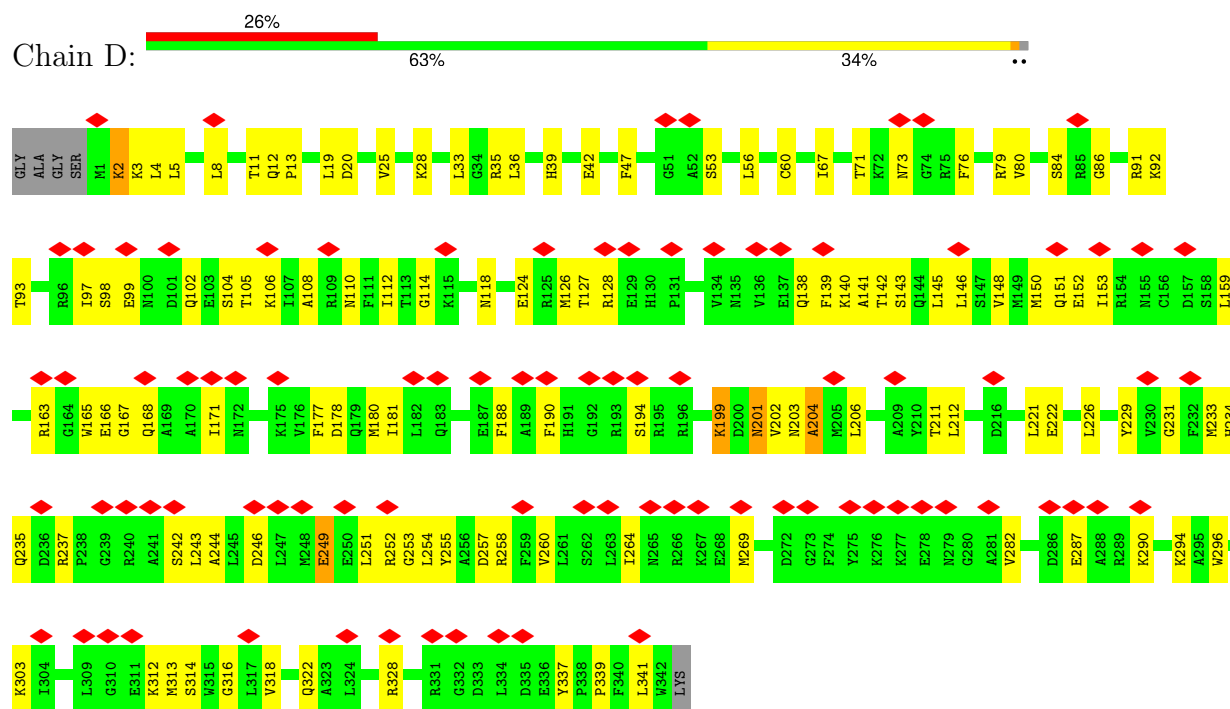
• Molecule 1: CRISPR-associated endonuclease Cas1



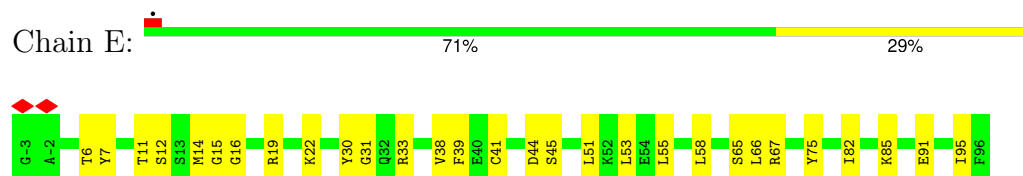
• Molecule 1: CRISPR-associated endonuclease Cas1



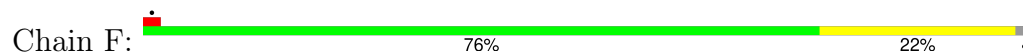
• Molecule 1: CRISPR-associated endonuclease Cas1

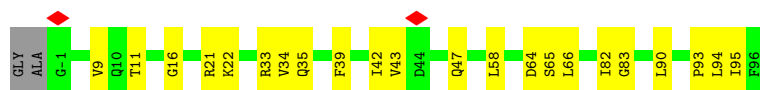


• Molecule 2: CRISPR-associated endonuclease Cas2



• Molecule 2: CRISPR-associated endonuclease Cas2





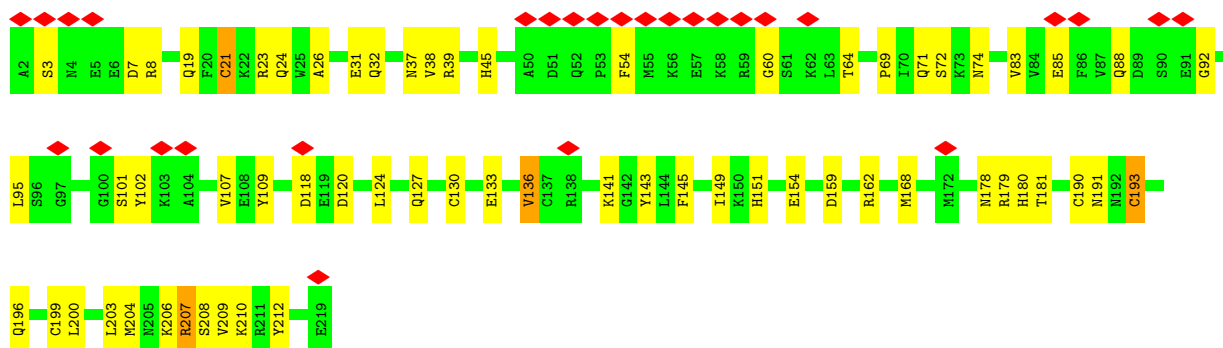
- Molecule 3: HSI strand 2- integrated prespacer strand plus repeat



- Molecule 4: HSI strand 2



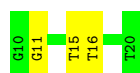
- Molecule 5: CRISPR-associated exonuclease Cas4



- Molecule 6: HSI strand 3 bottom strand leader-repeat



- Molecule 7: HSI strand 4 top leader strand



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	182000	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS GLACIOS	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	3500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.118	Depositor
Minimum map value	-0.375	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.020	Depositor
Recommended contour level	0.11	Depositor
Map size ($\text{\AA}$)	308.142, 308.142, 308.142	wwPDB
Map dimensions	340, 340, 340	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	0.9063, 0.9063, 0.9063	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: MN, SF4

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	0.21	0/2822	0.37	0/3803
1	B	0.40	2/2831 (0.1%)	0.56	3/3817 (0.1%)
1	C	0.33	0/2822	0.55	2/3803 (0.1%)
1	D	0.29	0/2812	0.58	4/3792 (0.1%)
2	E	0.14	0/788	0.34	0/1060
2	F	0.16	0/779	0.35	0/1048
3	G	0.25	0/1327	0.45	0/2049
4	H	0.20	0/818	0.40	0/1261
5	I	0.25	0/1809	0.46	0/2426
6	K	0.32	0/943	0.52	1/1451 (0.1%)
7	L	0.45	0/250	0.79	0/384
All	All	0.29	2/18001 (0.0%)	0.50	10/24894 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	133	ARG	C-N	14.65	1.47	1.33
1	B	132	LEU	C-N	-5.18	1.26	1.33

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	249	GLU	N-CA-C	-11.52	97.72	112.23
1	B	133	ARG	CA-C-N	-8.23	113.47	122.27
1	B	133	ARG	C-N-CA	-8.23	113.47	122.27
1	D	204	ALA	N-CA-C	-8.04	102.47	111.07
1	B	329	PHE	N-CA-C	-7.37	103.23	111.71
1	C	195	ARG	N-CA-C	-7.34	104.21	113.02
1	C	191	HIS	N-CA-C	-6.05	105.71	114.12
1	D	194	SER	N-CA-C	-5.30	101.52	109.15

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	K	9	DT	C4'-C3'-O3'	5.19	117.79	110.00
1	D	13	PRO	N-CA-C	5.15	119.39	111.57

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2768	0	2795	66	0
1	B	2777	0	2798	87	0
1	C	2768	0	2795	81	0
1	D	2758	0	2782	93	0
2	E	780	0	805	23	0
2	F	771	0	797	20	0
3	G	1187	0	661	52	0
4	H	732	0	412	38	0
5	I	1775	0	1783	79	0
6	K	839	0	457	35	0
7	L	225	0	127	4	0
8	I	8	0	0	2	0
9	I	1	0	0	0	0
All	All	17389	0	16212	466	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 14.

All (466) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:289:ARG:HD3	4:H:24:DT:O2	1.23	1.31
1:B:336:GLU:CD	5:I:209:VAL:HG23	1.62	1.22
4:H:19:DG:H2''	4:H:20:DT:C7	1.73	1.18
4:H:19:DG:C2'	4:H:20:DT:H71	1.73	1.16
4:H:19:DG:H2''	4:H:20:DT:H71	1.12	1.09

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:290:LYS:HG2	2:F:95:ILE:HG21	1.25	1.07
1:C:215:ASN:ND2	3:G:25:DT:C6	2.23	1.06
4:H:19:DG:C2'	4:H:20:DT:C7	2.35	0.99
1:B:335:ASP:OD2	5:I:208:SER:HB2	1.64	0.98
1:C:240:ARG:HH11	3:G:28:DT:H2''	1.28	0.98
1:B:196:ARG:HG3	1:B:197:PRO:HD3	1.46	0.95
1:B:336:GLU:O	5:I:209:VAL:HG21	1.67	0.94
1:A:289:ARG:CD	4:H:24:DT:O2	2.15	0.94
1:D:5:LEU:HB2	1:D:42:GLU:HB2	1.49	0.93
3:G:29:DG:C2	6:K:38:DA:C5	2.57	0.92
4:H:19:DG:H2''	4:H:20:DT:C5	2.07	0.89
1:A:275:TYR:HD2	5:I:54:PHE:CD1	1.91	0.89
1:B:334:LEU:HD21	5:I:203:LEU:CD1	2.02	0.89
1:D:328:ARG:HH22	6:K:29:DG:H5'	1.40	0.87
1:B:334:LEU:HD21	5:I:203:LEU:HD11	1.55	0.87
3:G:12:DC:H5	4:H:11:DG:H1	1.22	0.87
1:B:335:ASP:OD2	5:I:208:SER:CB	2.22	0.87
1:B:336:GLU:CD	5:I:209:VAL:CG2	2.47	0.86
1:B:336:GLU:OE2	5:I:209:VAL:HG23	1.74	0.86
1:B:9:TYR:HB2	2:E:95:ILE:HD12	1.59	0.84
3:G:29:DG:H1	6:K:37:DC:H5	1.25	0.84
1:A:139:PHE:HE1	1:A:179:GLN:HE21	1.28	0.81
1:D:243:LEU:HD12	1:D:246:ASP:HB3	1.61	0.81
1:B:333:ASP:HB3	5:I:204:MET:HE1	1.63	0.81
1:A:275:TYR:HD2	5:I:54:PHE:HD1	1.28	0.79
1:A:289:ARG:HD3	4:H:24:DT:C2	2.15	0.79
1:A:201:ASN:H	1:A:282:VAL:HG11	1.49	0.78
3:G:29:DG:N1	6:K:38:DA:N7	2.32	0.77
1:B:9:TYR:HB2	2:E:95:ILE:CD1	2.15	0.76
1:A:275:TYR:CD2	5:I:54:PHE:HD1	2.04	0.76
1:B:334:LEU:HD21	5:I:203:LEU:CG	2.16	0.75
1:B:185:LYS:HG3	1:B:186:GLU:H	1.52	0.74
6:K:40:DC:H2'	6:K:41:DG:C8	2.21	0.74
1:B:273:GLY:O	1:B:285:THR:OG1	2.05	0.74
1:A:275:TYR:CD2	5:I:54:PHE:CD1	2.76	0.73
1:B:324:LEU:CD2	5:I:200:LEU:HD11	2.17	0.73
1:A:196:ARG:HB2	5:I:71:GLN:HE22	1.53	0.73
4:H:19:DG:H2'	4:H:20:DT:C7	2.18	0.72
3:G:32:DG:H22	6:K:34:DG:H1	1.38	0.71
1:D:328:ARG:NH2	6:K:29:DG:H5'	2.05	0.71
6:K:43:DA:H2''	6:K:44:DA:C8	2.25	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:K:41:DG:H2''	6:K:42:DA:H5''	1.71	0.71
1:C:240:ARG:NH1	3:G:28:DT:H2''	2.02	0.71
1:C:199:LYS:HG3	1:C:280:GLY:HA3	1.73	0.70
3:G:36:DT:C2	6:K:31:DG:N2	2.60	0.70
1:B:334:LEU:HD21	5:I:203:LEU:HG	1.74	0.70
1:D:28:LYS:HE3	1:D:33:LEU:HD11	1.73	0.69
1:D:25:VAL:HG12	1:D:35:ARG:HB3	1.73	0.69
1:C:120:LYS:NZ	1:C:143:SER:OG	2.24	0.69
3:G:29:DG:C2	6:K:38:DA:C4	2.80	0.69
1:C:240:ARG:NH2	3:G:30:DT:OP2	2.26	0.69
1:D:234:HIS:H	1:D:243:LEU:HD22	1.58	0.68
1:D:303:LYS:HG2	1:D:312:LYS:HZ2	1.59	0.68
6:K:13:DT:H2''	6:K:14:DC:H5''	1.76	0.67
5:I:21:CYS:SG	8:I:301:SF4:FE1	1.77	0.67
5:I:26:ALA:HB1	5:I:181:THR:HG22	1.77	0.67
1:D:229:TYR:HA	1:D:244:ALA:H	1.58	0.67
1:D:246:ASP:HA	1:D:249:GLU:HB2	1.75	0.67
1:B:331:ARG:NH1	5:I:31:GLU:OE2	2.27	0.66
1:C:5:LEU:HD23	1:C:324:LEU:HD22	1.77	0.66
6:K:47:DC:H6	7:L:11:DG:H22	1.44	0.66
5:I:60:GLY:O	5:I:88:GLN:NE2	2.28	0.66
1:D:110:ASN:ND2	1:D:337:TYR:O	2.28	0.66
3:G:29:DG:N2	6:K:38:DA:C4	2.64	0.66
1:B:110:ASN:ND2	1:B:337:TYR:O	2.27	0.66
1:D:303:LYS:HG2	1:D:312:LYS:NZ	2.11	0.65
1:D:242:SER:O	1:D:246:ASP:N	2.30	0.65
1:A:104:SER:OG	1:A:232:PHE:O	2.15	0.64
2:E:31:GLY:HA3	2:E:41:CYS:HB3	1.80	0.64
1:B:334:LEU:CD2	5:I:203:LEU:HD11	2.25	0.64
1:C:215:ASN:ND2	3:G:25:DT:C5	2.52	0.64
2:E:33:ARG:NH1	4:H:14:DC:OP1	2.31	0.64
5:I:21:CYS:SG	5:I:190:CYS:SG	2.95	0.64
4:H:10:DG:H2'	4:H:11:DG:C8	2.32	0.64
1:D:163:ARG:O	1:D:166:GLU:HB2	1.97	0.63
4:H:19:DG:H2''	4:H:20:DT:C6	2.33	0.63
1:D:93:THR:O	1:D:97:ILE:HG12	1.99	0.63
1:B:54:PRO:HA	1:B:57:MET:HE2	1.80	0.63
1:A:196:ARG:HB3	1:A:197:PRO:HD2	1.81	0.63
1:B:199:LYS:NZ	1:B:279:ASN:OD1	2.32	0.63
5:I:196:GLN:HA	5:I:199:CYS:HB3	1.79	0.63
1:D:19:LEU:HD12	1:D:56:LEU:HA	1.79	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:29:DG:N1	6:K:38:DA:C5	2.66	0.62
4:H:4:DA:H2'	4:H:5:DG:H8	1.64	0.62
5:I:191:ASN:C	5:I:193:CYS:H	2.08	0.62
1:B:335:ASP:OD2	5:I:208:SER:HB3	2.00	0.62
4:H:15:DA:H2''	4:H:16:DC:H5''	1.81	0.62
1:C:329:PHE:HA	1:C:334:LEU:HB2	1.82	0.62
1:A:47:PHE:HZ	1:A:320:TYR:HE2	1.48	0.62
1:B:102:GLN:O	1:B:106:LYS:HG3	2.00	0.62
1:B:336:GLU:H	5:I:209:VAL:CG2	2.13	0.61
1:A:103:GLU:HA	1:A:106:LYS:HD2	1.81	0.61
1:C:244:ALA:O	1:C:248:MET:HG3	2.02	0.60
3:G:29:DG:N2	6:K:38:DA:N9	2.48	0.60
4:H:4:DA:H2'	4:H:5:DG:C8	2.35	0.60
1:C:300:LYS:O	1:C:314:SER:OG	2.18	0.60
1:D:138:GLN:O	1:D:141:ALA:HB3	2.02	0.60
1:D:322:GLN:OE1	1:D:337:TYR:OH	2.14	0.60
1:C:304:ILE:HD13	1:C:315:TRP:CE2	2.37	0.60
1:D:150:MET:O	1:D:153:ILE:HG22	2.02	0.60
1:C:149:MET:HG2	1:C:165:TRP:HZ3	1.67	0.60
4:H:7:DT:H2'	4:H:8:DG:C8	2.37	0.59
4:H:8:DG:H2'	4:H:9:DA:C8	2.38	0.59
1:D:178:ASP:HA	1:D:190:PHE:HE1	1.67	0.58
1:D:76:PHE:HZ	1:D:79:ARG:HB2	1.67	0.58
1:A:196:ARG:HB2	5:I:71:GLN:NE2	2.18	0.58
1:C:80:VAL:HG22	1:D:80:VAL:HG22	1.85	0.58
1:C:149:MET:HG2	1:C:165:TRP:CZ3	2.38	0.58
1:C:250:GLU:OE1	1:C:322:GLN:NE2	2.36	0.58
7:L:15:DT:H1'	7:L:16:DT:H5'	1.84	0.58
1:B:251:LEU:HD11	1:B:318:VAL:HG12	1.85	0.58
1:C:179:GLN:HA	1:C:185:LYS:NZ	2.18	0.58
1:B:196:ARG:CG	1:B:197:PRO:HD3	2.29	0.57
2:F:11:THR:HA	2:F:16:GLY:HA3	1.86	0.57
1:C:90:LEU:HD21	1:C:331:ARG:HE	1.69	0.57
1:B:201:ASN:O	1:B:203:ASN:N	2.36	0.57
1:B:251:LEU:O	1:B:255:TYR:HB3	2.05	0.57
1:C:130:HIS:CE1	1:C:132:LEU:HB2	2.40	0.57
1:D:294:LYS:HG2	2:F:93:PRO:CB	2.34	0.57
1:A:70:LEU:HD23	1:A:76:PHE:HA	1.86	0.57
1:A:302:GLU:HB3	1:A:315:TRP:HD1	1.69	0.57
1:C:201:ASN:HA	1:C:282:VAL:HG21	1.87	0.57
1:D:39:HIS:HD2	2:F:47:GLN:OE1	1.88	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:H:19:DG:H2'	4:H:20:DT:H71	1.72	0.57
1:C:245:LEU:HD11	3:G:28:DT:C6	2.40	0.56
1:A:339:PRO:HG2	1:A:341:LEU:HG	1.86	0.56
1:B:234:HIS:NE2	1:B:246:ASP:OD1	2.38	0.56
1:A:194:SER:H	1:A:203:ASN:HD21	1.54	0.56
5:I:19:GLN:HB2	5:I:168:MET:HE1	1.87	0.56
6:K:42:DA:H2''	6:K:43:DA:H5''	1.87	0.56
1:A:38:LEU:HD23	1:A:41:LEU:HD22	1.87	0.56
4:H:30:DA:N1	5:I:24:GLN:NE2	2.52	0.56
3:G:4:DC:H2'	3:G:5:DT:H71	1.87	0.56
5:I:83:VAL:HB	5:I:107:VAL:O	2.06	0.56
1:C:214:ALA:HA	1:C:248:MET:HE2	1.87	0.56
3:G:29:DG:C4	6:K:38:DA:C6	2.94	0.56
1:A:250:GLU:OE2	1:A:337:TYR:OH	2.20	0.56
1:B:327:ALA:HA	1:B:330:LEU:HD12	1.86	0.55
3:G:29:DG:C5	6:K:38:DA:N6	2.74	0.55
1:A:23:ASN:OD1	1:A:35:ARG:NH2	2.39	0.55
2:E:6:THR:HG22	2:E:38:VAL:HG23	1.87	0.55
1:D:243:LEU:HA	1:D:246:ASP:HB2	1.89	0.55
4:H:7:DT:H2'	4:H:8:DG:H8	1.72	0.55
5:I:109:TYR:HB3	5:I:145:PHE:HB3	1.89	0.55
1:A:107:ILE:HG21	1:A:232:PHE:HD2	1.72	0.55
1:A:127:THR:HG22	1:A:139:PHE:HD2	1.71	0.55
2:E:12:SER:HB2	4:H:11:DG:H3'	1.89	0.55
1:C:16:TYR:HB3	1:C:27:LEU:HB2	1.89	0.55
1:C:245:LEU:HD13	1:C:248:MET:SD	2.47	0.55
1:D:11:THR:HA	1:D:47:PHE:HB2	1.88	0.55
2:F:21:ARG:NH1	4:H:5:DG:OP2	2.40	0.55
3:G:9:DG:H2''	3:G:10:DG:C8	2.42	0.55
5:I:23:ARG:NH1	5:I:204:MET:SD	2.81	0.54
1:C:28:LYS:HD2	1:C:33:LEU:HD22	1.89	0.54
6:K:41:DG:H2''	6:K:42:DA:C8	2.42	0.54
1:B:208:PHE:HE2	1:B:293:LEU:HD21	1.72	0.54
1:B:340:PHE:CE2	1:B:342:TRP:HB2	2.43	0.54
1:C:240:ARG:HH12	3:G:29:DG:H5''	1.73	0.54
1:D:339:PRO:HG2	1:D:341:LEU:HD21	1.90	0.54
1:C:179:GLN:HA	1:C:185:LYS:HZ1	1.72	0.54
1:D:124:GLU:HB3	1:D:128:ARG:NH2	2.21	0.54
6:K:35:DG:H2''	6:K:36:DA:H8	1.72	0.54
1:A:275:TYR:HD2	5:I:54:PHE:CE1	2.25	0.53
1:B:336:GLU:OE1	5:I:210:LYS:HG3	2.07	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:324:LEU:HD22	5:I:200:LEU:HD11	1.90	0.53
1:D:112:ILE:HB	1:D:153:ILE:HD11	1.90	0.53
4:H:6:DC:H2'	4:H:7:DT:C6	2.44	0.53
1:B:86:GLY:O	5:I:32:GLN:HG3	2.08	0.53
1:D:253:GLY:O	1:D:257:ASP:HB2	2.09	0.53
1:B:233:MET:SD	1:B:234:HIS:N	2.68	0.52
1:B:304:ILE:HD13	1:B:315:TRP:CZ3	2.44	0.52
1:B:336:GLU:CD	5:I:210:LYS:HG3	2.35	0.52
1:D:98:SER:O	1:D:99:GLU:HG3	2.09	0.52
5:I:207:ARG:HH21	6:K:12:DA:H1'	1.75	0.52
5:I:37:ASN:OD1	5:I:38:VAL:N	2.40	0.52
3:G:9:DG:H2''	3:G:10:DG:H8	1.75	0.52
1:C:107:ILE:HG21	1:C:232:PHE:HD2	1.75	0.52
1:B:336:GLU:OE2	5:I:210:LYS:HA	2.10	0.52
1:A:50:THR:OG1	1:A:51:GLY:N	2.42	0.52
1:C:59:TYR:OH	1:C:63:ARG:NH1	2.43	0.52
1:C:111:PHE:HE1	1:C:337:TYR:CD2	2.28	0.51
1:D:39:HIS:CD2	2:F:47:GLN:OE1	2.63	0.51
3:G:22:DG:H2'	3:G:23:DT:C4	2.45	0.51
4:H:1:DC:H2''	4:H:2:DG:C8	2.45	0.51
5:I:3:SER:O	5:I:7:ASP:N	2.41	0.51
1:B:336:GLU:H	5:I:209:VAL:HG21	1.75	0.51
1:A:233:MET:N	1:A:246:ASP:OD2	2.41	0.51
1:B:341:LEU:HD12	5:I:212:TYR:CE2	2.46	0.51
2:E:65:SER:HA	2:F:83:GLY:HA3	1.91	0.51
5:I:124:LEU:O	5:I:127:GLN:HB2	2.10	0.51
1:C:111:PHE:HE1	1:C:337:TYR:HD2	1.59	0.51
4:H:26:DT:H2''	4:H:27:DT:O4'	2.11	0.51
1:C:245:LEU:HD11	3:G:28:DT:C5	2.46	0.51
1:A:19:LEU:HB2	1:A:56:LEU:HB2	1.93	0.50
1:B:336:GLU:OE2	5:I:210:LYS:N	2.44	0.50
1:B:336:GLU:CG	5:I:209:VAL:HG23	2.40	0.50
1:C:194:SER:H	1:C:203:ASN:HD21	1.60	0.50
3:G:29:DG:N2	6:K:38:DA:C8	2.80	0.50
3:G:40:DC:H2''	3:G:41:DA:C8	2.46	0.50
1:A:95:TYR:CE1	1:A:230:VAL:HG21	2.46	0.50
2:E:53:LEU:HD11	5:I:45:HIS:CD2	2.45	0.50
1:B:135:ASN:C	1:B:137:GLU:H	2.20	0.50
1:B:334:LEU:CD2	5:I:203:LEU:CD1	2.82	0.50
2:F:34:VAL:HG12	2:F:35:GLN:HG3	1.94	0.50
1:C:173:TYR:O	1:C:174:ASN:C	2.53	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:33:ARG:HG2	2:F:39:PHE:CE1	2.45	0.50
1:A:134:VAL:HG13	1:A:139:PHE:CE2	2.47	0.50
1:C:7:THR:HG21	1:C:324:LEU:HD11	1.94	0.50
3:G:11:DT:H2''	3:G:12:DC:O2	2.12	0.50
1:A:18:SER:OG	1:A:19:LEU:N	2.45	0.50
1:D:140:LYS:O	1:D:143:SER:HB2	2.11	0.50
1:C:196:ARG:O	1:C:197:PRO:C	2.52	0.49
4:H:19:DG:H2'	4:H:20:DT:H73	1.92	0.49
1:C:32:LYS:HZ2	1:C:35:ARG:HB2	1.77	0.49
1:D:19:LEU:HD23	1:D:20:ASP:N	2.27	0.49
1:C:205:MET:HE1	1:C:260:VAL:HG13	1.93	0.49
5:I:107:VAL:HG22	5:I:143:TYR:HB2	1.94	0.49
1:B:276:LYS:NZ	1:B:279:ASN:O	2.44	0.49
5:I:64:THR:HG22	5:I:85:GLU:HG2	1.94	0.49
1:A:197:PRO:HG3	5:I:69:PRO:HB2	1.95	0.49
1:A:204:ALA:HB2	1:A:282:VAL:HG23	1.94	0.49
1:C:24:VAL:HB	1:C:38:LEU:HD21	1.95	0.49
1:B:336:GLU:OE2	5:I:210:LYS:CA	2.60	0.49
1:C:338:PRO:HB3	1:C:341:LEU:HB3	1.93	0.49
1:D:249:GLU:HG3	1:D:252:ARG:HE	1.78	0.49
1:D:296:TRP:HE1	1:D:300:LYS:HE2	1.78	0.49
6:K:43:DA:H2''	6:K:44:DA:H8	1.77	0.49
1:C:28:LYS:HB2	1:C:33:LEU:HD22	1.95	0.49
1:D:142:THR:O	1:D:145:LEU:HG	2.13	0.49
1:A:125:ARG:NH1	1:A:343:LYS:OXT	2.46	0.49
1:C:270:THR:OG1	1:C:272:ASP:OD1	2.28	0.49
1:A:25:VAL:HG23	1:A:32:LYS:HE3	1.93	0.49
1:A:275:TYR:CD2	5:I:54:PHE:CE1	3.01	0.49
1:D:79:ARG:NH2	1:D:222:GLU:OE2	2.32	0.49
1:D:108:ALA:HB2	1:D:233:MET:HG2	1.95	0.48
1:D:145:LEU:HD12	1:D:146:LEU:HD12	1.94	0.48
3:G:21:DC:H2''	3:G:22:DG:O5'	2.13	0.48
1:D:127:THR:HB	1:D:139:PHE:HD2	1.78	0.48
1:A:85:ARG:HD2	1:A:85:ARG:O	2.13	0.48
1:A:284:MET:O	5:I:54:PHE:HZ	1.96	0.48
1:B:336:GLU:C	5:I:209:VAL:HG21	2.35	0.48
1:A:8:LEU:HB3	1:A:44:ILE:HD13	1.96	0.48
1:C:12:GLN:O	1:C:15:THR:HG22	2.13	0.48
1:C:240:ARG:HH22	3:G:30:DT:P	2.36	0.48
1:D:243:LEU:HA	1:D:246:ASP:CB	2.43	0.48
1:A:196:ARG:CB	5:I:71:GLN:HE22	2.24	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:H:30:DA:H1'	5:I:39:ARG:HB3	1.94	0.48
5:I:159:ASP:HA	5:I:162:ARG:HG3	1.95	0.48
1:A:254:LEU:HD13	1:A:342:TRP:HE3	1.79	0.48
1:D:71:THR:O	1:D:73:ASN:N	2.47	0.48
5:I:191:ASN:C	5:I:193:CYS:N	2.72	0.48
1:D:152:GLU:OE2	1:D:165:TRP:NE1	2.46	0.48
7:L:15:DT:C2'	7:L:16:DT:H71	2.43	0.48
2:E:22:LYS:HB3	2:E:58:LEU:HD21	1.96	0.48
7:L:15:DT:H2'	7:L:16:DT:H71	1.95	0.48
1:B:122:MET:O	1:B:126:MET:HG3	2.14	0.48
1:D:163:ARG:HD3	1:D:163:ARG:C	2.38	0.48
1:B:336:GLU:CG	5:I:209:VAL:CG2	2.92	0.47
1:D:165:TRP:HE3	1:D:168:GLN:HG3	1.79	0.47
1:D:234:HIS:HB2	1:D:243:LEU:HB2	1.96	0.47
3:G:12:DC:H2''	3:G:13:DC:H5''	1.95	0.47
5:I:95:LEU:H	5:I:95:LEU:HD23	1.79	0.47
1:A:68:THR:OG1	1:A:79:ARG:NH1	2.47	0.47
4:H:14:DC:H2''	4:H:15:DA:C8	2.49	0.47
1:A:85:ARG:HB2	1:B:229:TYR:HE2	1.78	0.47
1:D:167:GLY:O	1:D:171:ILE:HG12	2.14	0.47
1:D:177:PHE:O	1:D:180:MET:HB2	2.14	0.47
1:D:201:ASN:H	1:D:282:VAL:HG21	1.79	0.47
5:I:193:CYS:HB3	8:I:301:SF4:S3	2.55	0.47
6:K:41:DG:H2''	6:K:42:DA:H8	1.80	0.47
1:C:75:ARG:O	1:C:76:PHE:C	2.57	0.47
1:D:328:ARG:HH12	6:K:29:DG:H5'	1.80	0.47
1:D:287:GLU:HA	1:D:290:LYS:HE2	1.95	0.47
4:H:16:DC:H2''	4:H:17:DC:H5'	1.96	0.47
1:D:151:GLN:HG3	1:D:152:GLU:N	2.29	0.47
3:G:10:DG:H2'	3:G:11:DT:H71	1.96	0.47
1:B:70:LEU:HD22	1:B:74:GLY:HA2	1.97	0.47
1:C:202:VAL:O	1:C:206:LEU:HD23	2.15	0.47
1:D:199:LYS:HD2	1:D:204:ALA:HA	1.97	0.47
2:E:6:THR:OG1	2:E:67:ARG:HB2	2.15	0.47
3:G:7:DG:C8	3:G:8:DT:H72	2.50	0.47
1:A:167:GLY:O	1:A:171:ILE:HG12	2.14	0.47
1:C:304:ILE:HD11	1:C:318:VAL:HG21	1.97	0.47
1:D:76:PHE:CZ	1:D:79:ARG:HB2	2.48	0.47
1:D:102:GLN:O	1:D:105:THR:HG22	2.15	0.47
2:E:66:LEU:HD22	2:F:82:ILE:HD12	1.97	0.47
2:E:82:ILE:HD12	2:F:66:LEU:HD22	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:57:DA:H2'	3:G:58:DA:C8	2.50	0.47
1:D:98:SER:OG	1:D:99:GLU:N	2.48	0.46
6:K:25:DT:H2''	6:K:26:DG:C8	2.49	0.46
4:H:12:DA:H2''	4:H:13:DC:H5'	1.98	0.46
1:D:254:LEU:O	1:D:258:ARG:HB3	2.15	0.46
2:E:55:LEU:HD23	2:E:66:LEU:HD11	1.97	0.46
1:A:236:ASP:O	5:I:179:ARG:NH2	2.48	0.46
1:B:228:ALA:C	1:B:229:TYR:HD1	2.24	0.46
1:B:199:LYS:HD2	1:B:281:ALA:HA	1.97	0.46
1:C:302:GLU:OE2	1:C:315:TRP:NE1	2.47	0.46
1:C:256:ALA:O	1:C:260:VAL:HG23	2.15	0.46
1:D:235:GLN:HB2	1:D:237:ARG:HG2	1.97	0.46
1:B:12:GLN:HA	1:B:13:PRO:HD3	1.85	0.46
1:C:205:MET:SD	1:C:260:VAL:HG22	2.56	0.46
1:D:126:MET:HE1	1:D:180:MET:O	2.15	0.46
1:D:231:GLY:H	1:D:243:LEU:HD23	1.81	0.46
1:D:8:LEU:HD12	1:D:36:LEU:HD22	1.97	0.46
5:I:141:LYS:NZ	5:I:154:GLU:OE1	2.41	0.46
3:G:29:DG:N1	6:K:37:DC:H5	2.04	0.46
1:A:103:GLU:OE1	1:A:103:GLU:N	2.38	0.45
1:A:137:GLU:HA	1:A:140:LYS:HG2	1.99	0.45
1:B:277:LYS:HG2	1:B:278:GLU:H	1.81	0.45
1:C:106:LYS:O	1:C:109:ARG:HG2	2.15	0.45
1:D:145:LEU:O	1:D:148:VAL:HB	2.16	0.45
1:D:313:MET:HG2	1:D:314:SER:N	2.31	0.45
1:D:102:GLN:O	1:D:106:LYS:HG3	2.17	0.45
1:D:181:ILE:HB	1:D:190:PHE:CE2	2.52	0.45
1:A:126:MET:HE1	1:A:180:MET:O	2.17	0.45
1:A:236:ASP:OD1	1:A:236:ASP:N	2.50	0.45
1:D:114:GLY:O	1:D:118:ASN:ND2	2.50	0.45
1:B:324:LEU:HD21	5:I:200:LEU:HD11	1.98	0.45
5:I:88:GLN:HG3	5:I:102:TYR:HE1	1.82	0.45
1:D:269:MET:HE3	1:D:269:MET:HB2	1.92	0.45
2:F:33:ARG:HH22	3:G:14:DT:P	2.40	0.45
1:A:196:ARG:CB	5:I:71:GLN:NE2	2.79	0.45
1:D:260:VAL:O	1:D:264:ILE:HG12	2.17	0.45
3:G:21:DC:H2'	3:G:22:DG:C5	2.52	0.45
1:D:86:GLY:O	1:D:91:ARG:NH2	2.42	0.45
5:I:72:SER:HB2	5:I:130:CYS:HA	1.98	0.45
1:B:257:ASP:OD1	1:B:257:ASP:N	2.49	0.45
1:C:213:LEU:HD13	1:C:255:TYR:CE2	2.52	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:318:VAL:O	1:D:322:GLN:HG2	2.16	0.44
3:G:5:DT:H2'	3:G:6:DG:C8	2.53	0.44
1:C:286:ASP:O	1:C:289:ARG:HG2	2.16	0.44
4:H:3:DT:H2''	4:H:4:DA:H8	1.81	0.44
1:A:181:ILE:HD12	1:A:181:ILE:H	1.82	0.44
1:B:180:MET:HE3	1:B:180:MET:HB3	1.88	0.44
1:C:91:ARG:NH2	1:D:84:SER:OG	2.50	0.44
1:D:234:HIS:CB	1:D:243:LEU:HB2	2.47	0.44
4:H:14:DC:H2''	4:H:15:DA:H8	1.82	0.44
1:B:140:LYS:O	1:B:144:GLN:OE1	2.35	0.44
6:K:44:DA:N1	6:K:45:DA:C2	2.86	0.44
1:C:41:LEU:HD21	1:C:44:ILE:HG13	1.99	0.44
1:A:123:LEU:O	1:A:127:THR:HG23	2.17	0.44
1:B:197:PRO:HB3	1:B:281:ALA:HB2	1.99	0.44
1:C:322:GLN:HG2	1:C:337:TYR:OH	2.18	0.44
4:H:21:DA:H2'	4:H:22:DC:C6	2.53	0.44
5:I:193:CYS:SG	5:I:196:GLN:HB2	2.57	0.44
1:C:95:TYR:HD1	1:D:92:LYS:HE2	1.83	0.44
1:D:4:LEU:HD13	1:D:316:GLY:HA3	2.00	0.44
1:D:290:LYS:O	1:D:294:LYS:HG3	2.17	0.44
3:G:2:DT:H2''	3:G:3:DA:C8	2.53	0.44
1:C:194:SER:C	1:C:196:ARG:H	2.25	0.44
2:E:7:TYR:HE1	2:E:39:PHE:CE1	2.36	0.44
1:C:245:LEU:HD21	3:G:28:DT:C4	2.53	0.43
1:D:39:HIS:NE2	2:F:43:VAL:HG12	2.33	0.43
3:G:21:DC:O2	3:G:22:DG:H5'	2.18	0.43
1:A:217:VAL:O	1:A:220:ALA:HB3	2.19	0.43
1:C:240:ARG:NH2	3:G:30:DT:P	2.91	0.43
2:F:42:ILE:HD12	2:F:90:LEU:HB2	2.00	0.43
3:G:31:DC:H2''	3:G:32:DG:C8	2.53	0.43
6:K:42:DA:H2''	6:K:43:DA:C8	2.52	0.43
1:B:309:LEU:HD11	1:B:325:LEU:HD21	2.00	0.43
1:D:199:LYS:HA	1:D:199:LYS:HD3	1.77	0.43
3:G:2:DT:H2''	3:G:3:DA:H8	1.84	0.43
1:B:184:GLN:OE1	1:B:267:LYS:HG3	2.18	0.43
1:C:100:ASN:OD1	1:C:101:ASP:N	2.47	0.43
1:D:104:SER:HB2	1:D:159:LEU:HD11	2.01	0.43
3:G:18:DC:H2''	3:G:19:DT:H5'	2.00	0.43
1:B:110:ASN:HB3	1:B:339:PRO:HG3	2.01	0.43
1:B:111:PHE:CE2	1:B:246:ASP:HB3	2.54	0.43
1:C:194:SER:HB2	1:C:196:ARG:O	2.17	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:293:LEU:HD13	3:G:24:DT:N3	2.34	0.43
1:A:84:SER:C	1:A:86:GLY:H	2.27	0.43
1:B:324:LEU:CD2	5:I:200:LEU:CD1	2.94	0.43
2:E:15:GLY:O	2:E:19:ARG:NH2	2.51	0.43
1:A:94:GLN:NE2	1:A:230:VAL:O	2.52	0.43
1:C:289:ARG:O	1:C:293:LEU:HG	2.19	0.43
1:C:323:ALA:O	1:C:326:LEU:HB3	2.19	0.43
2:E:85:LYS:HB2	2:F:65:SER:HB2	2.01	0.43
1:C:108:ALA:HB2	1:C:233:MET:HB2	2.01	0.43
1:D:124:GLU:O	1:D:127:THR:HG22	2.18	0.43
1:D:178:ASP:HA	1:D:190:PHE:CE1	2.52	0.43
2:E:14:MET:SD	2:E:14:MET:N	2.92	0.43
3:G:27:DT:H5''	3:G:27:DT:O2	2.19	0.43
1:C:32:LYS:HZ1	1:C:35:ARG:HD3	1.84	0.42
1:C:123:LEU:HD13	1:C:123:LEU:HA	1.89	0.42
5:I:178:ASN:O	5:I:180:HIS:N	2.52	0.42
1:D:294:LYS:HG2	2:F:93:PRO:CG	2.49	0.42
1:A:49:TYR:CD2	3:G:1:DG:N3	2.87	0.42
5:I:92:GLY:O	5:I:101:SER:OG	2.35	0.42
1:D:243:LEU:C	1:D:246:ASP:H	2.28	0.42
1:D:229:TYR:HA	1:D:244:ALA:N	2.28	0.42
1:D:251:LEU:HD12	1:D:255:TYR:HB2	2.01	0.42
4:H:19:DG:C2'	4:H:20:DT:H73	2.41	0.42
1:B:112:ILE:HG13	1:B:162:LEU:HD21	2.02	0.42
2:F:9:VAL:HA	2:F:64:ASP:HB2	2.01	0.42
1:A:92:LYS:HG3	1:B:95:TYR:HE1	1.84	0.42
1:B:185:LYS:HG3	1:B:186:GLU:N	2.28	0.42
2:E:44:ASP:OD1	2:E:45:SER:N	2.46	0.42
1:B:72:LYS:NZ	1:B:289:ARG:HH22	2.17	0.42
1:B:304:ILE:HD13	1:B:315:TRP:HZ3	1.83	0.42
3:G:49:DG:C8	3:G:50:DT:H72	2.55	0.42
5:I:149:ILE:HB	5:I:151:HIS:ND1	2.35	0.42
1:A:329:PHE:CE1	1:A:336:GLU:HA	2.54	0.42
1:B:240:ARG:O	1:B:242:SER:N	2.53	0.42
2:E:11:THR:HA	2:E:16:GLY:HA2	2.01	0.42
2:F:22:LYS:HE2	2:F:58:LEU:HD22	2.02	0.42
6:K:26:DG:H2''	6:K:27:DA:C8	2.55	0.42
1:B:337:TYR:O	1:B:339:PRO:HD3	2.20	0.41
1:C:259:PHE:HE2	1:C:292:PHE:CZ	2.38	0.41
1:D:328:ARG:NH1	6:K:29:DG:H5'	2.35	0.41
1:A:51:GLY:HA2	1:B:54:PRO:HD3	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:8:LEU:HD11	1:C:36:LEU:HD13	2.02	0.41
1:C:159:LEU:O	1:C:160:GLU:C	2.62	0.41
1:C:194:SER:H	1:C:203:ASN:ND2	2.18	0.41
1:B:19:LEU:HD13	1:B:56:LEU:HA	2.02	0.41
1:B:255:TYR:HE1	1:B:315:TRP:CD1	2.37	0.41
1:C:240:ARG:CD	3:G:28:DT:O2	2.68	0.41
1:D:294:LYS:HG2	2:F:93:PRO:HG2	2.02	0.41
1:B:119:SER:HB3	1:B:173:TYR:CD1	2.56	0.41
1:A:255:TYR:HE1	1:A:296:TRP:CH2	2.39	0.41
1:B:109:ARG:NE	1:B:156:CYS:O	2.51	0.41
1:B:221:LEU:O	1:B:224:VAL:HG12	2.21	0.41
1:D:53:SER:O	1:D:56:LEU:N	2.53	0.41
1:D:60:CYS:SG	1:D:67:ILE:HD11	2.60	0.41
5:I:88:GLN:HA	5:I:102:TYR:HD1	1.85	0.41
1:B:270:THR:HG22	1:B:272:ASP:H	1.86	0.41
1:C:8:LEU:HB2	1:C:41:LEU:HD11	2.01	0.41
1:A:277:LYS:HD3	1:A:277:LYS:HA	1.86	0.41
1:B:4:LEU:HD12	1:B:4:LEU:HA	1.79	0.41
1:D:2:LYS:HE3	1:D:2:LYS:HB3	1.38	0.41
6:K:33:DC:H2''	6:K:34:DG:H5''	2.03	0.41
1:A:1:MET:HG3	1:A:12:GLN:HE22	1.84	0.41
1:B:12:GLN:H	1:B:12:GLN:HG2	1.72	0.41
1:C:97:ILE:HG23	1:C:103:GLU:HB2	2.02	0.41
1:C:269:MET:HE1	1:C:288:ALA:HB1	2.02	0.41
2:E:53:LEU:HD21	5:I:45:HIS:CG	2.56	0.41
3:G:29:DG:C2	6:K:38:DA:C8	3.09	0.41
3:G:52:DG:H2''	3:G:53:DA:C8	2.56	0.41
1:A:77:LEU:HA	1:A:77:LEU:HD23	1.84	0.41
1:A:172:ASN:O	1:A:175:LYS:HG2	2.21	0.41
1:C:296:TRP:CD1	1:C:300:LYS:HD2	2.56	0.41
2:E:30:TYR:HD2	2:E:51:LEU:HD22	1.86	0.41
4:H:19:DG:C2'	4:H:20:DT:C5	2.86	0.40
1:B:-1:GLY:O	1:B:0:SER:C	2.64	0.40
1:B:254:LEU:HD23	1:B:254:LEU:HA	1.84	0.40
1:B:336:GLU:H	5:I:209:VAL:HG22	1.83	0.40
5:I:74:ASN:H	5:I:133:GLU:CD	2.28	0.40
1:A:325:LEU:HD23	1:A:325:LEU:HA	1.90	0.40
1:B:304:ILE:HD13	1:B:315:TRP:CE3	2.57	0.40
1:C:10:VAL:HG21	1:C:17:LEU:HD21	2.03	0.40
1:C:121:TRP:HD1	1:C:125:ARG:HH21	1.69	0.40
1:C:186:GLU:H	1:C:186:GLU:HG2	1.61	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:30:TYR:CD2	2:E:51:LEU:HD13	2.55	0.40
2:E:75:TYR:OH	2:E:91:GLU:OE1	2.20	0.40
3:G:29:DG:N1	6:K:38:DA:C8	2.88	0.40
1:A:329:PHE:HA	1:A:334:LEU:HB2	2.03	0.40
1:D:188:PHE:CE2	1:D:264:ILE:HD12	2.57	0.40
1:D:221:LEU:HD22	1:D:226:LEU:HD11	2.04	0.40
4:H:30:DA:H1'	5:I:39:ARG:CB	2.51	0.40
4:H:31:DA:N3	4:H:31:DA:H2'	2.36	0.40
1:C:255:TYR:HD1	1:C:315:TRP:CE3	2.39	0.40
2:F:94:LEU:HD23	2:F:94:LEU:HA	1.92	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	341/347 (98%)	323 (95%)	17 (5%)	1 (0%)	36	71
1	B	344/347 (99%)	301 (88%)	39 (11%)	4 (1%)	10	43
1	C	341/347 (98%)	301 (88%)	39 (11%)	1 (0%)	36	71
1	D	340/347 (98%)	308 (91%)	30 (9%)	2 (1%)	21	58
2	E	98/100 (98%)	92 (94%)	6 (6%)	0	100	100
2	F	96/100 (96%)	88 (92%)	8 (8%)	0	100	100
5	I	216/218 (99%)	198 (92%)	15 (7%)	3 (1%)	9	39
All	All	1776/1806 (98%)	1611 (91%)	154 (9%)	11 (1%)	23	58

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	197	PRO

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Mol	Chain	Res	Type
1	C	76	PHE
5	I	118	ASP
1	B	1	MET
1	B	133	ARG
1	B	135	ASN
1	B	131	PRO
1	D	201	ASN
1	D	199	LYS
5	I	21	CYS
5	I	136	VAL

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	295/296 (100%)	294 (100%)	1 (0%)	86	84
1	B	295/296 (100%)	286 (97%)	9 (3%)	35	56
1	C	295/296 (100%)	283 (96%)	12 (4%)	27	49
1	D	294/296 (99%)	286 (97%)	8 (3%)	39	60
2	E	89/89 (100%)	89 (100%)	0	100	100
2	F	89/89 (100%)	89 (100%)	0	100	100
5	I	197/197 (100%)	191 (97%)	6 (3%)	36	57
All	All	1554/1559 (100%)	1518 (98%)	36 (2%)	44	63

All (36) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	154	ARG
1	B	2	LYS
1	B	3	LYS
1	B	133	ARG
1	B	134	VAL
1	B	135	ASN
1	B	136	VAL

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Mol	Chain	Res	Type
1	B	150	MET
1	B	154	ARG
1	B	155	ASN
1	C	15	THR
1	C	70	LEU
1	C	72	LYS
1	C	75	ARG
1	C	166	GLU
1	C	171	ILE
1	C	180	MET
1	C	186	GLU
1	C	187	GLU
1	C	194	SER
1	C	195	ARG
1	C	196	ARG
1	D	2	LYS
1	D	3	LYS
1	D	12	GLN
1	D	202	VAL
1	D	203	ASN
1	D	206	LEU
1	D	211	THR
1	D	212	LEU
5	I	8	ARG
5	I	120	ASP
5	I	136	VAL
5	I	193	CYS
5	I	206	LYS
5	I	207	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	100	ASN
1	A	155	ASN
1	A	322	GLN
1	B	30	GLN
1	B	73	ASN
1	B	215	ASN
1	C	110	ASN
1	C	130	HIS
1	C	138	GLN

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Mol	Chain	Res	Type
1	C	174	ASN
1	D	6	ASN
1	D	39	HIS
1	D	172	ASN
1	D	183	GLN
1	D	297	GLN
2	E	28	GLN
5	I	71	GLN
5	I	147	ASN
5	I	191	ASN
5	I	196	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 2 ligands modelled in this entry, 1 is monoatomic - leaving 1 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
8	SF4	I	301	5	0,12,12	-	-	-		

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	SF4	I	301	5	-	-	0/6/5/5

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

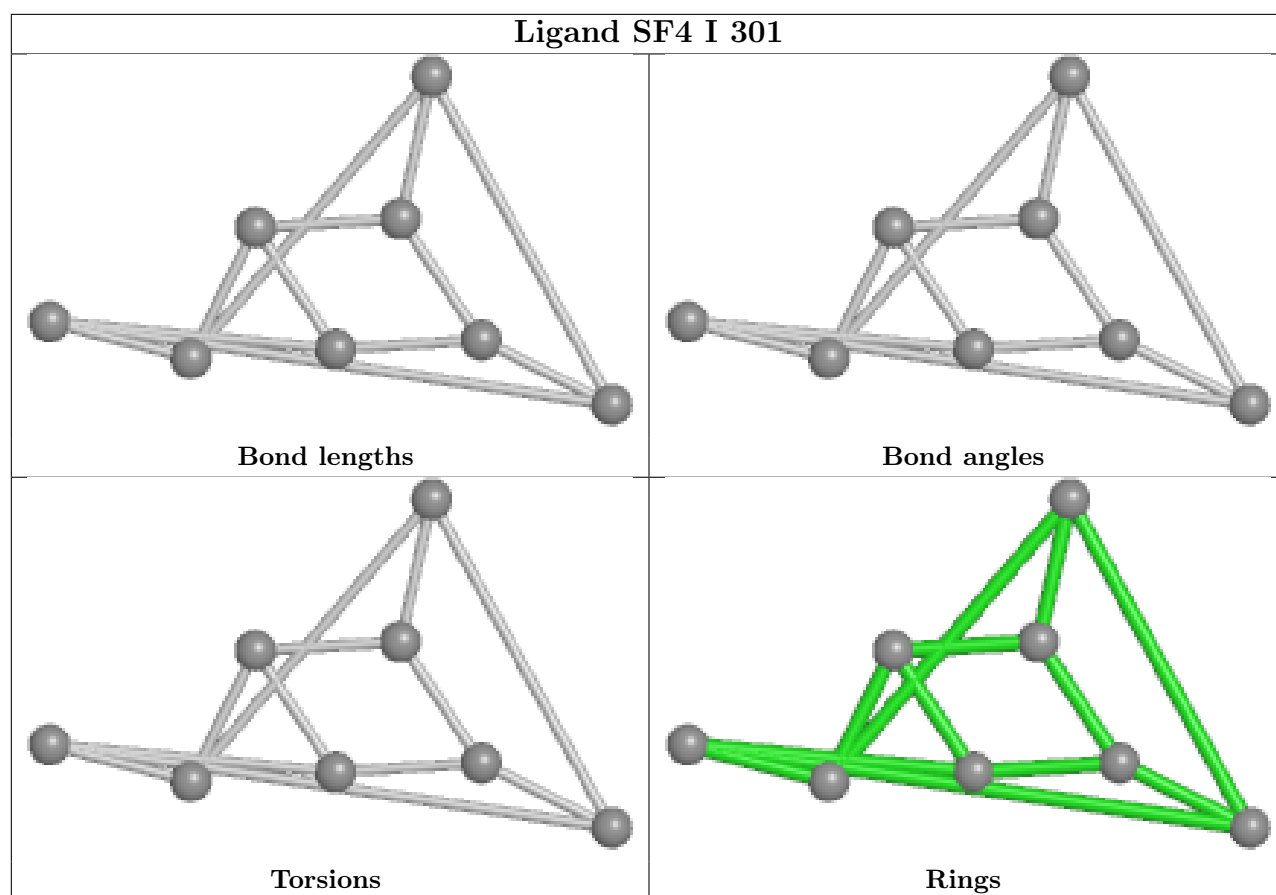
There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	I	301	SF4	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

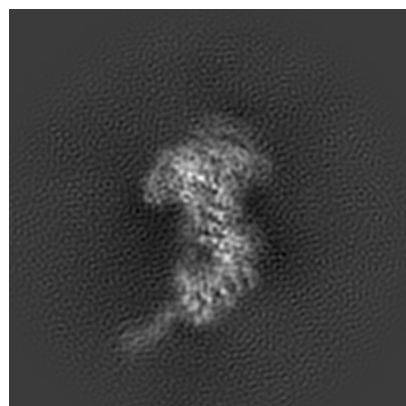
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-27161. These allow visual inspection of the internal detail of the map and identification of artifacts.

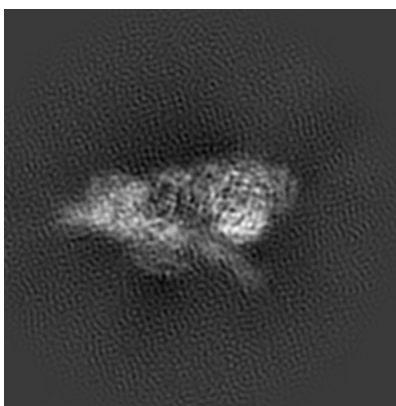
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

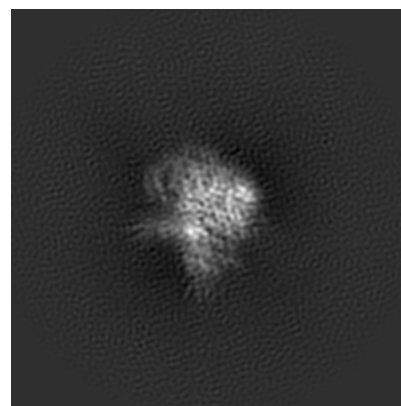
6.1.1 Primary map



X

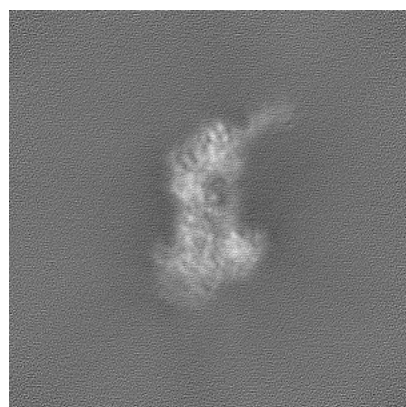


Y

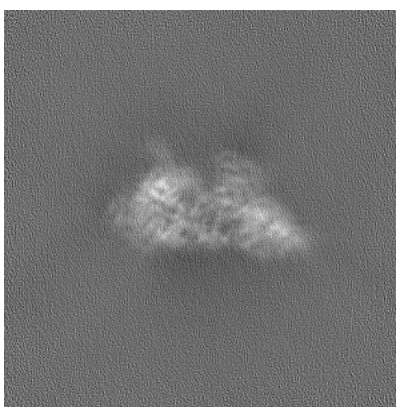


Z

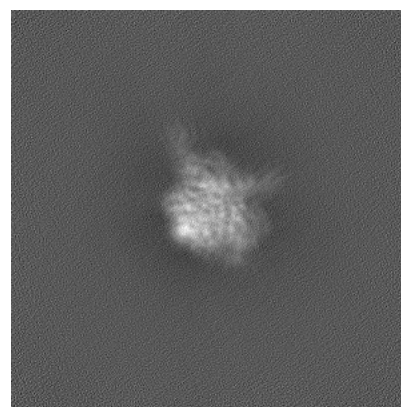
6.1.2 Raw map



X



Y

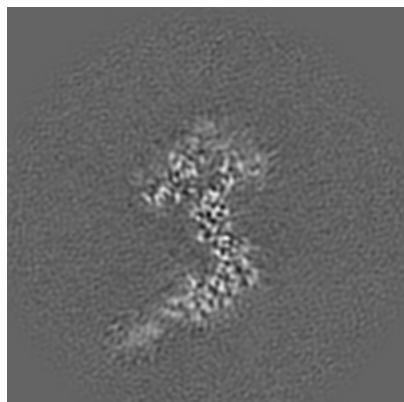


Z

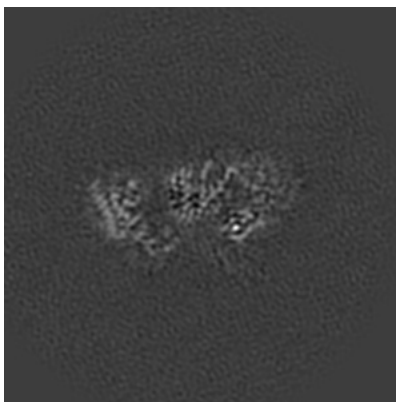
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

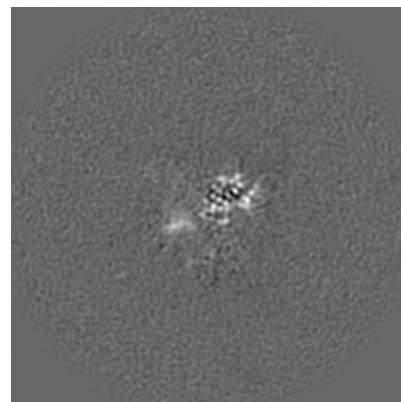
6.2.1 Primary map



X Index: 170

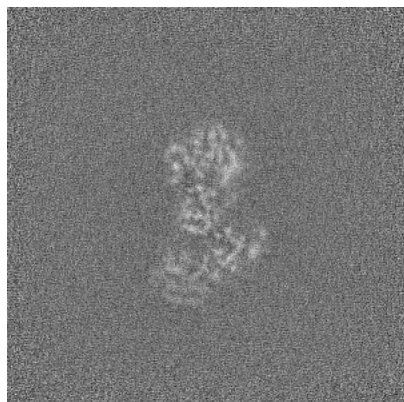


Y Index: 170

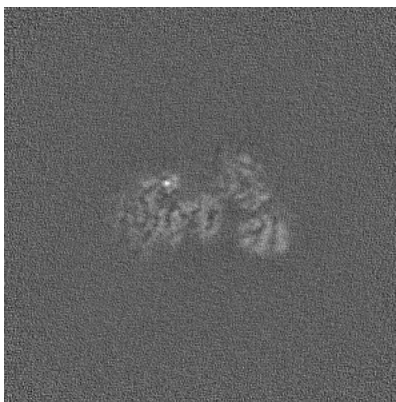


Z Index: 170

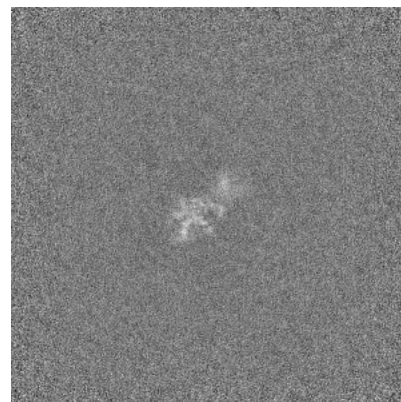
6.2.2 Raw map



X Index: 192



Y Index: 192

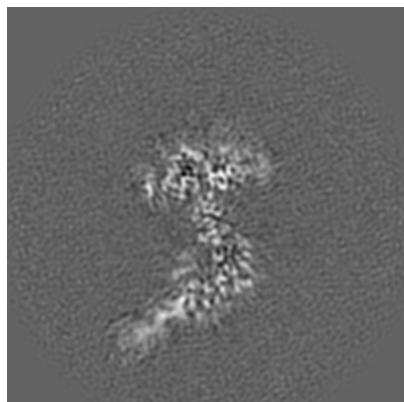


Z Index: 192

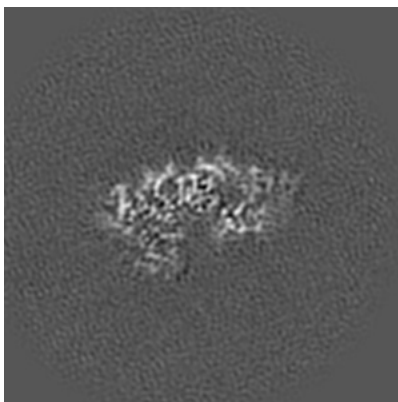
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

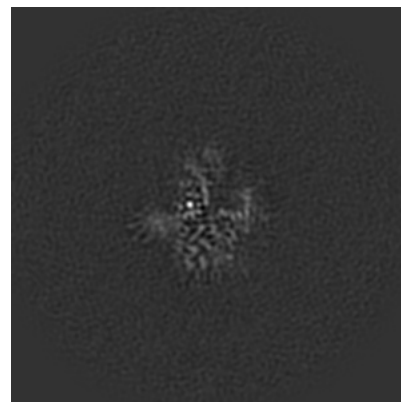
6.3.1 Primary map



X Index: 165

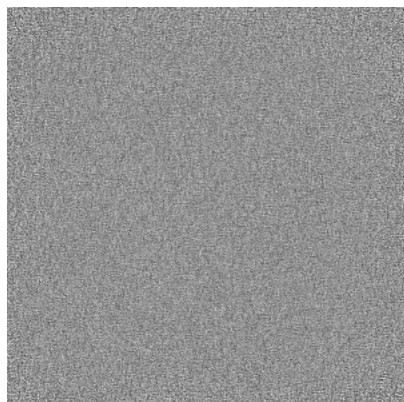


Y Index: 182

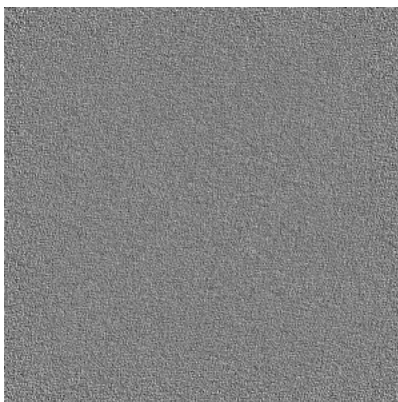


Z Index: 196

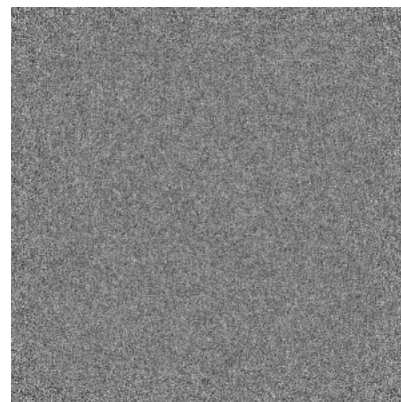
6.3.2 Raw map



X Index: 0



Y Index: 0

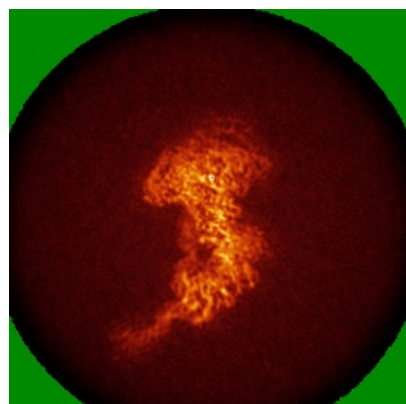


Z Index: 0

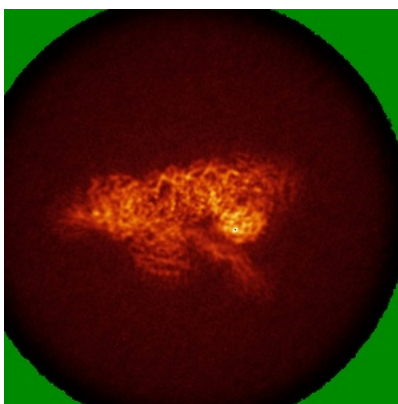
The images above show the largest variance slices of the map in three orthogonal directions.

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

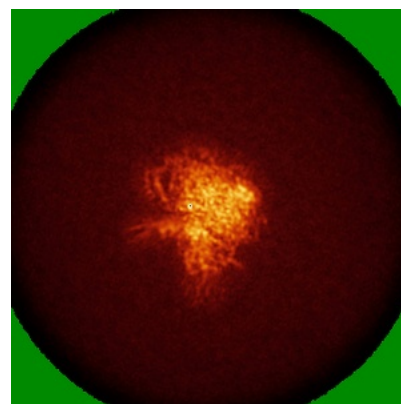
6.4.1 Primary map



X

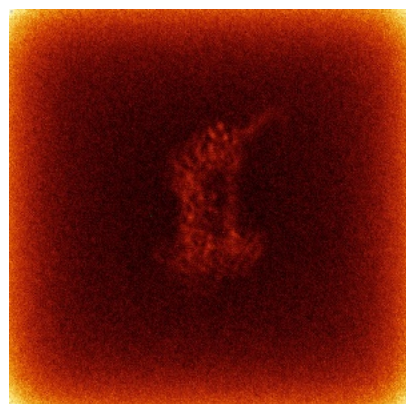


Y

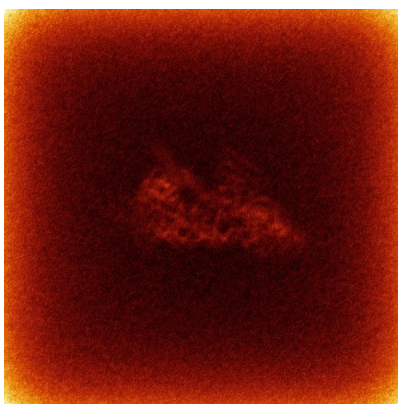


Z

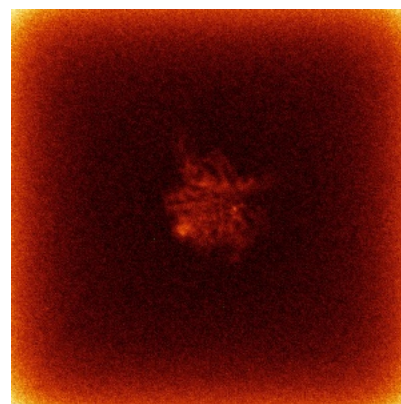
6.4.2 Raw map



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.

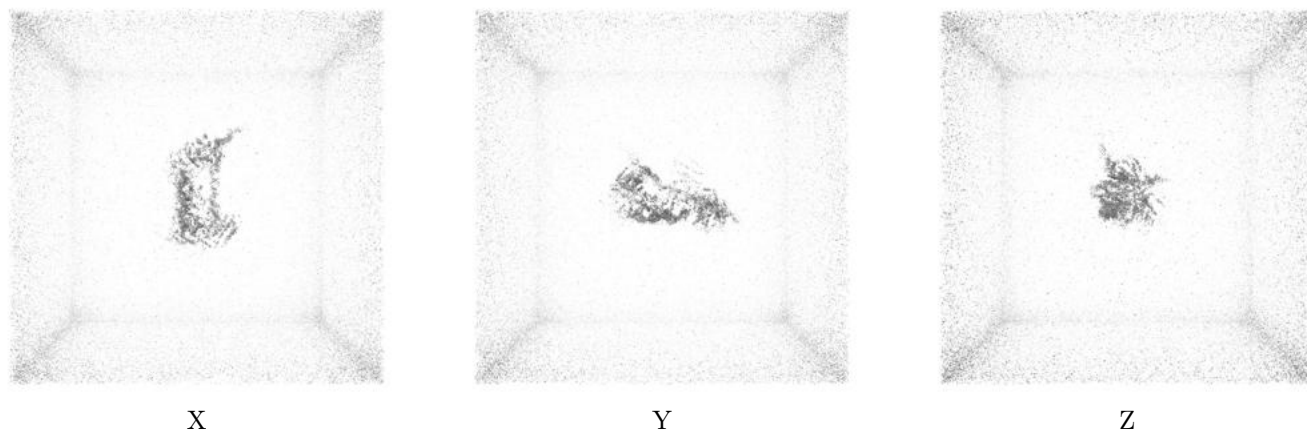
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.11. 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.

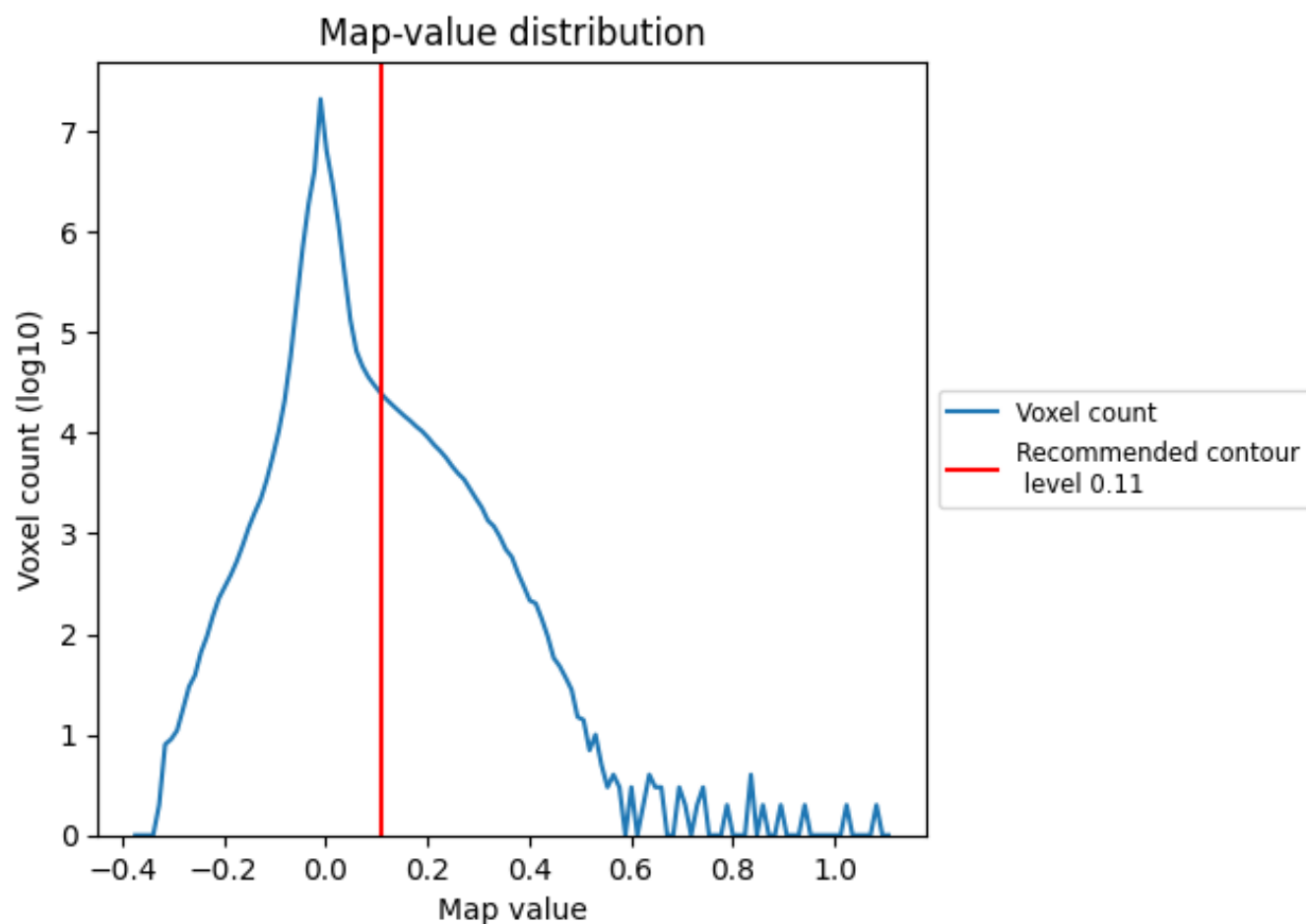
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

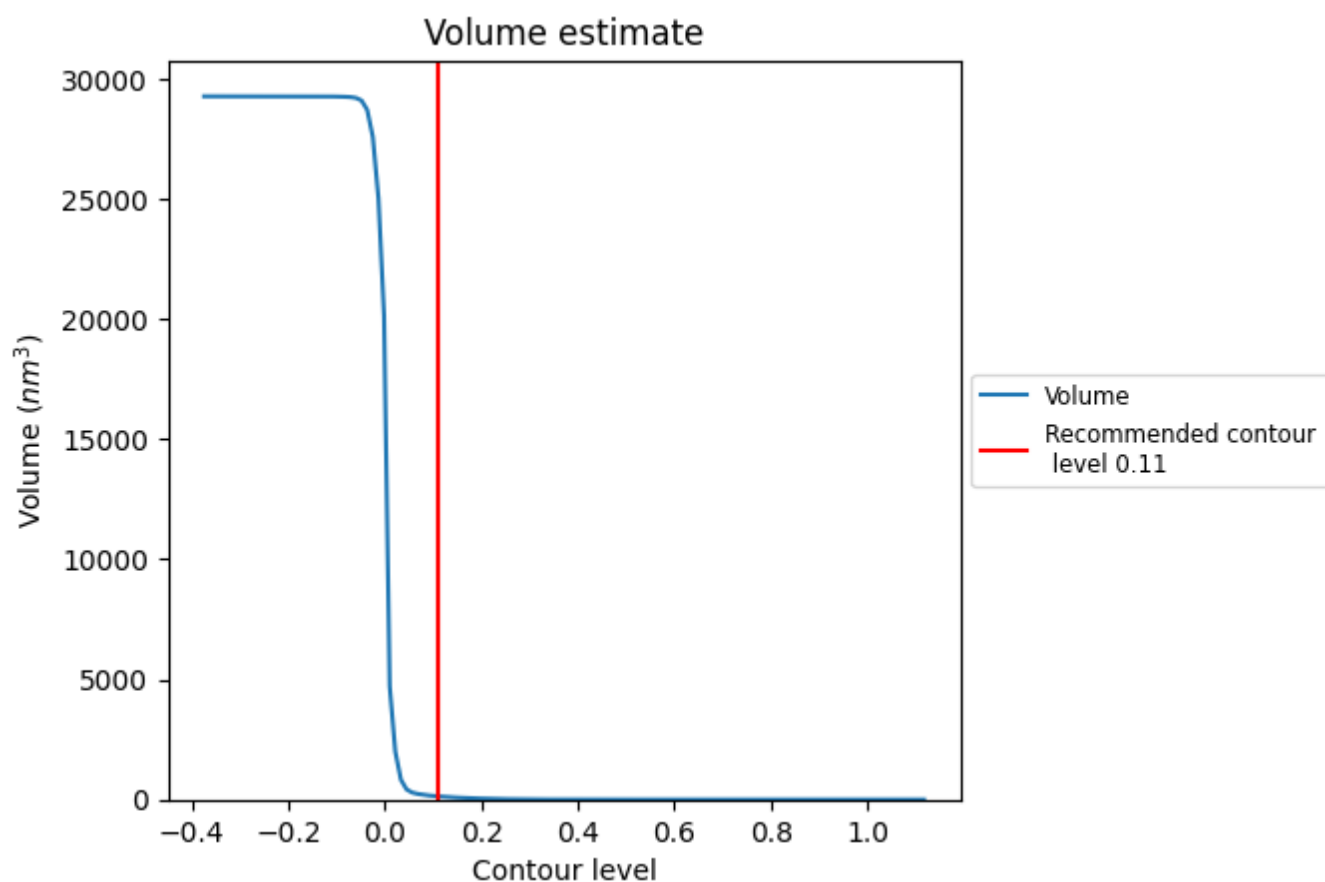
This section contains the results of statistical analysis of the map.

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.

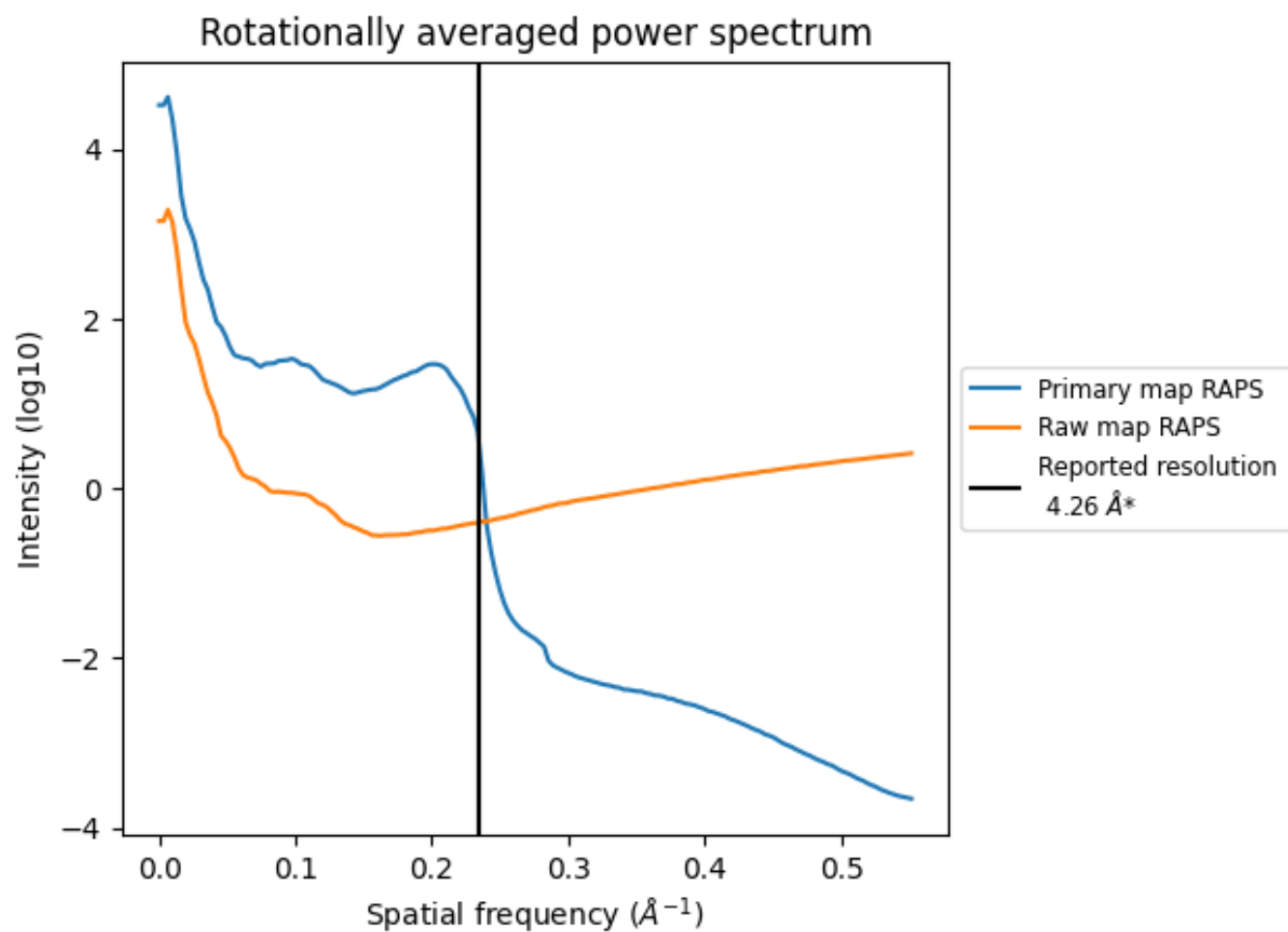
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 135 nm^3 ; this corresponds to an approximate mass of 122 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 ⓘ

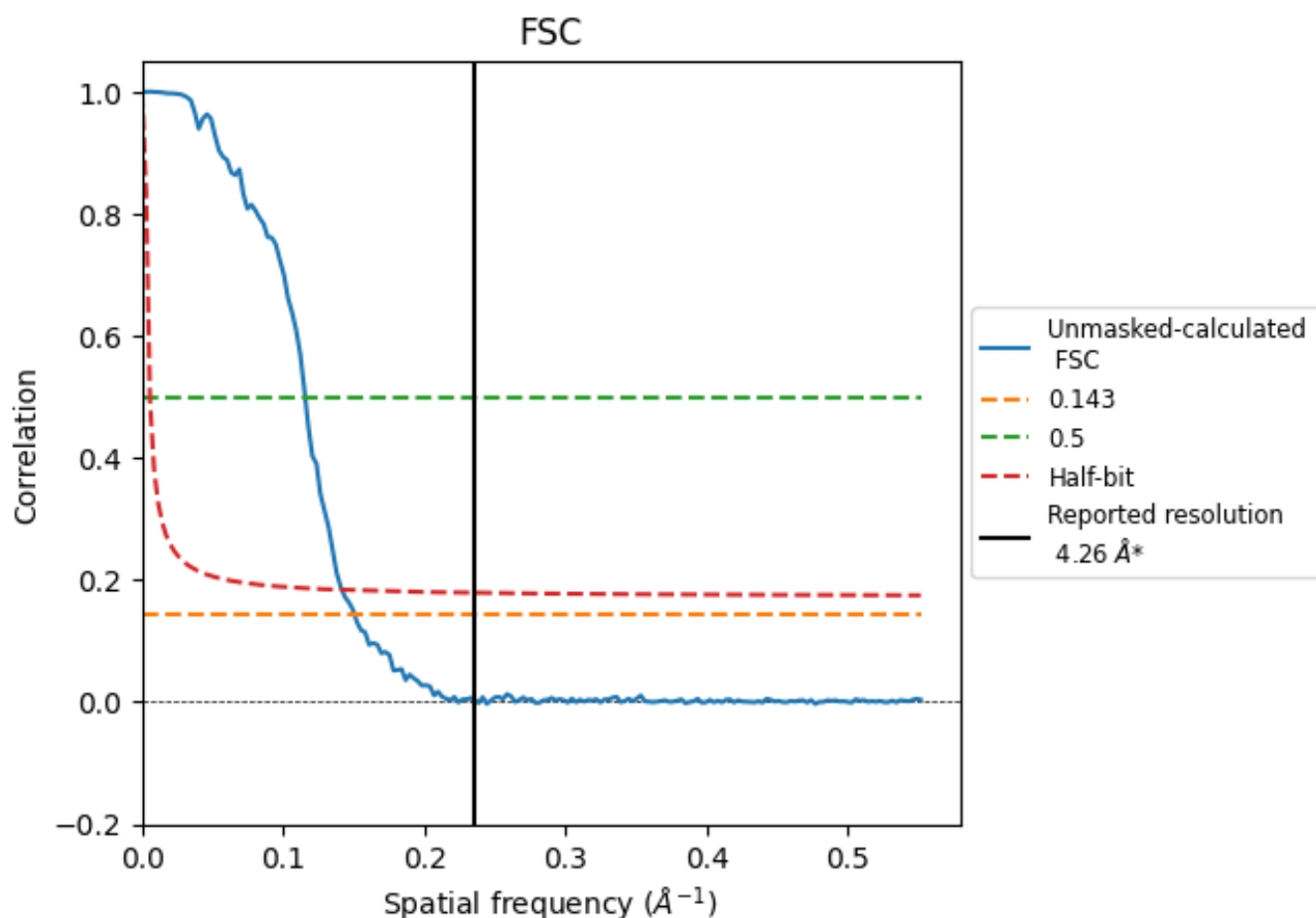


*Reported resolution corresponds to spatial frequency of 0.235 $\text{\AA}^{-1}$

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 0.235 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

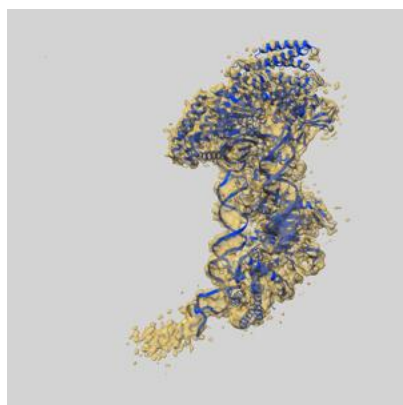
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.26	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	6.64	8.65	7.06

*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 6.64 differs from the reported value 4.26 by more than 10 %

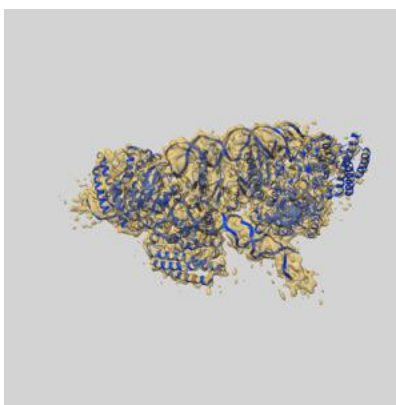
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-27161 and PDB model 8D3P. Per-residue inclusion information can be found in section [3](#) on page [7](#).

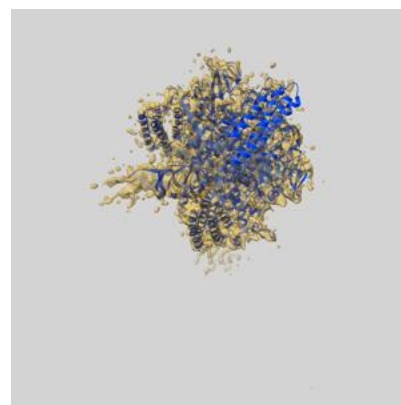
9.1 Map-model overlay [i](#)



X



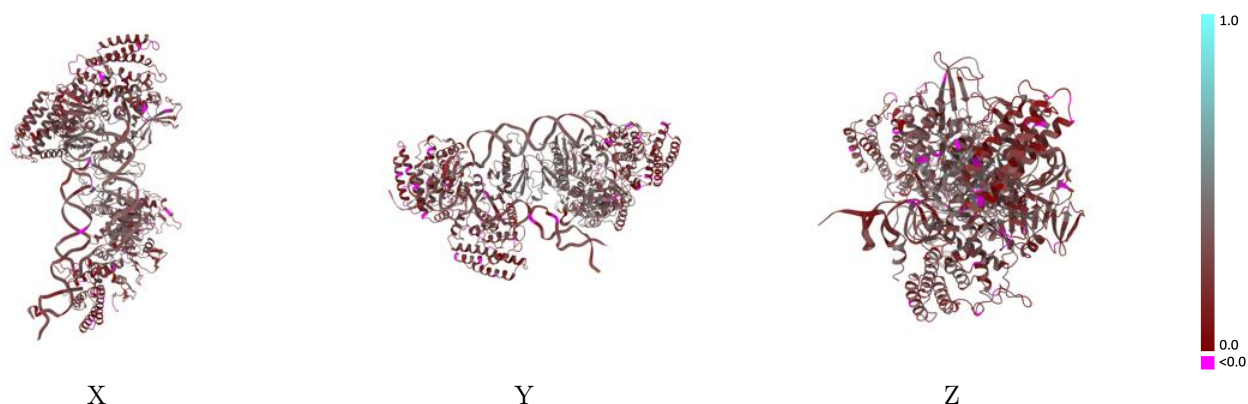
Y



Z

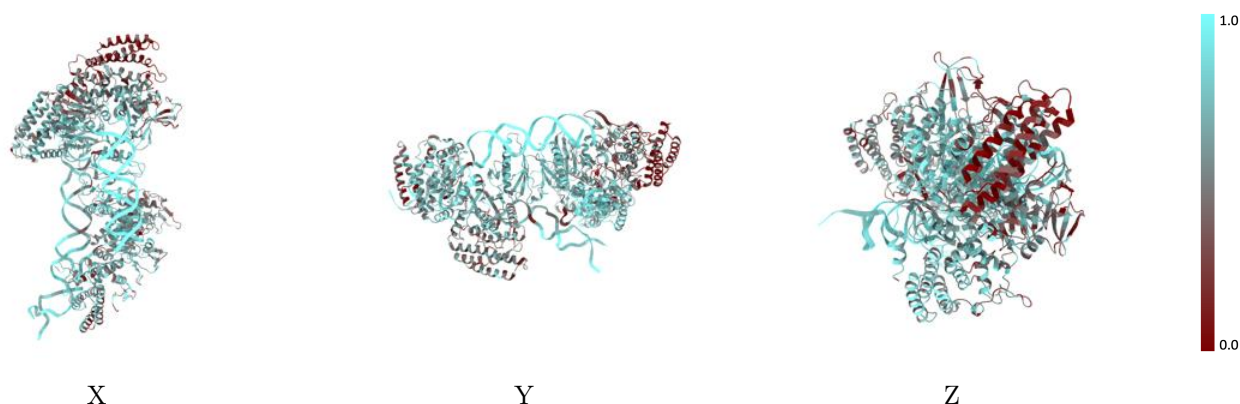
The images above show the 3D surface view of the map at the recommended contour level 0.11 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



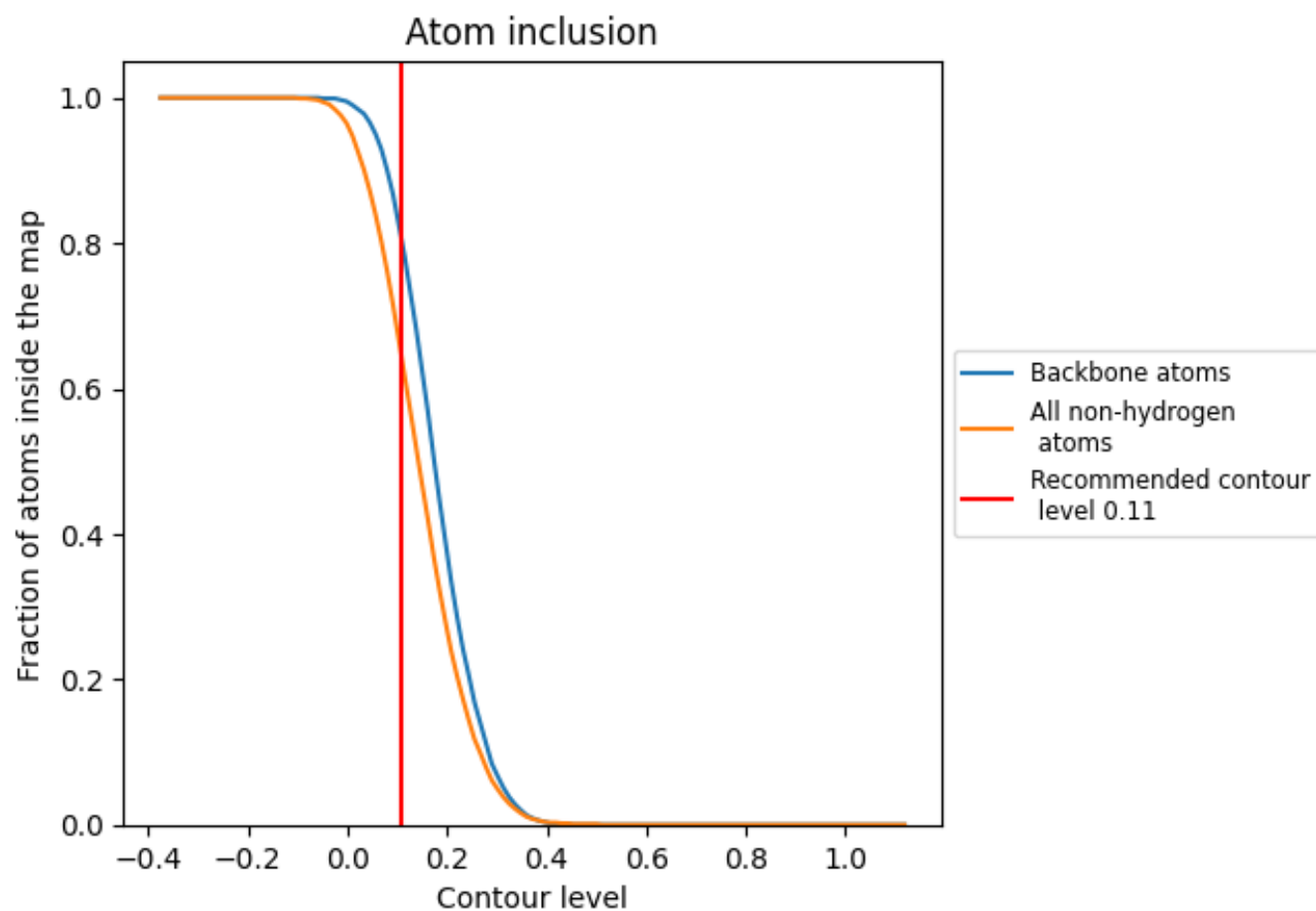
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.11).

9.4 Atom inclusion [i](#)



At the recommended contour level, 80% of all backbone atoms, 64% 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 (0.11) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6390	 0.2780
A	 0.3710	 0.2190
B	 0.6600	 0.3010
C	 0.6550	 0.2360
D	 0.5580	 0.2530
E	 0.7850	 0.4070
F	 0.7560	 0.3820
G	 0.8410	 0.2830
H	 0.8130	 0.3400
I	 0.7040	 0.3340
K	 0.8060	 0.2280
L	 0.7560	 0.2350

