



Full wwPDB EM Validation Report ⓘ

Mar 28, 2026 – 09:03 AM UTC

PDB ID : 7TJH / pdb_00007tjh
EMDB ID : EMD-25925
Title : S. cerevisiae ORC bound to 84 bp ARS1 DNA and Cdc6 (state 1) with flexible Orc6 N-terminal domain
Authors : Schmidt, J.M.; Yang, R.; Kumar, A.; Hunker, O.; Bleichert, F.
Deposited on : 2022-01-16
Resolution : 2.50 Å(reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

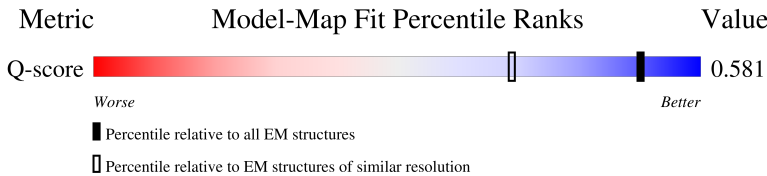
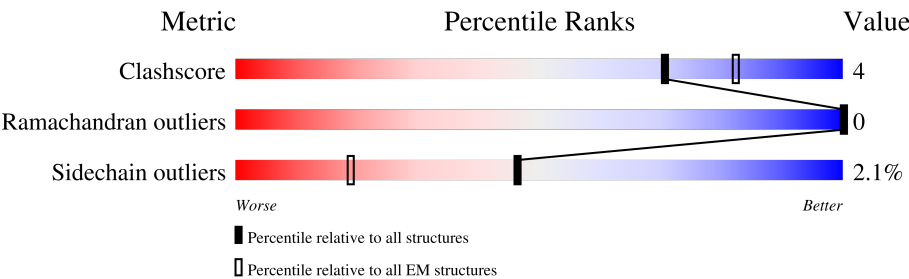
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data 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) : 2.49

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 2.50 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	7115 (2.00 - 3.00)

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	917	48% 47%
2	B	620	36% 5% 60%
3	C	616	7% 78% 10% 11%
4	D	532	76% 6% 18%

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Mol	Chain	Length	Quality of chain
5	E	479	 84% 8% 8%
6	F	435	 27% 9% 64%
7	G	84	 49% 51%
8	H	84	 37% 12% 51%
9	I	516	 62% 10% 27%

2 Entry composition [i](#)

There are 12 unique types of molecules in this entry. The entry contains 23899 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 Origin recognition complex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	483	Total	C	N	O	S	0	0
			3871	2472	665	716	18		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	SER	-	expression tag	UNP P54784
A	-1	ASN	-	expression tag	UNP P54784
A	0	ALA	-	expression tag	UNP P54784

- Molecule 2 is a protein called Origin recognition complex subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	251	Total	C	N	O	S	0	0
			2080	1348	344	379	9		

- Molecule 3 is a protein called Origin recognition complex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	546	Total	C	N	O	S	0	0
			4517	2922	740	839	16		

- Molecule 4 is a protein called Origin recognition complex subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	434	Total	C	N	O	S	0	0
			3544	2272	601	658	13		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	-2	SER	-	expression tag	UNP P54791

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-1	ASN	-	expression tag	UNP P54791
D	0	ALA	-	expression tag	UNP P54791

- Molecule 5 is a protein called Origin recognition complex subunit 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	439	Total	C	N	O	S	0	0
			3604	2346	585	660	13		

- Molecule 6 is a protein called Origin recognition complex subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	157	Total	C	N	O	S	0	0
			1314	845	222	235	12		

- Molecule 7 is a DNA chain called DNA, 84 bp ARS1.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	41	Total	C	N	O	P	0	0
			832	405	132	255	40		

- Molecule 8 is a DNA chain called DNA, 84 bp ARS1.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	41	Total	C	N	O	P	0	0
			846	405	165	235	41		

- Molecule 9 is a protein called Cell division control protein 6.

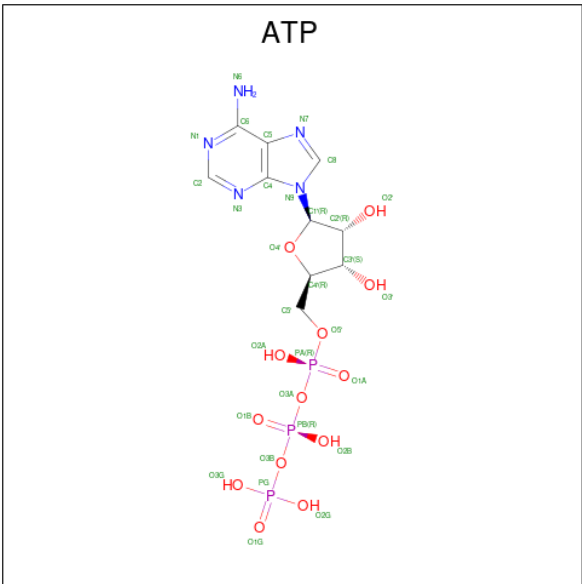
Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	379	Total	C	N	O	S	0	0
			3015	1943	497	559	16		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	-2	SER	-	expression tag	UNP P09119
I	-1	ASN	-	expression tag	UNP P09119
I	0	ALA	-	expression tag	UNP P09119

- Molecule 10 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: C₁₀H₁₆N₅O₁₃P₃)

(labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
10	A	1	Total	C	N	O	P	0
			31	10	5	13	3	
10	D	1	Total	C	N	O	P	0
			31	10	5	13	3	
10	E	1	Total	C	N	O	P	0
			31	10	5	13	3	
10	I	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 11 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
11	A	1	Total	Mg	0
			1	1	
11	D	1	Total	Mg	0
			1	1	
11	E	1	Total	Mg	0
			1	1	
11	I	1	Total	Mg	0
			1	1	

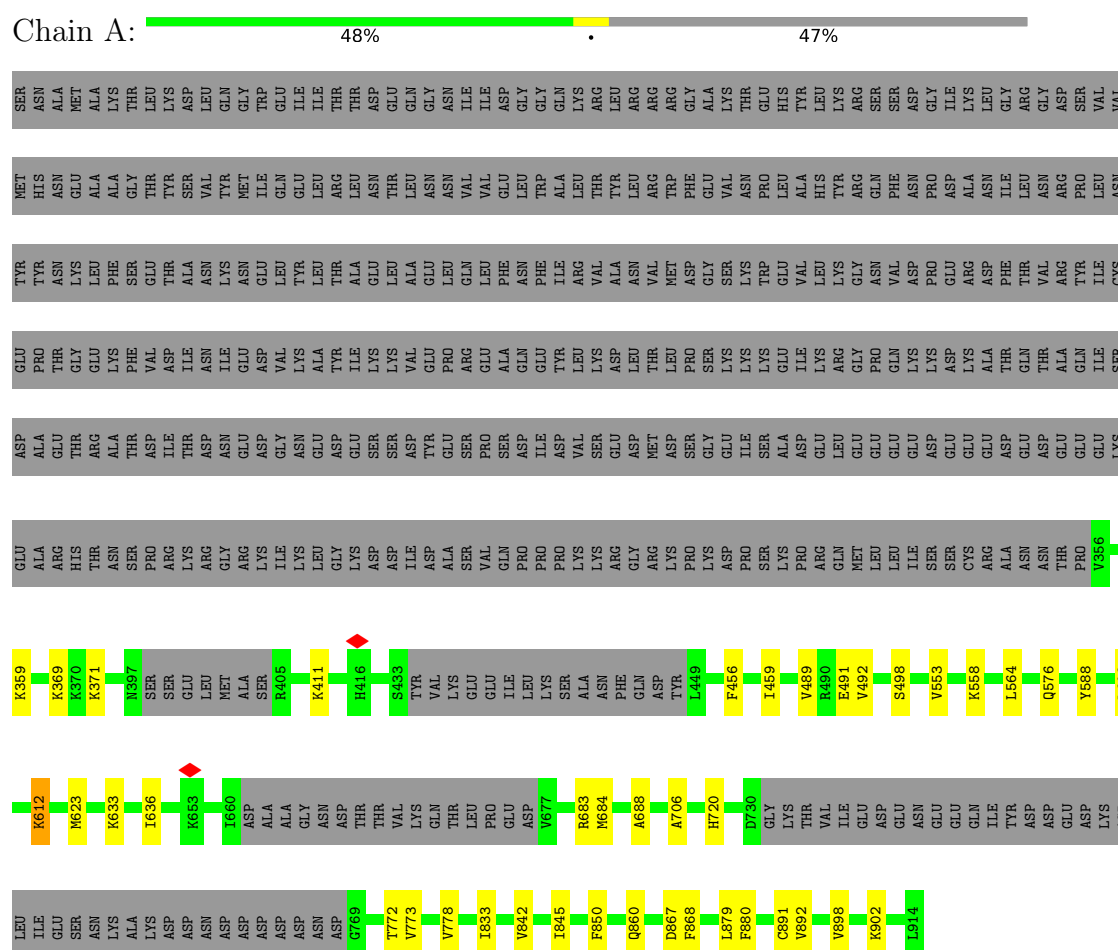
- Molecule 12 is water.

Mol	Chain	Residues	Atoms		AltConf
12	A	30	Total 30	O 30	0
12	B	5	Total 5	O 5	0
12	C	7	Total 7	O 7	0
12	D	47	Total 47	O 47	0
12	E	29	Total 29	O 29	0
12	F	1	Total 1	O 1	0
12	G	14	Total 14	O 14	0
12	H	10	Total 10	O 10	0
12	I	5	Total 5	O 5	0

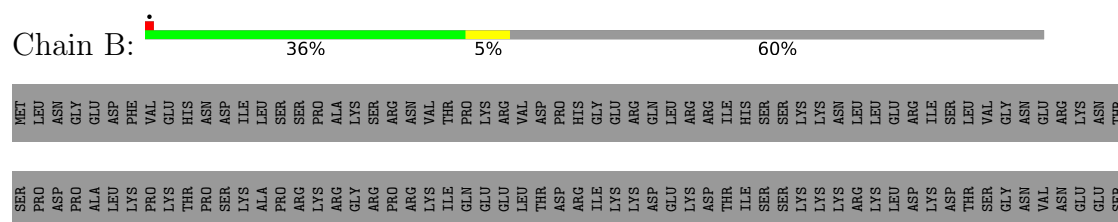
3 Residue-property plots

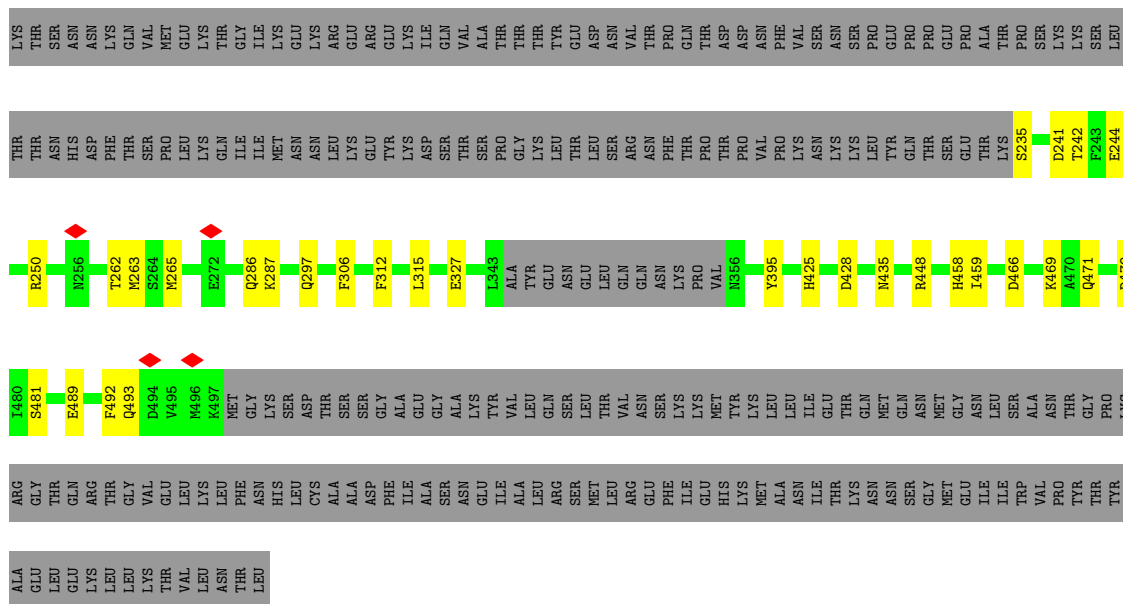
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: Origin recognition complex subunit 1

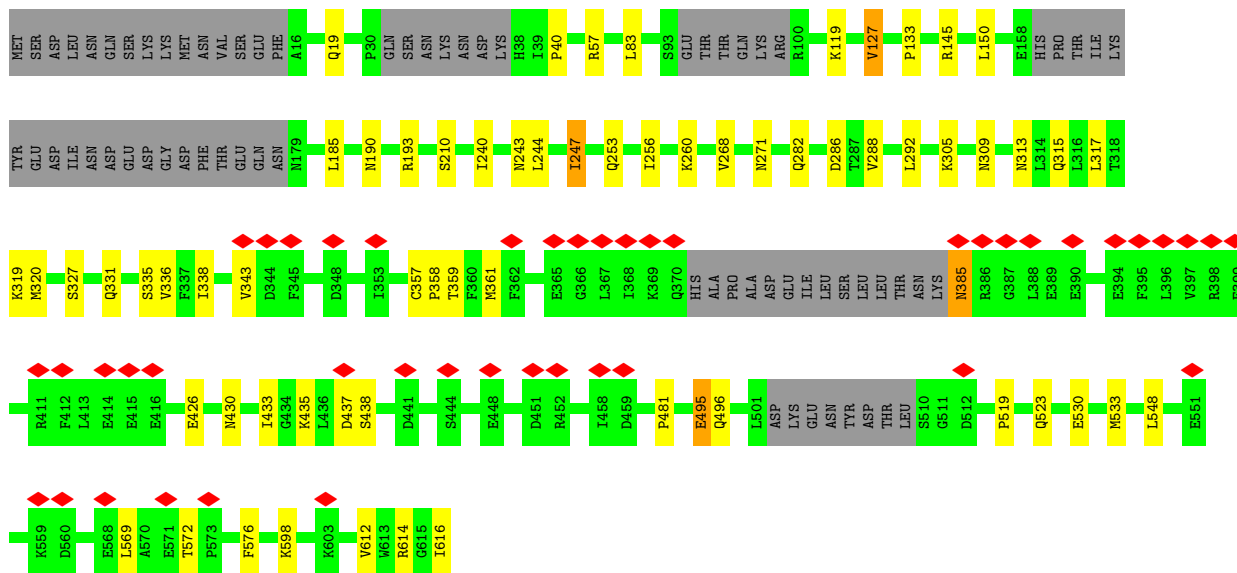
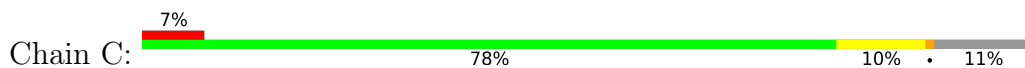


• Molecule 2: Origin recognition complex subunit 2

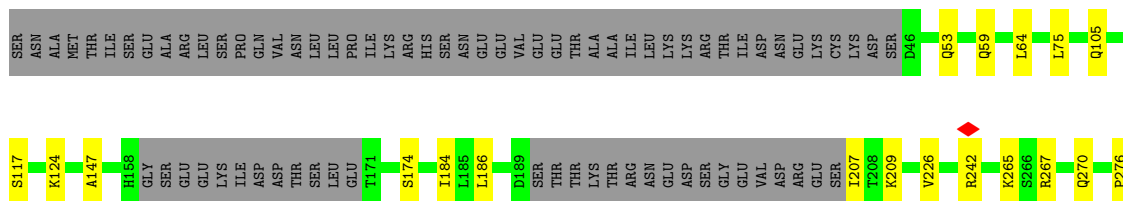
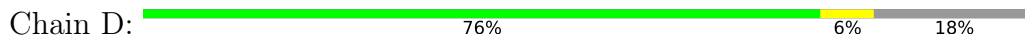




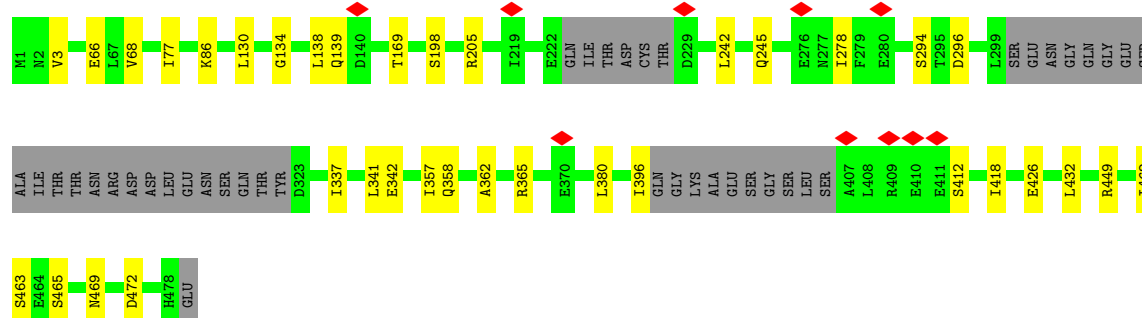
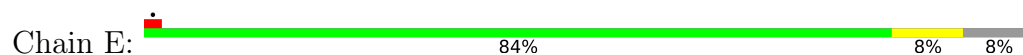
- Molecule 3: Origin recognition complex subunit 3



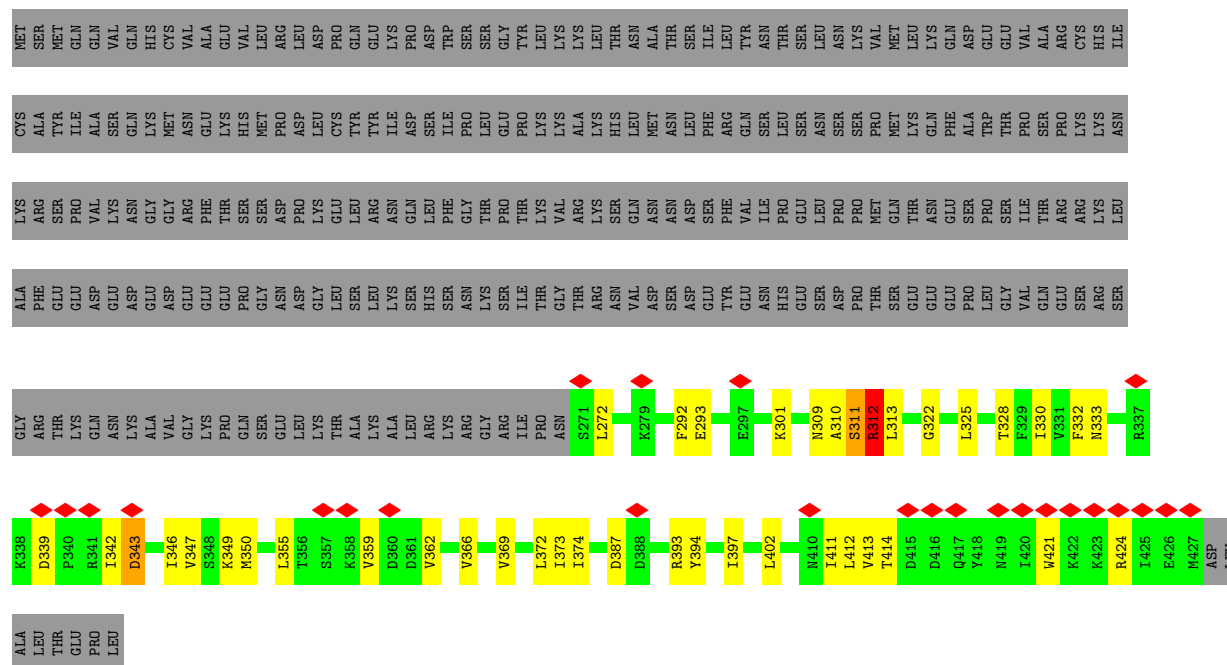
- Molecule 4: Origin recognition complex subunit 4



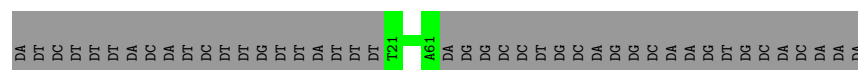
- Molecule 5: Origin recognition complex subunit 5



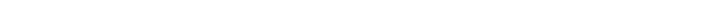
- Molecule 6: Origin recognition complex subunit 6

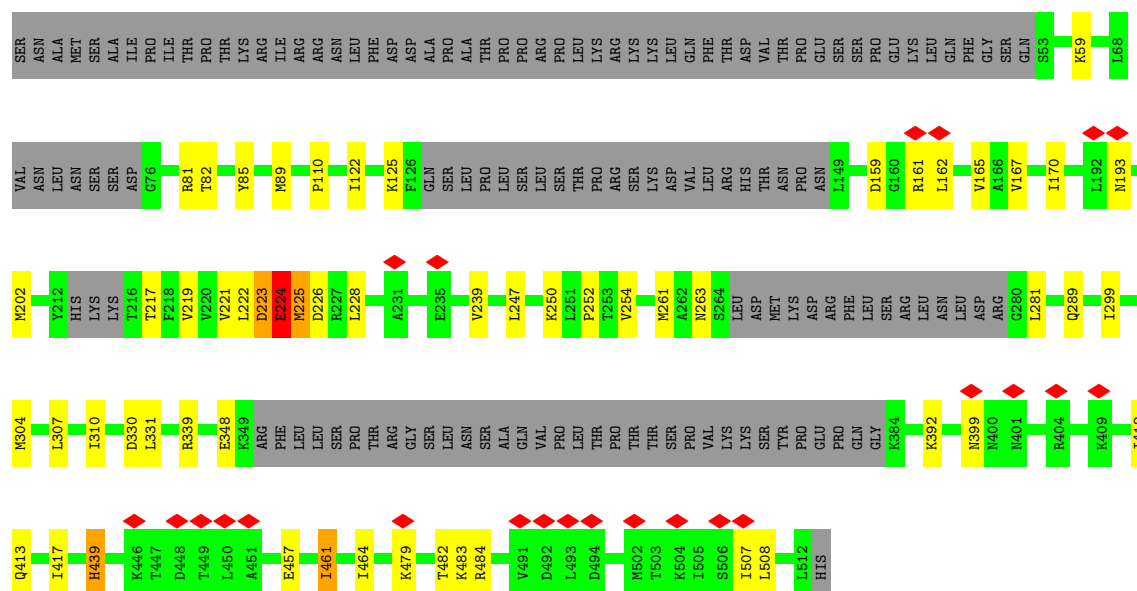


- Molecule 7: DNA, 84 bp ARS1



- Molecule 8: DNA, 84 bp ARS1

Chain I:  5% 62% 10% 27%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	211406	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	6.6	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1600	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.095	Depositor
Minimum map value	-0.025	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.01	Depositor
Map size (Å)	258.0, 258.0, 258.0	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.86, 0.86, 0.86	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.25	0/3929	0.55	0/5282
2	B	0.24	0/2133	0.53	0/2884
3	C	0.23	0/4613	0.51	1/6222 (0.0%)
4	D	0.22	0/3606	0.48	0/4871
5	E	0.25	0/3687	0.50	1/5002 (0.0%)
6	F	0.35	0/1336	0.67	1/1799 (0.1%)
7	G	0.25	0/928	0.57	0/1431
8	H	0.23	0/953	0.47	0/1468
9	I	0.30	0/3060	0.68	3/4121 (0.1%)
All	All	0.25	0/24245	0.55	6/33080 (0.0%)

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
9	I	0	1

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	I	224	GLU	O-C-N	-11.34	109.86	122.67
6	F	312	ARG	N-CA-C	-8.77	103.12	113.38
5	E	432	LEU	N-CA-C	-7.04	104.50	113.23
3	C	496	GLN	N-CA-C	-5.30	106.86	113.38
9	I	252	PRO	CA-C-N	5.19	129.70	122.08
9	I	252	PRO	C-N-CA	5.19	129.70	122.08

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
9	I	224	GLU	Mainchain

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	3871	0	3994	22	0
2	B	2080	0	2049	20	0
3	C	4517	0	4478	40	0
4	D	3544	0	3605	16	0
5	E	3604	0	3643	20	0
6	F	1314	0	1352	23	0
7	G	832	0	474	0	0
8	H	846	0	462	7	0
9	I	3015	0	3134	43	0
10	A	31	0	12	1	0
10	D	31	0	12	0	0
10	E	31	0	12	0	0
10	I	31	0	12	0	0
11	A	1	0	0	0	0
11	D	1	0	0	0	0
11	E	1	0	0	0	0
11	I	1	0	0	0	0
12	A	30	0	0	1	0
12	B	5	0	0	0	0
12	C	7	0	0	0	0
12	D	47	0	0	0	0
12	E	29	0	0	0	0
12	F	1	0	0	0	0
12	G	14	0	0	0	0
12	H	10	0	0	0	0
12	I	5	0	0	1	0
All	All	23899	0	23239	165	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 4.

All (165) 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:880:PHE:HB3	9:I:482:THR:HG21	1.37	1.03
6:F:325:LEU:HD11	6:F:350:MET:HG2	1.51	0.90
3:C:385:ASN:HD22	3:C:385:ASN:N	1.83	0.77
9:I:223:ASP:CG	9:I:261:MET:HE3	2.16	0.70
9:I:482:THR:HG22	9:I:484:ARG:HD3	1.73	0.70
1:A:612:LYS:HE3	9:I:224:GLU:OE1	1.96	0.65
9:I:224:GLU:OE2	12:I:1101:HOH:O	2.13	0.65
5:E:77:ILE:HG12	5:E:130:LEU:HD21	1.80	0.64
9:I:482:THR:CG2	9:I:484:ARG:HH11	2.12	0.63
6:F:309:ASN:O	6:F:313:LEU:HG	1.98	0.62
9:I:165:VAL:HG13	9:I:217:THR:HB	1.81	0.62
3:C:335:SER:O	3:C:338:ILE:HB	2.01	0.61
1:A:684:MET:HG3	1:A:773:VAL:HB	1.84	0.60
3:C:481:PRO:HD2	5:E:418:ILE:HG12	1.82	0.59
2:B:262:THR:H	2:B:265:MET:HE3	1.67	0.59
4:D:59:GLN:HG2	4:D:64:LEU:HD11	1.84	0.59
3:C:271:ASN:ND2	3:C:313:ASN:OD1	2.35	0.58
3:C:433:ILE:HG13	3:C:435:LYS:HG3	1.84	0.58
6:F:311:SER:C	6:F:313:LEU:N	2.60	0.57
2:B:241:ASP:OD2	3:C:614:ARG:NH1	2.36	0.57
3:C:260:LYS:NZ	5:E:296:ASP:O	2.37	0.57
9:I:439:HIS:HD1	9:I:439:HIS:C	2.13	0.57
1:A:588:TYR:HB3	12:A:1118:HOH:O	2.04	0.57
6:F:311:SER:C	6:F:313:LEU:H	2.12	0.57
9:I:81:ARG:NH2	9:I:289:GLN:O	2.38	0.56
5:E:342:GLU:OE2	5:E:365:ARG:NH2	2.38	0.56
3:C:57:ARG:HG3	3:C:336:VAL:HG13	1.88	0.55
1:A:880:PHE:HB3	9:I:482:THR:CG2	2.25	0.55
3:C:426:GLU:O	3:C:430:ASN:ND2	2.39	0.55
1:A:489:VAL:HG11	1:A:564:LEU:HD13	1.89	0.55
2:B:235:SER:N	3:C:530:GLU:O	2.40	0.54
9:I:82:THR:O	9:I:85:TYR:HB3	2.08	0.54
6:F:343:ASP:O	6:F:347:VAL:HG23	2.08	0.54
6:F:411:ILE:HG22	6:F:412:LEU:HD12	1.89	0.53
9:I:159:ASP:OD2	9:I:161:ARG:NH1	2.42	0.53
9:I:161:ARG:HG2	9:I:162:LEU:H	1.73	0.53
9:I:225:MET:O	9:I:228:LEU:HB2	2.10	0.52
9:I:85:TYR:OH	9:I:125:LYS:NZ	2.41	0.52
2:B:471:GLN:HE21	3:C:315:GLN:HG2	1.74	0.52
2:B:250:ARG:HG2	3:C:533:MET:HG3	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:435:ASN:OD1	2:B:469:LYS:NZ	2.41	0.52
4:D:418:MET:HG3	4:D:526:TRP:CE2	2.44	0.52
9:I:59:LYS:HG3	9:I:339:ARG:HG3	1.91	0.52
4:D:53:GLN:NE2	4:D:345:VAL:O	2.40	0.52
6:F:293:GLU:HB3	6:F:332:PHE:HZ	1.75	0.51
2:B:489:GLU:O	2:B:493:GLN:NE2	2.43	0.51
5:E:134:GLY:N	5:E:169:THR:OG1	2.42	0.51
1:A:688:ALA:HB1	1:A:778:VAL:HG21	1.93	0.51
6:F:330:ILE:O	6:F:333:ASN:ND2	2.43	0.51
3:C:190:ASN:OD1	3:C:193:ARG:NH1	2.44	0.50
2:B:286:GLN:HE22	3:C:519:PRO:HD3	1.76	0.50
4:D:315:ASP:O	4:D:321:ASN:ND2	2.41	0.50
3:C:185:LEU:HB3	5:E:66:GLU:HB3	1.93	0.50
9:I:250:LYS:HG3	9:I:281:LEU:HB3	1.93	0.49
2:B:466:ASP:HB2	5:E:426:GLU:HG2	1.94	0.49
9:I:122:ILE:HD11	9:I:221:VAL:HG21	1.93	0.49
9:I:330:ASP:OD1	9:I:330:ASP:N	2.45	0.49
3:C:288:VAL:HB	3:C:292:LEU:HB2	1.94	0.49
5:E:358:GLN:NE2	6:F:313:LEU:O	2.46	0.49
1:A:459:ILE:HG22	1:A:492:VAL:HG11	1.93	0.49
1:A:860:GLN:OE1	4:D:375:ASN:ND2	2.39	0.49
2:B:428:ASP:OD2	2:B:458:HIS:N	2.41	0.49
2:B:242:THR:HG23	2:B:244:GLU:H	1.78	0.48
3:C:358:PRO:HA	3:C:361:MET:HB2	1.95	0.48
9:I:167:VAL:HG22	9:I:219:VAL:HB	1.96	0.48
9:I:482:THR:HG22	9:I:484:ARG:CD	2.42	0.48
3:C:435:LYS:HB3	3:C:438:SER:HB3	1.95	0.48
6:F:292:PHE:CE1	6:F:349:LYS:HD2	2.49	0.48
1:A:369:LYS:HE3	8:H:57:DA:H3'	1.95	0.48
6:F:339:ASP:O	6:F:342:ILE:HG12	2.14	0.48
3:C:83:LEU:HD13	3:C:268:VAL:HG11	1.96	0.48
3:C:357:CYS:SG	3:C:359:THR:OG1	2.68	0.48
3:C:569:LEU:O	3:C:572:THR:OG1	2.32	0.48
6:F:394:TYR:HA	6:F:397:ILE:HG22	1.95	0.48
9:I:461:ILE:HA	9:I:464:ILE:HD12	1.97	0.47
1:A:553:VAL:HB	1:A:558:LYS:HE3	1.96	0.47
3:C:253:GLN:HA	3:C:256:ILE:HD12	1.96	0.47
1:A:842:VAL:HA	1:A:845:ILE:HG22	1.96	0.47
2:B:312:PHE:HE1	3:C:319:LYS:HG3	1.79	0.47
3:C:309:ASN:HB3	3:C:313:ASN:HB3	1.97	0.47
3:C:385:ASN:N	3:C:385:ASN:ND2	2.53	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:105:GLN:HB3	4:D:335:PRO:HG2	1.96	0.47
5:E:357:ILE:HA	6:F:312:ARG:O	2.14	0.47
9:I:483:LYS:O	9:I:484:ARG:HD2	2.14	0.46
6:F:421:TRP:HA	6:F:424:ARG:HE	1.80	0.46
9:I:170:ILE:HB	9:I:222:LEU:HD23	1.96	0.46
9:I:417:ILE:HD13	9:I:461:ILE:HG21	1.97	0.46
9:I:482:THR:HG22	9:I:484:ARG:HH11	1.77	0.46
1:A:371:LYS:HD2	8:H:58:DA:H3'	1.97	0.46
5:E:337:ILE:HG23	5:E:341:LEU:HD12	1.98	0.46
8:H:62:DG:H2''	8:H:63:DT:H5''	1.96	0.46
2:B:297:GLN:HG2	6:F:402:LEU:HD21	1.98	0.46
5:E:396:ILE:HG23	5:E:412:SER:HB3	1.98	0.46
5:E:242:LEU:HA	5:E:245:GLN:HG2	1.97	0.46
4:D:147:ALA:HB2	4:D:184:ILE:HD11	1.98	0.45
5:E:294:SER:OG	5:E:296:ASP:OD1	2.33	0.45
1:A:683:ARG:O	1:A:772:THR:HA	2.17	0.45
9:I:202:MET:HE1	9:I:247:LEU:HB3	1.98	0.45
1:A:576:GLN:HE22	1:A:609:LEU:HA	1.81	0.45
4:D:480:ASN:N	4:D:480:ASN:OD1	2.50	0.45
1:A:359:LYS:NZ	8:H:53:DA:OP1	2.45	0.45
9:I:482:THR:CG2	9:I:484:ARG:HD3	2.44	0.45
1:A:636:ILE:HD11	1:A:706:ALA:HB1	1.99	0.45
6:F:325:LEU:CD1	6:F:350:MET:HG2	2.34	0.45
9:I:304:MET:HE2	9:I:310:ILE:HD12	1.99	0.45
9:I:304:MET:HB3	9:I:307:LEU:HD12	1.99	0.44
3:C:327:SER:O	3:C:331:GLN:HB2	2.18	0.44
9:I:223:ASP:OD1	9:I:261:MET:HE3	2.16	0.44
2:B:492:PHE:HZ	3:C:19:GLN:HA	1.82	0.44
3:C:437:ASP:N	3:C:437:ASP:OD1	2.51	0.44
2:B:459:ILE:HG21	3:C:612:VAL:HG21	1.98	0.43
5:E:469:ASN:ND2	5:E:472:ASP:OD2	2.50	0.43
4:D:399:LEU:HD23	4:D:529:LEU:HD22	2.00	0.43
6:F:322:GLY:HA2	6:F:366:VAL:HG12	2.00	0.43
9:I:110:PRO:CD	9:I:263:ASN:HD21	2.32	0.43
3:C:243:ASN:OD1	3:C:244:LEU:N	2.52	0.43
9:I:412:ILE:HD11	9:I:508:LEU:HD12	2.01	0.43
6:F:387:ASP:OD2	6:F:393:ARG:NE	2.48	0.43
1:A:898:VAL:HG12	1:A:902:LYS:HD2	2.00	0.43
5:E:462:ILE:O	5:E:465:SER:OG	2.33	0.43
9:I:110:PRO:HD3	9:I:263:ASN:HD21	1.83	0.43
1:A:411:LYS:HE3	4:D:207:ILE:HD11	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:317:LEU:HA	3:C:320:MET:HE3	2.01	0.43
4:D:75:LEU:HD23	4:D:276:PRO:HG2	2.00	0.43
6:F:369:VAL:HG12	6:F:373:ILE:HD13	2.01	0.43
3:C:240:ILE:HD12	3:C:247:ILE:HG21	2.01	0.42
4:D:265:LYS:O	4:D:270:GLN:NE2	2.51	0.42
6:F:313:LEU:HD23	6:F:313:LEU:HA	1.82	0.42
6:F:272:LEU:HD23	6:F:355:LEU:HB2	2.01	0.42
4:D:186:LEU:HD23	4:D:186:LEU:HA	1.90	0.42
9:I:193:ASN:N	9:I:193:ASN:OD1	2.52	0.42
9:I:479:LYS:HD3	9:I:479:LYS:HA	1.85	0.42
3:C:495:GLU:H	3:C:495:GLU:CD	2.28	0.42
9:I:299:ILE:HG21	9:I:331:LEU:HD21	2.02	0.42
3:C:282:GLN:NE2	3:C:286:ASP:OD1	2.53	0.42
1:A:456:PHE:HE2	1:A:491:GLU:HB3	1.84	0.41
2:B:479:ASP:OD1	2:B:481:SER:OG	2.37	0.41
3:C:127:VAL:HG21	3:C:150:LEU:HD12	2.02	0.41
4:D:124:LYS:HE2	4:D:124:LYS:HB2	1.83	0.41
1:A:867:ASP:OD1	1:A:868:PHE:N	2.53	0.41
4:D:209:LYS:NZ	4:D:242:ARG:O	2.52	0.41
6:F:310:ALA:O	6:F:313:LEU:HB2	2.21	0.41
5:E:68:VAL:HG13	5:E:139:GLN:HB2	2.03	0.41
6:F:328:THR:HG21	6:F:346:ILE:HG12	2.02	0.41
9:I:348:GLU:OE2	9:I:392:LYS:NZ	2.53	0.41
5:E:380:LEU:HB3	5:E:449:ARG:HB3	2.03	0.41
2:B:306:PHE:HB2	3:C:40:PRO:HB2	2.02	0.41
5:E:86:LYS:HD2	5:E:86:LYS:HA	1.73	0.41
8:H:24:DT:H2"	8:H:25:DT:H5"	2.02	0.41
9:I:399:ASN:OD1	9:I:399:ASN:N	2.54	0.41
9:I:413:GLN:O	9:I:417:ILE:HD12	2.21	0.41
9:I:439:HIS:C	9:I:439:HIS:ND1	2.77	0.41
2:B:448:ARG:HA	2:B:448:ARG:HD2	1.85	0.41
3:C:305:LYS:HA	3:C:305:LYS:HD3	1.92	0.41
5:E:362:ALA:HB1	8:H:32:DG:OP1	2.20	0.41
2:B:327:GLU:CD	2:B:425:HIS:HE1	2.30	0.40
5:E:205:ARG:HA	5:E:205:ARG:HD2	1.82	0.40
1:A:833:ILE:HG21	1:A:850:PHE:HE2	1.86	0.40
9:I:223:ASP:C	9:I:224:GLU:HG2	2.47	0.40
10:A:1001:ATP:O1G	4:D:267:ARG:NH1	2.51	0.40
3:C:133:PRO:HG3	3:C:210:SER:HB2	2.03	0.40
8:H:26:DT:H2"	8:H:27:DG:C8	2.57	0.40
9:I:483:LYS:C	9:I:484:ARG:HD2	2.47	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:395:TYR:HB3	3:C:145:ARG:HG2	2.02	0.40
3:C:548:LEU:HB2	3:C:576:PHE:HZ	1.87	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	473/917 (52%)	466 (98%)	7 (2%)	0	100	100
2	B	247/620 (40%)	235 (95%)	12 (5%)	0	100	100
3	C	534/616 (87%)	516 (97%)	18 (3%)	0	100	100
4	D	426/532 (80%)	418 (98%)	8 (2%)	0	100	100
5	E	431/479 (90%)	424 (98%)	7 (2%)	0	100	100
6	F	155/435 (36%)	149 (96%)	6 (4%)	0	100	100
9	I	367/516 (71%)	347 (95%)	20 (5%)	0	100	100
All	All	2633/4115 (64%)	2555 (97%)	78 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	428/815 (52%)	420 (98%)	8 (2%)	50	76
2	B	234/573 (41%)	231 (99%)	3 (1%)	61	82
3	C	509/576 (88%)	500 (98%)	9 (2%)	51	77
4	D	401/490 (82%)	395 (98%)	6 (2%)	57	80
5	E	406/440 (92%)	401 (99%)	5 (1%)	63	83
6	F	151/406 (37%)	141 (93%)	10 (7%)	15	32
9	I	343/472 (73%)	333 (97%)	10 (3%)	37	65
All	All	2472/3772 (66%)	2421 (98%)	51 (2%)	46	74

All (51) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	498	SER
1	A	612	LYS
1	A	623	MET
1	A	633	LYS
1	A	720	HIS
1	A	879	LEU
1	A	891	CYS
1	A	892	VAL
2	B	263	MET
2	B	287	LYS
2	B	315	LEU
3	C	119	LYS
3	C	127	VAL
3	C	247	ILE
3	C	343	VAL
3	C	385	ASN
3	C	495	GLU
3	C	523	GLN
3	C	598	LYS
3	C	616	ILE
4	D	117	SER
4	D	174	SER
4	D	226	VAL
4	D	298	ILE
4	D	314	SER
4	D	525	SER
5	E	3	VAL
5	E	138	LEU
5	E	198	SER

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Mol	Chain	Res	Type
5	E	278	ILE
5	E	463	SER
6	F	301	LYS
6	F	311	SER
6	F	312	ARG
6	F	343	ASP
6	F	359	VAL
6	F	362	VAL
6	F	372	LEU
6	F	374	ILE
6	F	413	VAL
6	F	414	THR
9	I	89	MET
9	I	223	ASP
9	I	225	MET
9	I	226	ASP
9	I	239	VAL
9	I	254	VAL
9	I	439	HIS
9	I	457	GLU
9	I	461	ILE
9	I	507	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (30) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	576	GLN
1	A	608	GLN
1	A	634	ASN
1	A	783	ASN
1	A	895	ASN
2	B	286	GLN
2	B	356	ASN
2	B	403	GLN
2	B	414	GLN
2	B	471	GLN
2	B	493	GLN
3	C	71	GLN
3	C	212	ASN
3	C	279	GLN
3	C	536	ASN
4	D	58	GLN

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Mol	Chain	Res	Type
4	D	120	GLN
4	D	126	GLN
4	D	240	HIS
4	D	489	ASN
5	E	101	GLN
5	E	147	ASN
5	E	234	ASN
5	E	238	ASN
5	E	248	HIS
5	E	253	ASN
6	F	407	GLN
9	I	87	GLN
9	I	171	ASN
9	I	263	ASN

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 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 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
10	ATP	D	1001	11	32,33,33	0.56	0	48,52,52	0.34	0
10	ATP	E	1001	11	32,33,33	0.37	0	48,52,52	0.29	0
10	ATP	A	1001	11	32,33,33	0.47	0	48,52,52	0.29	0
10	ATP	I	1001	11	32,33,33	0.85	2 (6%)	48,52,52	0.68	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
10	ATP	D	1001	11	-	6/22/38/38	0/3/3/3
10	ATP	E	1001	11	-	5/22/38/38	0/3/3/3
10	ATP	A	1001	11	-	6/22/38/38	0/3/3/3
10	ATP	I	1001	11	-	4/22/38/38	0/3/3/3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	I	1001	ATP	PG-O2G	-2.33	1.46	1.54
10	I	1001	ATP	PG-O3G	-2.21	1.46	1.54

There are no bond angle outliers.

There are no chirality outliers.

All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	D	1001	ATP	C5'-O5'-PA-O1A
10	D	1001	ATP	C5'-O5'-PA-O3A
10	E	1001	ATP	C5'-O5'-PA-O1A
10	D	1001	ATP	C5'-O5'-PA-O2A
10	E	1001	ATP	C5'-O5'-PA-O2A
10	E	1001	ATP	C5'-O5'-PA-O3A
10	D	1001	ATP	PA-O3A-PB-O1B
10	E	1001	ATP	PA-O3A-PB-O2B
10	A	1001	ATP	O4'-C4'-C5'-O5'
10	D	1001	ATP	C4'-C5'-O5'-PA
10	A	1001	ATP	C3'-C4'-C5'-O5'
10	I	1001	ATP	PA-O3A-PB-O2B
10	A	1001	ATP	PA-O3A-PB-O1B

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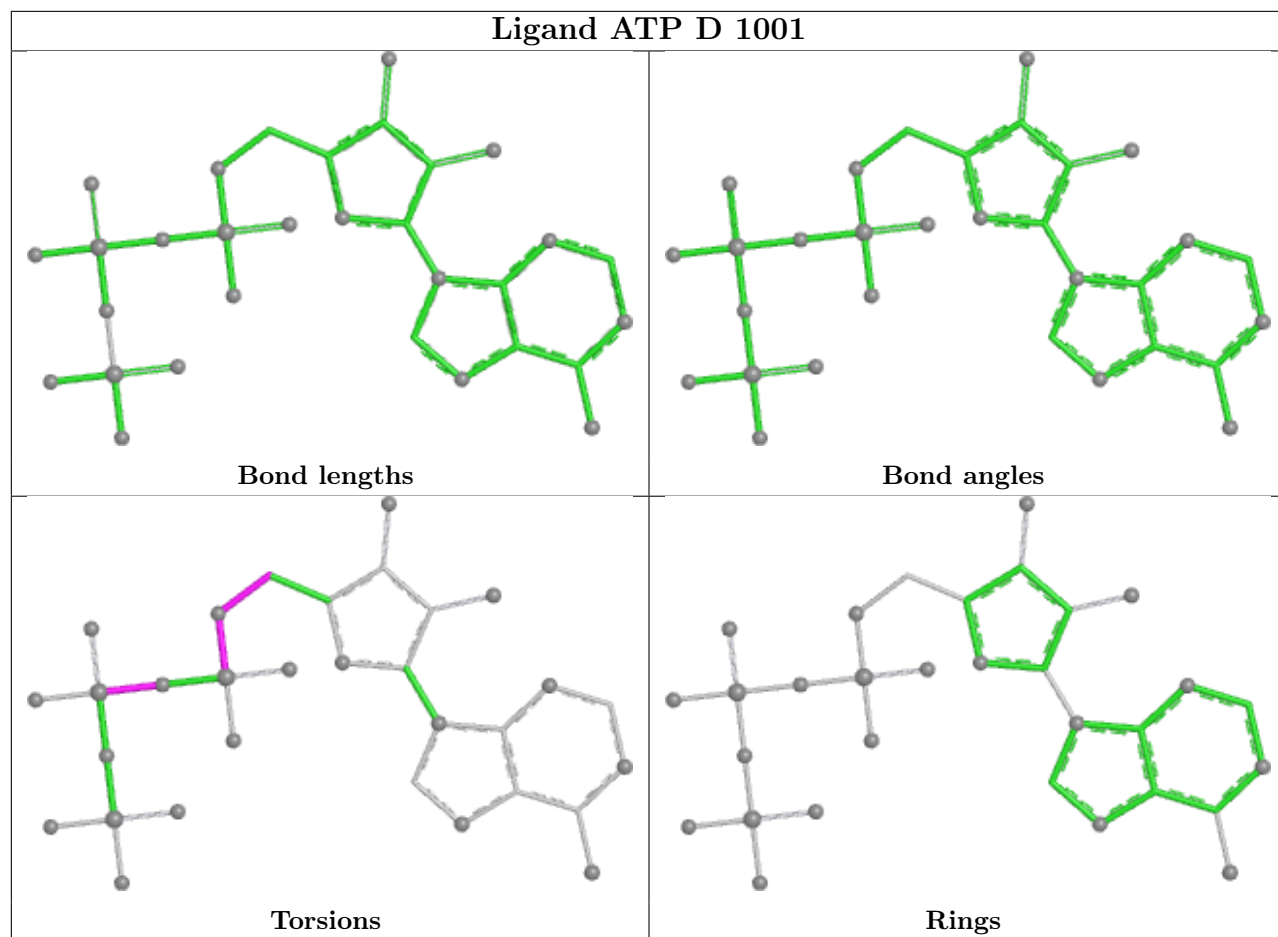
Mol	Chain	Res	Type	Atoms
10	A	1001	ATP	PA-O3A-PB-O2B
10	E	1001	ATP	PA-O3A-PB-O1B
10	I	1001	ATP	PG-O3B-PB-O1B
10	I	1001	ATP	PA-O3A-PB-O1B
10	A	1001	ATP	PG-O3B-PB-O1B
10	A	1001	ATP	PG-O3B-PB-O2B
10	D	1001	ATP	PA-O3A-PB-O2B
10	I	1001	ATP	PG-O3B-PB-O2B

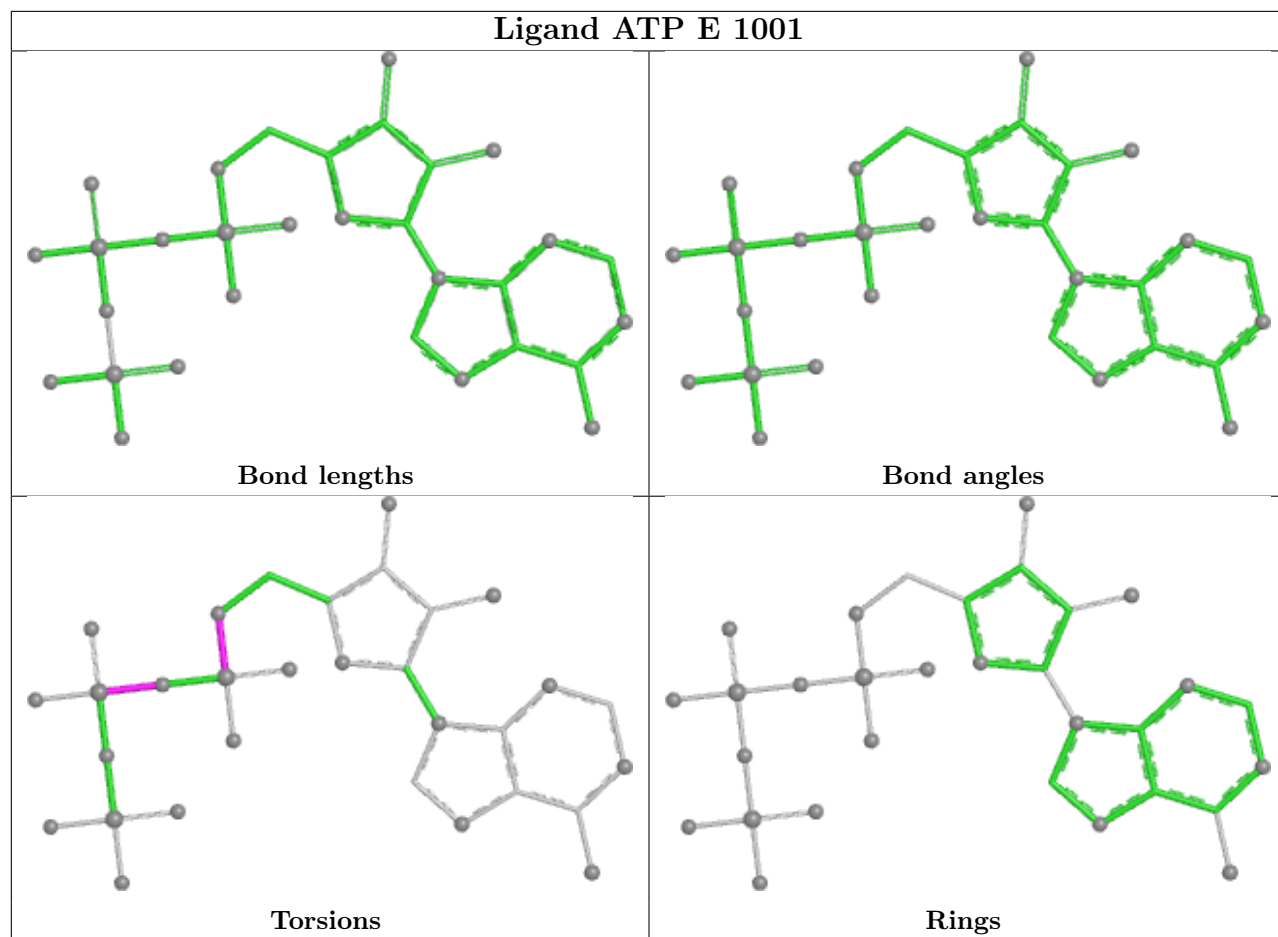
There are no ring outliers.

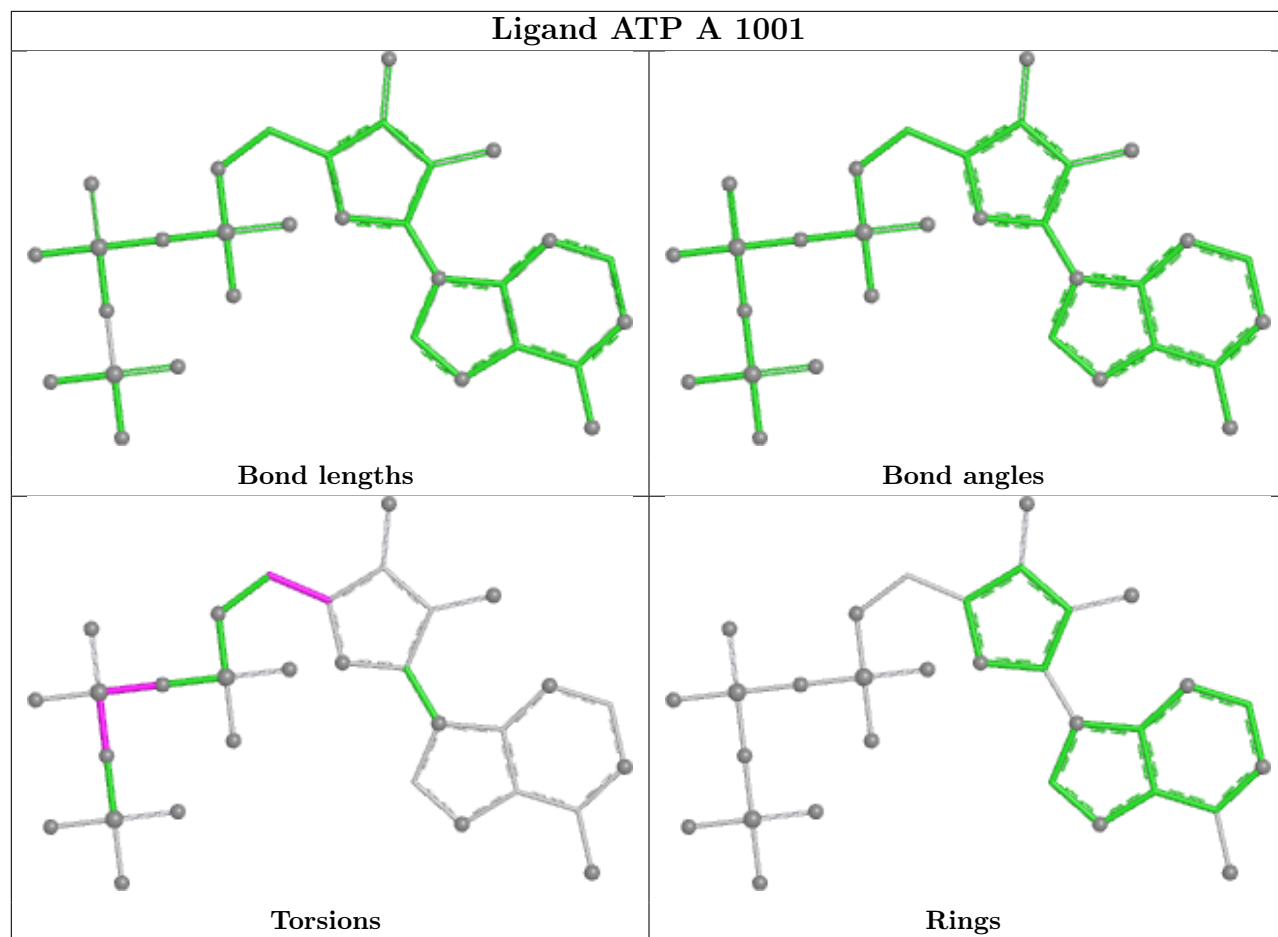
1 monomer is involved in 1 short contact:

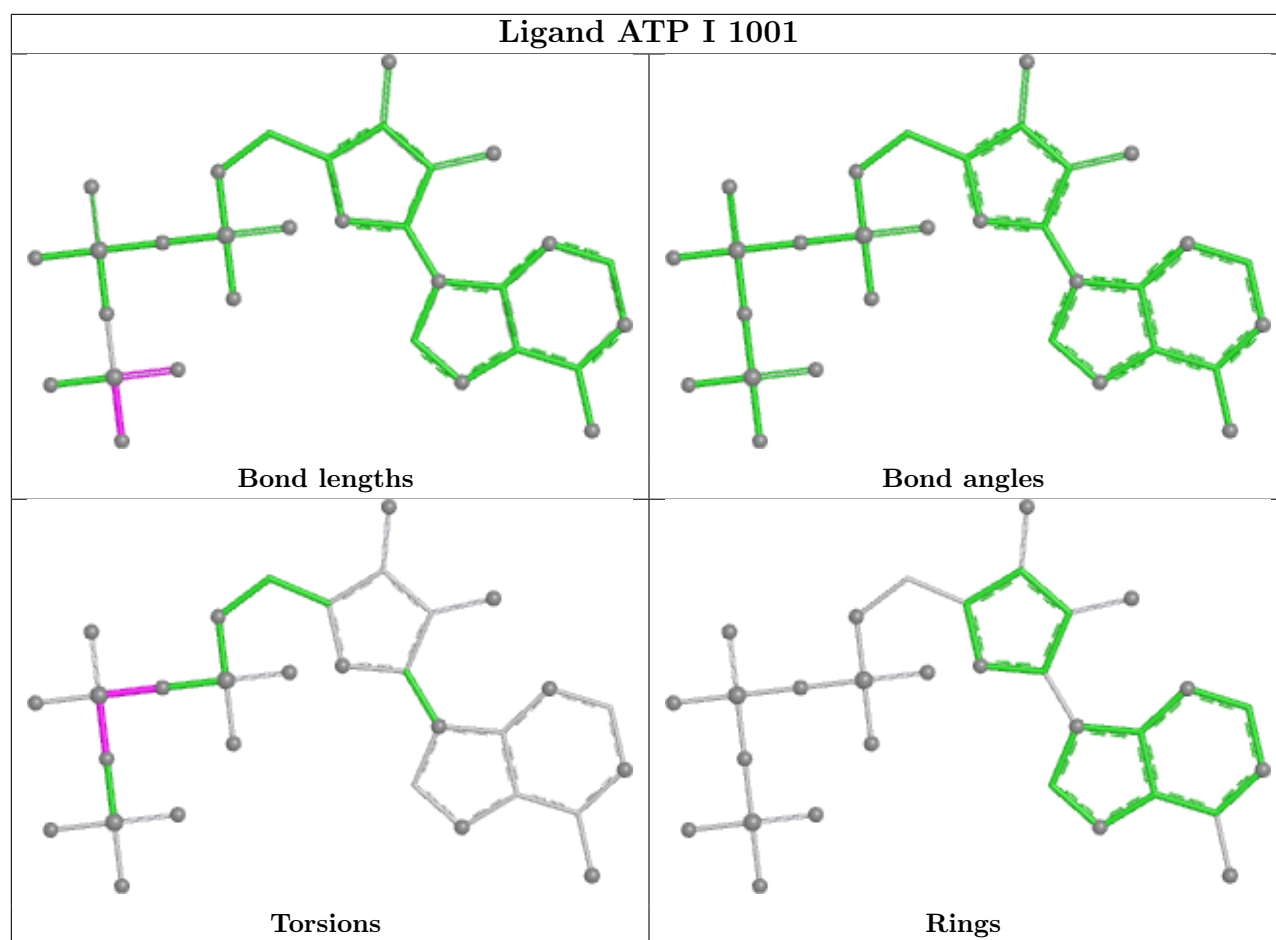
Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	A	1001	ATP	1	0

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.

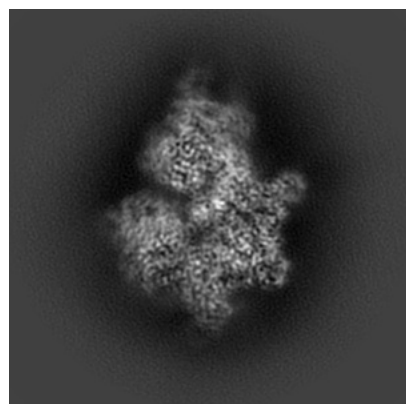
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-25925. These allow visual inspection of the internal detail of the map and identification of artifacts.

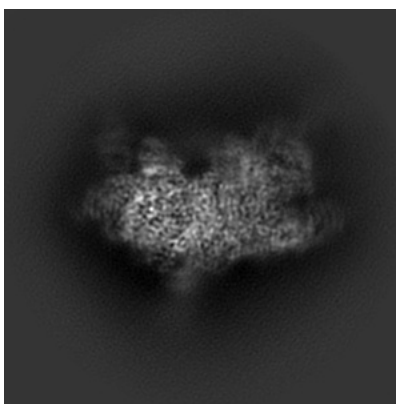
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

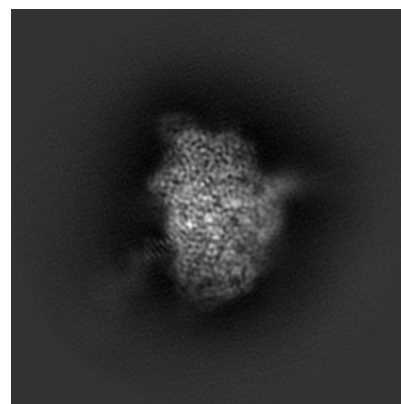
6.1.1 Primary map



X

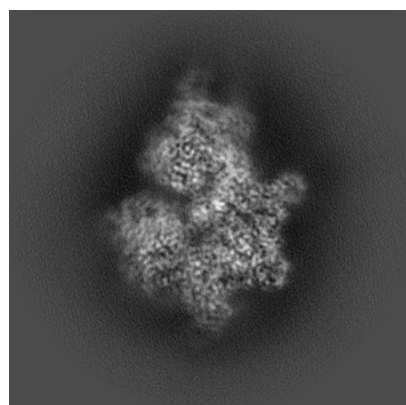


Y

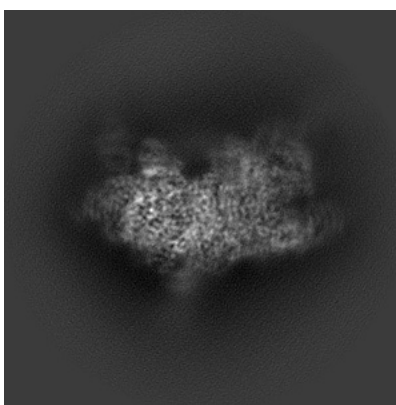


Z

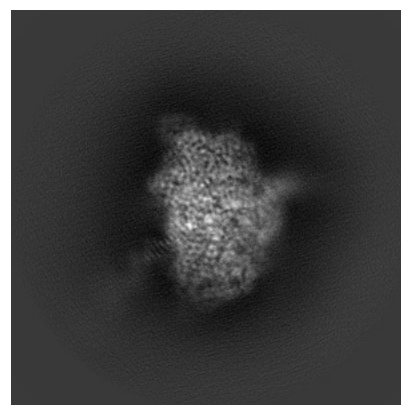
6.1.2 Raw map



X



Y

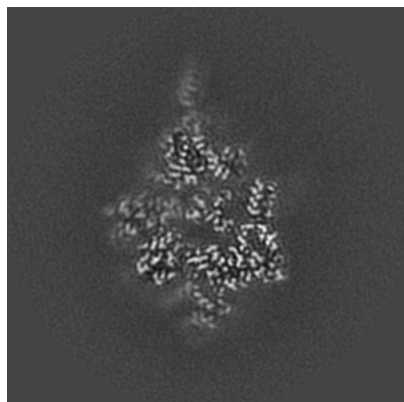


Z

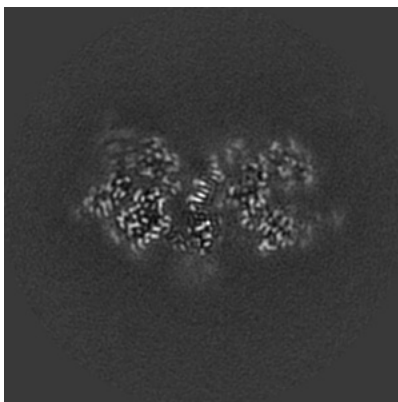
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

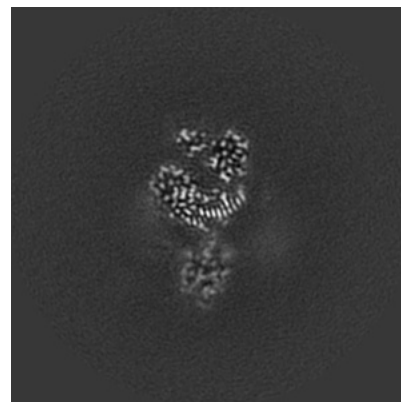
6.2.1 Primary map



X Index: 150

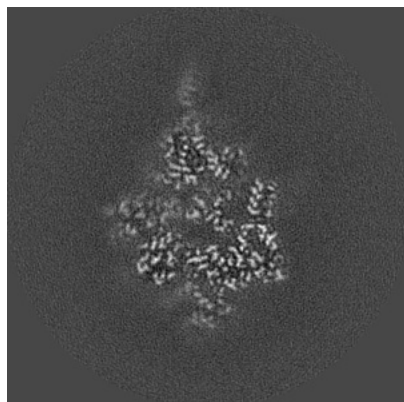


Y Index: 150

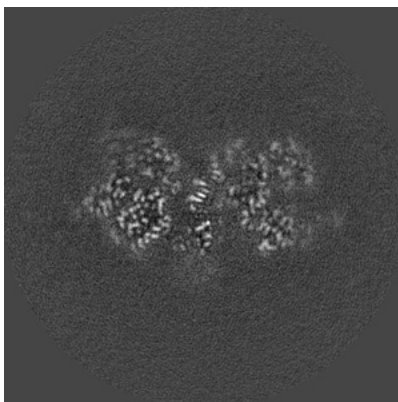


Z Index: 150

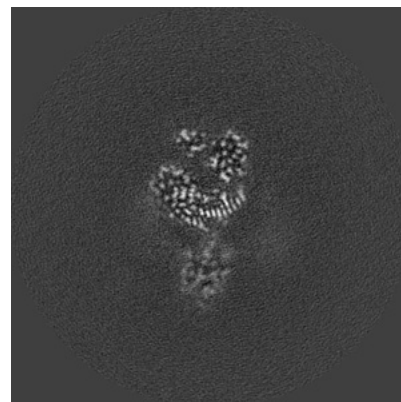
6.2.2 Raw map



X Index: 150



Y Index: 150

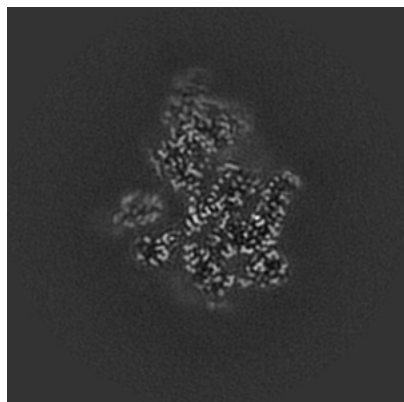


Z Index: 150

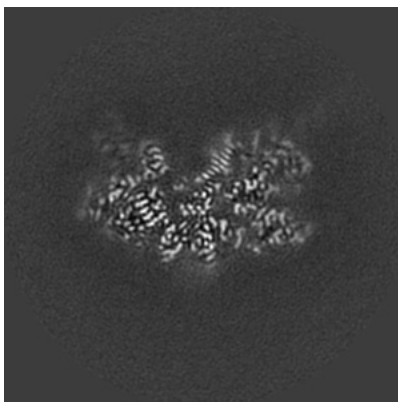
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

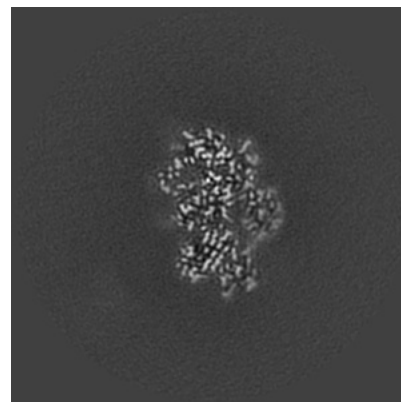
6.3.1 Primary map



X Index: 134

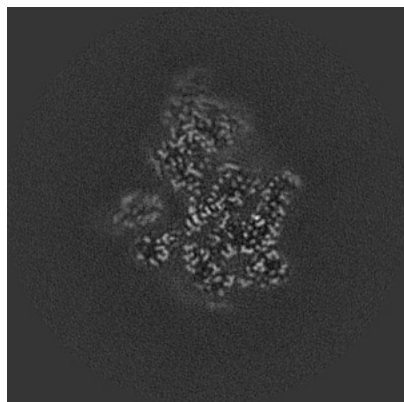


Y Index: 157

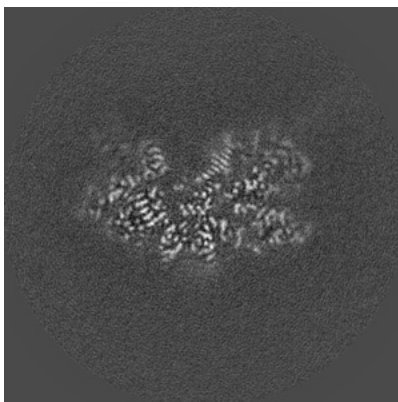


Z Index: 112

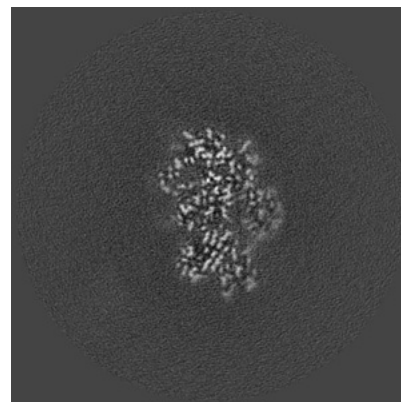
6.3.2 Raw map



X Index: 134



Y Index: 157

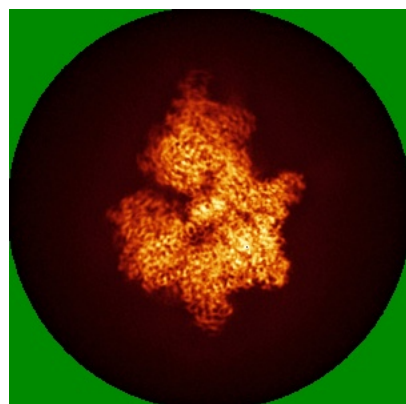


Z Index: 112

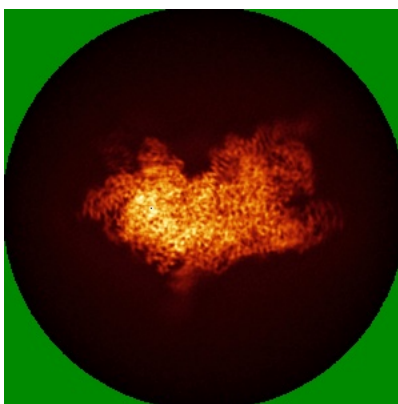
The images above show the largest variance slices of the map in three orthogonal directions.

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

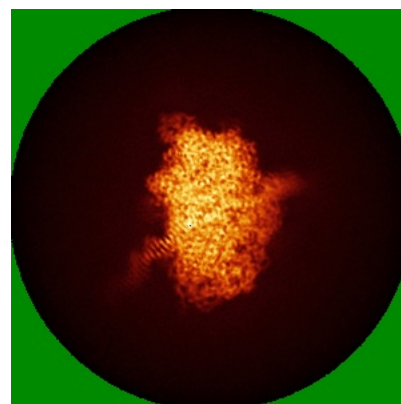
6.4.1 Primary map



X

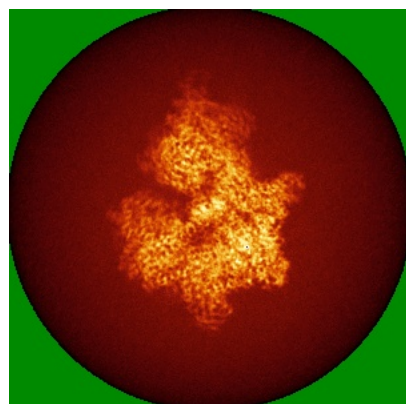


Y

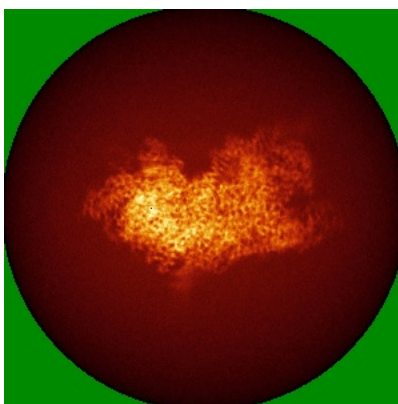


Z

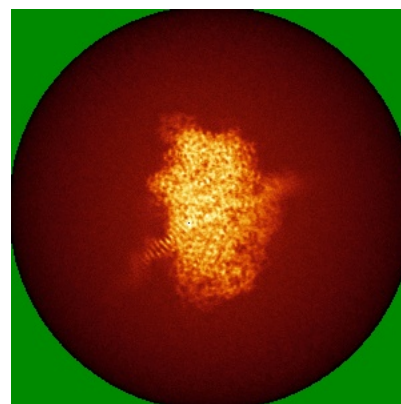
6.4.2 Raw map



X



Y

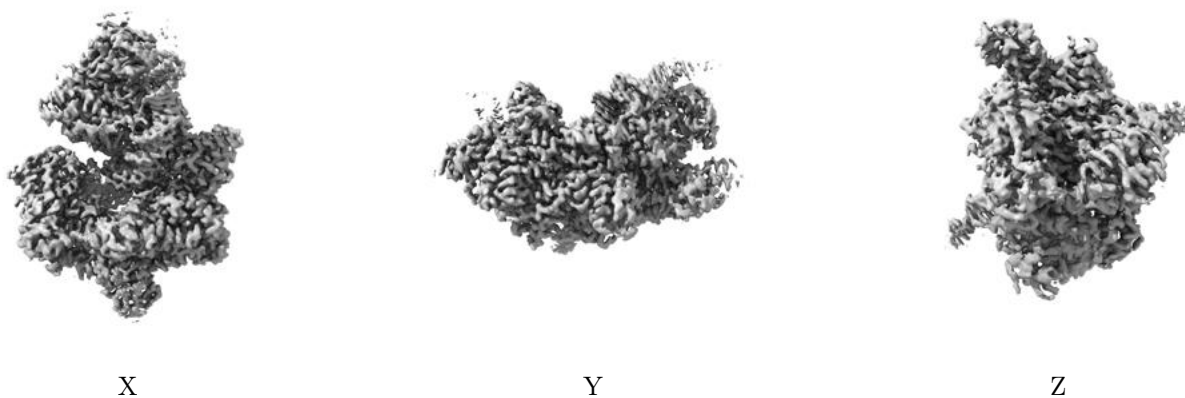


Z

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.

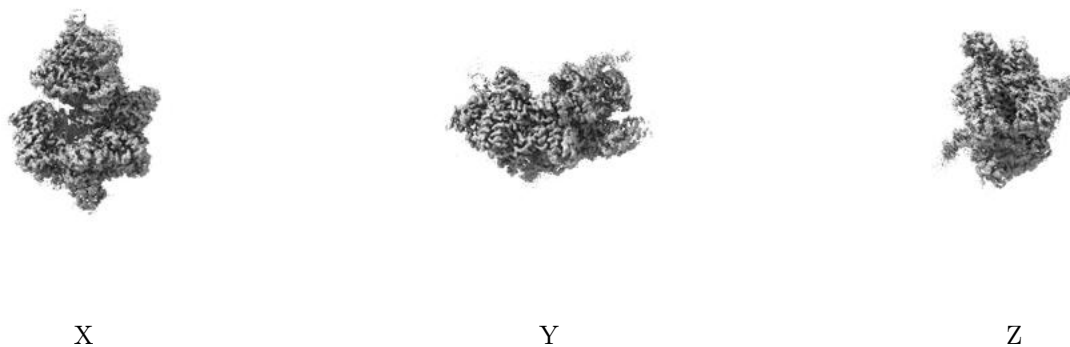
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.01. 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.

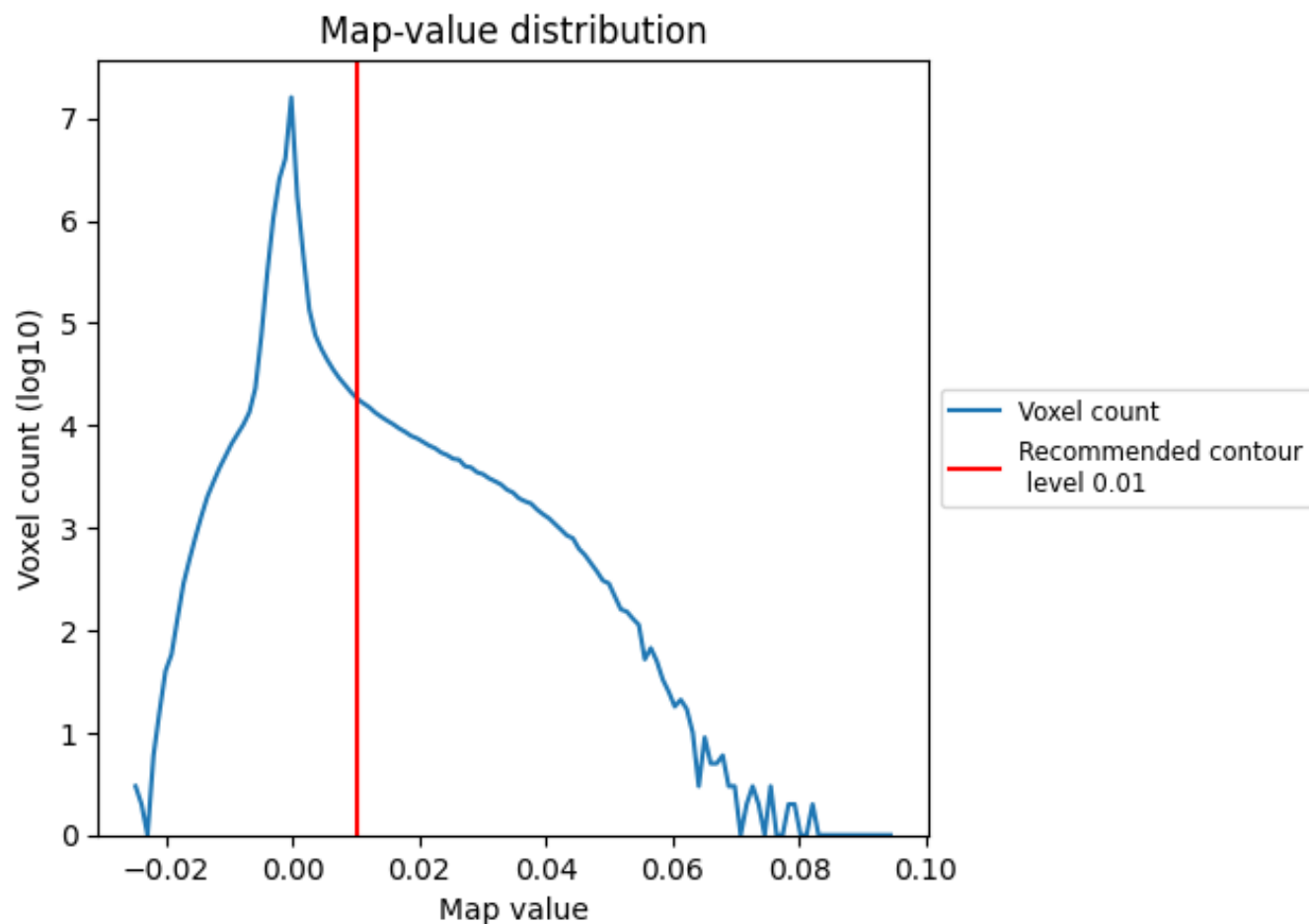
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

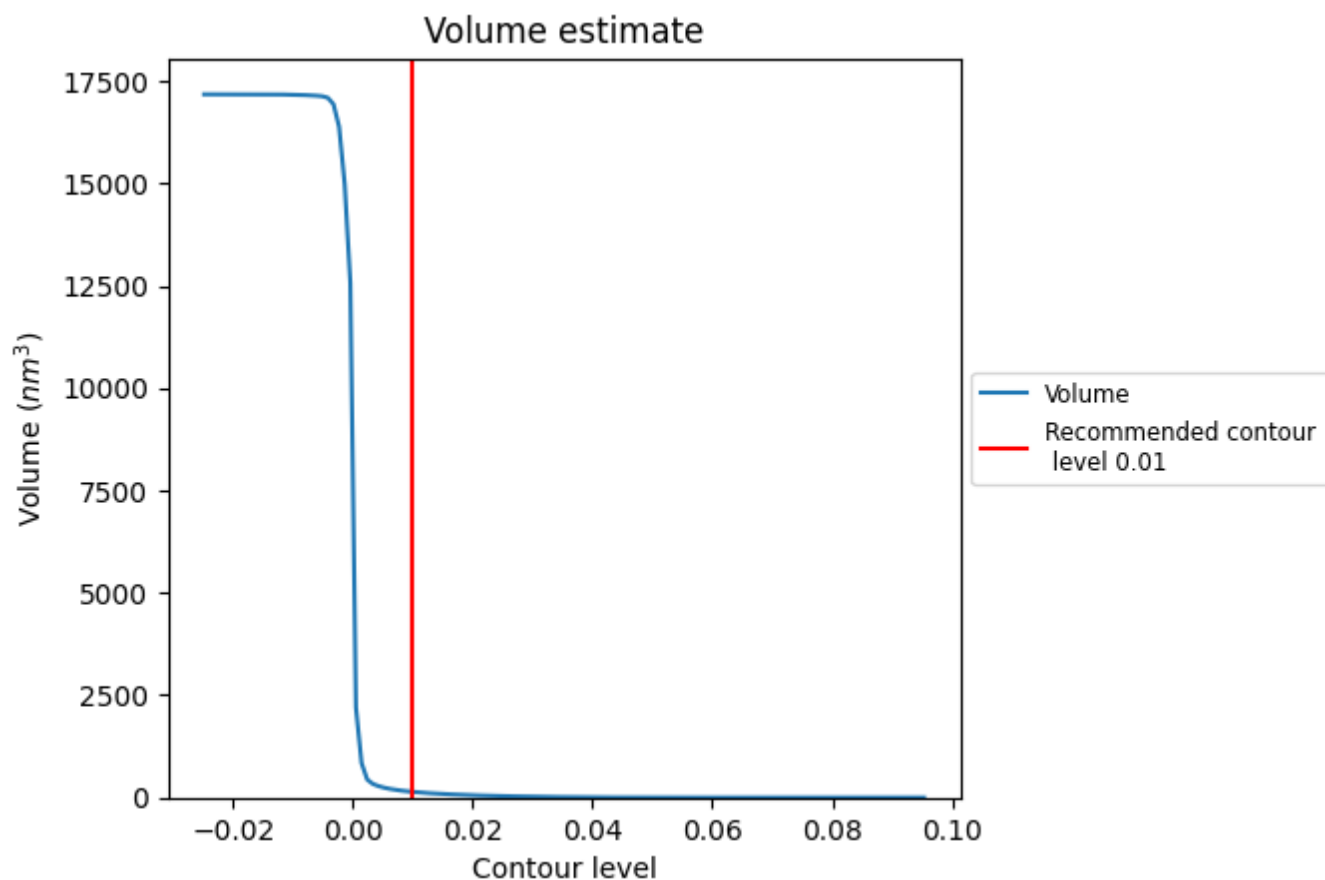
This section contains the results of statistical analysis of the map.

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.

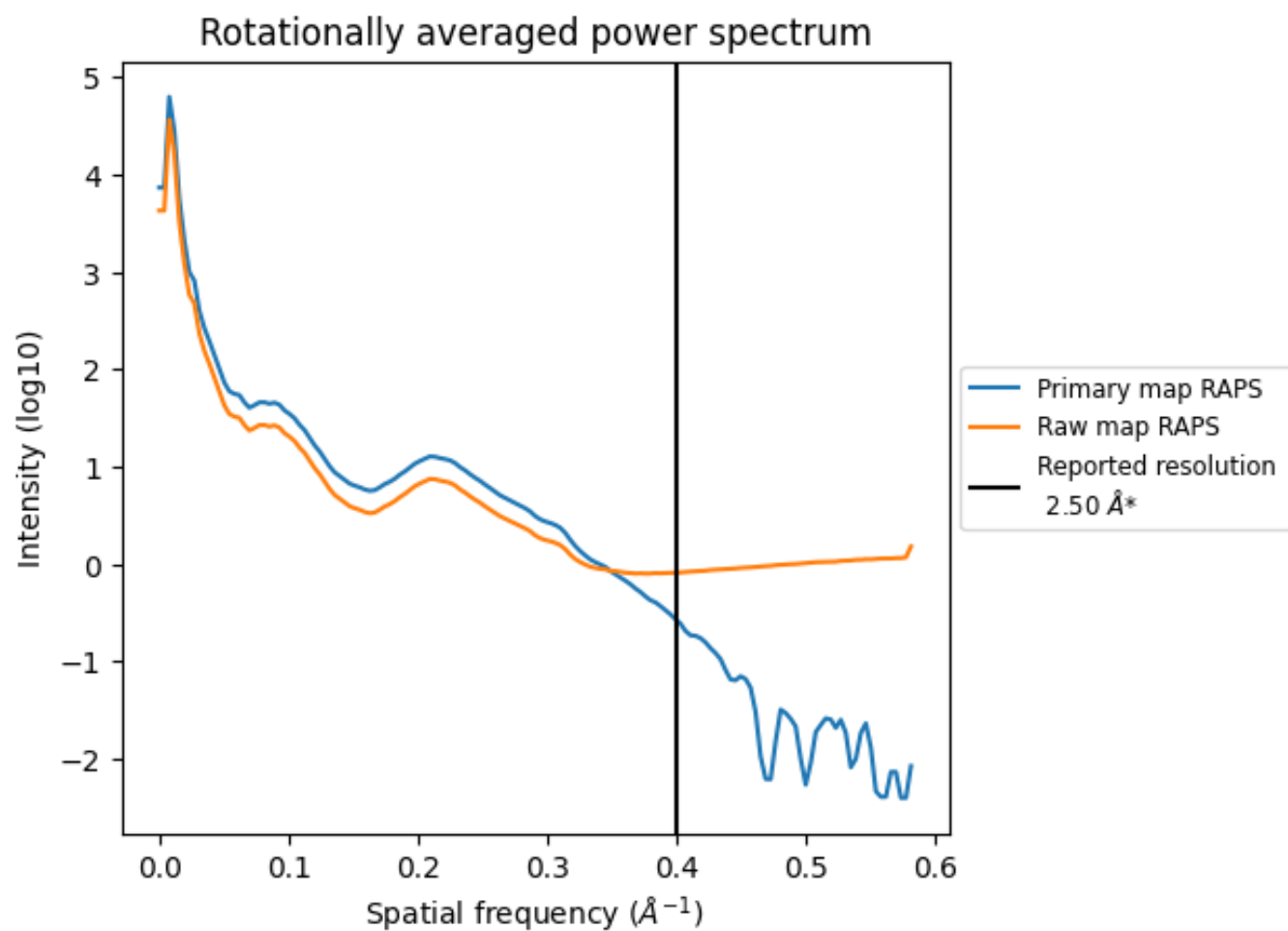
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 139 nm³; this corresponds to an approximate mass of 125 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 ⓘ

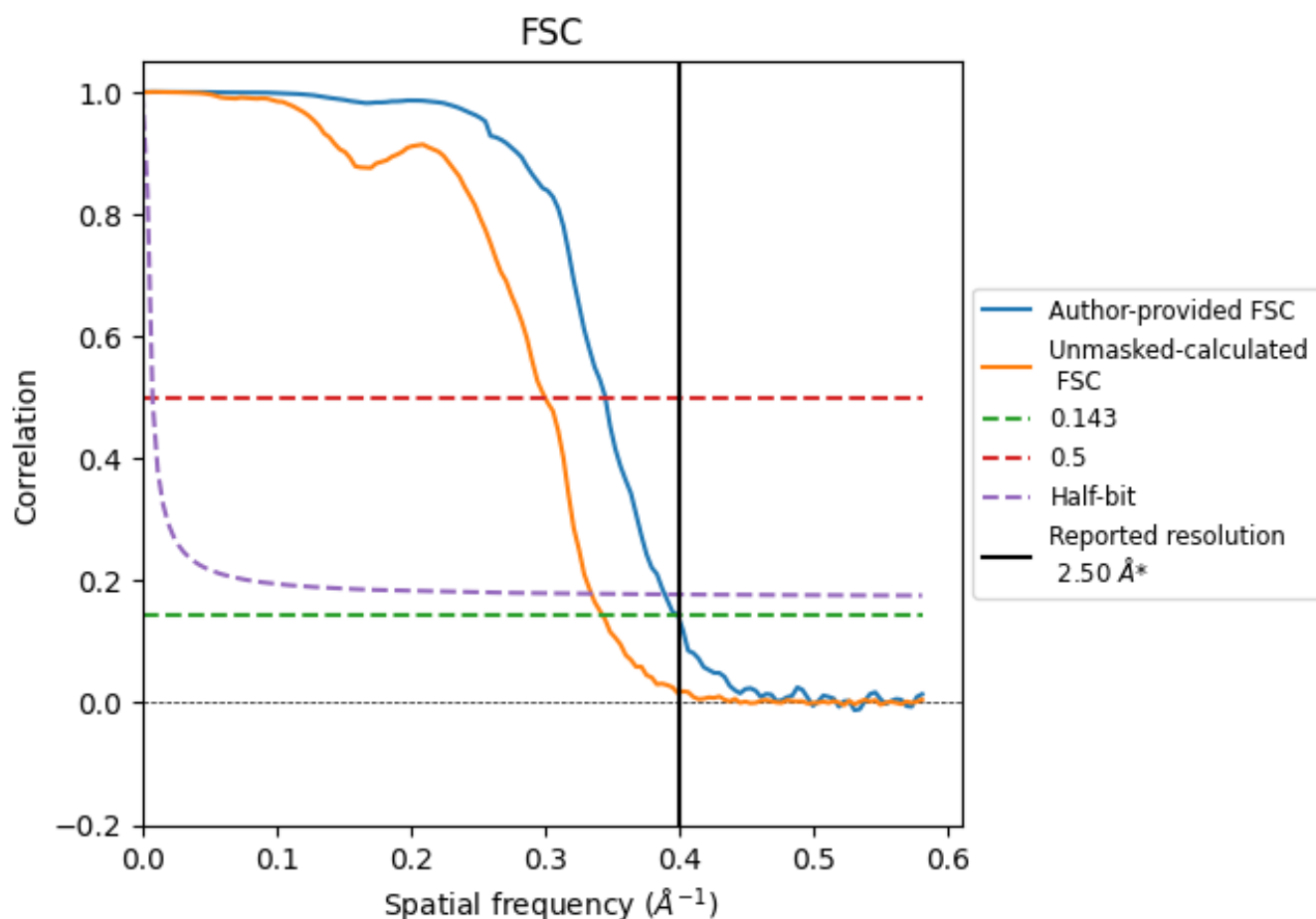


*Reported resolution corresponds to spatial frequency of 0.400 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.400 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

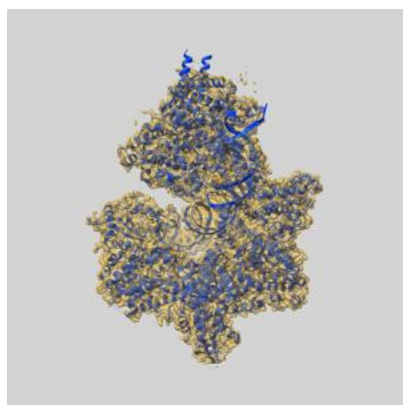
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.50	-	-
Author-provided FSC curve	2.50	2.90	2.57
Unmasked-calculated*	2.91	3.33	2.99

*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 2.91 differs from the reported value 2.5 by more than 10 %

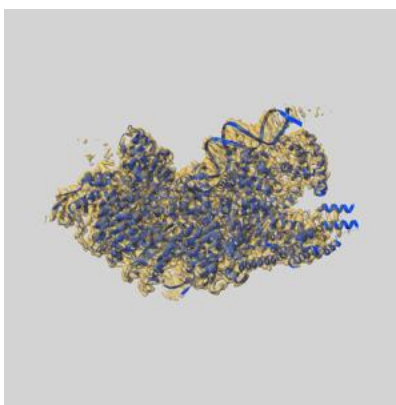
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-25925 and PDB model 7TJH. Per-residue inclusion information can be found in section [3](#) on page [8](#).

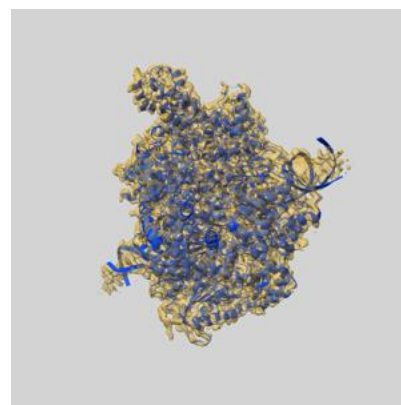
9.1 Map-model overlay [i](#)



X



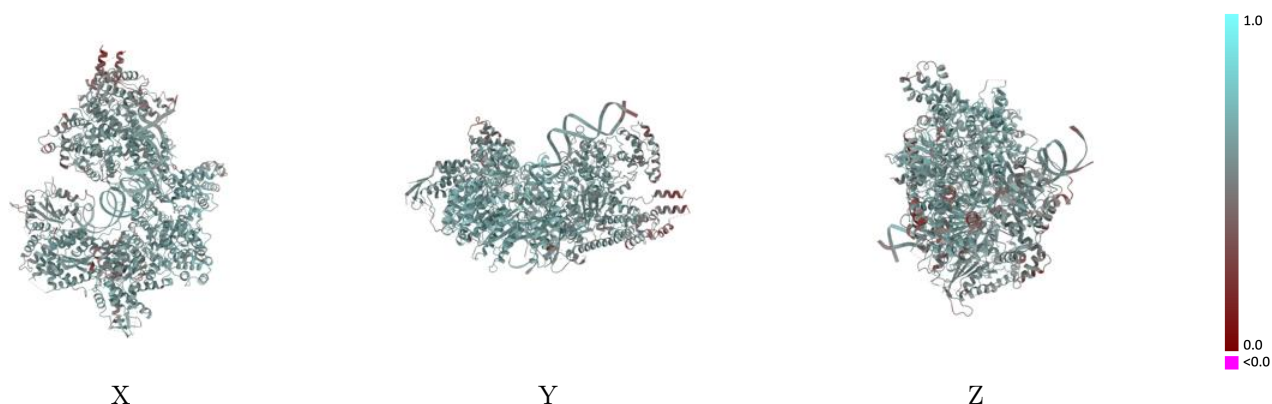
Y



Z

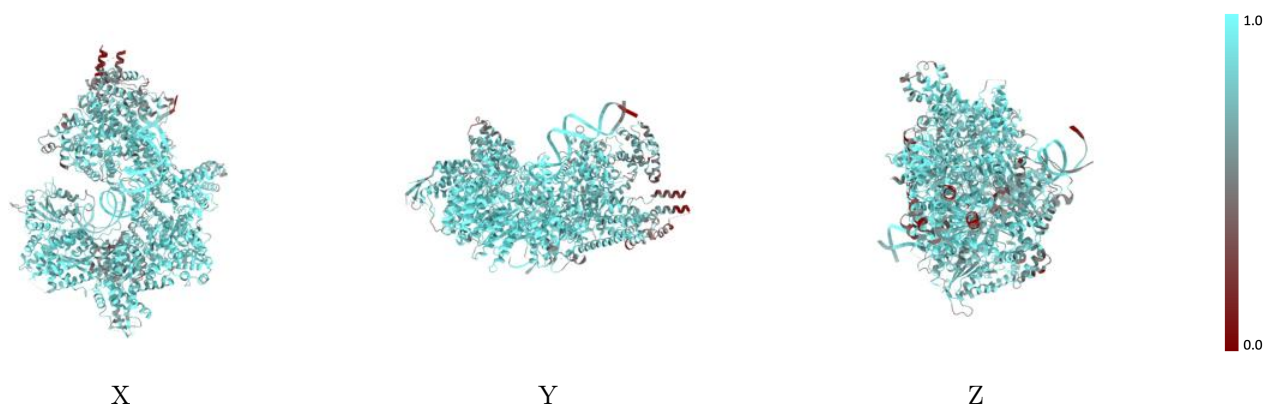
The images above show the 3D surface view of the map at the recommended contour level 0.01 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



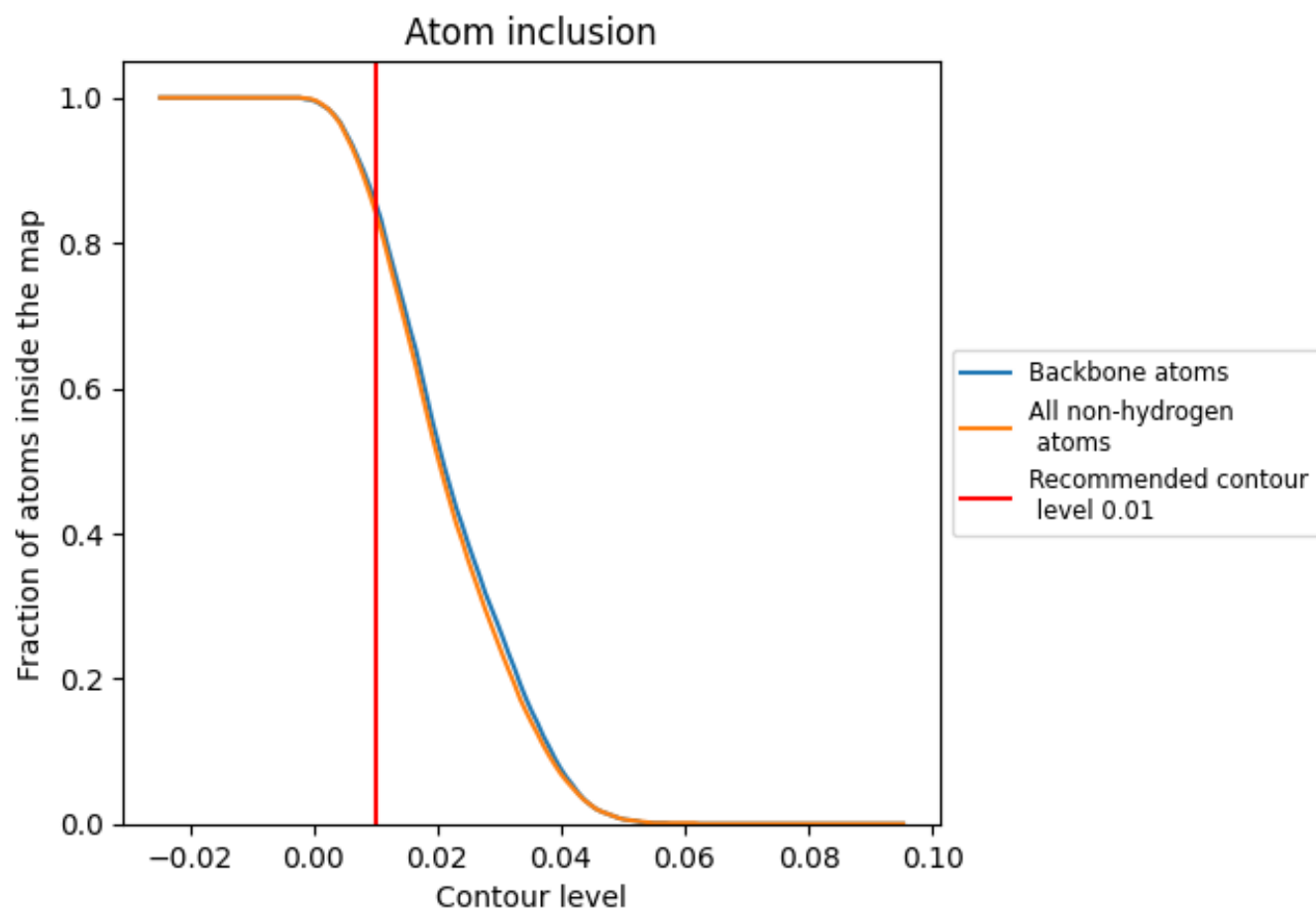
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.01).

9.4 Atom inclusion ⓘ



At the recommended contour level, 86% of all backbone atoms, 84% 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 (0.01) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8420	0.5810
A	0.8880	0.6070
B	0.8950	0.5970
C	0.7900	0.5520
D	0.9300	0.6330
E	0.8860	0.6080
F	0.6320	0.4870
G	0.9110	0.5990
H	0.8860	0.5990
I	0.7520	0.5190

1.0

0.0

<0.0