Full wwPDB EM Validation Report (i)

Sep 10, 2026 – 06:37 PM EDT

PDB ID	:	9ZP2 / pdb_00009zp2
EMDB ID	:	EMD-74514
Title	:	E. coli RNA polymerase elongation complex containing the unnatural dP:Z*TP base pair in a trigger-loop-open conformation (b)
Authors	:	Li, Q.; Benner, S.A.; Wang, D.
Deposited on	:	2025-12-16
Resolution	:	2.64 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 (i) 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 (i)) were used in the production of this report:

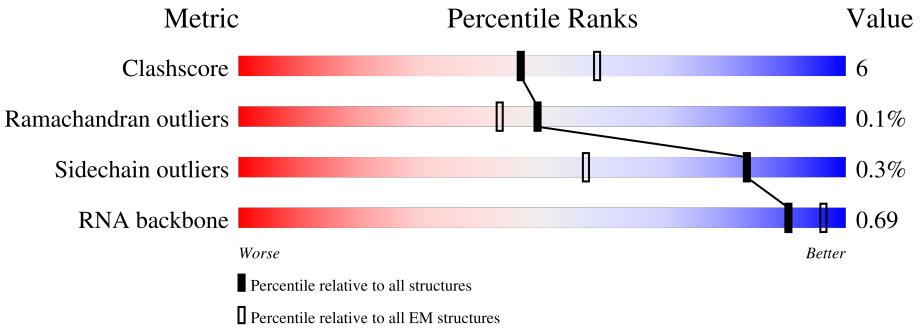
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data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

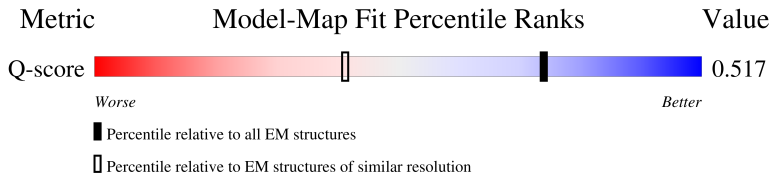
1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 2.64 Å.

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





Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	8968 (2.14 - 3.14)

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

Mol	Chain	Length	Quality of chain
1	A	231	5% 80% 19%
1	G	231	• 84% 14%
2	I	1342	9% 88% 11%

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Mol	Chain	Length	Quality of chain
3	J	1430	16% 78% 15% 7%
4	K	74	5% 82% 18%
5	N	11	45% 36% 18%
6	R	9	56% 33% 11%
7	T	22	41% 45% 5% 9%

2 Entry composition (i)

There are 11 unique types of molecules in this entry. The entry contains 25960 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 DNA-directed RNA polymerase subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	229	1772	1104	313	349	6	0	0
1	G	228	1768	1102	312	348	6	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	233	ASP	-	expression tag	UNP P0A7Z4
A	234	LEU	-	expression tag	UNP P0A7Z4
G	233	ASP	-	expression tag	UNP P0A7Z4
G	234	LEU	-	expression tag	UNP P0A7Z4

- Molecule 2 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	I	1325	10447	6552	1820	2031	44	0	0

- Molecule 3 is a protein called DNA-directed RNA polymerase subunit beta'.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	J	1336	10393	6529	1852	1962	50	0	0

There are 23 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
J	1408	LEU	-	expression tag	UNP P0A8T7
J	1409	GLU	-	expression tag	UNP P0A8T7
J	1410	LEU	-	expression tag	UNP P0A8T7
J	1411	GLU	-	expression tag	UNP P0A8T7
J	1412	VAL	-	expression tag	UNP P0A8T7

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Chain	Residue	Modelled	Actual	Comment	Reference
J	1413	LEU	-	expression tag	UNP P0A8T7
J	1414	PHE	-	expression tag	UNP P0A8T7
J	1415	GLN	-	expression tag	UNP P0A8T7
J	1416	GLY	-	expression tag	UNP P0A8T7
J	1417	PRO	-	expression tag	UNP P0A8T7
J	1418	SER	-	expression tag	UNP P0A8T7
J	1419	SER	-	expression tag	UNP P0A8T7
J	1420	GLY	-	expression tag	UNP P0A8T7
J	1421	HIS	-	expression tag	UNP P0A8T7
J	1422	HIS	-	expression tag	UNP P0A8T7
J	1423	HIS	-	expression tag	UNP P0A8T7
J	1424	HIS	-	expression tag	UNP P0A8T7
J	1425	HIS	-	expression tag	UNP P0A8T7
J	1426	HIS	-	expression tag	UNP P0A8T7
J	1427	HIS	-	expression tag	UNP P0A8T7
J	1428	HIS	-	expression tag	UNP P0A8T7
J	1429	HIS	-	expression tag	UNP P0A8T7
J	1430	HIS	-	expression tag	UNP P0A8T7

- Molecule 4 is a protein called DNA-directed RNA polymerase subunit omega.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	K	74	580	353	111	114	2	0	0

- Molecule 5 is a DNA chain called Non-template strand DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
5	N	9	184	88	38	50	8	0	0

- Molecule 6 is a RNA chain called RNA nonamer.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
6	R	9	194	88	40	58	8	0	0

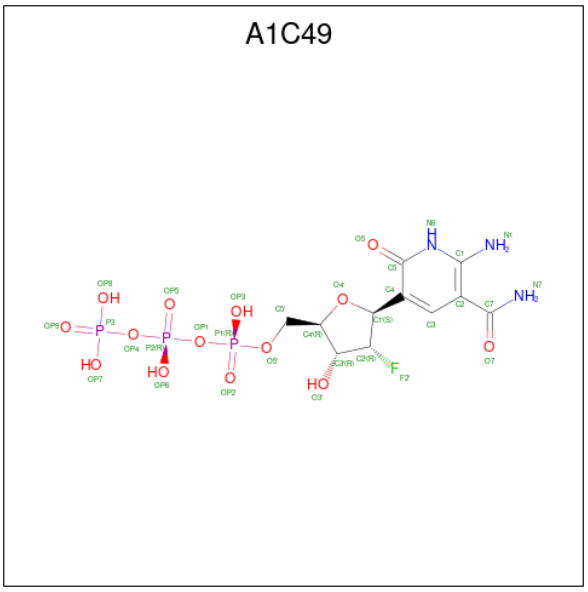
- Molecule 7 is a DNA chain called Template strand DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
7	T	20	405	193	68	124	20	0	0

- Molecule 8 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
8	J	2	2	2	0

- Molecule 9 is [[(2 {R},3 {R},4 {R},5 {S})-5-(5-aminocarbonyl-6-azanyl-2-oxidanylidene-1 {H}-pyridin-3-yl)-4-fluoranyl-3-oxidanyl-oxolan-2-yl]methoxy-oxidanyl-phosphoryl] phosphono hydrogen phosphate (CCD ID: A1C49) (formula: $C_{11}H_{17}FN_3O_{14}P_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms						AltConf
			Total	C	F	N	O	P	
9	J	1	32	11	1	3	14	3	0

- Molecule 10 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
10	J	1	1	1	0

- Molecule 11 is water.

Mol	Chain	Residues	Atoms		AltConf
			Total	O	
11	A	9	9	9	0
			Total	O	
11	G	9	9	9	0

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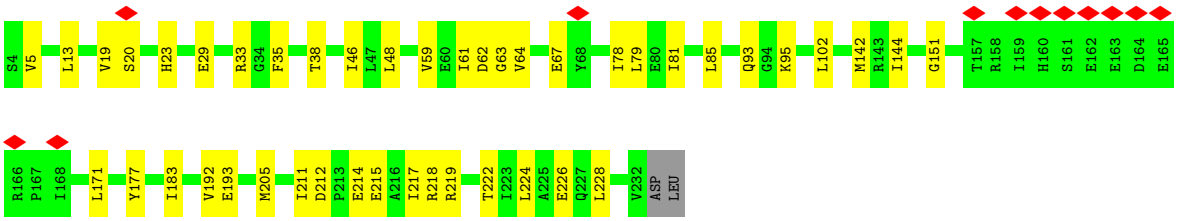
Mol	Chain	Residues	Atoms		AltConf
			Total	O	
11	I	87	87	87	0
			Total	O	
11	J	61	61	61	0
			Total	O	
11	K	2	2	2	0
			Total	O	
11	R	6	6	6	0
			Total	O	
11	T	8	8	8	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

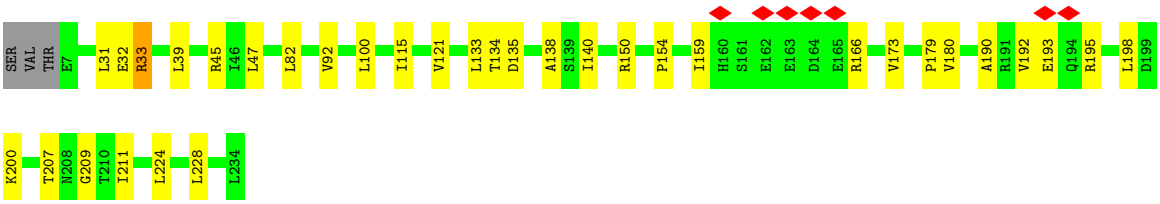
• Molecule 1: DNA-directed RNA polymerase subunit alpha

Chain A:



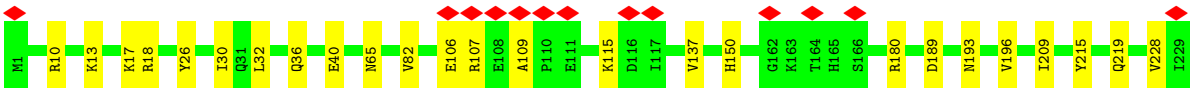
• Molecule 1: DNA-directed RNA polymerase subunit alpha

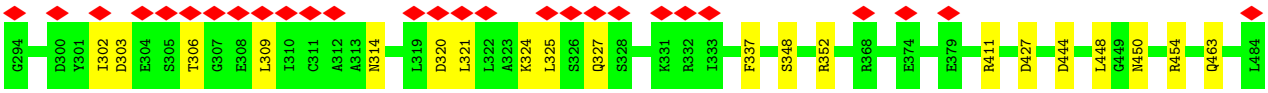
Chain G:

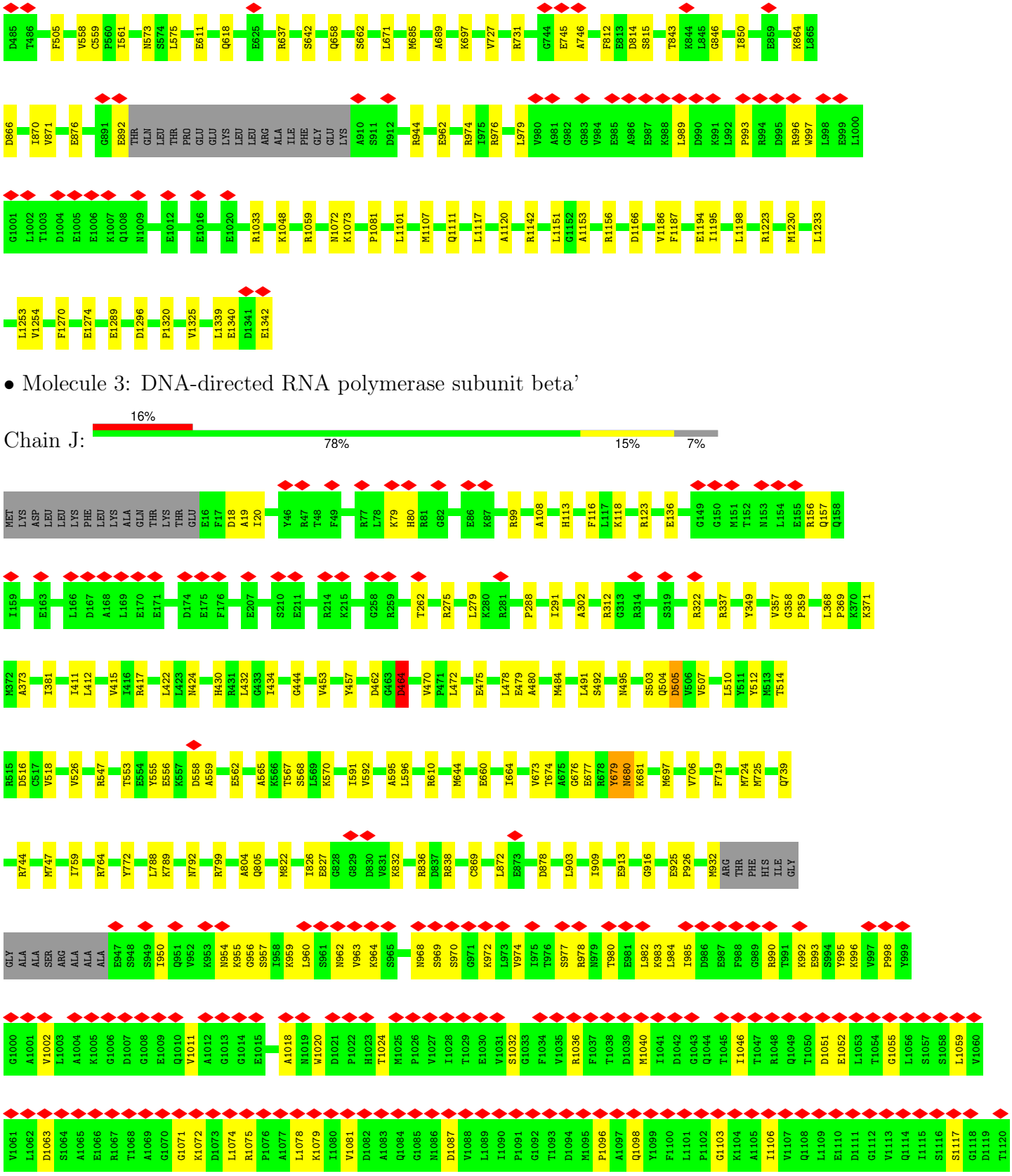


• Molecule 2: DNA-directed RNA polymerase subunit beta

Chain I:

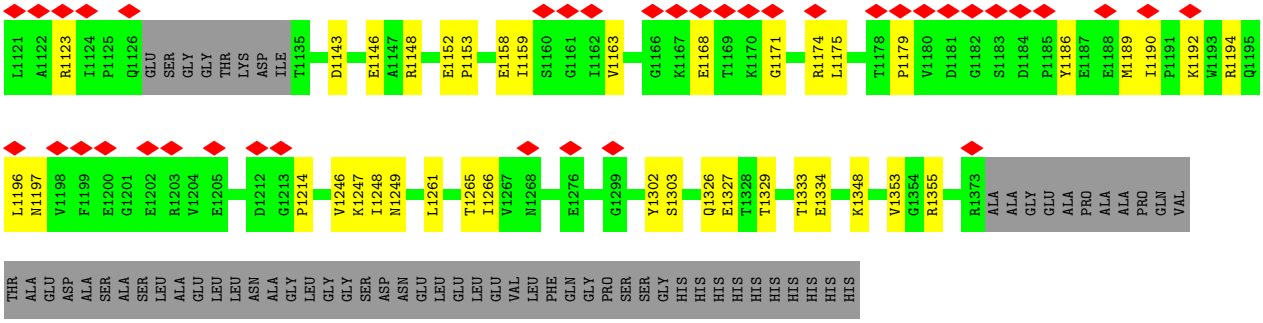






- Molecule 3: DNA-directed RNA polymerase subunit beta'

Chain J:

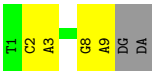


- Molecule 4: DNA-directed RNA polymerase subunit omega

Chain K:

- Molecule 5: Non-template strand DNA

Chain N:

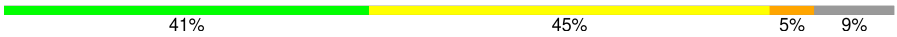


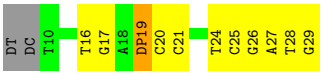
- Molecule 6: RNA nonamer

Chain R:

- Molecule 7: Template strand DNA

Chain T:





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, POINT, POINT, POINT, POINT, POINT, POINT, POINT, POINT	Depositor
Number of particles used	50457, 50457, 50457, 50457, 50457, 50457, 50457, 50457, 50457	Depositor
Resolution determination method	FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE, NONE, NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	30	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	TFS FALCON 4i (4k x 4k)	Depositor
Maximum map value	4.268	Depositor
Minimum map value	-2.396	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.117	Depositor
Recommended contour level	0.32	Depositor
Map size (Å)	297.19998, 297.19998, 297.19998	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.743, 0.743, 0.743	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: DP, MG, ZN, A1C49

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\|>5$	RMSZ	$\#\|Z\|>5$
1	A	0.29	0/1794	0.46	1/2432 (0.0%)
1	G	0.43	0/1790	0.50	1/2426 (0.0%)
2	I	0.27	2/10613 (0.0%)	0.41	0/14318
3	J	0.35	5/10550 (0.0%)	0.46	2/14244 (0.0%)
4	K	0.23	0/582	0.53	1/784 (0.1%)
5	N	0.22	0/207	0.42	0/318
6	R	0.27	0/218	0.32	0/339
7	T	0.31	0/425	0.44	0/650
All	All	0.32	7/26179 (0.0%)	0.44	5/35511 (0.0%)

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	J	503	SER	CA-C	-6.39	1.44	1.52
3	J	507	VAL	C-O	-5.93	1.17	1.24
3	J	504	GLN	C-O	-5.91	1.16	1.24
2	I	814	ASP	C-O	-5.69	1.16	1.24
3	J	359	PRO	C-O	-5.57	1.17	1.24
2	I	812	PHE	C-O	-5.14	1.17	1.24
3	J	462	ASP	C-O	-5.13	1.17	1.24

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	K	48	VAL	N-CA-C	-6.18	106.78	112.96
1	G	33	ARG	N-CA-C	5.66	122.86	110.80
1	A	93	GLN	N-CA-C	5.22	117.24	108.73
3	J	358	GLY	N-CA-C	-5.13	101.87	112.34
3	J	464	ASP	N-CA-C	5.03	121.52	110.80

There are no chirality outliers.

There are no planarity outliers.

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	1772	0	1799	33	0
1	G	1768	0	1793	24	0
2	I	10447	0	10455	100	0
3	J	10393	0	10610	153	0
4	K	580	0	583	10	0
5	N	184	0	102	3	0
6	R	194	0	98	5	0
7	T	405	0	216	13	0
8	J	2	0	0	0	0
9	J	32	0	0	2	0
10	J	1	0	0	0	0
11	A	9	0	0	0	0
11	G	9	0	0	1	0
11	I	87	0	0	9	0
11	J	61	0	0	9	0
11	K	2	0	0	0	0
11	R	6	0	0	1	0
11	T	8	0	0	0	0
All	All	25960	0	25656	312	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 6.

All (312) 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)
9:J:1503:A1C49:O4'	9:J:1503:A1C49:C1'	1.65	1.27
7:T:19:DP:C4'	7:T:19:DP:O4'	1.66	1.22
3:J:805:GLN:O	11:J:1601:HOH:O	1.76	1.01
3:J:491:LEU:O	11:J:1602:HOH:O	1.83	0.96
2:I:618:GLN:NE2	11:I:1402:HOH:O	2.03	0.90

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:J:136:GLU:OE1	11:J:1603:HOH:O	1.93	0.86
2:I:658:GLN:NE2	11:I:1401:HOH:O	2.00	0.84
3:J:262:THR:O	11:J:1604:HOH:O	1.95	0.83
1:A:228:LEU:HD12	1:G:224:LEU:HD22	1.60	0.81
3:J:118:LYS:HE2	3:J:312:ARG:HA	1.63	0.81
2:I:302:ILE:HG12	2:I:309:LEU:HA	1.63	0.81
2:I:444:ASP:O	2:I:450:ASN:ND2	2.14	0.80
2:I:1072:ASN:HD21	2:I:1230:MET:HE1	1.47	0.80
3:J:322:ARG:NH1	6:R:2:U:O2'	2.17	0.78
1:G:207:THR:HG22	1:G:209:GLY:H	1.51	0.76
2:I:242:VAL:HB	2:I:245:ARG:HG3	1.65	0.76
1:G:92:VAL:HG12	1:G:121:VAL:HG22	1.68	0.75
5:N:2:DC:H2'	5:N:3:DA:C8	2.22	0.74
2:I:637:ARG:NH1	11:I:1403:HOH:O	2.05	0.73
1:A:48:LEU:HB2	1:A:183:ILE:HD11	1.71	0.73
2:I:1142:ARG:NH2	2:I:1166:ASP:OD1	2.22	0.73
2:I:115:LYS:O	11:I:1404:HOH:O	2.06	0.72
3:J:430:HIS:CE1	3:J:432:LEU:HB2	2.25	0.72
7:T:27:DA:H2"	7:T:28:DT:H5"	1.71	0.71
2:I:1254:VAL:O	3:J:99:ARG:NH2	2.24	0.71
2:I:13:LYS:NZ	2:I:1151:LEU:O	2.21	0.70
2:I:685:MET:HE1	2:I:1073:LYS:HD3	1.72	0.70
3:J:956:GLY:H	3:J:1011:VAL:HB	1.55	0.70
3:J:788:LEU:HG	3:J:932:MET:HE3	1.73	0.70
4:K:25:ARG:NH1	4:K:61:ASN:OD1	2.24	0.70
3:J:1075:ARG:NE	3:J:1168:GLU:OE1	2.25	0.69
1:A:19:VAL:HB	1:A:23:HIS:HB3	1.76	0.68
1:G:166:ARG:NH2	2:I:876:GLU:OE1	2.26	0.67
3:J:679:TYR:O	3:J:681:LYS:N	2.28	0.67
2:I:244:GLU:HA	2:I:274:ILE:HD11	1.76	0.66
3:J:156:ARG:HG2	3:J:157:GLN:HG3	1.76	0.66
3:J:903:LEU:HD11	3:J:1249:ASN:HD22	1.61	0.66
2:I:320:ASP:HB3	2:I:324:LYS:NZ	2.11	0.65
2:I:1101:LEU:HG	3:J:725:MET:HE3	1.79	0.65
1:G:150:ARG:O	11:G:301:HOH:O	2.14	0.65
2:I:18:ARG:O	2:I:1156:ARG:NH1	2.28	0.64
2:I:320:ASP:HB3	2:I:324:LYS:HZ1	1.62	0.64
3:J:478:LEU:HD22	4:K:23:ALA:HB2	1.80	0.64
1:G:154:PRO:HB2	2:I:1059:ARG:HH12	1.62	0.64
3:J:799:ARG:NH1	3:J:1146:GLU:OE2	2.30	0.64
2:I:843:THR:OG1	2:I:846:GLY:O	2.15	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:J:1190:ILE:HG21	3:J:1196:LEU:HD21	1.81	0.62
1:A:59:VAL:HG21	1:A:85:LEU:HD13	1.82	0.62
3:J:430:HIS:CD2	3:J:925:GLU:HG3	2.34	0.62
3:J:674:THR:HG22	3:J:676:GLY:H	1.64	0.62
2:I:30:ILE:HD12	2:I:575:LEU:HD11	1.80	0.61
3:J:430:HIS:HD2	3:J:925:GLU:HG3	1.65	0.61
1:A:215:GLU:OE2	1:A:219:ARG:NH2	2.34	0.61
1:A:205:MET:HE1	1:A:217:ILE:HG13	1.83	0.60
3:J:417:ARG:NH1	4:K:43:ASN:O	2.35	0.60
2:I:264:GLU:HB2	2:I:267:ARG:HD3	1.85	0.59
2:I:1223:ARG:NH2	3:J:719:PHE:O	2.26	0.59
3:J:960:LEU:HD13	3:J:963:VAL:HG21	1.84	0.59
3:J:674:THR:HB	3:J:677:GLU:HG2	1.83	0.58
3:J:878:ASP:HA	3:J:990:ARG:HH12	1.68	0.58
3:J:826:ILE:HG21	3:J:993:GLU:HA	1.86	0.58
2:I:685:MET:CE	2:I:1073:LYS:HD3	2.34	0.57
3:J:950:ILE:HD12	3:J:1018:ALA:HB3	1.86	0.57
2:I:1223:ARG:NH2	3:J:719:PHE:HB3	2.19	0.57
2:I:1289:GLU:OE2	3:J:472:LEU:HB2	2.04	0.57
1:A:224:LEU:HD23	1:G:228:LEU:HD21	1.87	0.57
2:I:189:ASP:OD1	2:I:193:ASN:N	2.26	0.57
2:I:1072:ASN:ND2	2:I:1230:MET:HE1	2.19	0.57
3:J:505:ASP:N	3:J:505:ASP:OD1	2.38	0.57
1:G:192:VAL:HG11	1:G:198:LEU:HD22	1.87	0.56
2:I:250:THR:HG22	2:I:268:ARG:HE	1.69	0.56
2:I:864:LYS:NZ	2:I:876:GLU:O	2.38	0.56
3:J:514:THR:HG23	3:J:595:ALA:HA	1.86	0.56
7:T:20:DC:H2'	7:T:21:DC:C6	2.40	0.56
3:J:1326:GLN:HG3	3:J:1327:GLU:HG3	1.88	0.55
1:A:35:PHE:HA	1:A:38:THR:HG22	1.88	0.55
3:J:1075:ARG:HH21	3:J:1168:GLU:HB3	1.71	0.55
1:G:135:ASP:HB3	1:G:138:ALA:HB2	1.87	0.55
3:J:1071:GLY:HA2	3:J:1074:LEU:HD12	1.89	0.55
3:J:1072:LYS:HG3	3:J:1192:LYS:HZ2	1.71	0.55
3:J:381:ILE:HD11	3:J:412:LEU:HD13	1.89	0.55
3:J:959:LYS:HB3	3:J:983:LYS:HB2	1.89	0.55
2:I:256:GLU:HB3	2:I:261:VAL:HG22	1.89	0.55
4:K:40:PRO:O	4:K:52:ARG:NH2	2.39	0.55
2:I:611:GLU:OE2	2:I:637:ARG:NH2	2.40	0.54
2:I:892:GLU:HB2	11:I:1407:HOH:O	2.06	0.54
7:T:25:DC:H2'	7:T:26:DG:C8	2.42	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:I:411:ARG:NH2	2:I:427:ASP:OD2	2.37	0.54
3:J:660:GLU:O	3:J:664:ILE:HG12	2.08	0.54
3:J:926:PRO:HG2	3:J:1248:ILE:HD11	1.89	0.54
3:J:792:ASN:ND2	11:J:1611:HOH:O	2.41	0.54
2:I:17:LYS:NZ	2:I:1194:GLU:OE2	2.34	0.54
2:I:745:GLU:O	2:I:974:ARG:NH1	2.39	0.53
2:I:1325:VAL:HG11	3:J:337:ARG:HH12	1.72	0.53
2:I:26:TYR:HE2	2:I:32:LEU:HD12	1.73	0.53
2:I:746:ALA:HA	2:I:974:ARG:HH22	1.74	0.53
1:A:33:ARG:HH11	2:I:1081:PRO:HG3	1.74	0.53
3:J:1106:ILE:HB	3:J:1123:ARG:HB3	1.90	0.53
7:T:16:DT:H2'	7:T:17:DG:C8	2.44	0.53
7:T:24:DT:H2'	7:T:25:DC:H6	1.74	0.53
3:J:982:LEU:HD23	3:J:995:TYR:OH	2.09	0.53
3:J:747:MET:HE3	3:J:759:ILE:HD12	1.91	0.53
7:T:24:DT:H2'	7:T:25:DC:C6	2.44	0.53
3:J:1072:LYS:O	3:J:1192:LYS:NZ	2.42	0.52
6:R:1:A:N3	6:R:1:A:H2'	2.24	0.52
3:J:591:ILE:HG13	3:J:592:VAL:HG13	1.91	0.52
3:J:962:ASN:O	3:J:980:THR:HG22	2.10	0.52
3:J:970:SER:HB3	3:J:972:LYS:NZ	2.25	0.52
3:J:430:HIS:HE1	3:J:432:LEU:HB2	1.73	0.51
3:J:1096:PRO:HG2	3:J:1098:GLN:HE22	1.73	0.51
1:A:33:ARG:NH1	2:I:1081:PRO:HG3	2.24	0.51
3:J:495:ASN:HD22	3:J:1247:LYS:HB2	1.75	0.51
3:J:1040:MET:HB3	3:J:1046:ILE:HD13	1.92	0.51
3:J:478:LEU:HD11	4:K:47:THR:HB	1.92	0.51
3:J:1106:ILE:HG21	3:J:1123:ARG:NH2	2.26	0.51
7:T:20:DC:H2'	7:T:21:DC:H6	1.76	0.51
3:J:475:GLU:O	3:J:479:GLU:HG2	2.10	0.51
3:J:957:SER:HB3	3:J:985:ILE:HB	1.92	0.51
2:I:180:ARG:NH1	11:I:1412:HOH:O	2.43	0.51
1:A:228:LEU:CD1	1:G:224:LEU:HD22	2.34	0.51
3:J:869:CYS:HA	3:J:872:LEU:HD12	1.93	0.51
3:J:1106:ILE:N	3:J:1123:ARG:O	2.39	0.51
3:J:492:SER:OG	3:J:495:ASN:O	2.29	0.50
1:A:214:GLU:O	1:A:218:ARG:HG3	2.12	0.50
1:A:46:ILE:HD11	1:A:224:LEU:HD13	1.93	0.50
2:I:276:GLN:HA	2:I:279:LYS:HE2	1.94	0.50
3:J:1075:ARG:HH12	3:J:1192:LYS:NZ	2.08	0.50
6:R:6:G:OP2	11:R:101:HOH:O	2.19	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:19:VAL:HG12	1:A:20:SER:H	1.77	0.50
3:J:926:PRO:HB3	3:J:1246:VAL:HG21	1.93	0.50
2:I:1117:LEU:HD13	2:I:1195:ILE:HG12	1.93	0.49
3:J:679:TYR:O	3:J:680:ASN:C	2.54	0.49
3:J:1063:ASP:HA	3:J:1103:GLY:HA3	1.94	0.49
3:J:950:ILE:HG21	3:J:995:TYR:CE1	2.47	0.49
3:J:644:MET:O	3:J:764:ARG:NH1	2.42	0.49
3:J:978:ARG:HE	3:J:1197:ASN:HA	1.77	0.49
9:J:1503:A1C49:O5	7:T:19:DP:N2	2.45	0.49
2:I:215:TYR:HD1	2:I:219:GLN:HB3	1.77	0.49
3:J:998:PRO:HG2	3:J:1020:TRP:CE2	2.48	0.48
2:I:850:ILE:HD12	2:I:1048:LYS:HD3	1.94	0.48
3:J:568:SER:OG	3:J:570:LYS:NZ	2.42	0.48
3:J:968:ASN:OD1	3:J:969:SER:N	2.46	0.48
2:I:1033:ARG:NH1	11:I:1410:HOH:O	2.41	0.48
2:I:1339:LEU:HD23	3:J:20:ILE:HG12	1.95	0.48
1:A:212:ASP:OD1	1:A:212:ASP:N	2.43	0.48
3:J:1261:LEU:HD12	3:J:1261:LEU:O	2.14	0.48
2:I:1340:GLU:HB2	3:J:19:ALA:HB3	1.96	0.48
2:I:463:GLN:HG3	2:I:505:PHE:HB2	1.95	0.48
1:A:13:LEU:HD23	1:A:13:LEU:H	1.79	0.48
1:A:79:LEU:HD11	3:J:526:VAL:HG11	1.95	0.48
1:G:100:LEU:HD23	1:G:115:ILE:HG21	1.96	0.48
2:I:671:LEU:HB3	2:I:1186:VAL:HG13	1.96	0.48
2:I:1186:VAL:HG12	2:I:1187:PHE:CD2	2.49	0.47
2:I:352:ARG:NE	11:I:1406:HOH:O	2.46	0.47
2:I:866:ASP:OD2	2:I:944:ARG:HD3	2.14	0.47
3:J:789:LYS:HG2	3:J:932:MET:HE2	1.96	0.47
2:I:271:ALA:HA	2:I:274:ILE:HG22	1.96	0.47
2:I:30:ILE:CD1	2:I:575:LEU:HD11	2.44	0.47
3:J:974:VAL:HG22	3:J:1002:VAL:HG22	1.95	0.47
6:R:2:U:H2'	6:R:3:C:C6	2.49	0.47
1:G:82:LEU:HG	1:G:173:VAL:HG12	1.96	0.47
2:I:196:VAL:HG21	2:I:209:ILE:HD12	1.95	0.47
3:J:1353:VAL:HG13	3:J:1355:ARG:HG3	1.95	0.47
1:G:224:LEU:HD23	1:G:228:LEU:HD13	1.96	0.47
3:J:518:VAL:HG23	3:J:547:ARG:NH2	2.29	0.47
3:J:1163:VAL:HG13	3:J:1175:LEU:HD11	1.96	0.47
2:I:17:LYS:NZ	2:I:1153:ALA:O	2.46	0.47
3:J:512:TYR:HD1	3:J:724:MET:HE1	1.80	0.47
3:J:827:GLU:HB2	3:J:832:LYS:HG3	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:J:453:VAL:HG12	3:J:457:TYR:HD2	1.80	0.46
3:J:553:THR:HB	3:J:567:THR:HG22	1.97	0.46
3:J:1032:SER:OG	3:J:1117:SER:N	2.48	0.46
7:T:19:DP:O4'	7:T:19:DP:C5'	2.52	0.46
1:G:192:VAL:HG13	1:G:195:ARG:HB3	1.96	0.46
2:I:559:CYS:HB2	2:I:662:SER:HB3	1.97	0.46
1:A:5:VAL:O	1:G:150:ARG:NH1	2.48	0.46
1:A:192:VAL:HG12	1:A:193:GLU:H	1.80	0.46
2:I:976:ARG:HB2	2:I:997:TRP:CZ3	2.51	0.46
5:N:8:DG:H2"	5:N:9:DA:H5"	1.97	0.46
1:A:62:ASP:OD1	1:A:63:GLY:N	2.49	0.46
3:J:957:SER:N	3:J:985:ILE:O	2.44	0.46
3:J:1153:PRO:O	3:J:1194:ARG:NH2	2.49	0.46
4:K:20:VAL:O	4:K:24:ALA:HB3	2.16	0.46
3:J:79:LYS:HE3	3:J:80:HIS:NE2	2.31	0.46
3:J:744:ARG:NH2	11:J:1610:HOH:O	2.36	0.46
1:A:222:THR:O	1:A:226:GLU:HG2	2.16	0.46
2:I:303:ASP:HB3	2:I:306:THR:OG1	2.16	0.46
2:I:1120:ALA:HB1	2:I:1198:LEU:HB3	1.98	0.46
3:J:1051:ASP:HB3	3:J:1055:GLY:HA3	1.98	0.46
3:J:555:TYR:CE2	3:J:565:ALA:HB2	2.51	0.45
2:I:870:ILE:HD12	2:I:944:ARG:HG2	1.99	0.45
3:J:1143:ASP:OD1	3:J:1148:ARG:NH2	2.47	0.45
1:A:78:ILE:HA	1:A:81:ILE:HG12	1.98	0.45
2:I:352:ARG:CZ	11:I:1406:HOH:O	2.65	0.45
3:J:480:ALA:HA	3:J:484:MET:HB3	1.99	0.45
3:J:990:ARG:HB3	3:J:992:LYS:HE3	1.98	0.45
5:N:2:DC:H2'	5:N:3:DA:H8	1.79	0.45
2:I:275:ARG:HG2	2:I:279:LYS:NZ	2.32	0.44
3:J:954:ASN:HB2	3:J:984:LEU:HD21	1.99	0.44
3:J:1174:ARG:HG3	3:J:1189:MET:SD	2.56	0.44
3:J:422:LEU:HB3	3:J:434:ILE:HD11	1.98	0.44
3:J:1046:ILE:HD12	3:J:1059:LEU:HD22	1.98	0.44
2:I:228:VAL:HG22	2:I:245:ARG:NH2	2.32	0.44
2:I:1072:ASN:HD22	2:I:1111:GLN:NE2	2.15	0.44
3:J:836:ARG:HG3	3:J:869:CYS:HB3	1.98	0.44
1:G:159:ILE:HD11	1:G:166:ARG:HH22	1.82	0.44
3:J:369:PRO:HB3	3:J:444:GLY:O	2.18	0.44
3:J:903:LEU:HD11	3:J:1249:ASN:ND2	2.32	0.44
3:J:955:LYS:HG3	3:J:1011:VAL:O	2.18	0.44
3:J:996:LYS:NZ	3:J:998:PRO:HA	2.32	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:T:25:DC:H2'	7:T:26:DG:H8	1.82	0.44
2:I:65:ASN:ND2	2:I:107:ARG:HG2	2.33	0.44
3:J:516:ASP:OD1	11:J:1605:HOH:O	2.21	0.44
2:I:1270:PHE:CZ	2:I:1274:GLU:HB3	2.53	0.43
2:I:82:VAL:HG13	2:I:137:VAL:HG21	1.99	0.43
2:I:228:VAL:HG23	2:I:337:PHE:HB2	2.00	0.43
2:I:265:LYS:HE3	2:I:265:LYS:HB2	1.79	0.43
2:I:321:LEU:HD23	2:I:321:LEU:HA	1.83	0.43
3:J:108:ALA:HB3	3:J:279:LEU:HD23	2.00	0.43
3:J:804:ALA:O	3:J:916:GLY:HA3	2.18	0.43
1:A:102:LEU:HB3	1:A:142:MET:HG2	2.00	0.43
3:J:262:THR:N	11:J:1604:HOH:O	2.47	0.43
3:J:1075:ARG:HH22	3:J:1192:LYS:HE2	1.84	0.43
3:J:368:LEU:CD1	3:J:373:ALA:HB2	2.48	0.43
2:I:231:GLU:N	2:I:238:GLN:O	2.42	0.43
2:I:269:ILE:HG23	2:I:273:HIS:HB2	2.00	0.43
2:I:314:ASN:OD1	2:I:348:SER:OG	2.36	0.43
3:J:424:ASN:HB2	3:J:434:ILE:HD13	2.00	0.43
3:J:909:ILE:HD11	3:J:913:GLU:HG3	2.00	0.43
3:J:964:LYS:HB2	3:J:977:SER:HB3	2.01	0.43
2:I:196:VAL:HG21	2:I:209:ILE:CD1	2.49	0.43
3:J:349:TYR:HB3	3:J:470:VAL:CG1	2.49	0.43
3:J:453:VAL:HG12	3:J:457:TYR:CD2	2.54	0.43
3:J:492:SER:OG	3:J:495:ASN:OD1	2.34	0.43
3:J:518:VAL:CG1	3:J:706:VAL:HG21	2.49	0.43
4:K:22:VAL:HG22	4:K:54:ILE:HD13	2.00	0.43
1:A:61:ILE:HB	1:A:64:VAL:HB	2.01	0.43
2:I:106:GLU:HB3	2:I:109:ALA:HB3	2.01	0.43
2:I:324:LYS:HA	2:I:327:GLN:HG2	2.00	0.43
2:I:689:ALA:HB2	2:I:1233:LEU:HD23	2.01	0.43
2:I:321:LEU:O	2:I:325:LEU:HG	2.19	0.43
1:G:190:ALA:HB2	1:G:200:LYS:HB2	1.99	0.43
1:G:134:THR:HG21	2:I:727:VAL:O	2.19	0.42
3:J:514:THR:HG21	3:J:596:LEU:H	1.84	0.42
3:J:1159:ILE:HD12	3:J:1179:PRO:HG3	2.00	0.42
2:I:1342:GLU:HB2	3:J:18:ASP:HB2	2.01	0.42
3:J:925:GLU:HB3	3:J:926:PRO:HD3	2.01	0.42
2:I:558:VAL:HG13	2:I:573:ASN:HB3	2.01	0.42
3:J:411:ILE:O	3:J:415:VAL:HG23	2.20	0.42
1:G:192:VAL:HG22	1:G:193:GLU:H	1.84	0.42
3:J:805:GLN:OE1	3:J:1348:LYS:HG3	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:J:1265:THR:O	3:J:1303:SER:N	2.36	0.42
1:A:38:THR:HB	1:G:45:ARG:HD3	2.02	0.42
2:I:150:HIS:CD2	2:I:454:ARG:HD2	2.55	0.42
2:I:1107:MET:HE1	3:J:739:GLN:HB2	2.01	0.42
3:J:275:ARG:HD2	3:J:302:ALA:HB2	2.00	0.42
3:J:556:GLU:HG3	3:J:558:ASP:CG	2.44	0.42
3:J:697:MET:HE2	3:J:697:MET:HB3	1.90	0.42
3:J:822:MET:HE3	3:J:838:ARG:O	2.19	0.42
3:J:1266:ILE:HA	3:J:1302:TYR:HA	2.02	0.42
2:I:993:PRO:HD2	2:I:996:ARG:HD2	2.02	0.42
3:J:559:ALA:HB3	3:J:562:GLU:HB2	2.02	0.42
3:J:950:ILE:HD11	3:J:1020:TRP:HZ3	1.84	0.42
1:A:13:LEU:HD21	1:A:29:GLU:HG3	2.01	0.42
2:I:637:ARG:HA	2:I:642:SER:HA	2.02	0.42
3:J:113:HIS:HB3	3:J:116:PHE:HD2	1.85	0.42
3:J:1171:GLY:H	3:J:1192:LYS:HE3	1.84	0.42
1:A:151:GLY:H	1:A:177:TYR:HB2	1.85	0.41
1:G:31:LEU:HD21	1:G:39:LEU:HD12	2.02	0.41
2:I:10:ARG:CZ	2:I:697:LYS:HD3	2.50	0.41
3:J:1329:THR:O	3:J:1333:THR:HG22	2.20	0.41
2:I:448:LEU:HD23	2:I:448:LEU:HA	1.91	0.41
2:I:1296:ASP:O	2:I:1320:PRO:HA	2.19	0.41
3:J:1152:GLU:OE2	3:J:1194:ARG:NH1	2.53	0.41
3:J:1158:GLU:HG3	3:J:1186:TYR:CZ	2.55	0.41
3:J:349:TYR:HB3	3:J:470:VAL:HG12	2.01	0.41
3:J:510:LEU:O	3:J:514:THR:HG22	2.20	0.41
3:J:1036:ARG:HD3	3:J:1081:VAL:HG11	2.02	0.41
2:I:1253:LEU:O	3:J:99:ARG:NH1	2.52	0.41
1:A:59:VAL:HG22	1:A:144:ILE:HG13	2.03	0.41
1:A:67:GLU:HG3	1:A:171:LEU:HD22	2.02	0.41
1:A:211:ILE:HD11	1:A:215:GLU:CD	2.45	0.41
1:G:47:LEU:O	1:G:180:VAL:HG21	2.21	0.41
2:I:275:ARG:O	2:I:278:GLU:HB2	2.20	0.41
3:J:1079:LYS:HD2	3:J:1087:ASP:OD2	2.21	0.41
1:A:211:ILE:HD11	1:A:215:GLU:OE1	2.21	0.41
1:A:228:LEU:HD23	1:A:228:LEU:HA	1.75	0.41
3:J:464:ASP:OD1	3:J:464:ASP:N	2.37	0.41
4:K:19:LEU:HA	4:K:22:VAL:HG23	2.02	0.41
1:G:133:LEU:HD21	1:G:140:ILE:HG23	2.02	0.41
3:J:478:LEU:CD2	4:K:22:VAL:HB	2.51	0.41
3:J:1152:GLU:O	3:J:1214:PRO:HD2	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:19:VAL:HG12	1:A:20:SER:N	2.36	0.41
1:G:179:PRO:HG3	1:G:211:ILE:HG13	2.03	0.41
2:I:241:LEU:HD23	2:I:285:ILE:HG12	2.02	0.41
3:J:371:LYS:HD2	11:J:1615:HOH:O	2.20	0.41
3:J:610:ARG:HA	3:J:610:ARG:HD3	1.86	0.41
3:J:1078:LEU:O	3:J:1098:GLN:HA	2.21	0.41
6:R:1:A:N6	7:T:29:DG:C2	2.89	0.41
2:I:561:ILE:HD11	3:J:772:TYR:HE1	1.85	0.41
2:I:979:LEU:HD13	2:I:989:LEU:HD11	2.03	0.41
2:I:731:ARG:NH2	2:I:962:GLU:OE1	2.54	0.40
3:J:123:ARG:NH2	3:J:1334:GLU:HG2	2.36	0.40
3:J:673:VAL:HG13	3:J:677:GLU:HG3	2.03	0.40
2:I:189:ASP:OD2	2:I:193:ASN:HB2	2.21	0.40
2:I:871:VAL:O	2:I:944:ARG:NH2	2.54	0.40
3:J:514:THR:CG2	3:J:596:LEU:H	2.33	0.40
3:J:288:PRO:HD2	3:J:291:ILE:HD12	2.03	0.40
3:J:1024:THR:HG21	3:J:1123:ARG:HG3	2.04	0.40
7:T:28:DT:H2"	7:T:29:DG:O4'	2.21	0.40
2:I:36:GLN:HE21	2:I:40:GLU:CD	2.29	0.40
3:J:478:LEU:HD23	4:K:22:VAL:HB	2.03	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	227/231 (98%)	219 (96%)	8 (4%)	0	100	100
1	G	226/231 (98%)	221 (98%)	5 (2%)	0	100	100
2	I	1321/1342 (98%)	1293 (98%)	28 (2%)	0	100	100
3	J	1330/1430 (93%)	1277 (96%)	50 (4%)	3 (0%)	43	58

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	K	72/74 (97%)	70 (97%)	2 (3%)	0	100	100
All	All	3176/3308 (96%)	3080 (97%)	93 (3%)	3 (0%)	49	64

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	J	680	ASN
3	J	1052	GLU
3	J	679	TYR

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	197/199 (99%)	196 (100%)	1 (0%)	81	89
1	G	196/199 (98%)	194 (99%)	2 (1%)	68	80
2	I	1142/1157 (99%)	1141 (100%)	1 (0%)	88	95
3	J	1121/1189 (94%)	1118 (100%)	3 (0%)	86	93
4	K	61/64 (95%)	61 (100%)	0	100	100
All	All	2717/2808 (97%)	2710 (100%)	7 (0%)	84	93

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	95	LYS
1	G	32	GLU
1	G	33	ARG
2	I	815	SER
3	J	357	VAL
3	J	464	ASP
3	J	505	ASP

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	37	HIS
1	A	93	GLN
2	I	120	GLN
2	I	327	GLN
2	I	604	HIS
2	I	649	GLN
2	I	1111	GLN
2	I	1237	HIS
2	I	1313	HIS
3	J	232	ASN
3	J	424	ASN
3	J	430	HIS
3	J	716	GLN
3	J	762	ASN
3	J	792	ASN
3	J	875	ASN
3	J	1019	ASN
3	J	1126	GLN
3	J	1252	HIS
4	K	31	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
6	R	7/9 (77%)	1 (14%)	0

All (1) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
6	R	2	U

There are no RNA pucker outliers to report.

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

1 non-standard protein/DNA/RNA residue is modelled in this entry.

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	$\#\|Z\| > 2$
7	DP	T	19	7	19,24,25	4.65	13 (68%)	22,35,38	1.87	6 (27%)

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
7	DP	T	19	7	-	0/7/21/22	0/3/3/3

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	T	19	DP	C4-N3	10.34	1.46	1.31
7	T	19	DP	O4'-C4'	9.75	1.66	1.45
7	T	19	DP	C3'-C4'	-9.10	1.29	1.53
7	T	19	DP	O4'-C1'	-6.27	1.28	1.42
7	T	19	DP	C7-N5	-3.47	1.33	1.39
7	T	19	DP	C6-N1	3.25	1.42	1.36
7	T	19	DP	O6-C6	-3.23	1.17	1.23
7	T	19	DP	C2-N1	3.14	1.41	1.35
7	T	19	DP	C2-N2	3.09	1.42	1.34
7	T	19	DP	C8-N9	-2.92	1.33	1.38
7	T	19	DP	C7-C8	2.35	1.38	1.34
7	T	19	DP	O3'-C3'	2.23	1.48	1.43
7	T	19	DP	C2-N3	2.09	1.40	1.36

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	T	19	DP	N5-C4-N3	-4.37	122.60	126.21
7	T	19	DP	N2-C2-N1	3.81	122.98	117.09
7	T	19	DP	N3-C2-N1	-3.50	120.89	126.44
7	T	19	DP	C1'-N9-C4	-2.92	120.57	127.92
7	T	19	DP	C2'-C1'-N9	-2.82	106.75	113.81
7	T	19	DP	O4'-C1'-N9	2.18	111.74	107.86

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	T	19	DP	3	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 4 ligands modelled in this entry, 3 are 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	$\#\|Z\| > 2$
9	A1C49	J	1503	-	32,33,33	5.50	19 (59%)	41,52,52	0.99	1 (2%)

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
9	A1C49	J	1503	-	-	4/25/42/42	0/2/2/2

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	J	1503	A1C49	O4'-C1'	15.28	1.65	1.43
9	J	1503	A1C49	C2'-C1'	-13.79	1.32	1.52
9	J	1503	A1C49	P1-OP1	10.21	1.70	1.59
9	J	1503	A1C49	P2-OP1	9.60	1.69	1.59
9	J	1503	A1C49	P2-OP4	7.12	1.67	1.59
9	J	1503	A1C49	C3-C4	6.88	1.48	1.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	J	1503	A1C49	O4'-C4'	-6.57	1.30	1.45
9	J	1503	A1C49	C5-N6	5.55	1.49	1.38
9	J	1503	A1C49	C1-N1	5.29	1.45	1.34
9	J	1503	A1C49	C2-C1	5.28	1.52	1.43
9	J	1503	A1C49	C1-N6	5.19	1.47	1.37
9	J	1503	A1C49	C7-N7	4.26	1.45	1.33
9	J	1503	A1C49	O5-C5	-4.25	1.15	1.23
9	J	1503	A1C49	O3'-C3'	-3.71	1.33	1.43
9	J	1503	A1C49	C5-C4	3.12	1.53	1.44
9	J	1503	A1C49	O7-C7	-3.06	1.17	1.24
9	J	1503	A1C49	C3-C2	2.78	1.49	1.41
9	J	1503	A1C49	C3'-C4'	2.13	1.58	1.53
9	J	1503	A1C49	P1-O5'	2.02	1.67	1.59

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
9	J	1503	A1C49	C2'-C3'-C4'	-2.28	99.42	102.43

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	J	1503	A1C49	C3-C2-C7-O7
9	J	1503	A1C49	P2-OP4-P3-OP9
9	J	1503	A1C49	P2-OP1-P1-OP2
9	J	1503	A1C49	O4'-C4'-C5'-O5'

There are no ring outliers.

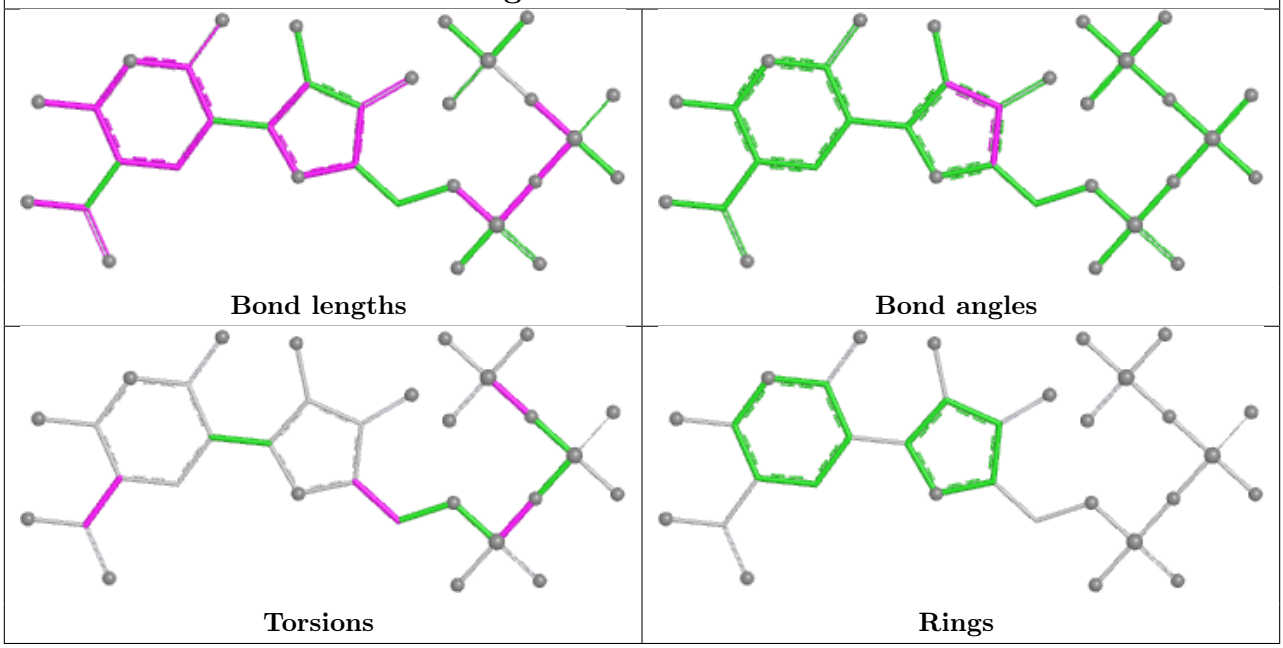
1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	J	1503	A1C49	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 then 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.

Ligand A1C49 J 1503



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.

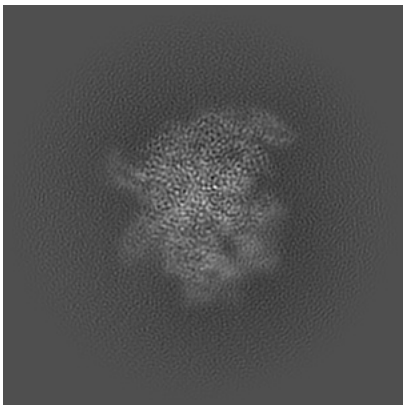
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-74514. 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



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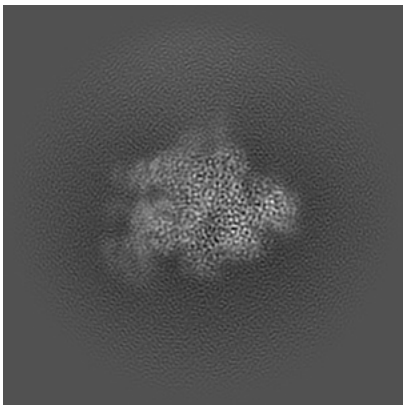
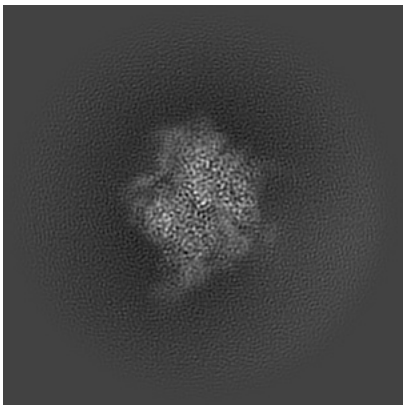
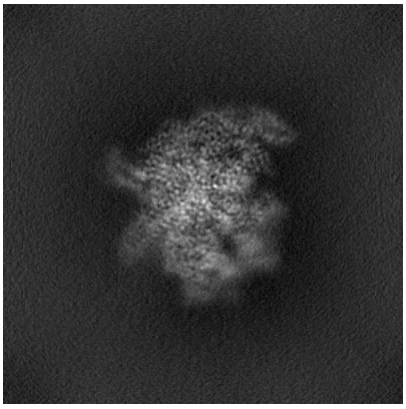


Y

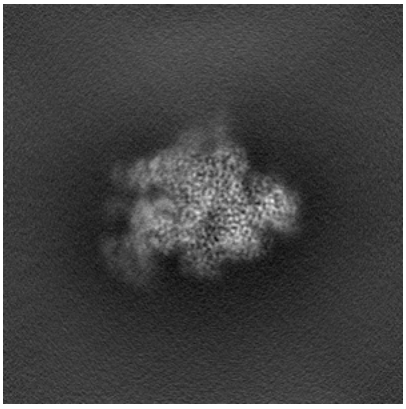


Z

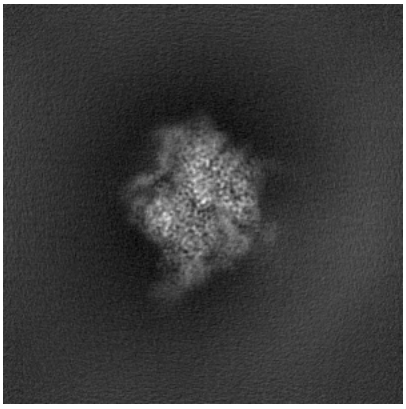
6.1.2 Raw map



X



Y

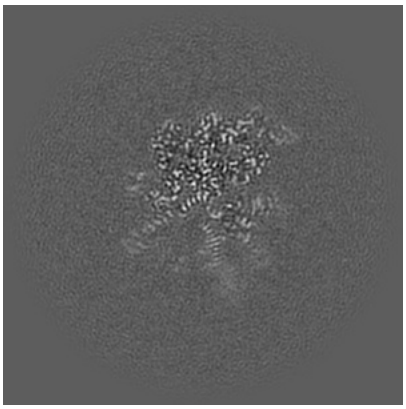


Z

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

6.2 Central slices (i)

6.2.1 Primary map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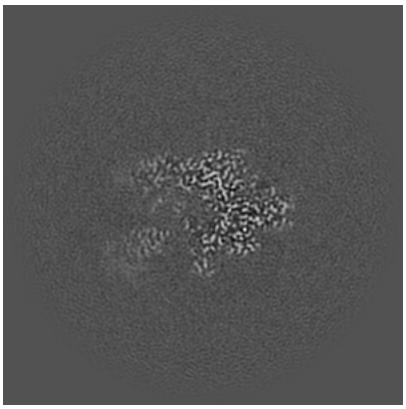
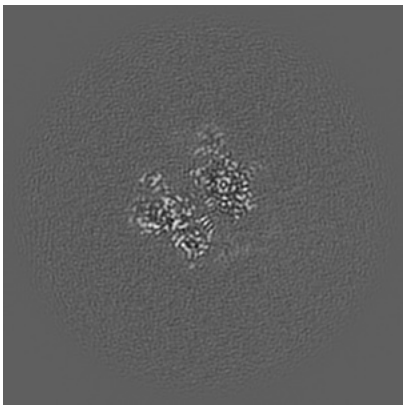
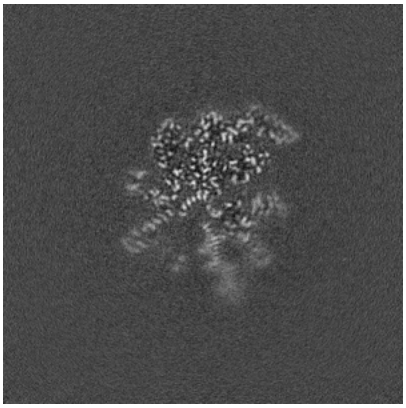
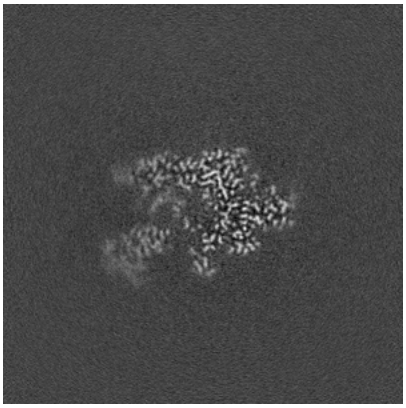
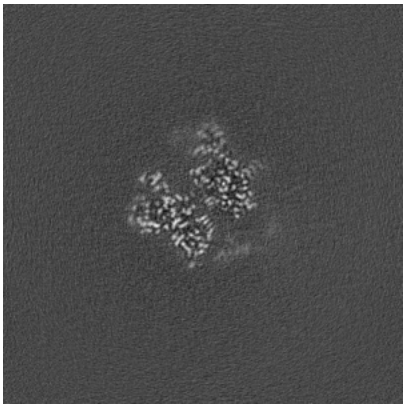

Y Index: 200


Z Index: 200

6.2.2 Raw map


X Index: 200

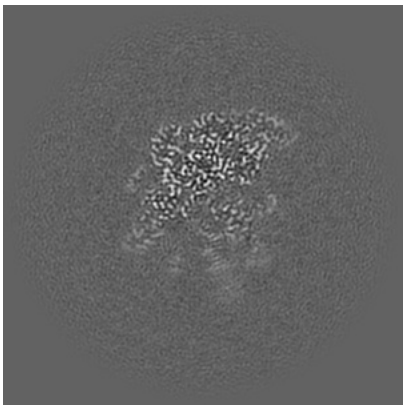

Y Index: 200


Z Index: 200

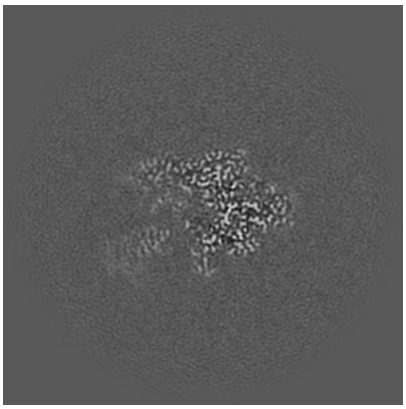
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

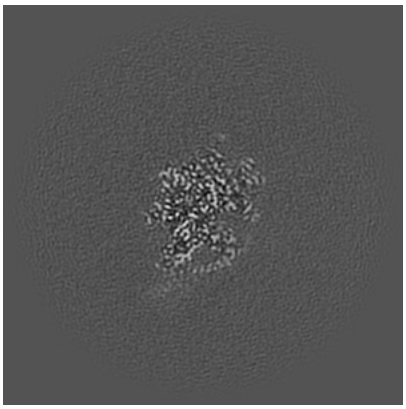
6.3.1 Primary map



X Index: 197

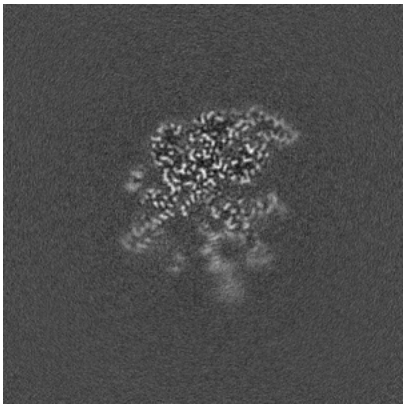


Y Index: 201

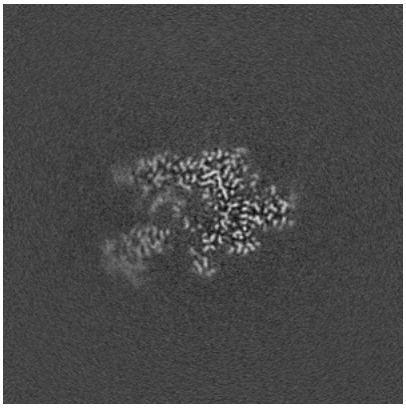


Z Index: 228

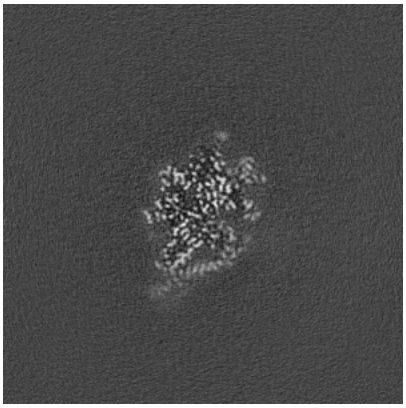
6.3.2 Raw map



X Index: 198



Y Index: 200

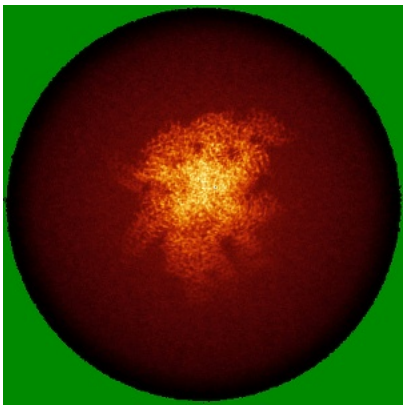


Z Index: 229

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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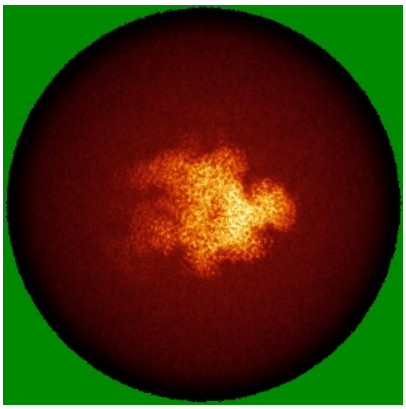
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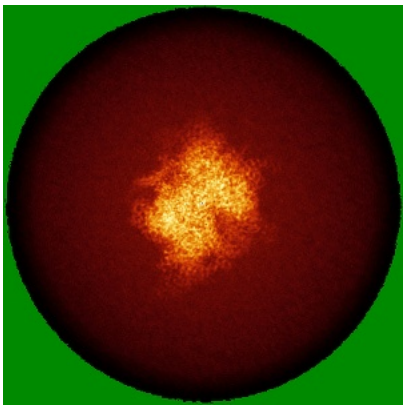
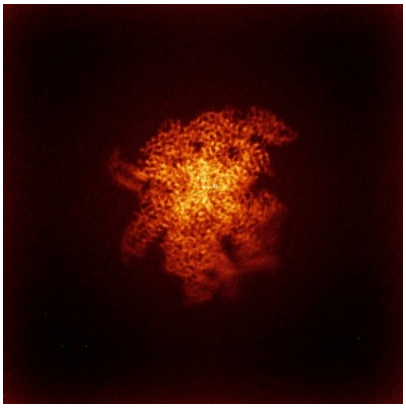
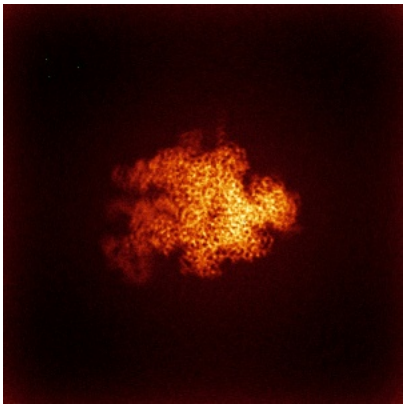
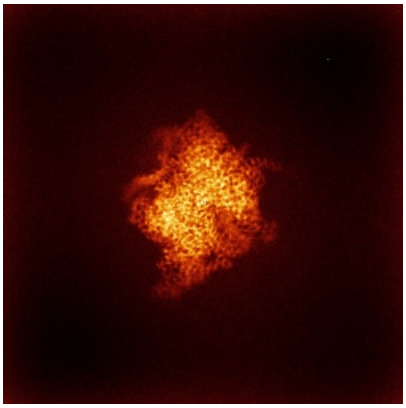

Z

6.4.2 Raw map


X

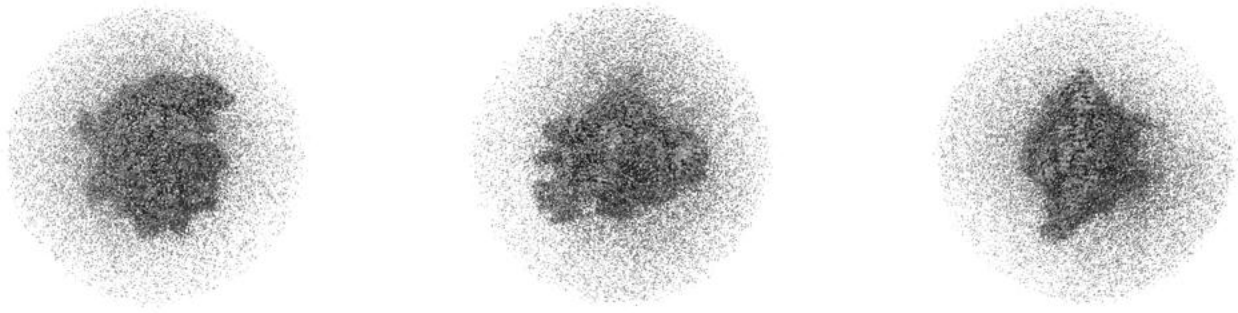

Y


Z

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

6.5 Orthogonal surface views (i)

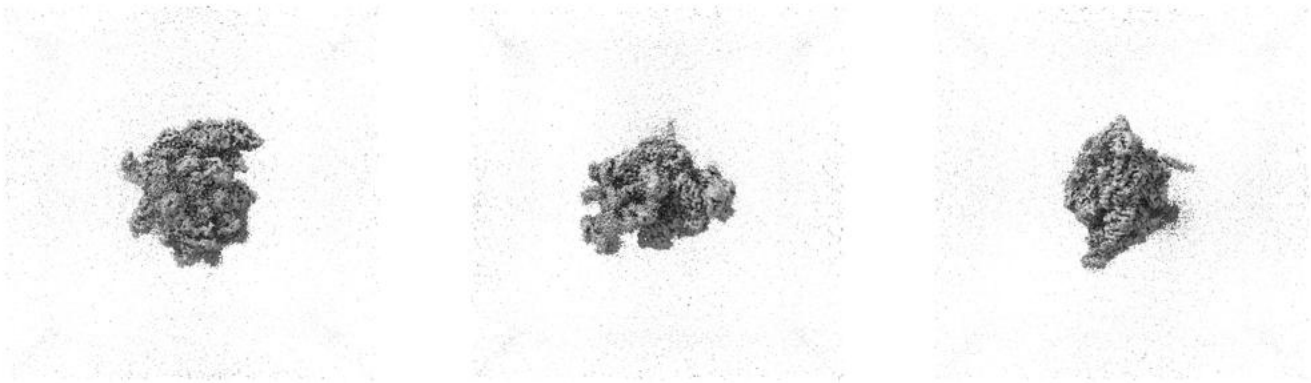
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.32. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

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

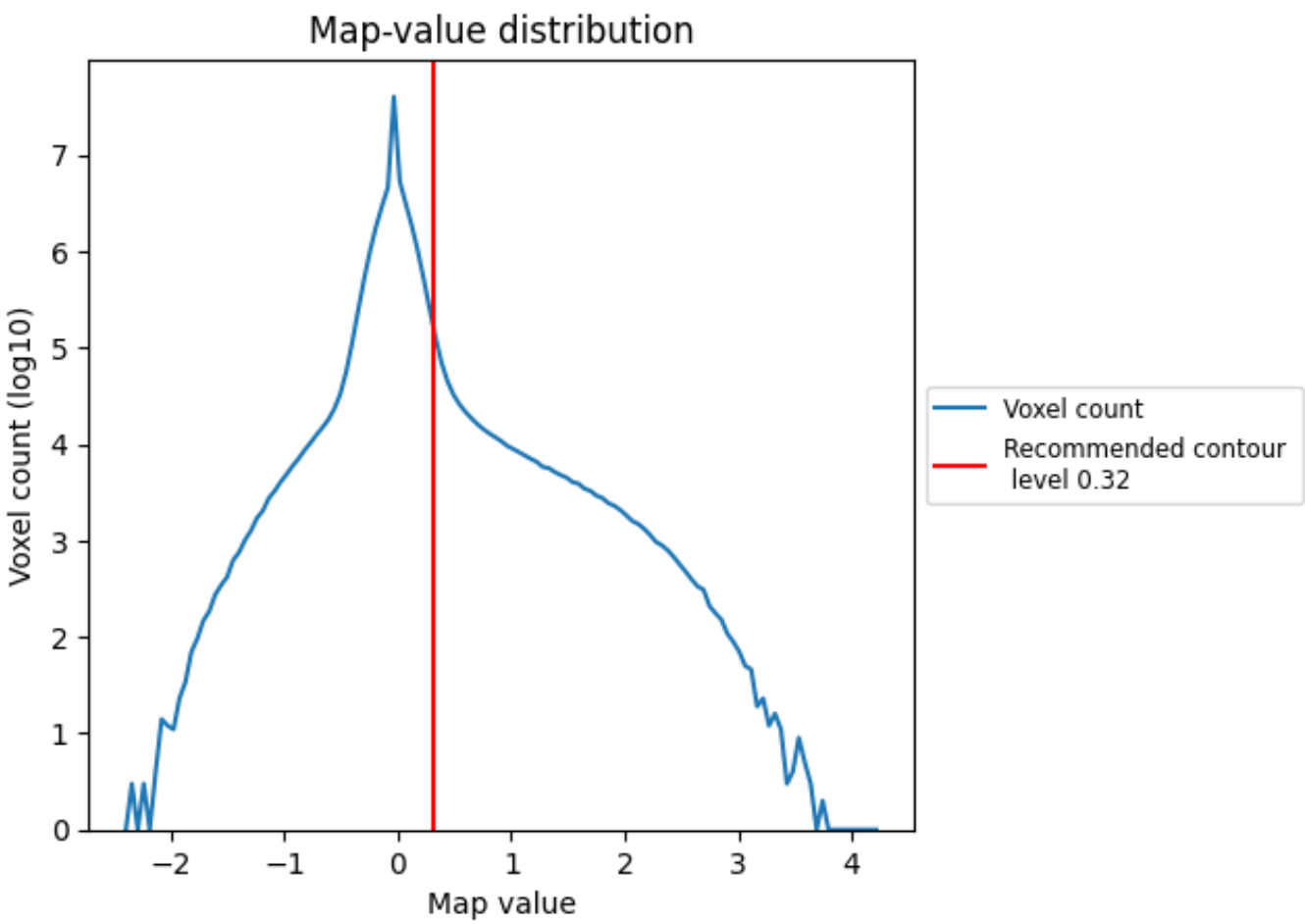
6.6 Mask visualisation (i)

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

7 Map analysis (i)

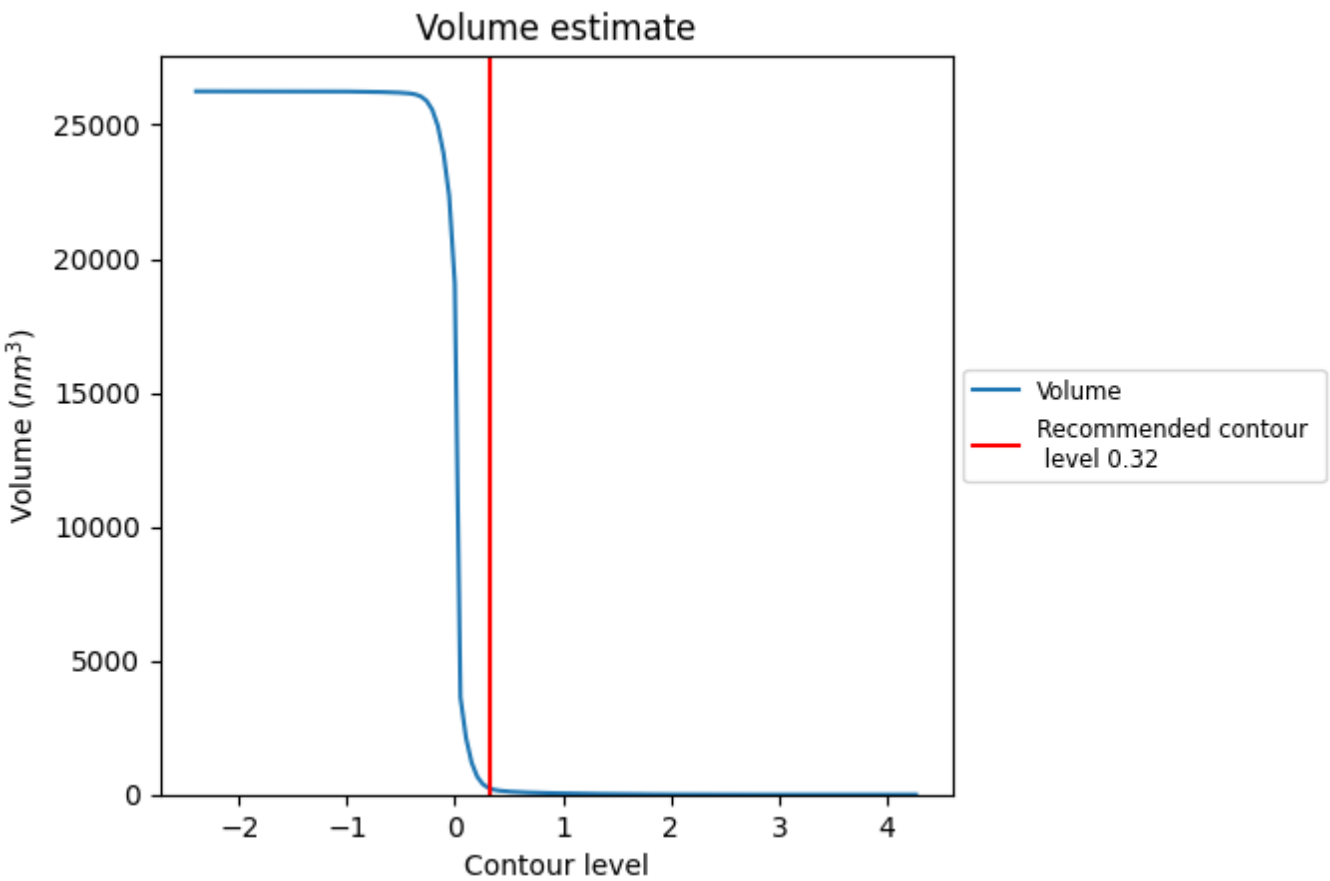
This section contains the results of statistical analysis of the map.

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.

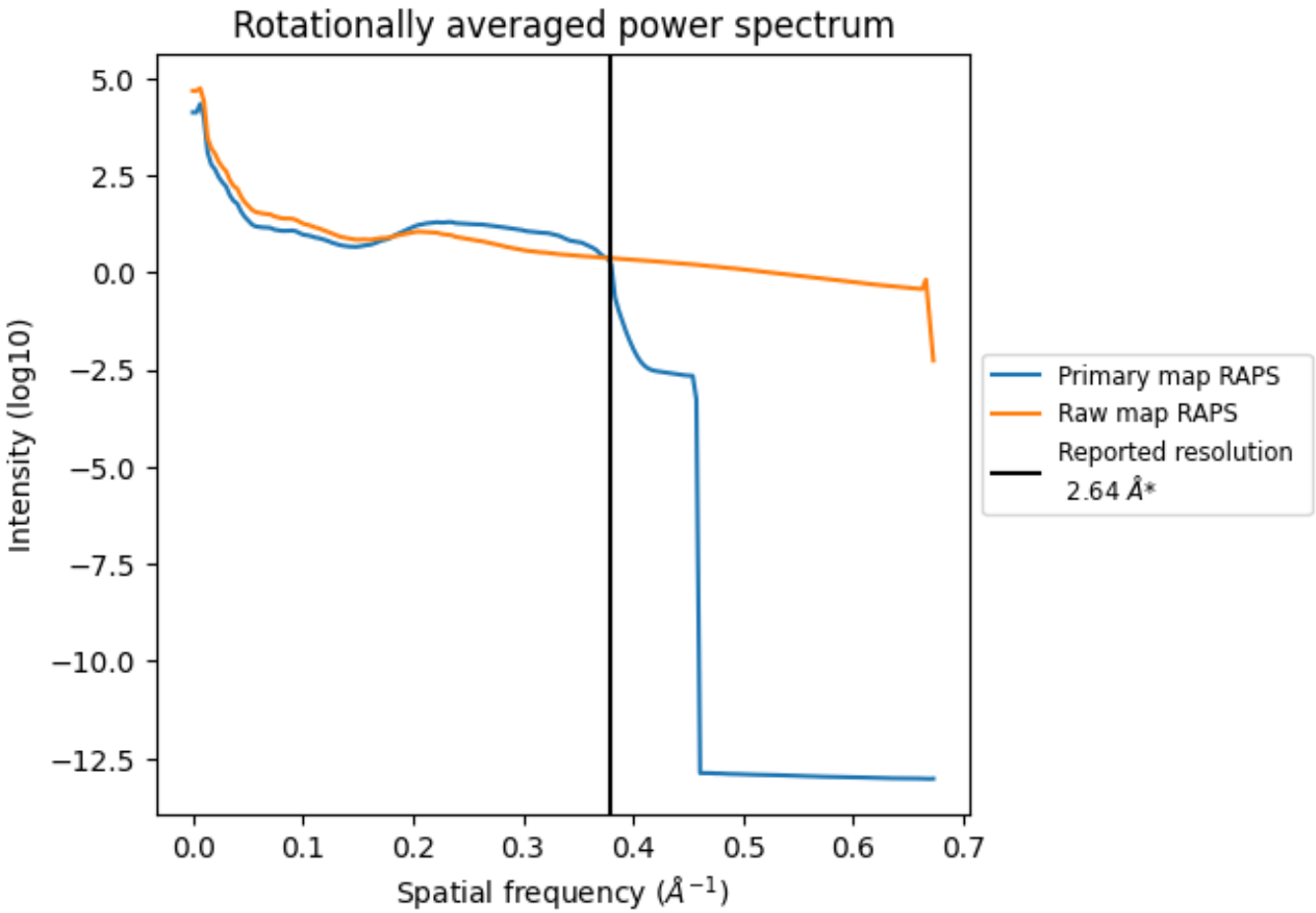
7.2 Volume estimate (i)



The volume at the recommended contour level is 235 nm^3; this corresponds to an approximate mass of 212 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)

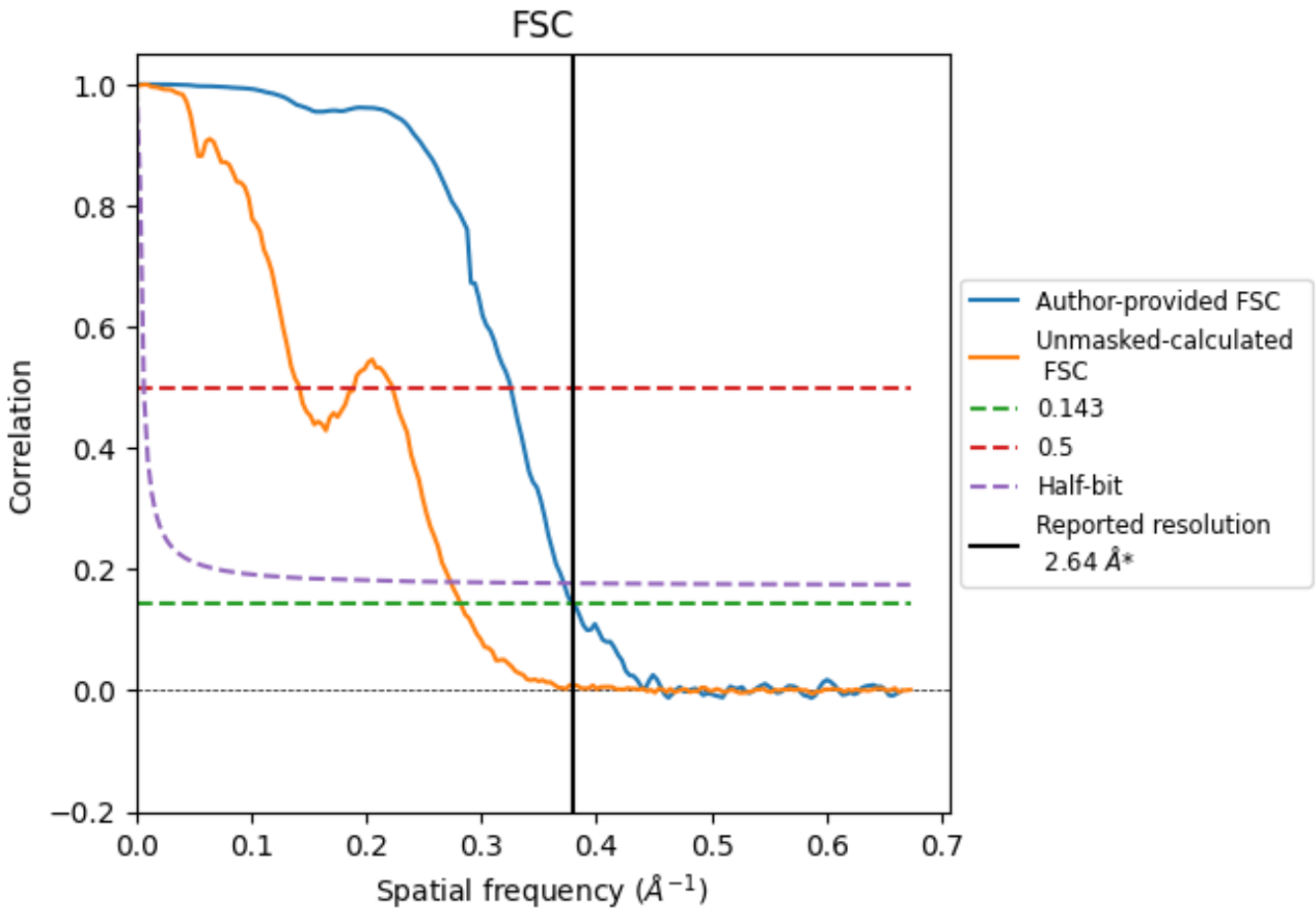


*Reported resolution corresponds to spatial frequency of 0.379 Å^{-1}

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 0.379 Å^{-1}

8.2 Resolution estimates (i)

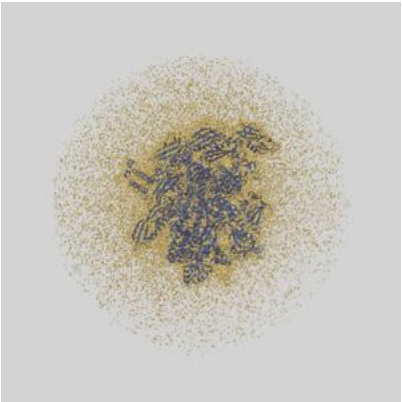
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	-	-	-
Author-provided FSC curve	2.64	3.07	2.69
Unmasked-calculated*	3.55	7.05	3.66

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

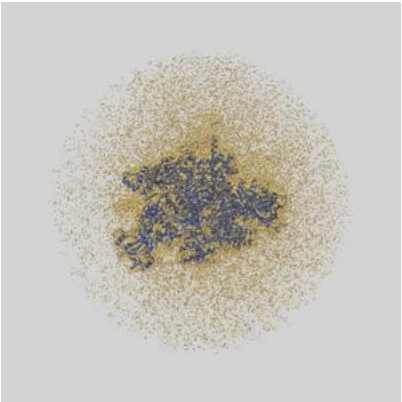
9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-74514 and PDB model 9ZP2. Per-residue inclusion information can be found in section 3 on page 8.

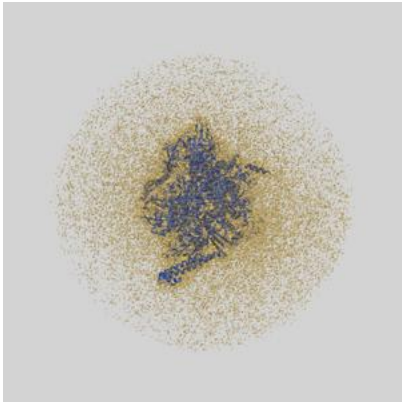
9.1 Map-model overlay (i)



X



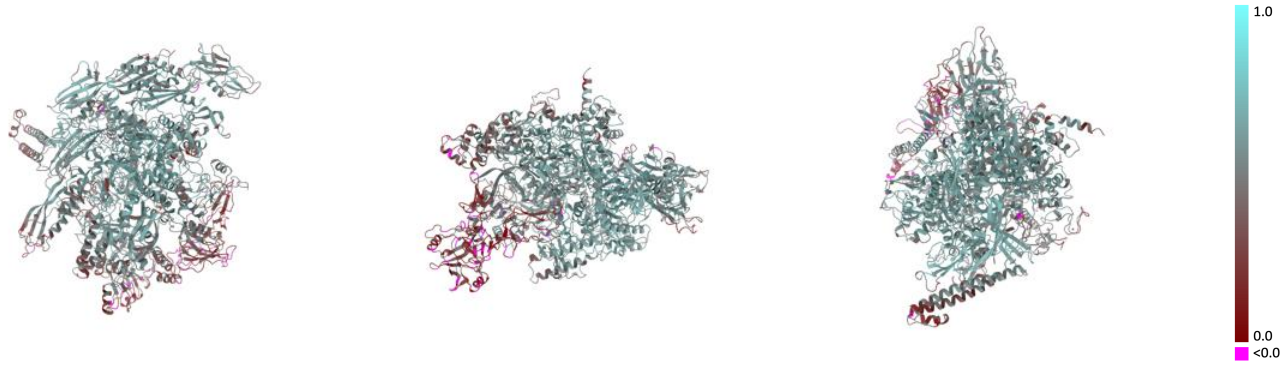
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.32 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

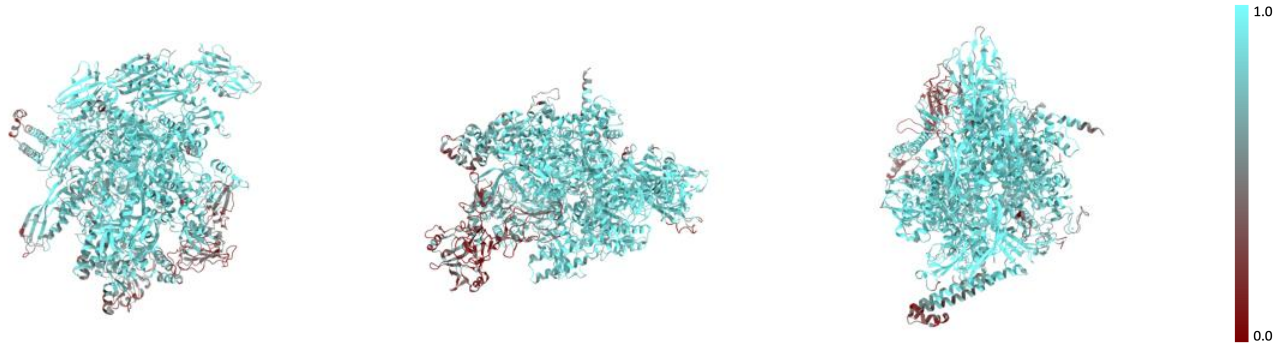
9.2 Q-score mapped to coordinate model (i)



X Y Z

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

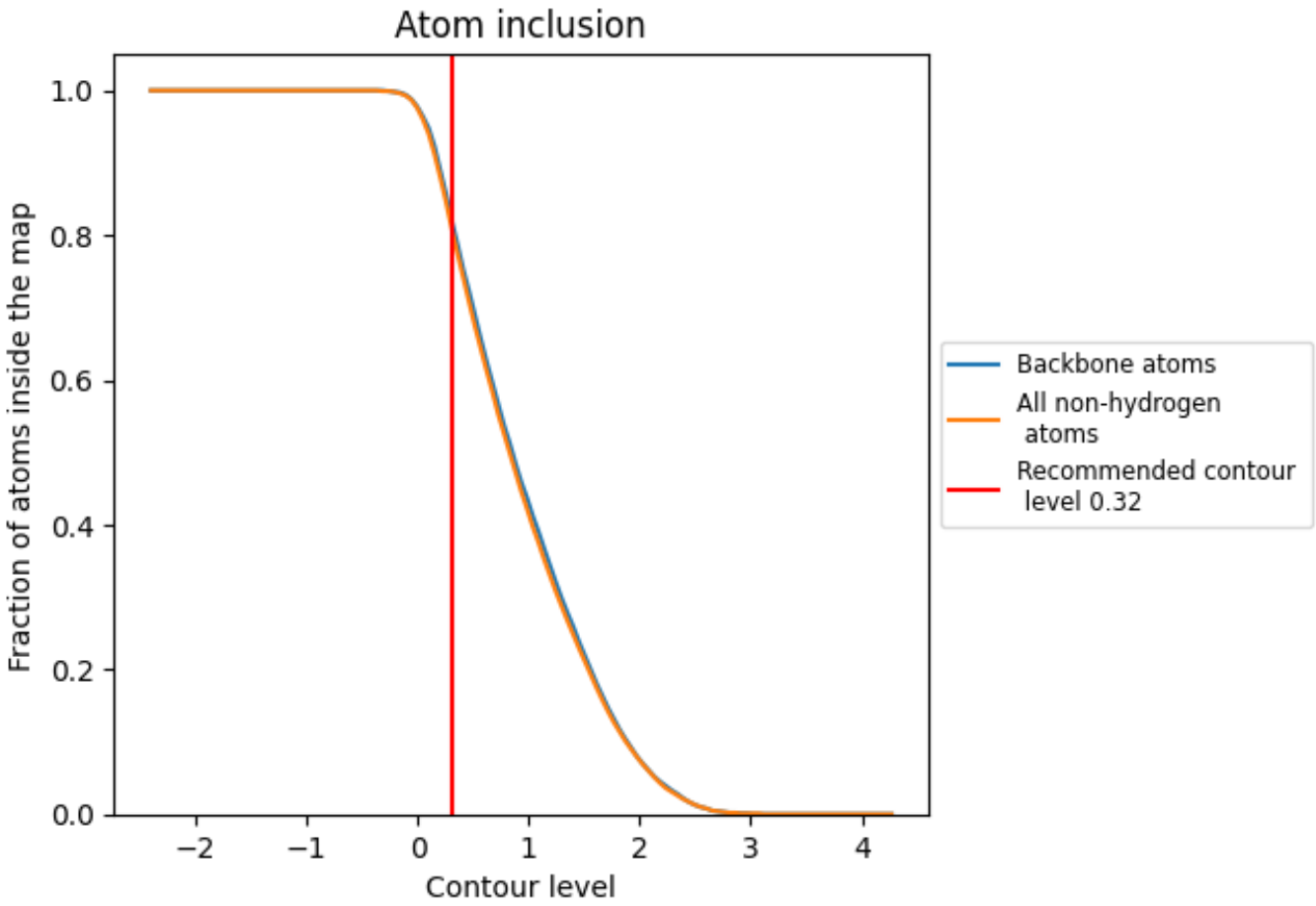
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.32).

9.4 Atom inclusion (i)



At the recommended contour level, 81% of all backbone atoms, 80% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.32) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8020	0.5170
A	0.8200	0.5130
G	0.8830	0.5690
I	0.8360	0.5410
J	0.7540	0.4810
K	0.8030	0.5090
N	0.8590	0.5350
R	0.9540	0.5970
T	0.9090	0.5620