



## Full wwPDB EM Validation Report ⓘ

Nov 9, 2022 – 04:23 AM JST

PDB ID : 6IFR  
EMDB ID : EMD-9656  
Title : Type III-A Csm complex, Cryo-EM structure of Csm-NTR, ATP bound  
Authors : You, L.; Ma, J.; Wang, J.; Zhang, X.; Wang, Y.  
Deposited on : 2018-09-21  
Resolution : 3.40 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](mailto: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>.

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

EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

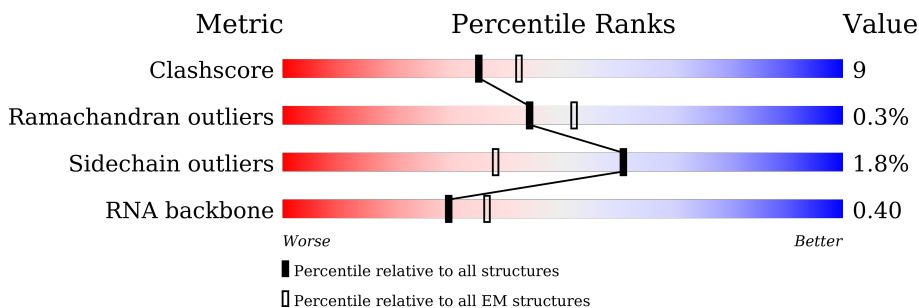
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.40 Å.

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



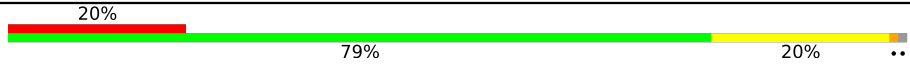
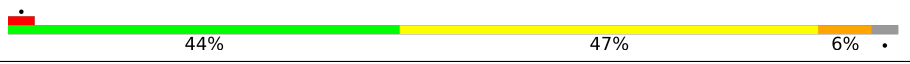

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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

Mol	Chain	Length	Quality of chain
1	A	758	
2	C	126	
2	D	126	
3	E	220	
3	F	220	
3	G	220	
4	B	299	

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Mol	Chain	Length	Quality of chain
5	H	357	
6	N	36	
7	J	43	

## 2 Entry composition i

There are 9 unique types of molecules in this entry. The entry contains 19219 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 Type III-A CRISPR-associated protein Csm1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	694	5549	3569	930	1036	14	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	16	ASN	ASP	engineered mutation	UNP A0A2U2M0F3

- Molecule 2 is a protein called Type III-A CRISPR-associated protein Csm2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	D	121	995	642	166	185	2	0	0
2	C	121	995	642	166	185	2	0	0

- Molecule 3 is a protein called Type III-A CRISPR-associated RAMP protein Csm3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	G	217	1703	1079	291	331	2	0	0
3	F	217	1695	1075	291	327	2	0	0
3	E	205	1610	1024	277	307	2	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	33	ASN	ASP	engineered mutation	UNP A0A2U2M035
F	33	ASN	ASP	engineered mutation	UNP A0A2U2M035
E	33	ASN	ASP	engineered mutation	UNP A0A2U2M035

- Molecule 4 is a protein called Type III-A CRISPR-associated RAMP protein Csm4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	B	288	Total	C	N	O	S	0	0
			2289	1465	375	444	5		

- Molecule 5 is a protein called Type III-A CRISPR-associated RAMP protein Csm5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	H	353	Total	C	N	O	S	0	0
			2832	1824	487	514	7		

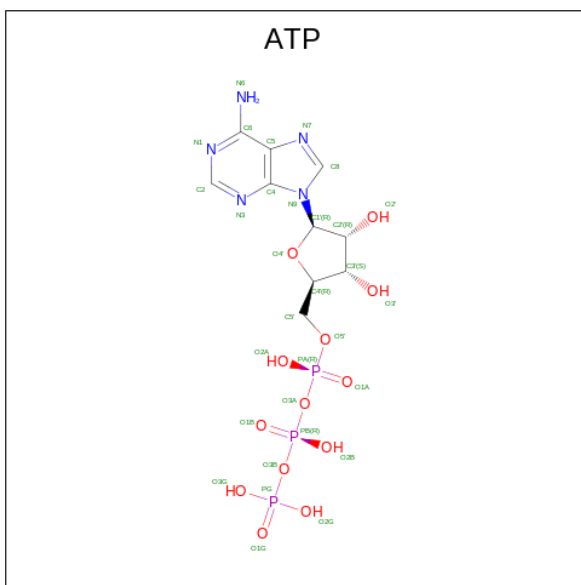
- Molecule 6 is a RNA chain called type III-A CRISPR-Cas interference complex, crRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
6	N	35	Total	C	N	O	P	0	0
			735	330	125	245	35		

- Molecule 7 is a RNA chain called type III-A CRISPR-Cas interference complex, NTR.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
7	J	35	Total	C	N	O	P	0	0
			752	336	138	243	35		

- Molecule 8 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula:  $C_{10}H_{16}N_5O_{13}P_3$ ).



Mol	Chain	Residues	Atoms				AltConf	
			Total	C	N	O		P
8	A	1	62	20	10	26	6	0
8	A	1	62	20	10	26	6	0

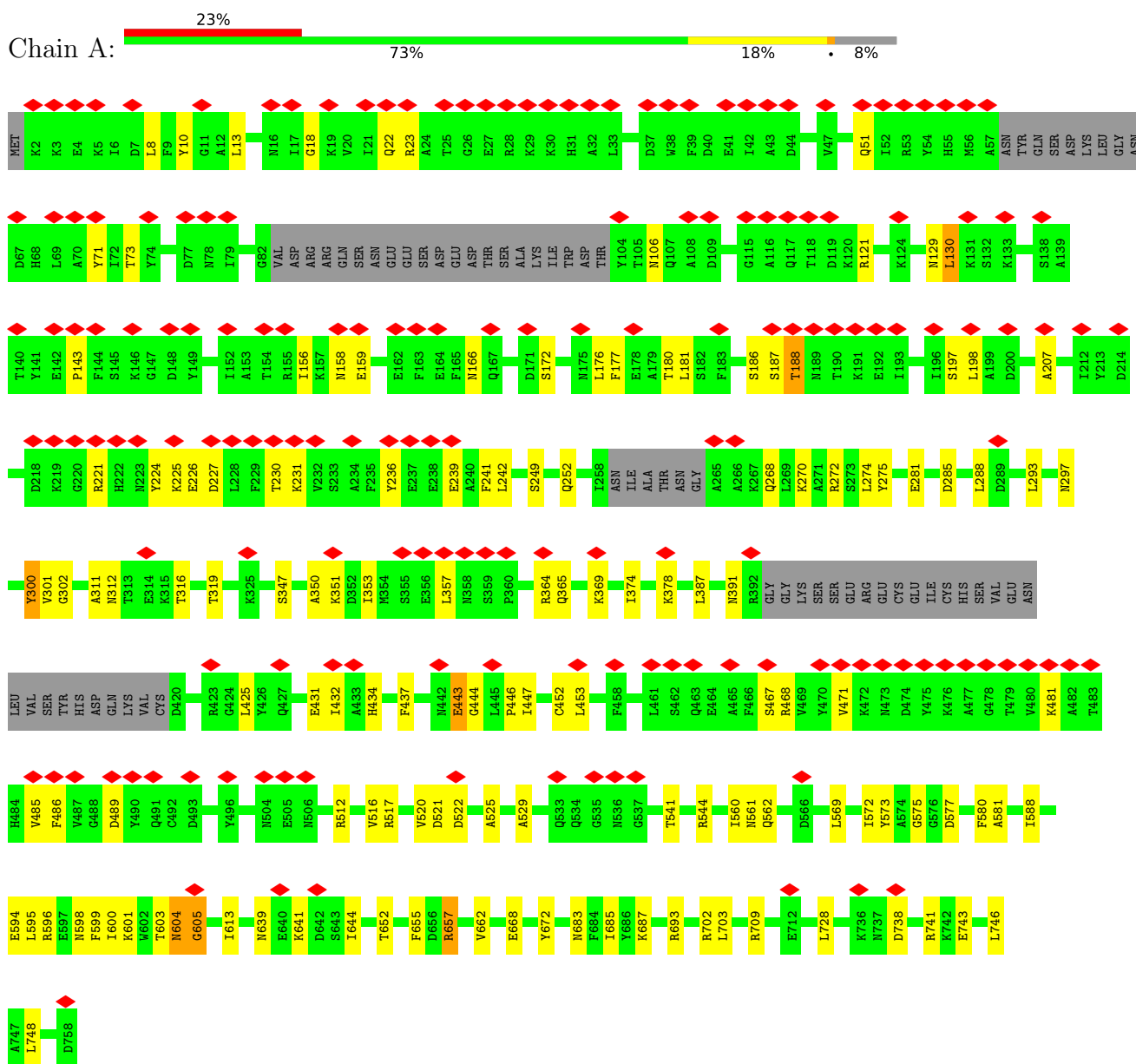
- Molecule 9 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
9	A	2	2	2	0

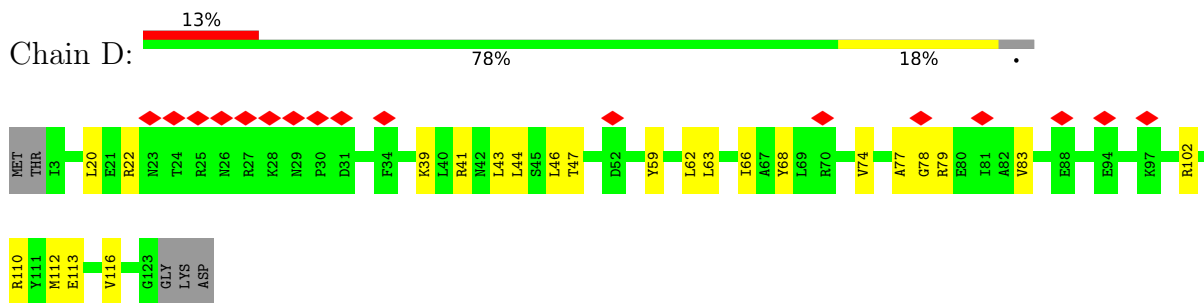
### 3 Residue-property plots

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.

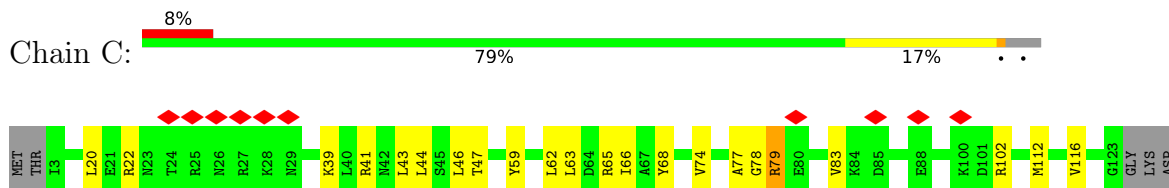
- Molecule 1: Type III-A CRISPR-associated protein Csm1



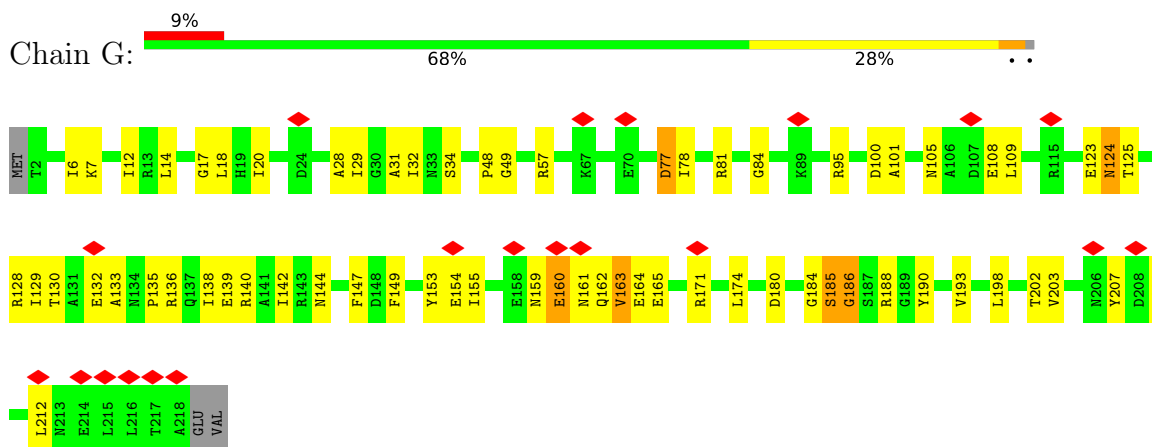
- Molecule 2: Type III-A CRISPR-associated protein Csm2



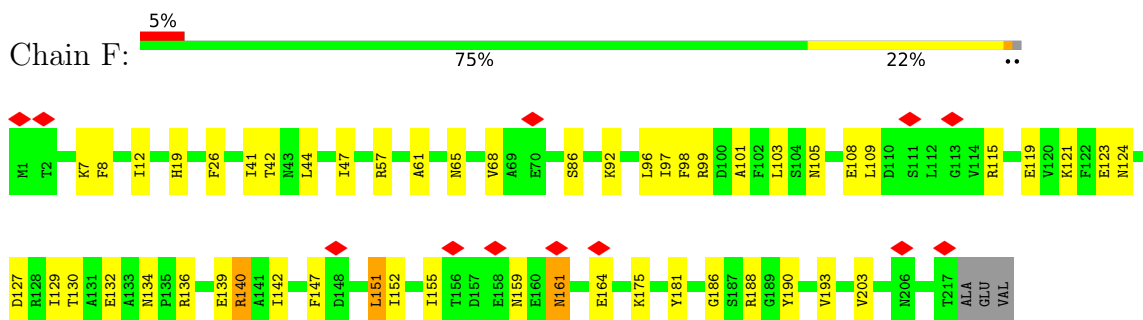
• Molecule 2: Type III-A CRISPR-associated protein Csm2



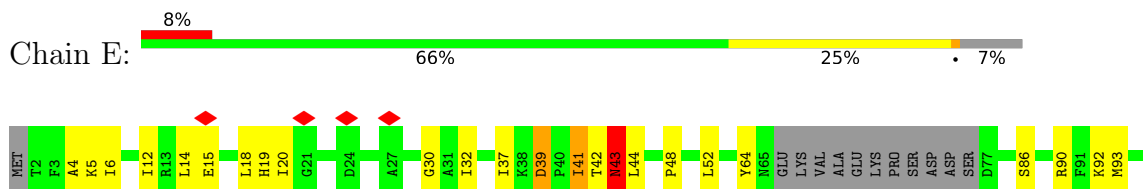
• Molecule 3: Type III-A CRISPR-associated RAMP protein Csm3



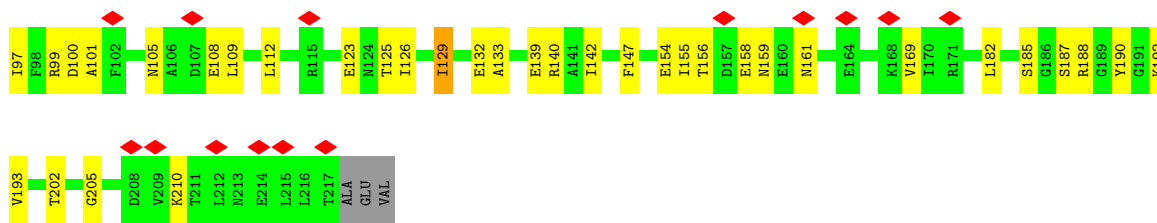
• Molecule 3: Type III-A CRISPR-associated RAMP protein Csm3



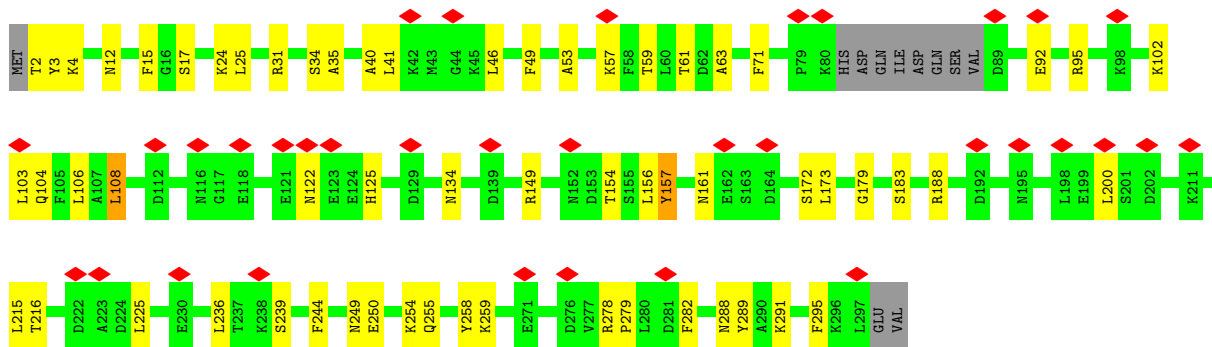
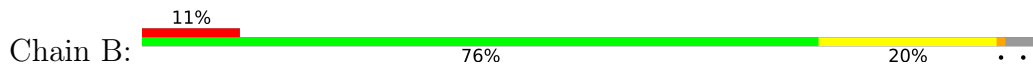
• Molecule 3: Type III-A CRISPR-associated RAMP protein Csm3



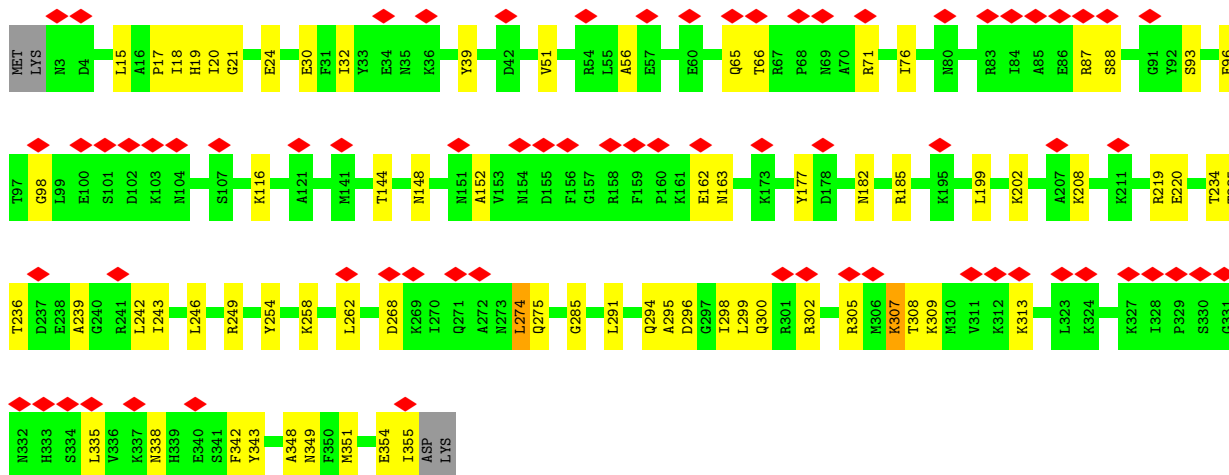
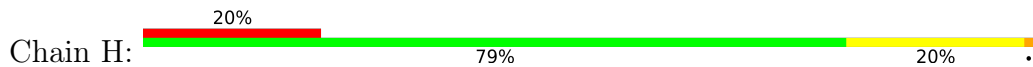




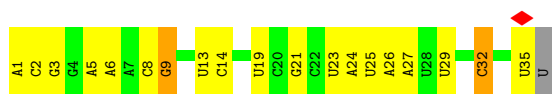
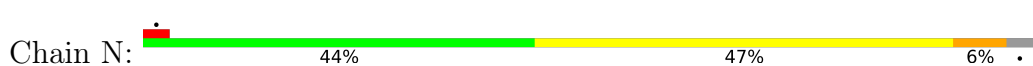
• Molecule 4: Type III-A CRISPR-associated RAMP protein Csm4



• Molecule 5: Type III-A CRISPR-associated RAMP protein Csm5



• Molecule 6: type III-A CRISPR-Cas interference complex, crRNA



• Molecule 7: type III-A CRISPR-Cas interference complex, NTR



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	54012	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	60	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.337	Depositor
Minimum map value	-0.149	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.016	Depositor
Recommended contour level	0.062	Depositor
Map size ( $\text{\AA}$ )	208.0, 208.0, 208.0	wwPDB
Map dimensions	200, 200, 200	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.04, 1.04, 1.04	Depositor

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ATP, 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	0.35	0/5662	0.64	7/7635 (0.1%)
2	C	0.34	0/1009	0.55	1/1358 (0.1%)
2	D	0.33	0/1009	0.55	1/1358 (0.1%)
3	E	0.36	0/1633	0.68	1/2197 (0.0%)
3	F	0.37	0/1720	0.64	1/2316 (0.0%)
3	G	0.40	0/1728	0.71	3/2326 (0.1%)
4	B	0.35	0/2339	0.64	3/3161 (0.1%)
5	H	0.34	0/2899	0.65	2/3904 (0.1%)
6	N	0.66	0/819	0.92	0/1271
7	J	0.57	0/842	0.89	2/1311 (0.2%)
All	All	0.38	0/19660	0.67	21/26837 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
3	E	0	1
5	H	0	2
All	All	0	4

There are no bond length outliers.

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	G	185	SER	N-CA-C	-7.95	89.52	111.00
5	H	274	LEU	CA-CB-CG	7.05	131.51	115.30
1	A	728	LEU	CA-CB-CG	6.80	130.93	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	25	LEU	CA-CB-CG	6.70	130.70	115.30
3	F	151	LEU	CA-CB-CG	6.41	130.03	115.30
1	A	703	LEU	CA-CB-CG	5.92	128.93	115.30
3	G	77	ASP	CB-CG-OD1	5.88	123.59	118.30
2	C	62	LEU	CA-CB-CG	5.73	128.49	115.30
2	D	62	LEU	CA-CB-CG	5.72	128.46	115.30
1	A	143	PRO	N-CA-CB	5.68	110.12	103.30
4	B	157	TYR	CA-CB-CG	5.62	124.08	113.40
1	A	425	LEU	CA-CB-CG	5.53	128.03	115.30
3	E	20	ILE	CG1-CB-CG2	-5.50	99.31	111.40
1	A	130	LEU	CA-CB-CG	5.49	127.92	115.30
5	H	291	LEU	CA-CB-CG	5.46	127.86	115.30
3	G	186	GLY	N-CA-C	5.43	126.68	113.10
4	B	108	LEU	CA-CB-CG	5.27	127.42	115.30
1	A	8	LEU	CA-CB-CG	5.15	127.14	115.30
7	J	22	C	N3-C2-O2	-5.14	118.30	121.90
1	A	300	TYR	CD1-CE1-CZ	-5.12	115.19	119.80
7	J	20	A	P-O3'-C3'	5.08	125.80	119.70

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	604	ASN	Peptide
3	E	112	LEU	Peptide
5	H	20	ILE	Peptide
5	H	87	ARG	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	5549	0	5385	82	0
2	C	995	0	1012	13	0
2	D	995	0	1012	13	0
3	E	1610	0	1628	60	0
3	F	1695	0	1709	45	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	G	1703	0	1716	51	0
4	B	2289	0	2227	43	0
5	H	2832	0	2824	49	0
6	N	735	0	376	22	0
7	J	752	0	377	9	0
8	A	62	0	24	1	0
9	A	2	0	0	0	0
All	All	19219	0	18290	326	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 9.

All (326) 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)
3:G:81:ARG:NH1	3:G:162:GLN:OE1	1.60	1.32
3:E:39:ASP:HB3	4:B:149:ARG:NH1	1.45	1.28
3:G:185:SER:O	3:G:190:TYR:HD2	1.27	1.14
3:E:39:ASP:HB3	4:B:149:ARG:HH12	0.92	1.05
3:E:41:ILE:HD11	4:B:149:ARG:HG3	1.36	1.05
3:E:126:ILE:HD12	6:N:14:C:C5	1.90	1.04
3:G:185:SER:O	3:G:190:TYR:CD2	2.18	0.96
3:F:155:ILE:HA	3:F:159:ASN:ND2	1.80	0.95
3:E:39:ASP:CB	4:B:149:ARG:NH1	2.31	0.94
3:E:126:ILE:HD12	6:N:14:C:C6	2.06	0.91
5:H:294:GLN:N	5:H:294:GLN:OE1	2.08	0.86
3:G:162:GLN:O	3:G:163:VAL:C	2.12	0.86
3:E:39:ASP:CB	4:B:149:ARG:HH12	1.84	0.84
3:E:39:ASP:OD1	3:E:39:ASP:N	2.08	0.83
3:G:188:ARG:NH1	6:N:25:U:OP2	2.12	0.82
3:G:162:GLN:O	3:G:165:GLU:N	2.15	0.79
3:G:162:GLN:O	3:G:164:GLU:N	2.17	0.77
3:E:126:ILE:CD1	6:N:14:C:C5	2.66	0.77
3:F:155:ILE:HA	3:F:159:ASN:HD21	1.47	0.76
1:A:23:ARG:NH2	1:A:188:THR:HG22	2.04	0.72
3:E:42:THR:O	3:E:43:ASN:C	2.27	0.72
3:E:126:ILE:CD1	6:N:14:C:C4	2.73	0.71
3:G:81:ARG:CZ	3:G:162:GLN:OE1	2.39	0.70
5:H:298:ILE:N	5:H:298:ILE:HD12	2.07	0.69
3:G:185:SER:HB3	3:G:190:TYR:CD2	2.27	0.69
3:F:68:VAL:CG1	3:E:129:ILE:HD11	2.24	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:2:THR:N	4:B:59:THR:HG1	1.91	0.68
5:H:268:ASP:HB3	5:H:338:ASN:HB3	1.78	0.66
1:A:71:TYR:HB2	1:A:225:LYS:HB2	1.77	0.65
5:H:296:ASP:O	5:H:300:GLN:NE2	2.29	0.65
3:E:42:THR:O	3:E:44:LEU:HG	1.96	0.64
1:A:252:GLN:HB2	8:A:801:ATP:H5'1	1.79	0.64
3:E:188:ARG:NH1	6:N:13:U:OP2	2.31	0.64
3:G:129:ILE:HG13	5:H:152:ALA:HB2	1.79	0.63
1:A:447:ILE:HG12	1:A:453:LEU:HB2	1.80	0.63
4:B:102:LYS:O	4:B:122:ASN:ND2	2.32	0.63
6:N:35:U:H3	7:J:8:A:H61	1.47	0.62
3:F:155:ILE:HG23	3:F:159:ASN:HD22	1.64	0.62
3:G:12:ILE:HB	3:G:147:PHE:HB2	1.81	0.62
3:G:6:ILE:HB	3:G:153:TYR:HB3	1.82	0.62
4:B:63:ALA:HB1	4:B:156:LEU:HB3	1.81	0.62
1:A:23:ARG:NH2	1:A:187:SER:O	2.33	0.62
4:B:104:GLN:HG2	4:B:122:ASN:HD21	1.65	0.61
3:G:123:GLU:OE2	3:G:190:TYR:OH	2.16	0.61
3:G:129:ILE:HG22	3:G:130:THR:HG23	1.83	0.61
3:F:96:LEU:HD13	3:F:98:PHE:HE1	1.65	0.61
3:F:188:ARG:NH2	6:N:19:U:OP2	2.32	0.61
1:A:520:VAL:H	1:A:577:ASP:HB2	1.66	0.61
3:E:42:THR:O	3:E:44:LEU:N	2.33	0.61
1:A:188:THR:HG23	1:A:188:THR:O	2.00	0.61
3:F:105:ASN:HB2	3:F:108:GLU:HB3	1.83	0.60
3:F:68:VAL:CG1	3:E:129:ILE:CD1	2.80	0.60
3:E:42:THR:O	3:E:42:THR:HG22	2.01	0.60
4:B:108:LEU:HG	4:B:200:LEU:HD12	1.82	0.60
3:F:12:ILE:HB	3:F:147:PHE:HB2	1.84	0.60
3:E:100:ASP:OD2	4:B:12:ASN:ND2	2.35	0.60
3:F:8:PHE:HB2	3:F:151:LEU:HB3	1.84	0.59
3:E:42:THR:CG2	3:E:44:LEU:HD12	2.32	0.59
6:N:32:C:O2	7:J:12:G:N2	2.35	0.59
5:H:24:GLU:HG3	5:H:116:LYS:HD2	1.84	0.59
4:B:278:ARG:NH2	4:B:282:PHE:O	2.34	0.59
3:F:155:ILE:HA	3:F:159:ASN:HD22	1.66	0.59
5:H:202:LYS:HD2	5:H:219:ARG:HH12	1.67	0.59
1:A:365:GLN:OE1	1:A:369:LYS:NZ	2.34	0.59
1:A:236:TYR:HA	1:A:350:ALA:HB3	1.84	0.59
1:A:516:VAL:HG22	1:A:613:ILE:HG12	1.85	0.59
4:B:239:SER:OG	4:B:259:LYS:NZ	2.35	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:H:275:GLN:HB2	5:H:349:ASN:HB3	1.84	0.59
3:F:109:LEU:HD13	3:F:142:ILE:HD11	1.85	0.58
5:H:354:GLU:HG2	5:H:355:ILE:HG12	1.85	0.58
1:A:130:LEU:O	1:A:562:GLN:NE2	2.36	0.58
3:G:185:SER:HB3	3:G:190:TYR:CE2	2.38	0.58
3:G:78:ILE:HG23	3:G:81:ARG:HH21	1.69	0.58
2:C:39:LYS:NZ	7:J:19:U:OP1	2.37	0.58
3:E:5:LYS:NZ	4:B:172:SER:O	2.37	0.58
3:E:6:ILE:HG22	3:E:202:THR:HG22	1.84	0.58
3:E:105:ASN:HB2	3:E:108:GLU:HB2	1.85	0.57
1:A:241:PHE:HA	1:A:311:ALA:HA	1.85	0.57
1:A:471:VAL:HG12	1:A:486:PHE:HA	1.87	0.57
5:H:258:LYS:HA	5:H:262:LEU:HB2	1.86	0.57
5:H:338:ASN:HD21	5:H:342:PHE:HB2	1.70	0.57
5:H:199:LEU:HA	5:H:220:GLU:HA	1.86	0.57
1:A:437:PHE:HB2	1:A:468:ARG:HB2	1.86	0.57
3:G:17:GLY:H	3:G:140:ARG:HH21	1.52	0.57
3:E:132:GLU:OE2	7:J:28:A:HI <sup>1</sup>	2.05	0.57
5:H:298:ILE:HD12	5:H:298:ILE:H	1.69	0.57
3:E:156:THR:HG23	3:E:158:GLU:H	1.68	0.57
3:G:130:THR:HG22	5:H:298:ILE:HG22	1.86	0.56
4:B:71:PHE:O	4:B:157:TYR:OH	2.20	0.56
3:G:202:THR:HG21	3:G:207:TYR:H	1.70	0.56
4:B:255:GLN:HE21	4:B:279:PRO:HA	1.70	0.56
1:A:657:ARG:NE	1:A:743:GLU:OE2	2.39	0.56
3:F:124:ASN:ND2	6:N:21:G:N3	2.54	0.56
1:A:121:ARG:NH1	1:A:601:LYS:O	2.39	0.56
5:H:148:ASN:O	5:H:294:GLN:NE2	2.39	0.55
3:E:4:ALA:HA	3:E:205:GLY:HA3	1.88	0.55
3:G:209:VAL:HG12	3:G:212:LEU:HD13	1.88	0.55
1:A:312:ASN:ND2	1:A:347:SER:OG	2.40	0.55
3:G:180:ASP:OD1	5:H:185:ARG:NH1	2.40	0.55
2:D:47:THR:HG21	2:D:112:MET:HG3	1.89	0.55
3:G:130:THR:CG2	5:H:298:ILE:HG22	2.36	0.55
1:A:18:GLY:O	1:A:22:GLN:N	2.39	0.55
3:F:96:LEU:HD13	3:F:98:PHE:CE1	2.41	0.55
1:A:23:ARG:CZ	1:A:188:THR:HG22	2.37	0.55
1:A:13:LEU:HB3	1:A:177:PHE:HE2	1.72	0.54
1:A:249:SER:OG	1:A:378:LYS:NZ	2.40	0.54
3:G:28:ALA:HB3	3:G:31:ALA:HB3	1.89	0.54
1:A:225:LYS:HD2	1:A:225:LYS:N	2.23	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:101:ALA:HB1	3:F:147:PHE:HB3	1.89	0.54
3:E:42:THR:HG22	3:E:44:LEU:HD12	1.88	0.54
1:A:268:GLN:HE22	1:A:272:ARG:HH21	1.56	0.54
4:B:41:LEU:HD23	4:B:46:LEU:HD22	1.89	0.54
2:C:20:LEU:O	2:C:22:ARG:NH2	2.41	0.54
2:D:39:LYS:NZ	7:J:13:U:OP1	2.41	0.54
2:C:65:ARG:HE	3:F:115:ARG:HH22	1.56	0.53
3:E:14:LEU:HD23	3:E:193:VAL:HG23	1.90	0.53
3:E:126:ILE:HD13	6:N:14:C:C4	2.42	0.53
5:H:298:ILE:H	5:H:298:ILE:CD1	2.22	0.53
2:C:47:THR:HG21	2:C:112:MET:HG3	1.89	0.53
2:C:79:ARG:NH1	7:J:17:U:OP1	2.39	0.53
3:F:123:GLU:OE1	3:F:136:ARG:NH1	2.42	0.53
3:E:39:ASP:CB	4:B:149:ARG:CZ	2.86	0.53
1:A:207:ALA:O	1:A:297:ASN:ND2	2.42	0.53
1:A:443:GLU:HG3	1:A:444:GLY:N	2.22	0.53
3:G:34:SER:HB2	3:G:138:ILE:HG22	1.90	0.53
4:B:236:LEU:HD12	4:B:258:TYR:HB3	1.91	0.53
3:F:155:ILE:CA	3:F:159:ASN:ND2	2.65	0.52
3:E:39:ASP:OD2	4:B:149:ARG:NH2	2.32	0.52
3:F:161:ASN:O	3:F:164:GLU:CD	2.47	0.52
4:B:92:GLU:OE2	4:B:95:ARG:NH1	2.43	0.52
3:F:68:VAL:HG12	3:E:129:ILE:HD11	1.92	0.52
1:A:227:ASP:HA	1:A:231:LYS:HD2	1.92	0.52
3:F:129:ILE:HG13	3:F:130:THR:HG23	1.92	0.52
5:H:298:ILE:N	5:H:298:ILE:CD1	2.73	0.52
3:F:86:SER:O	3:F:92:LYS:NZ	2.41	0.51
2:D:20:LEU:O	2:D:22:ARG:NH2	2.41	0.51
3:E:123:GLU:OE2	3:E:190:TYR:OH	2.28	0.51
3:F:47:ILE:HB	3:F:101:ALA:HB3	1.93	0.51
3:E:129:ILE:HG22	3:E:129:ILE:O	2.10	0.51
5:H:235:THR:OG1	5:H:236:THR:N	2.44	0.51
1:A:275:TYR:OH	1:A:446:PRO:O	2.27	0.51
3:G:128:ARG:NH1	6:N:26:A:OP2	2.40	0.51
3:F:61:ALA:O	3:F:65:ASN:ND2	2.44	0.51
5:H:15:LEU:HD12	5:H:335:LEU:HD21	1.92	0.51
3:F:41:ILE:HD12	3:F:42:THR:HG23	1.92	0.51
1:A:391:ASN:HD21	4:B:258:TYR:H	1.60	0.51
5:H:17:PRO:HD3	5:H:343:TYR:HD2	1.76	0.51
1:A:176:LEU:O	1:A:180:THR:OG1	2.28	0.50
3:G:132:GLU:OE2	5:H:302:ARG:NE	2.42	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:12:ILE:HG23	3:F:193:VAL:HG13	1.93	0.50
3:E:37:ILE:HG23	3:E:37:ILE:O	2.10	0.50
3:G:124:ASN:HD21	3:G:133:ALA:HB1	1.76	0.50
5:H:309:LYS:NZ	5:H:313:LYS:O	2.38	0.50
1:A:285:ASP:OD2	1:A:468:ARG:NH2	2.44	0.50
3:E:32:ILE:HG21	3:E:139:GLU:HB2	1.93	0.50
1:A:288:LEU:HD22	1:A:293:LEU:HB2	1.93	0.50
1:A:738:ASP:OD1	1:A:741:ARG:NH1	2.45	0.49
3:E:93:MET:HE3	6:N:5:A:H5''	1.94	0.49
1:A:517:ARG:HD3	1:A:580:PHE:HD1	1.78	0.49
3:F:99:ARG:HD2	3:E:192:LYS:HB2	1.94	0.49
4:B:103:LEU:HD11	4:B:106:LEU:HD21	1.93	0.49
3:G:155:ILE:HA	3:G:159:ASN:ND2	2.27	0.49
3:E:109:LEU:HD13	3:E:142:ILE:HD11	1.94	0.49
5:H:305:ARG:O	5:H:308:THR:OG1	2.30	0.49
1:A:600:ILE:HA	1:A:603:THR:HG22	1.94	0.49
3:G:105:ASN:ND2	3:G:144:ASN:O	2.45	0.49
6:N:6:A:H61	7:J:37:U:H3	1.59	0.49
1:A:512:ARG:NH1	7:J:31:A:OP2	2.43	0.49
3:G:105:ASN:HB2	3:G:108:GLU:HB3	1.95	0.48
3:F:161:ASN:O	3:F:164:GLU:OE1	2.31	0.48
1:A:197:SER:OG	1:A:198:LEU:N	2.46	0.48
4:B:17:SER:HB3	4:B:24:LYS:HD2	1.95	0.48
4:B:49:PHE:O	4:B:53:ALA:N	2.46	0.48
5:H:39:TYR:HD1	5:H:93:SER:HB3	1.79	0.48
3:F:19:HIS:ND1	3:F:139:GLU:O	2.46	0.48
3:F:97:ILE:HA	3:E:187:SER:HA	1.94	0.48
3:E:37:ILE:HD13	3:E:48:PRO:HG3	1.96	0.48
2:C:44:LEU:HD22	2:C:116:VAL:HG21	1.96	0.48
3:G:109:LEU:HD13	3:G:142:ILE:HD11	1.95	0.48
4:B:289:TYR:CZ	4:B:291:LYS:HB2	2.49	0.47
3:G:161:ASN:OD1	3:G:161:ASN:N	2.47	0.47
4:B:34:SER:OG	6:N:1:A:OP1	2.27	0.47
4:B:254:LYS:NZ	6:N:3:G:OP2	2.35	0.47
1:A:242:LEU:HB2	1:A:347:SER:HA	1.96	0.47
1:A:274:LEU:HD13	1:A:432:ILE:HD11	1.95	0.47
3:G:174:LEU:HG	3:G:198:LEU:HD21	1.95	0.47
3:E:5:LYS:HG2	3:E:154:GLU:HG2	1.97	0.47
5:H:234:THR:HG21	5:H:243:ILE:HG13	1.96	0.47
1:A:10:TYR:OH	1:A:166:ASN:O	2.32	0.47
3:F:97:ILE:HB	3:F:152:ILE:HB	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:H:15:LEU:HD23	5:H:349:ASN:HB2	1.97	0.47
5:H:254:TYR:O	5:H:258:LYS:N	2.46	0.47
3:G:14:LEU:HA	3:G:193:VAL:HG23	1.97	0.47
3:G:125:THR:OG1	6:N:25:U:O2	2.29	0.47
3:F:121:LYS:HG2	3:F:123:GLU:HG3	1.96	0.47
1:A:181:LEU:HD12	1:A:198:LEU:HD12	1.97	0.47
3:E:41:ILE:H	3:E:41:ILE:HG12	1.33	0.47
1:A:596:ARG:HD3	1:A:655:PHE:CD2	2.50	0.46
3:G:130:THR:HB	5:H:302:ARG:HD2	1.98	0.46
1:A:51:GLN:NE2	1:A:73:THR:OG1	2.37	0.46
2:D:44:LEU:HD22	2:D:116:VAL:HG21	1.96	0.46
1:A:351:LYS:HE3	1:A:357:LEU:HD22	1.98	0.46
3:E:15:GLU:HB3	3:E:192:LYS:HG3	1.96	0.46
4:B:15:PHE:HA	4:B:31:ARG:HH22	1.79	0.46
3:F:119:GLU:OE2	3:F:140:ARG:NE	2.42	0.46
1:A:639:ASN:ND2	1:A:652:THR:O	2.48	0.46
2:D:68:TYR:OH	5:H:30:GLU:OE2	2.33	0.46
3:F:7:LYS:HE3	3:F:203:VAL:HG11	1.97	0.46
5:H:152:ALA:HA	5:H:162:GLU:HA	1.98	0.46
1:A:186:SER:HA	1:A:198:LEU:HD23	1.98	0.45
3:F:96:LEU:HB3	3:F:98:PHE:CE1	2.52	0.45
3:F:41:ILE:H	3:F:41:ILE:HG13	1.54	0.45
1:A:364:ARG:HD3	1:A:529:ALA:HB2	1.97	0.45
5:H:246:LEU:HA	5:H:249:ARG:HB2	1.99	0.45
1:A:242:LEU:HD22	1:A:312:ASN:HA	1.99	0.45
3:F:123:GLU:OE2	3:F:190:TYR:OH	2.30	0.45
3:F:155:ILE:CG2	3:F:159:ASN:HD22	2.30	0.45
3:E:52:LEU:HD23	3:E:182:LEU:HD21	1.98	0.45
1:A:270:LYS:HD3	1:A:572:ILE:HG12	1.99	0.45
1:A:467:SER:OG	1:A:481:LYS:O	2.35	0.45
1:A:521:ASP:HB3	1:A:641:LYS:HE2	1.98	0.45
1:A:522:ASP:HB3	1:A:525:ALA:HB3	1.99	0.45
4:B:31:ARG:HH21	4:B:179:GLY:HA2	1.82	0.45
3:E:64:TYR:CZ	3:E:169:VAL:HG22	2.52	0.45
1:A:239:GLU:O	1:A:312:ASN:ND2	2.48	0.45
1:A:702:ARG:HG2	3:F:26:PHE:HE2	1.81	0.44
2:D:110:ARG:HD3	2:C:68:TYR:HB2	1.99	0.44
4:B:134:ASN:ND2	6:N:9:G:N3	2.64	0.44
1:A:594:GLU:O	1:A:598:ASN:ND2	2.50	0.44
3:G:49:GLY:N	3:G:100:ASP:OD1	2.43	0.44
3:E:42:THR:HG22	3:E:44:LEU:CD1	2.46	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:99:ARG:HD2	4:B:188:ARG:HD3	1.99	0.44
3:G:184:GLY:C	3:G:186:GLY:N	2.70	0.44
2:C:63:LEU:HA	2:C:66:ILE:HD12	1.99	0.44
3:G:20:ILE:HD13	3:G:48:PRO:HD2	2.00	0.44
3:F:181:TYR:CG	3:F:186:GLY:HA3	2.52	0.44
1:A:522:ASP:OD1	1:A:641:LYS:NZ	2.40	0.44
5:H:295:ALA:O	5:H:299:LEU:CB	2.66	0.44
1:A:353:ILE:HD12	1:A:353:ILE:HA	1.93	0.44
1:A:685:ILE:HG23	1:A:748:LEU:HD22	2.00	0.44
5:H:236:THR:HG23	5:H:239:ALA:H	1.82	0.44
5:H:307:LYS:H	5:H:307:LYS:HD2	1.82	0.43
2:C:59:TYR:HB2	2:C:102:ARG:HG3	2.00	0.43
3:G:203:VAL:O	3:F:175:LYS:NZ	2.51	0.43
3:G:81:ARG:HB3	3:G:95:ARG:NH2	2.32	0.43
4:B:61:THR:HA	4:B:216:THR:HB	2.00	0.43
5:H:285:GLY:HA3	6:N:29:U:H5 <sup>7</sup>	2.00	0.43
3:E:92:LYS:NZ	4:B:250:GLU:O	2.51	0.43
3:E:97:ILE:HA	4:B:183:SER:HA	2.00	0.43
5:H:21:GLY:HA2	6:N:27:A:H3 <sup>7</sup>	1.99	0.43
3:E:101:ALA:HB1	3:E:147:PHE:HB3	2.01	0.43
5:H:144:THR:HG23	5:H:249:ARG:HH22	1.83	0.43
3:G:123:GLU:OE1	3:G:136:ARG:NE	2.51	0.43
1:A:226:GLU:HG3	1:A:230:THR:HB	2.01	0.43
3:E:19:HIS:HB2	3:E:140:ARG:HG2	2.00	0.43
4:B:125:HIS:HB3	4:B:154:THR:HG21	1.99	0.43
1:A:516:VAL:HG23	1:A:588:ILE:HG13	2.00	0.43
1:A:281:GLU:HG3	1:A:485:VAL:HG22	2.01	0.43
1:A:300:TYR:OH	1:A:302:GLY:O	2.37	0.43
1:A:431:GLU:HA	1:A:434:HIS:HD2	1.84	0.43
2:D:63:LEU:HA	2:D:66:ILE:HD12	1.99	0.43
3:E:42:THR:HG21	3:E:44:LEU:HD12	1.99	0.43
2:D:41:ARG:HH21	2:D:116:VAL:HG11	1.84	0.42
2:D:59:TYR:HB2	2:D:102:ARG:HG3	2.00	0.42
3:G:14:LEU:HD21	3:G:18:LEU:HD22	2.01	0.42
3:G:57:ARG:NH2	3:G:84:GLY:O	2.52	0.42
1:A:316:THR:HA	1:A:319:THR:HG22	2.01	0.42
5:H:300:GLN:OE1	5:H:309:LYS:NZ	2.39	0.42
1:A:374:ILE:O	1:A:378:LYS:N	2.47	0.42
1:A:668:GLU:O	1:A:672:TYR:N	2.49	0.42
2:D:77:ALA:HA	2:D:83:VAL:HB	2.01	0.42
2:C:74:VAL:O	2:C:78:GLY:N	2.50	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:77:ALA:HA	2:C:83:VAL:HB	2.01	0.42
1:A:569:LEU:HD12	1:A:581:ALA:HB1	2.01	0.42
2:C:41:ARG:HH21	2:C:116:VAL:HG11	1.84	0.42
3:G:101:ALA:HB1	3:G:147:PHE:HB3	2.00	0.42
1:A:446:PRO:HA	1:A:452:CYS:HA	2.01	0.42
1:A:560:ILE:HD12	1:A:595:LEU:HD21	2.01	0.42
2:D:74:VAL:O	2:D:78:GLY:N	2.50	0.42
3:G:7:LYS:HE3	3:G:203:VAL:HG11	2.01	0.42
1:A:226:GLU:HG2	1:A:231:LYS:HG3	2.02	0.42
5:H:19:HIS:NE2	5:H:116:LYS:O	2.53	0.42
1:A:596:ARG:HA	1:A:599:PHE:HB3	2.01	0.42
4:B:244:PHE:O	6:N:1:A:O2'	2.33	0.42
1:A:662:VAL:HG11	1:A:746:LEU:HD12	2.02	0.42
1:A:683:ASN:OD1	1:A:687:LYS:NZ	2.53	0.42
2:D:43:LEU:HA	2:D:46:LEU:HD12	2.02	0.42
3:G:12:ILE:HG13	3:G:149:PHE:HB2	2.02	0.42
5:H:18:ILE:HD11	5:H:348:ALA:HB2	2.02	0.42
3:E:125:THR:O	3:E:133:ALA:HA	2.19	0.42
5:H:65:GLN:NE2	5:H:66:THR:O	2.53	0.42
1:A:541:THR:OG1	1:A:544:ARG:NH1	2.53	0.41
3:E:185:SER:OG	3:E:188:ARG:NH2	2.52	0.41
3:F:44:LEU:HB3	3:F:103:LEU:HD12	2.02	0.41
3:G:32:ILE:HG12	3:G:139:GLU:HG3	2.03	0.41
3:G:124:ASN:HA	3:G:135:PRO:HA	2.03	0.41
3:E:12:ILE:HB	3:E:147:PHE:HB2	2.01	0.41
2:C:43:LEU:HA	2:C:46:LEU:HD12	2.02	0.41
5:H:177:TYR:OH	5:H:182:ASN:ND2	2.53	0.41
1:A:387:LEU:HD22	4:B:225:LEU:HD21	2.03	0.41
1:A:573:TYR:CZ	1:A:575:GLY:HA3	2.54	0.41
2:D:113:GLU:HB3	3:G:29:ILE:HD13	2.02	0.41
1:A:159:GLU:OE2	1:A:172:SER:OG	2.38	0.41
4:B:35:ALA:HB1	4:B:173:LEU:HD21	2.02	0.41
4:B:61:THR:OG1	4:B:215:LEU:O	2.37	0.41
4:B:215:LEU:HD22	4:B:295:PHE:HB2	2.03	0.41
5:H:32:ILE:HB	5:H:76:ILE:HD13	2.03	0.41
5:H:242:LEU:HD22	5:H:249:ARG:HH12	1.86	0.41
1:A:156:ILE:HG23	1:A:176:LEU:HD11	2.03	0.41
1:A:489:ASP:HB3	1:A:561:ASN:HB3	2.03	0.41
1:A:603:THR:HG23	1:A:605:GLY:HA2	2.03	0.41
5:H:96:GLU:OE1	5:H:98:GLY:N	2.53	0.41
1:A:693:ARG:HH11	3:E:30:GLY:H	1.69	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:68:VAL:HG13	3:E:129:ILE:HD11	2.00	0.41
3:E:155:ILE:HA	3:E:159:ASN:HD21	1.86	0.41
5:H:51:VAL:HG22	5:H:56:ALA:HB2	2.02	0.41
1:A:644:ILE:HB	1:A:655:PHE:CD1	2.57	0.40
1:A:709:ARG:NH2	7:J:25:G:OP1	2.54	0.40
3:F:127:ASP:HB3	3:F:132:GLU:H	1.86	0.40
3:E:86:SER:OG	6:N:5:A:N3	2.49	0.40
4:B:40:ALA:HB1	4:B:46:LEU:HA	2.03	0.40
5:H:274:LEU:HD12	5:H:275:GLN:HG3	2.02	0.40
3:G:95:ARG:HA	3:G:154:GLU:HB3	2.03	0.40
3:F:57:ARG:O	3:F:61:ALA:N	2.52	0.40
3:E:129:ILE:HD13	3:E:129:ILE:N	2.36	0.40
4:B:3:TYR:HB3	4:B:4:LYS:H	1.74	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	684/758 (90%)	585 (86%)	98 (14%)	1 (0%)	51	82
2	C	119/126 (94%)	109 (92%)	10 (8%)	0	100	100
2	D	119/126 (94%)	110 (92%)	9 (8%)	0	100	100
3	E	201/220 (91%)	176 (88%)	23 (11%)	2 (1%)	15	46
3	F	215/220 (98%)	196 (91%)	19 (9%)	0	100	100
3	G	215/220 (98%)	191 (89%)	21 (10%)	3 (1%)	11	37
4	B	284/299 (95%)	250 (88%)	34 (12%)	0	100	100
5	H	351/357 (98%)	301 (86%)	49 (14%)	1 (0%)	41	72
All	All	2188/2326 (94%)	1918 (88%)	263 (12%)	7 (0%)	44	72

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	G	160	GLU
3	G	163	VAL
3	E	129	ILE
3	G	77	ASP
3	E	43	ASN
5	H	88	SER
1	A	605	GLY

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	568/651 (87%)	558 (98%)	10 (2%)	59	79
2	C	105/112 (94%)	104 (99%)	1 (1%)	76	88
2	D	105/112 (94%)	104 (99%)	1 (1%)	76	88
3	E	173/188 (92%)	166 (96%)	7 (4%)	31	60
3	F	182/188 (97%)	179 (98%)	3 (2%)	62	81
3	G	184/188 (98%)	181 (98%)	3 (2%)	62	81
4	B	250/263 (95%)	246 (98%)	4 (2%)	62	81
5	H	297/312 (95%)	292 (98%)	5 (2%)	60	80
All	All	1864/2014 (93%)	1830 (98%)	34 (2%)	61	79

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	106	ASN
1	A	129	ASN
1	A	158	ASN
1	A	188	THR
1	A	221	ARG
1	A	224	TYR
1	A	301	VAL

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	443	GLU
1	A	604	ASN
1	A	657	ARG
2	D	79	ARG
2	C	79	ARG
3	G	124	ASN
3	G	160	GLU
3	G	171	ARG
3	F	134	ASN
3	F	140	ARG
3	F	161	ASN
3	E	18	LEU
3	E	39	ASP
3	E	41	ILE
3	E	43	ASN
3	E	90	ARG
3	E	161	ASN
3	E	210	LYS
4	B	57	LYS
4	B	161	ASN
4	B	249	ASN
4	B	288	ASN
5	H	71	ARG
5	H	163	ASN
5	H	208	LYS
5	H	307	LYS
5	H	351	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	106	ASN
1	A	129	ASN
1	A	158	ASN
1	A	222	HIS
1	A	223	ASN
1	A	268	GLN
1	A	312	ASN
1	A	391	ASN
1	A	434	HIS
1	A	436	HIS
1	A	484	HIS

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Mol	Chain	Res	Type
1	A	604	ASN
3	G	124	ASN
3	F	124	ASN
3	F	134	ASN
3	F	159	ASN
3	E	33	ASN
3	E	43	ASN
3	E	161	ASN
4	B	110	ASN
4	B	161	ASN
4	B	249	ASN
4	B	255	GLN
4	B	288	ASN
5	H	163	ASN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
6	N	34/36 (94%)	6 (17%)	0
7	J	34/43 (79%)	10 (29%)	1 (2%)
All	All	68/79 (86%)	16 (23%)	1 (1%)

All (16) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
6	N	2	C
6	N	8	C
6	N	9	G
6	N	23	U
6	N	24	A
6	N	32	C
7	J	12	G
7	J	18	A
7	J	21	G
7	J	22	C
7	J	24	A
7	J	28	A
7	J	30	A
7	J	33	G
7	J	36	U
7	J	41	G

All (1) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
7	J	20	A

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 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	ATP	A	801	-	26,33,33	0.88	1 (3%)	31,52,52	1.58	5 (16%)
8	ATP	A	802	9,1	26,33,33	0.89	1 (3%)	31,52,52	1.72	8 (25%)

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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	ATP	A	801	-	-	1/18/38/38	0/3/3/3
8	ATP	A	802	9,1	-	4/18/38/38	0/3/3/3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	A	802	ATP	C5-C4	2.29	1.47	1.40
8	A	801	ATP	C5-C4	2.19	1.46	1.40

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	A	801	ATP	PB-O3B-PG	-3.96	119.25	132.83
8	A	801	ATP	PA-O3A-PB	-3.73	120.03	132.83
8	A	802	ATP	C3'-C2'-C1'	3.32	105.97	100.98
8	A	802	ATP	C5-C6-N1	-3.26	112.95	120.35
8	A	802	ATP	C4-C5-N7	-3.26	106.00	109.40
8	A	801	ATP	N3-C2-N1	-3.25	123.60	128.68
8	A	802	ATP	N6-C6-N1	3.23	125.28	118.57
8	A	802	ATP	N3-C2-N1	-3.16	123.73	128.68
8	A	802	ATP	C2-N1-C6	3.15	124.14	118.75
8	A	801	ATP	C3'-C2'-C1'	2.87	105.30	100.98
8	A	801	ATP	C4-C5-N7	-2.71	106.58	109.40
8	A	802	ATP	PA-O3A-PB	-2.62	123.83	132.83
8	A	802	ATP	PB-O3B-PG	-2.59	123.95	132.83

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	A	801	ATP	C5'-O5'-PA-O1A
8	A	802	ATP	O4'-C4'-C5'-O5'
8	A	802	ATP	C3'-C4'-C5'-O5'
8	A	802	ATP	PG-O3B-PB-O3A
8	A	802	ATP	PB-O3A-PA-O5'

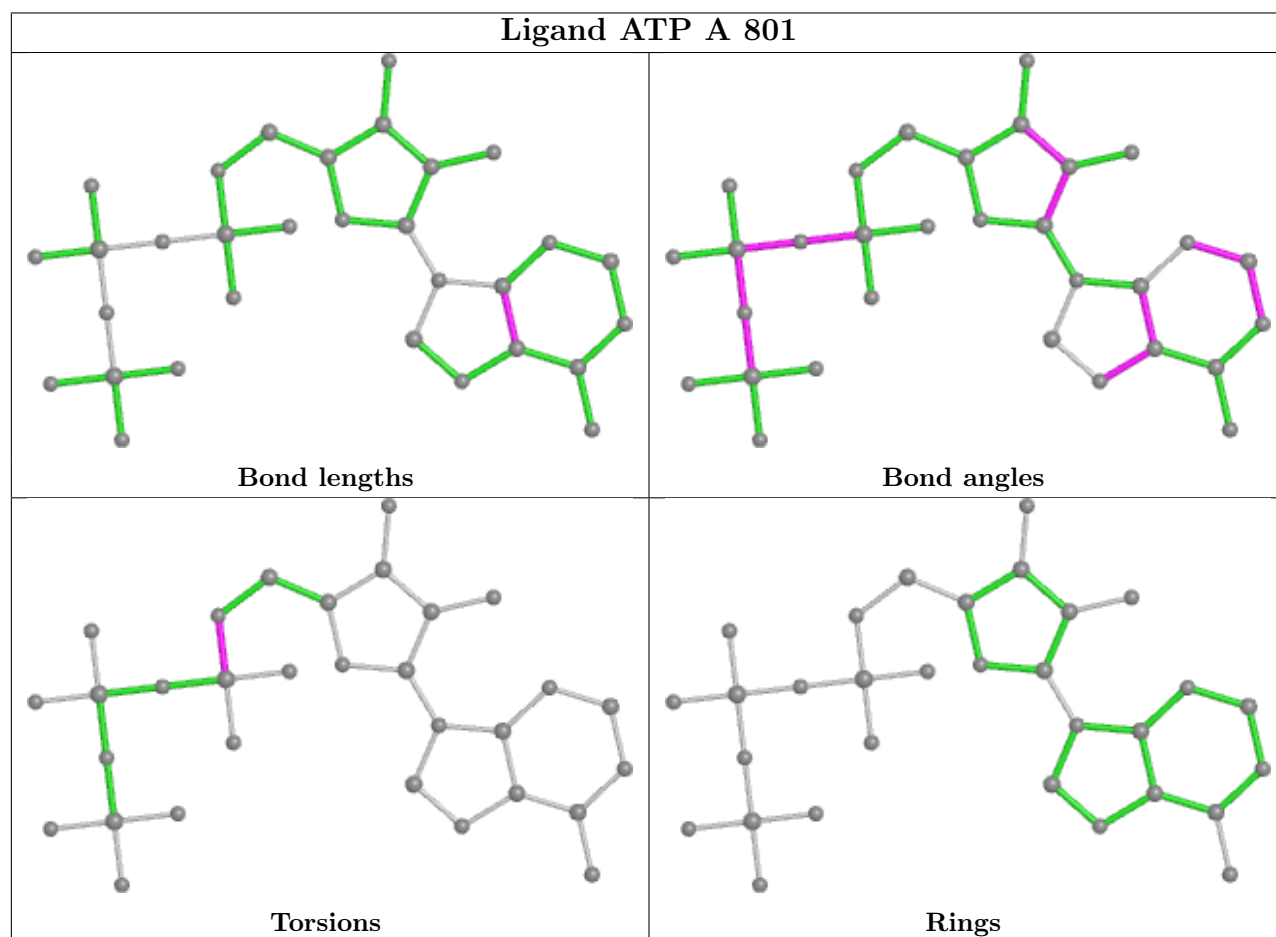
There are no ring outliers.

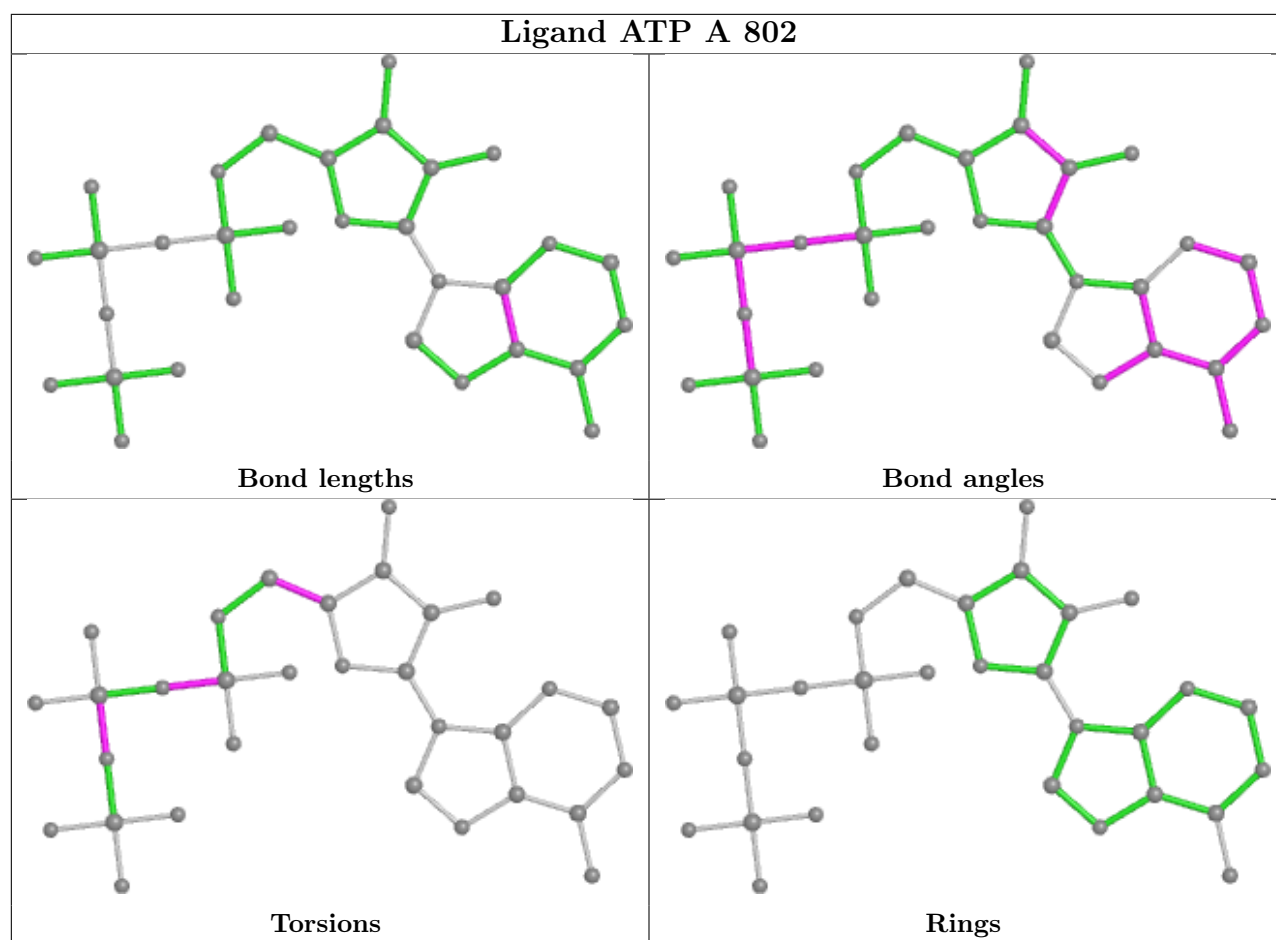
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	A	801	ATP	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

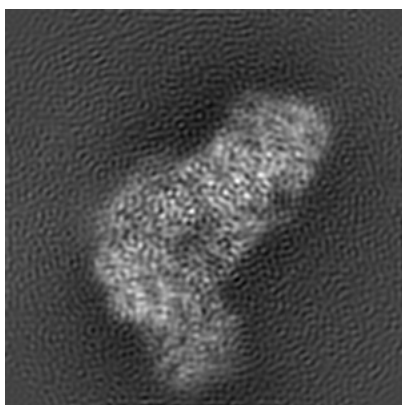
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-9656. These allow visual inspection of the internal detail of the map and identification of artifacts.

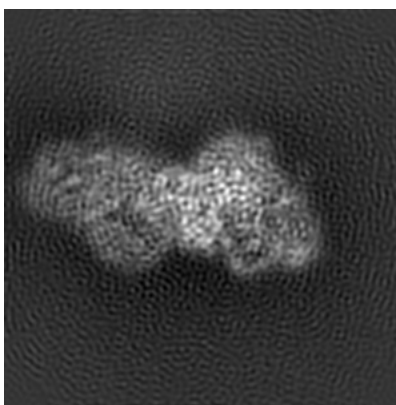
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

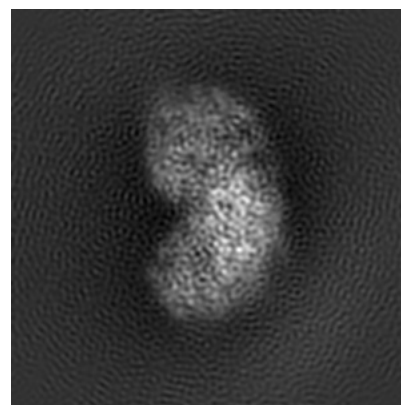
#### 6.1.1 Primary map



X



Y

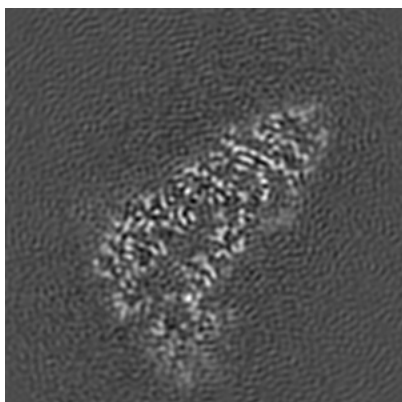


Z

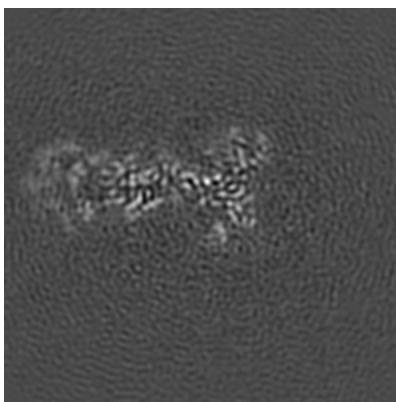
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

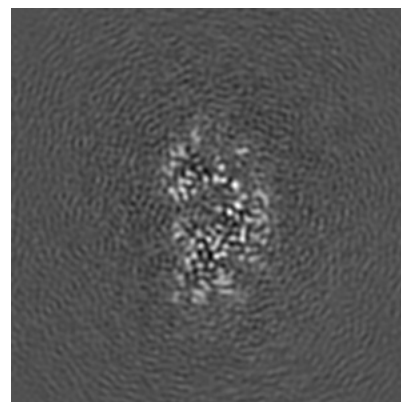
#### 6.2.1 Primary map



X Index: 100



Y Index: 100

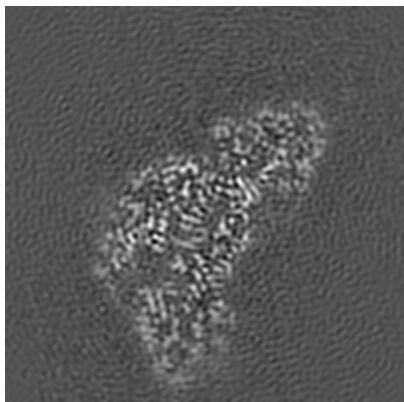


Z Index: 100

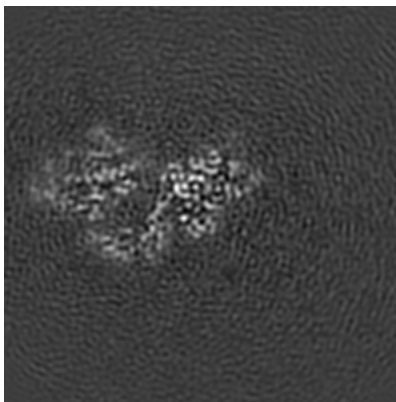
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

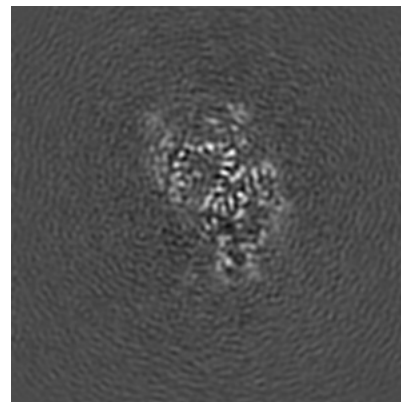
### 6.3.1 Primary map



X Index: 105



Y Index: 79



Z Index: 113

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

## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.062. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

## 6.5 Mask visualisation

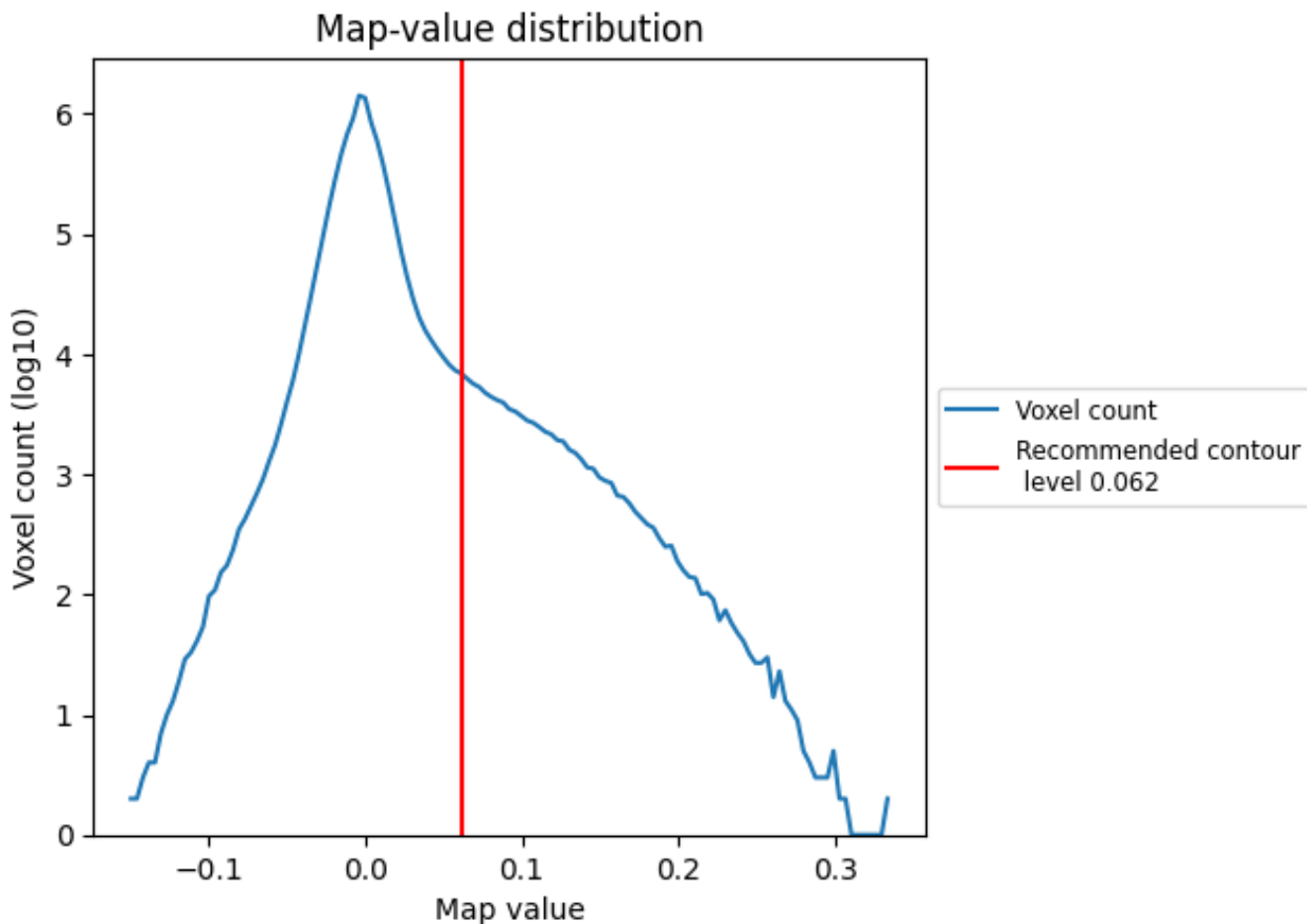
This section was not generated. No masks/segmentation were deposited.



## 7 Map analysis [i](#)

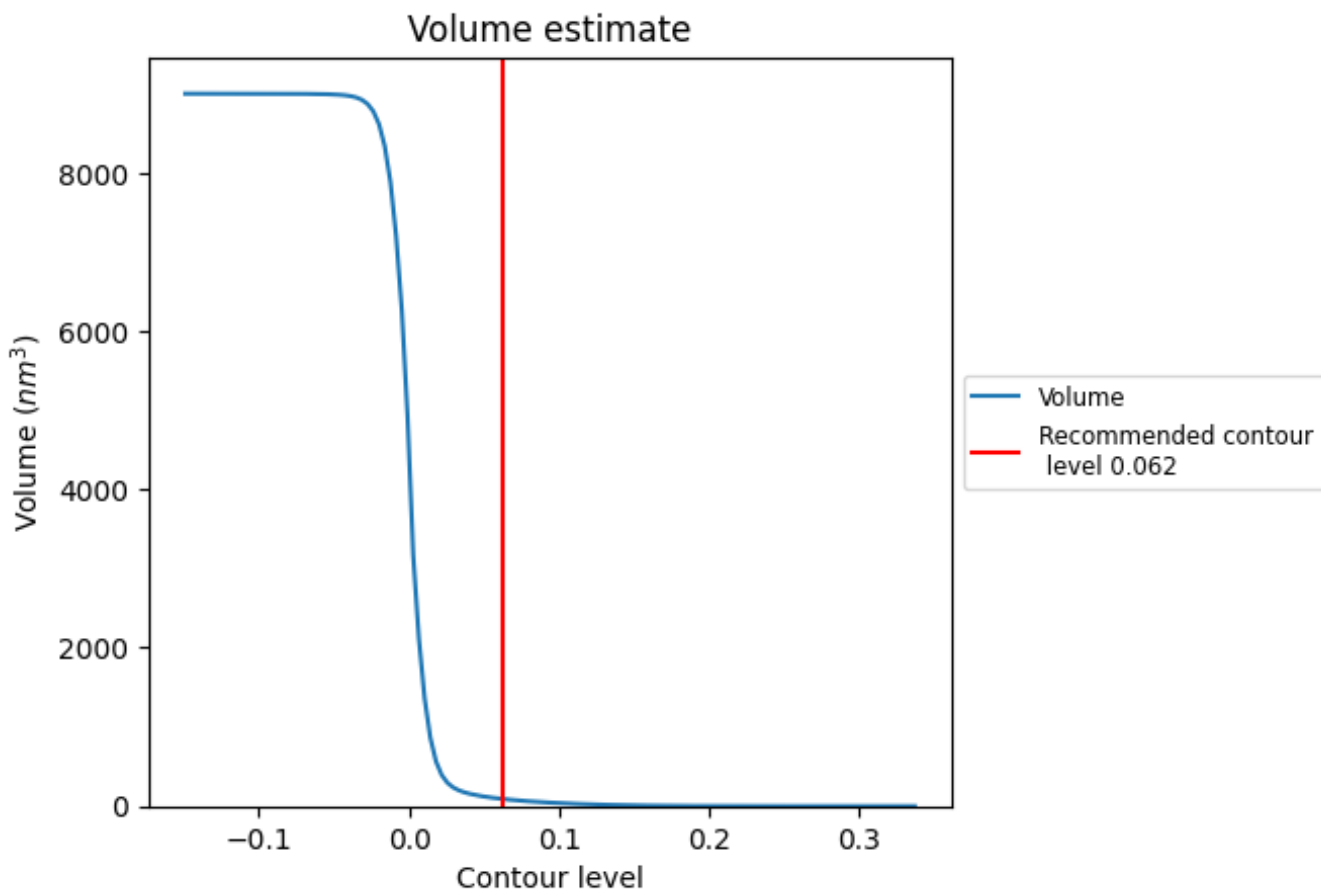
This section contains the results of statistical analysis of the map.

### 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.

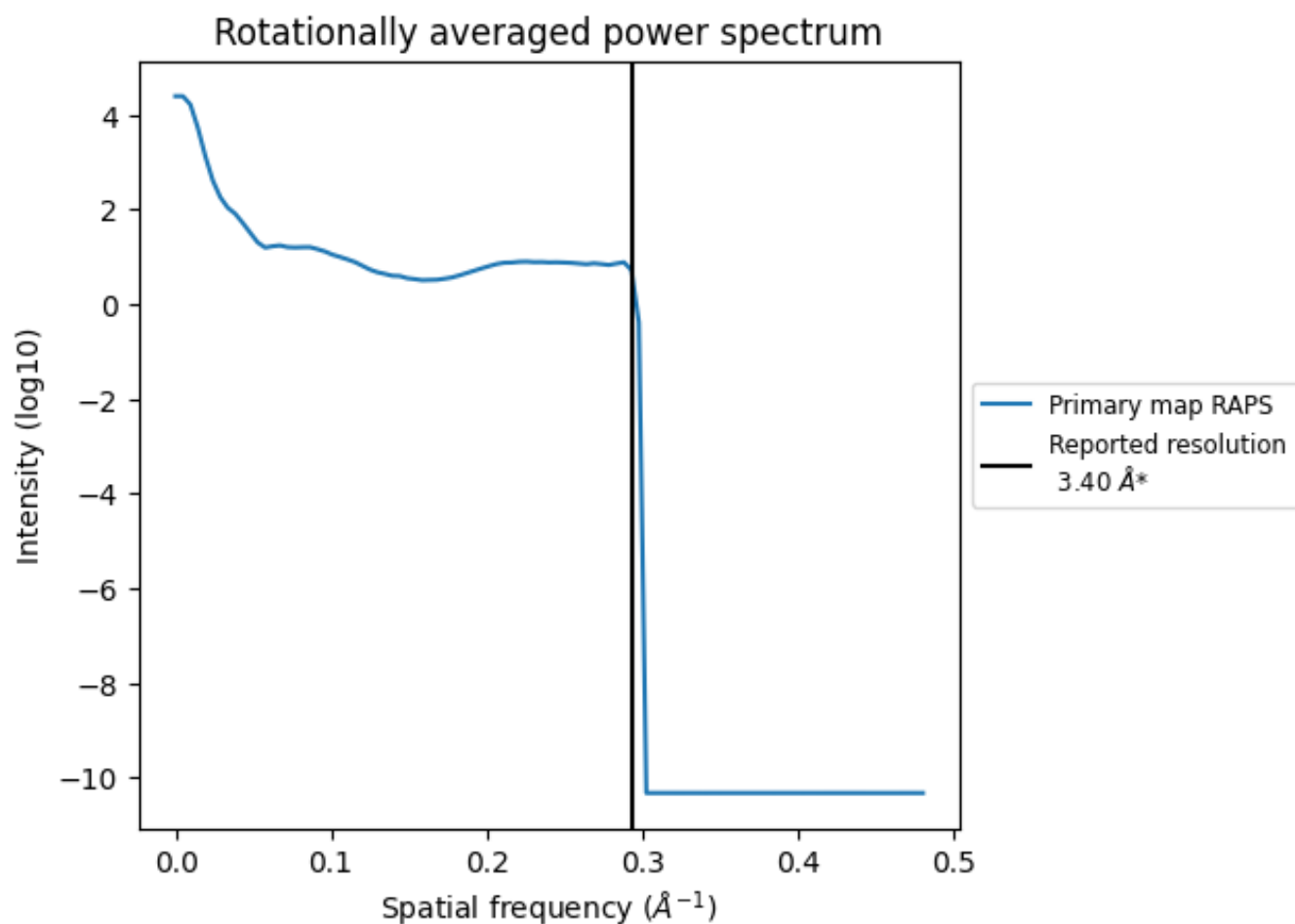
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 92  $\text{nm}^3$ ; this corresponds to an approximate mass of 83 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  $0.294 \text{\AA}^{-1}$

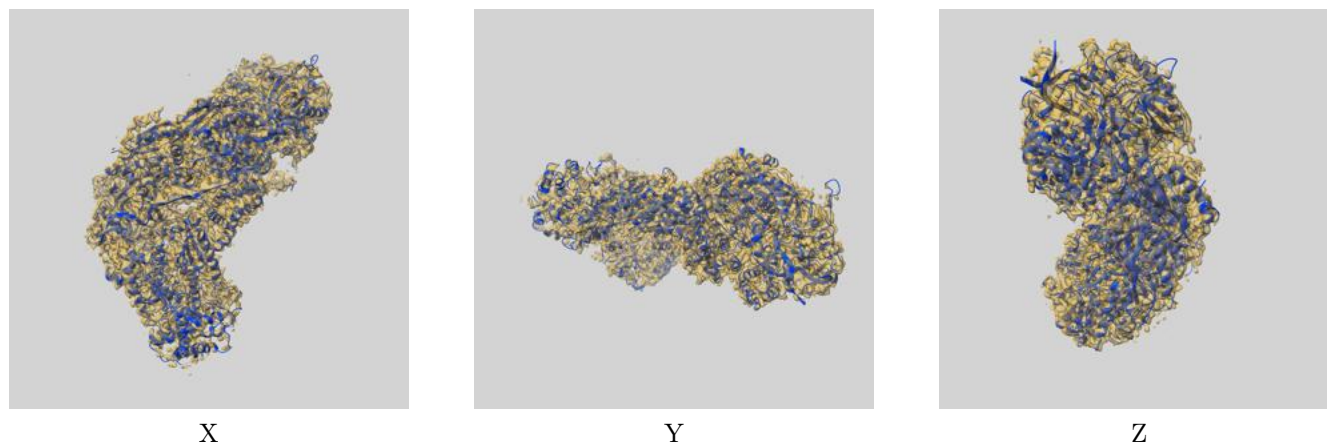
## 8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

## 9 Map-model fit [i](#)

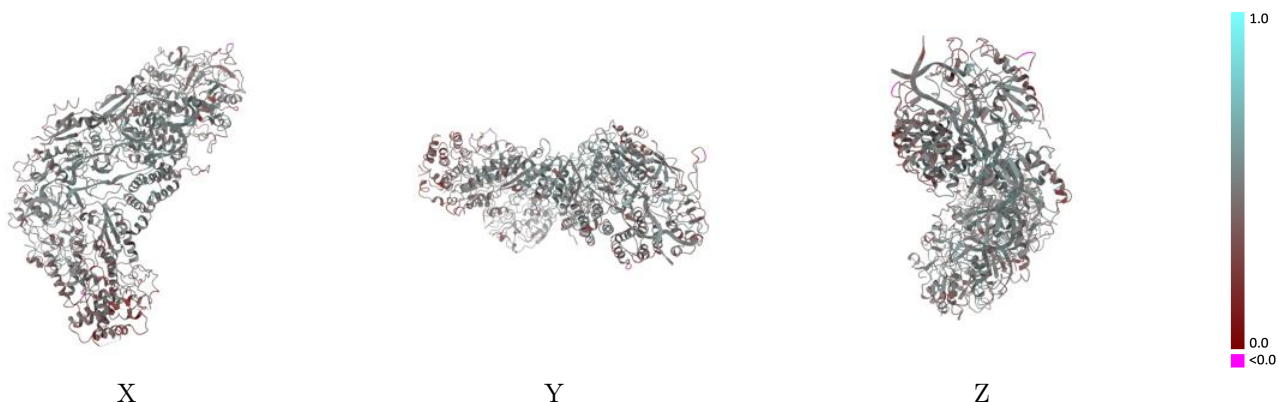
This section contains information regarding the fit between EMDB map EMD-9656 and PDB model 6IFR. Per-residue inclusion information can be found in section 3 on page 7.

### 9.1 Map-model overlay [i](#)



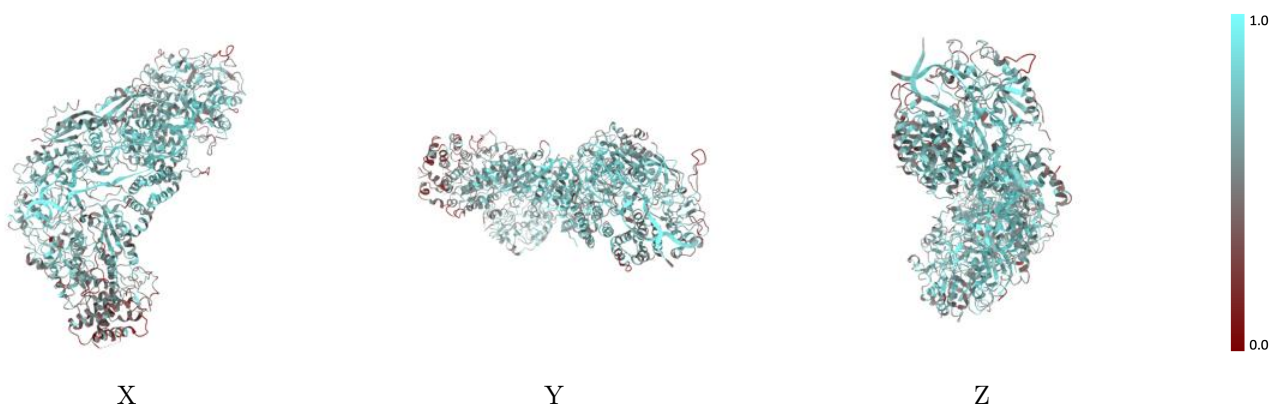
The images above show the 3D surface view of the map at the recommended contour level 0.062 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



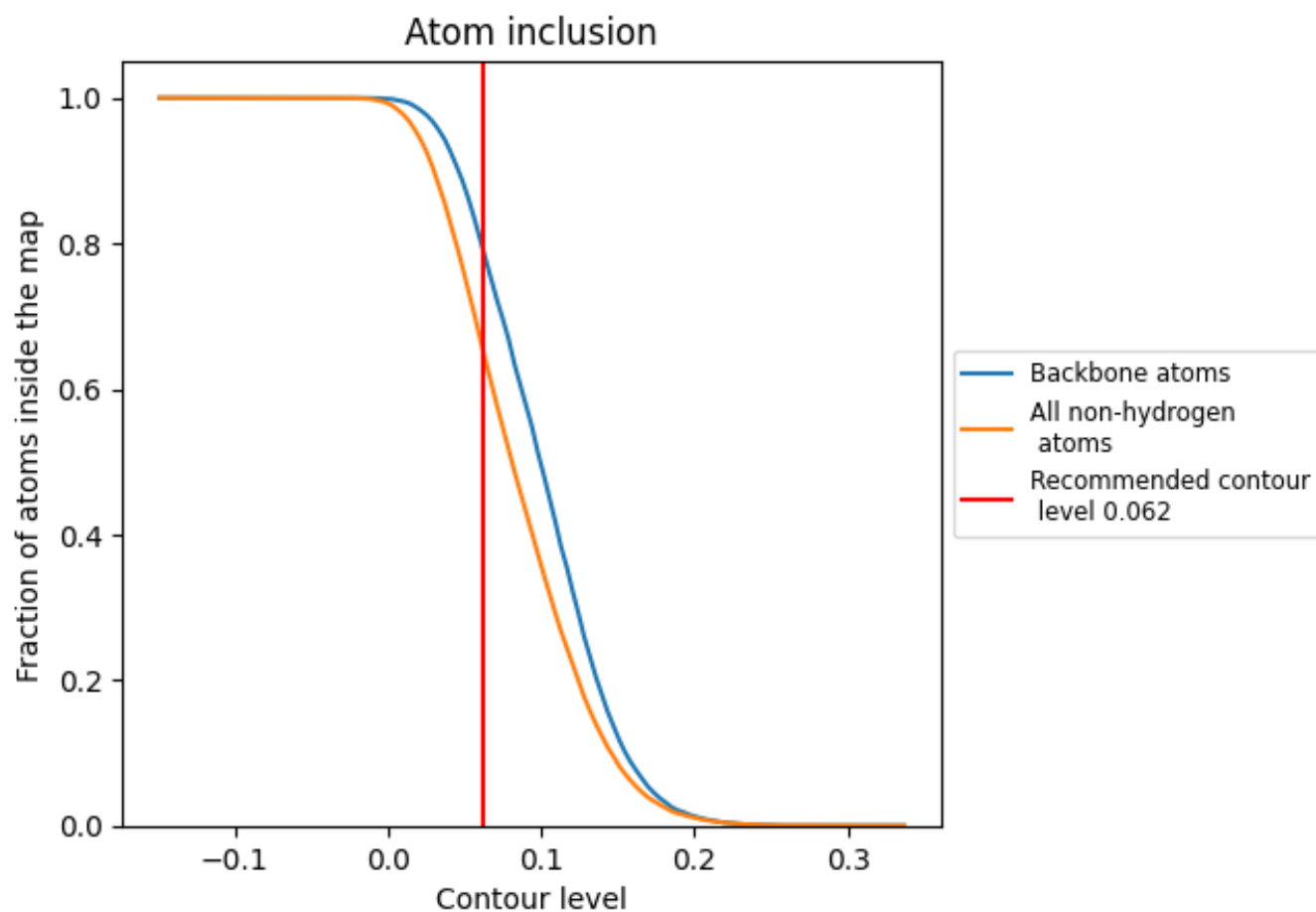
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.062).























## 9.4 Atom inclusion [i](#)



At the recommended contour level, 79% of all backbone atoms, 65% 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 (0.062) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6519	 0.4560
A	 0.5723	 0.4260
B	 0.6606	 0.4570
C	 0.6835	 0.4600
D	 0.6134	 0.4120
E	 0.6984	 0.4820
F	 0.7084	 0.4880
G	 0.6715	 0.4830
H	 0.6128	 0.4460
J	 0.8590	 0.5080
N	 0.8939	 0.5260

