



## Full wwPDB EM Validation Report ⓘ

Feb 20, 2023 – 10:25 AM EST

PDB ID : 8EG7  
EMDB ID : EMD-28109  
Title : Cryo-EM structure of pre-consensus elemental paused elongation complex  
Authors : Kang, J.Y.; Chen, J.; Llewellyn, E.; Landick, R.; Darst, S.A.  
Deposited on : 2022-09-11  
Resolution : 3.20 Å (reported)  
Based on initial model : 6C6T

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

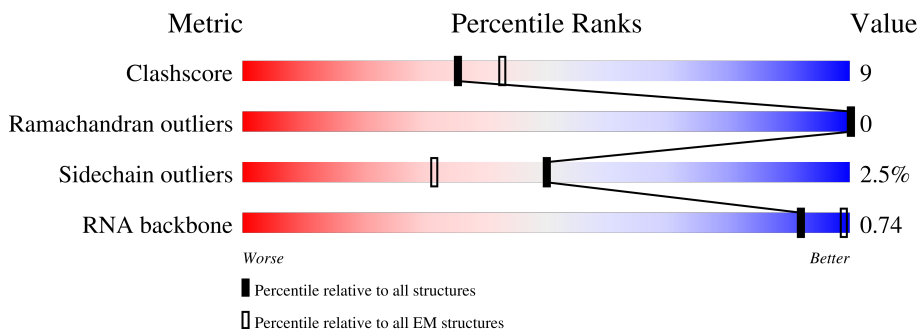
EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.32.1

# 1 Overall quality at a glance i

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

The reported resolution of this entry is 3.20 Å.

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




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

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

Mol	Chain	Length	Quality of chain
1	A	32	
2	B	32	
3	R	16	
4	G	239	
4	H	239	
5	I	1342	
6	J	1407	

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Mol	Chain	Length	Quality of chain
7	K	91	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into four segments: a red segment on the left labeled '14%', a green segment labeled '63%', a yellow segment labeled '27%', and a small grey segment on the far right labeled '9%'.</p>

## 2 Entry composition i

There are 10 unique types of molecules in this entry. The entry contains 26200 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 DNA chain called non-template DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	A	24	487	232	86	145	24	0	0

- Molecule 2 is a DNA chain called template DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	B	31	637	302	118	186	31	0	0

- Molecule 3 is a RNA chain called RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	R	10	216	96	39	71	10	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	G	218	1670	1045	293	326	6	0	0
4	H	219	1687	1053	298	330	6	0	0

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	235	GLU	-	expression tag	UNP P0A7Z6
G	236	VAL	-	expression tag	UNP P0A7Z6
G	237	LEU	-	expression tag	UNP P0A7Z6
G	238	PHE	-	expression tag	UNP P0A7Z6
G	239	GLN	-	expression tag	UNP P0A7Z6
H	235	GLU	-	expression tag	UNP P0A7Z6
H	236	VAL	-	expression tag	UNP P0A7Z6

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Chain	Residue	Modelled	Actual	Comment	Reference
H	237	LEU	-	expression tag	UNP P0A7Z6
H	238	PHE	-	expression tag	UNP P0A7Z6
H	239	GLN	-	expression tag	UNP P0A7Z6

- Molecule 5 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	I	1319	10407	6530	1814	2020	43	0	0

- Molecule 6 is a protein called DNA-directed RNA polymerase subunit beta'.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	J	1335	10384	6524	1851	1959	50	0	0

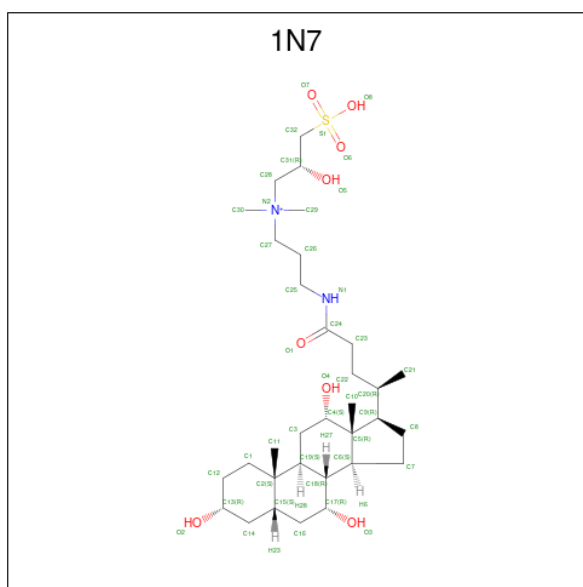
There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
J	1	VAL	-	expression tag	UNP C3SIA2

- Molecule 7 is a protein called DNA-directed RNA polymerase subunit omega.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	K	83	655	399	123	132	1	0	0

- Molecule 8 is CHAPSO (three-letter code: 1N7) (formula: C<sub>32</sub>H<sub>59</sub>N<sub>2</sub>O<sub>8</sub>S).



Mol	Chain	Residues	Atoms		AltConf
8	I	1	Total	C O	0
			27	24 3	
8	I	1	Total	C O	0
			27	24 3	

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

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

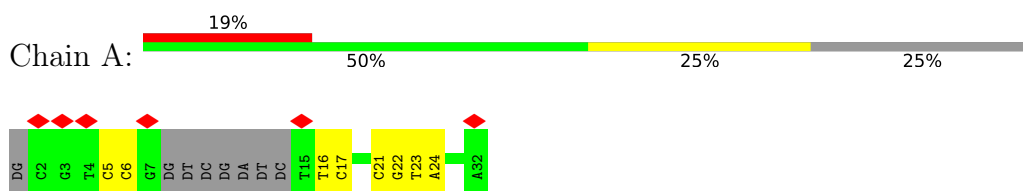
- Molecule 10 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

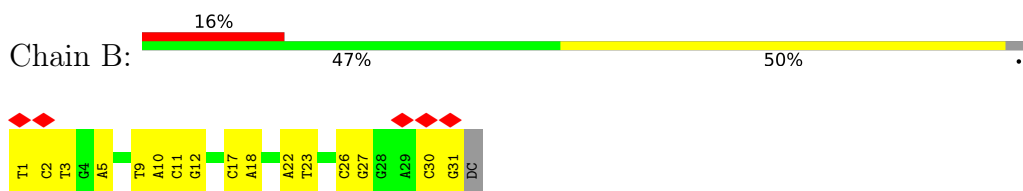
### 3 Residue-property plots [i](#)

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: non-template DNA



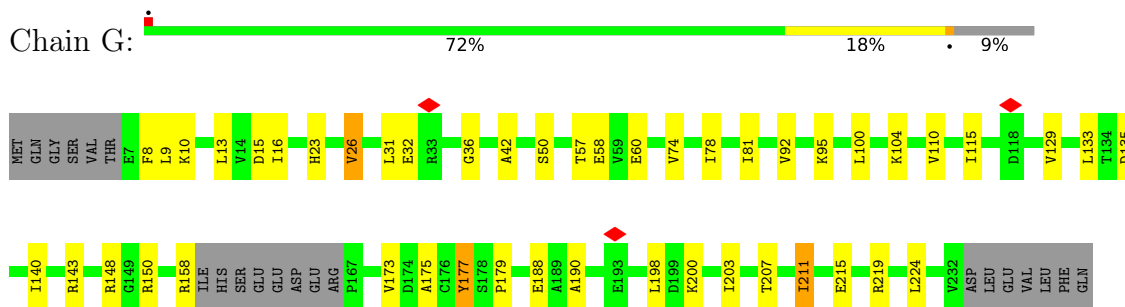
- Molecule 2: template DNA



- Molecule 3: RNA

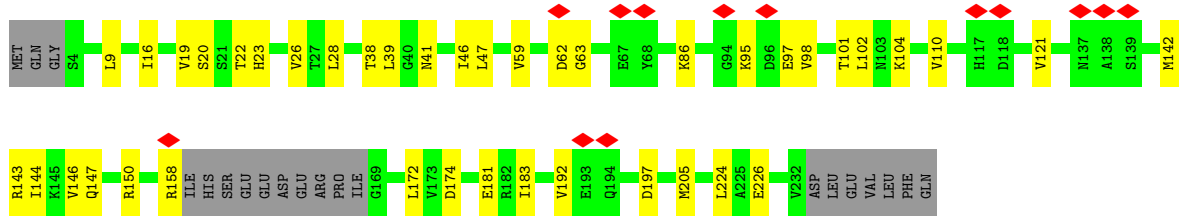


- Molecule 4: DNA-directed RNA polymerase subunit alpha

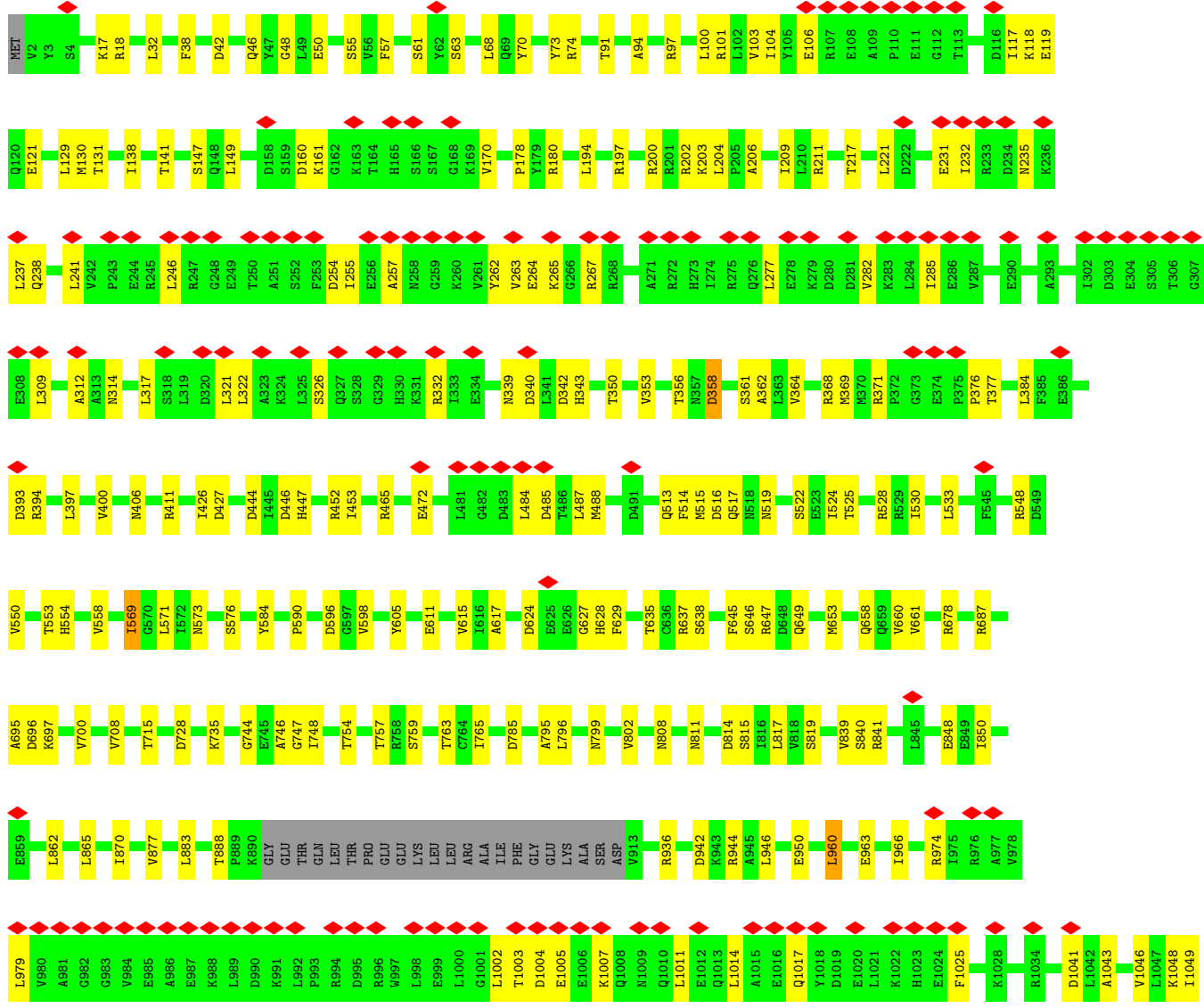
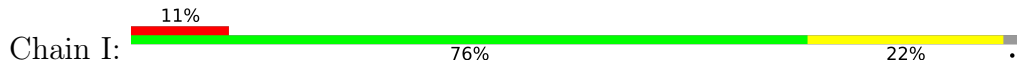


- Molecule 4: DNA-directed RNA polymerase subunit alpha

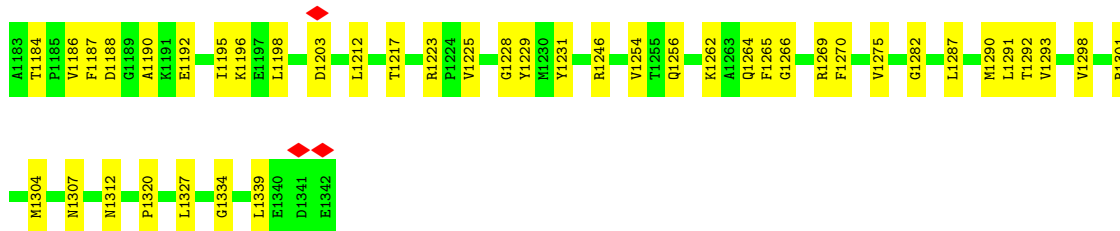




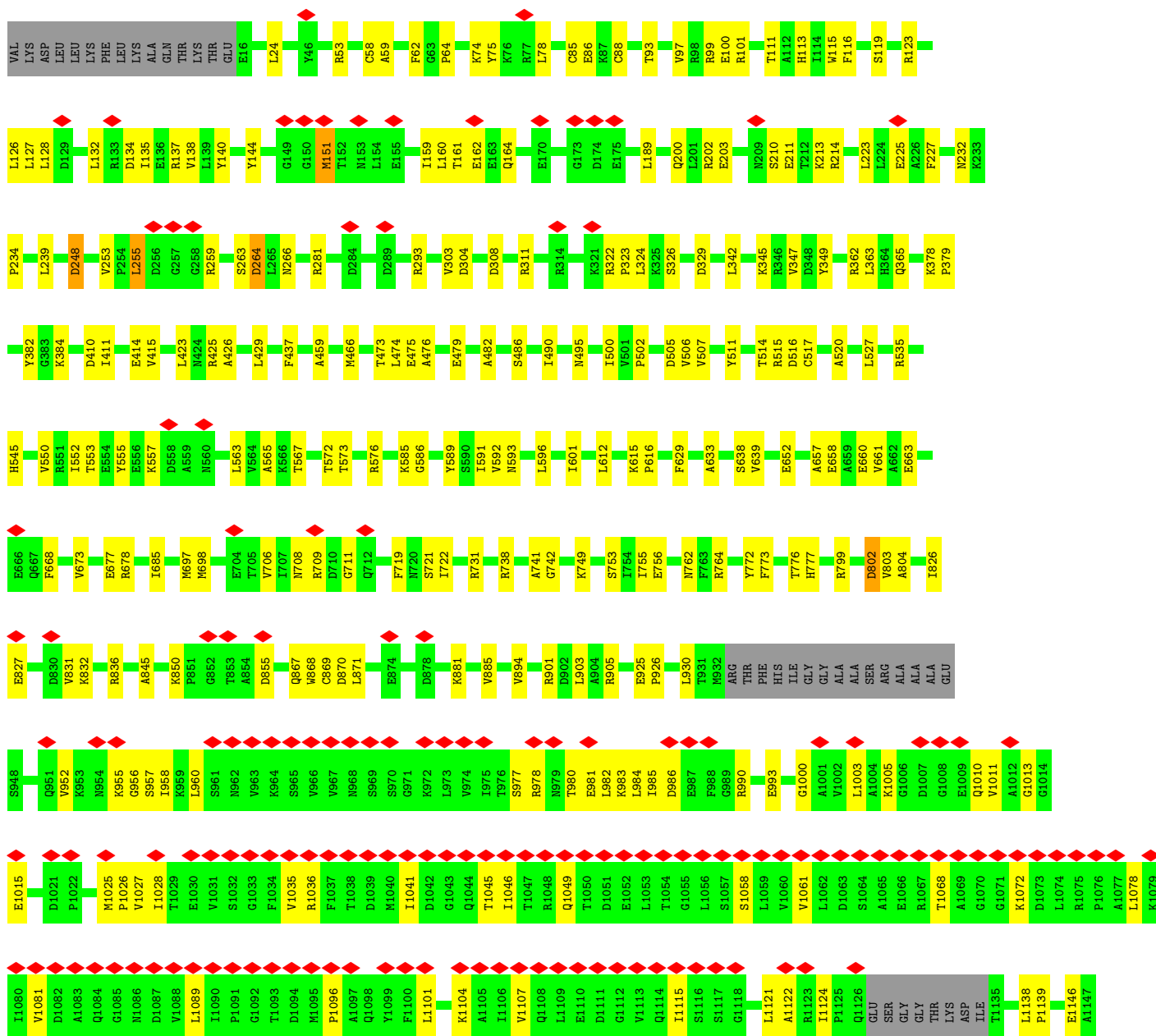
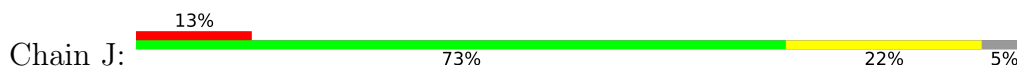
• Molecule 5: DNA-directed RNA polymerase subunit beta

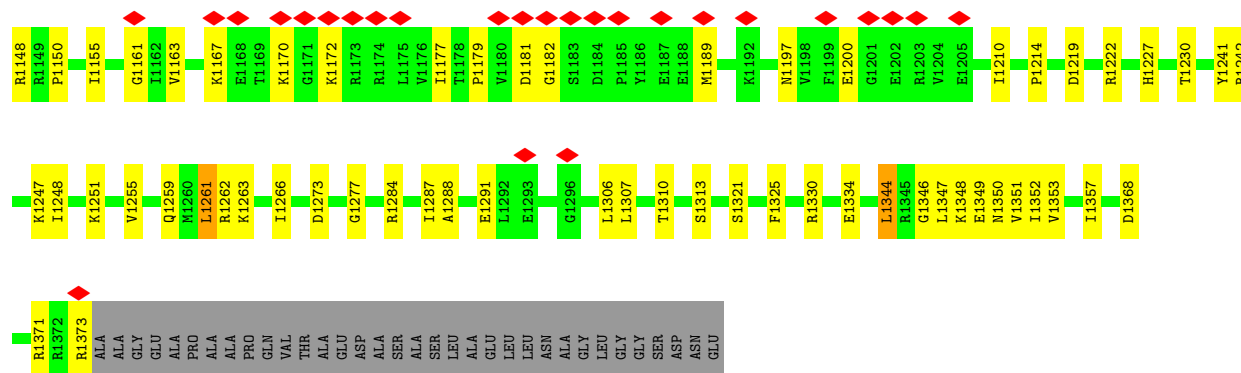




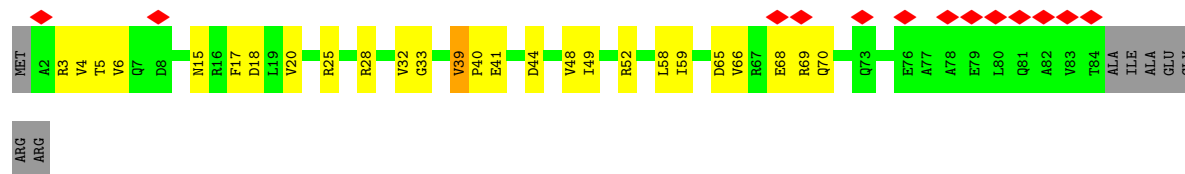


• Molecule 6: DNA-directed RNA polymerase subunit beta'





● Molecule 7: DNA-directed RNA polymerase subunit omega



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	213041	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 ( $e^-/\text{\AA}^2$ )	47.34	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.256	Depositor
Minimum map value	-0.172	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.028	Depositor
Map size ( $\text{\AA}$ )	332.8, 332.8, 332.8	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.3, 1.3, 1.3	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: 1N7, ZN, MG

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.50	0/543	0.88	0/832
2	B	0.57	0/714	0.90	0/1100
3	R	0.41	0/241	0.80	0/374
4	G	0.27	0/1690	0.52	0/2290
4	H	0.26	0/1706	0.52	0/2311
5	I	0.29	0/10573	0.51	0/14265
6	J	0.28	0/10541	0.51	0/14232
7	K	0.24	0/657	0.51	0/886
All	All	0.30	0/26665	0.54	0/36290

There are no bond length outliers.

There are no bond angle outliers.

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	487	0	272	6	0
2	B	637	0	349	15	0
3	R	216	0	107	1	0
4	G	1670	0	1696	24	0
4	H	1687	0	1722	23	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	I	10407	0	10420	184	0
6	J	10384	0	10604	186	0
7	K	655	0	663	20	0
8	I	54	0	75	19	0
9	J	1	0	0	0	0
10	J	2	0	0	0	0
All	All	26200	0	25908	448	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 9.

All (448) 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)
8:I:1402:1N7:C3	8:I:1402:1N7:C19	1.83	1.56
8:I:1401:1N7:C3	8:I:1401:1N7:C19	1.82	1.53
6:J:1025:MET:HB3	6:J:1124:ILE:HB	1.63	0.81
6:J:210:SER:HB2	6:J:213:LYS:HB2	1.65	0.78
5:I:840:SER:HB3	5:I:850:ILE:HD11	1.65	0.77
5:I:966:ILE:HD11	8:I:1402:1N7:H15	1.65	0.77
5:I:57:PHE:HD2	5:I:70:TYR:HB2	1.53	0.73
6:J:1005:LYS:HG2	6:J:1011:VAL:HG11	1.70	0.73
6:J:263:SER:OG	6:J:266:ASN:ND2	2.21	0.73
6:J:1351:VAL:HG23	6:J:1357:ILE:HD11	1.70	0.73
6:J:984:LEU:HB3	6:J:993:GLU:HB2	1.72	0.72
6:J:1035:VAL:HG13	6:J:1078:LEU:HD11	1.72	0.72
8:I:1402:1N7:C3	8:I:1402:1N7:C2	2.67	0.71
8:I:1401:1N7:C3	8:I:1401:1N7:C2	2.65	0.70
6:J:58:CYS:SG	6:J:59:ALA:N	2.64	0.70
5:I:1143:GLU:OE1	5:I:1147:ARG:NH1	2.24	0.69
6:J:557:LYS:HB3	6:J:563:LEU:HD23	1.77	0.66
7:K:3:ARG:HG2	7:K:48:VAL:HG13	1.76	0.66
6:J:952:VAL:HG13	6:J:984:LEU:HD22	1.77	0.66
5:I:197:ARG:HH21	5:I:203:LYS:HB2	1.59	0.66
5:I:1254:VAL:O	6:J:99:ARG:NH2	2.29	0.65
4:G:100:LEU:HD23	4:G:115:ILE:HG21	1.77	0.65
5:I:966:ILE:HG12	8:I:1402:1N7:H25	1.79	0.65
4:G:188:GLU:OE1	4:G:200:LYS:NZ	2.30	0.65
6:J:956:GLY:HA3	6:J:985:ILE:O	1.97	0.65
5:I:528:ARG:NH2	5:I:576:SER:O	2.31	0.64
5:I:1072:ASN:ND2	5:I:1111:GLN:OE1	2.30	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:J:1155:ILE:HG13	6:J:1210:ILE:HB	1.79	0.64
6:J:1346:GLY:O	6:J:1350:ASN:ND2	2.29	0.64
5:I:695:ALA:HB1	5:I:795:ALA:HB3	1.79	0.64
5:I:221:LEU:HD11	5:I:314:ASN:HB2	1.79	0.63
5:I:180:ARG:NH1	5:I:393:ASP:O	2.31	0.63
6:J:1049:GLN:HB2	6:J:1058:SER:HB2	1.80	0.63
6:J:572:THR:HG21	6:J:589:TYR:HE2	1.62	0.63
5:I:232:ILE:HG12	5:I:237:LEU:HG	1.79	0.63
5:I:211:ARG:NH2	5:I:217:THR:OG1	2.31	0.62
5:I:101:ARG:HG2	5:I:119:GLU:HB2	1.81	0.62
5:I:533:LEU:HD21	5:I:571:LEU:HD13	1.81	0.62
6:J:572:THR:HG21	6:J:589:TYR:CE2	2.34	0.62
5:I:870:ILE:HB	5:I:944:ARG:HD3	1.81	0.62
6:J:708:ASN:ND2	6:J:711:GLY:O	2.32	0.62
6:J:144:TYR:OH	6:J:293:ARG:NH2	2.33	0.62
6:J:507:VAL:HG12	6:J:601:ILE:HD12	1.82	0.62
4:H:101:THR:HG22	4:H:143:ARG:HG2	1.81	0.62
4:G:31:LEU:HD13	4:G:36:GLY:HA2	1.82	0.61
5:I:1275:VAL:HG13	5:I:1287:LEU:HD11	1.81	0.61
5:I:611:GLU:OE2	5:I:637:ARG:NH2	2.33	0.61
7:K:32:VAL:HB	7:K:33:GLY:HA2	1.83	0.61
6:J:977:SER:OG	6:J:980:THR:OG1	2.19	0.61
6:J:255:LEU:HD21	6:J:259:ARG:HG3	1.81	0.60
5:I:525:THR:HG21	5:I:687:ARG:HD2	1.82	0.60
5:I:400:VAL:HG11	5:I:452:ARG:HD2	1.82	0.60
6:J:836:ARG:HG3	6:J:869:CYS:HB3	1.83	0.60
6:J:151:MET:SD	6:J:151:MET:N	2.69	0.60
5:I:1142:ARG:NH1	5:I:1161:LEU:O	2.34	0.60
6:J:741:ALA:O	6:J:762:ASN:ND2	2.34	0.60
4:G:215:GLU:OE2	4:G:219:ARG:NH1	2.35	0.59
6:J:502:PRO:HB3	6:J:506:VAL:HB	1.84	0.59
5:I:1142:ARG:NH2	5:I:1166:ASP:OD1	2.35	0.59
6:J:901:ARG:HG2	6:J:903:LEU:H	1.68	0.59
6:J:802:ASP:OD2	6:J:1348:LYS:NZ	2.31	0.59
6:J:1089:LEU:HA	6:J:1096:PRO:HA	1.85	0.59
5:I:358:ASP:OD1	5:I:358:ASP:N	2.33	0.59
8:I:1402:1N7:C3	8:I:1402:1N7:C18	2.70	0.59
6:J:826:ILE:HG12	6:J:831:VAL:HG12	1.85	0.59
6:J:211:GLU:OE1	6:J:214:ARG:NH2	2.36	0.59
6:J:1200:GLU:OE1	6:J:1200:GLU:N	2.36	0.58
6:J:255:LEU:HD11	6:J:259:ARG:HD2	1.86	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:J:926:PRO:HG2	6:J:1248:ILE:HD11	1.84	0.58
5:I:808:ASN:H	6:J:633:ALA:HB2	1.69	0.58
6:J:576:ARG:HD3	6:J:593:ASN:HA	1.86	0.58
5:I:1127:LYS:NZ	5:I:1203:ASP:OD2	2.36	0.58
6:J:342:LEU:HD13	6:J:1352:ILE:HG23	1.86	0.58
5:I:617:ALA:HB3	5:I:653:MET:HG3	1.86	0.57
4:G:26:VAL:HG22	4:G:203:ILE:HB	1.86	0.57
5:I:91:THR:HG23	5:I:138:ILE:HA	1.87	0.57
6:J:349:TYR:HE2	6:J:379:PRO:HG2	1.69	0.57
5:I:197:ARG:HD3	5:I:200:ARG:HA	1.85	0.57
6:J:134:ASP:OD1	6:J:137:ARG:NH1	2.38	0.57
5:I:104:ILE:HD13	5:I:484:LEU:HB3	1.87	0.56
6:J:326:SER:OG	6:J:329:ASP:OD1	2.23	0.56
6:J:981:GLU:HB3	6:J:983:LYS:HE2	1.88	0.56
5:I:1070:HIS:NE2	5:I:1114:GLU:OE1	2.33	0.56
6:J:1161:GLY:HA3	6:J:1179:PRO:HA	1.88	0.56
6:J:1347:LEU:HG	6:J:1357:ILE:HG23	1.85	0.56
6:J:586:GLY:HA3	6:J:612:LEU:HD11	1.87	0.56
6:J:1344:LEU:HD22	6:J:1353:VAL:HG21	1.87	0.56
5:I:1291:LEU:HD12	5:I:1292:THR:HG23	1.88	0.55
4:G:8:PHE:HD1	4:G:32:GLU:HG3	1.71	0.55
4:H:97:GLU:HB3	4:H:147:GLN:HG3	1.86	0.55
5:I:50:GLU:HG2	5:I:73:TYR:HE2	1.72	0.55
5:I:264:GLU:HG2	5:I:267:ARG:HH21	1.71	0.55
5:I:231:GLU:HG2	5:I:332:ARG:HG3	1.88	0.55
5:I:264:GLU:HB2	5:I:267:ARG:HE	1.71	0.55
5:I:516:ASP:OD2	5:I:522:SER:OG	2.22	0.55
6:J:1027:VAL:HB	6:J:1121:LEU:HB2	1.88	0.55
7:K:25:ARG:NH1	7:K:65:ASP:OD1	2.36	0.55
5:I:519:ASN:HD21	5:I:796:LEU:HD22	1.72	0.55
5:I:1290:MET:HG3	6:J:347:VAL:HG11	1.88	0.55
6:J:591:ILE:HG23	6:J:592:VAL:HG13	1.87	0.55
6:J:958:ILE:HG23	6:J:982:LEU:HD11	1.88	0.55
7:K:39:VAL:HG22	7:K:40:PRO:HD2	1.88	0.55
4:H:181:GLU:O	6:J:535:ARG:NH1	2.40	0.55
6:J:111:THR:O	6:J:239:LEU:N	2.38	0.55
5:I:103:VAL:HG12	5:I:117:ILE:HG22	1.89	0.54
6:J:1179:PRO:HB2	6:J:1182:GLY:H	1.72	0.54
6:J:1078:LEU:HD23	6:J:1121:LEU:HD13	1.89	0.54
5:I:1117:LEU:HD21	5:I:1182:ILE:HG21	1.88	0.54
5:I:1192:GLU:OE2	6:J:764:ARG:NH2	2.41	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:J:64:PRO:HG2	6:J:93:THR:H	1.73	0.54
5:I:371:ARG:HH12	5:I:384:LEU:HD13	1.73	0.54
6:J:555:TYR:HD2	6:J:585:LYS:HB3	1.71	0.54
6:J:1321:SER:OG	6:J:1349:GLU:OE2	2.25	0.54
8:I:1401:1N7:C3	8:I:1401:1N7:C18	2.69	0.54
2:B:5:DA:H5'	2:B:5:DA:C8	2.43	0.53
5:I:848:GLU:HG2	5:I:888:THR:HG22	1.90	0.53
2:B:26:DC:H41	6:J:255:LEU:HD13	1.74	0.53
5:I:1117:LEU:HD12	5:I:1195:ILE:HG12	1.90	0.53
7:K:66:VAL:HG22	7:K:69:ARG:HH21	1.73	0.53
6:J:99:ARG:HA	6:J:248:ASP:HB2	1.91	0.53
4:G:13:LEU:HD21	4:G:16:ILE:HD11	1.91	0.52
4:H:183:ILE:HD12	4:H:205:MET:HE2	1.91	0.52
5:I:936:ARG:NH2	5:I:1043:ALA:O	2.42	0.52
6:J:322:ARG:HD3	6:J:323:PRO:HD2	1.90	0.52
6:J:773:PHE:O	6:J:776:THR:OG1	2.21	0.52
5:I:356:THR:HG21	5:I:362:ALA:HB2	1.90	0.52
6:J:1036:ARG:HD3	6:J:1081:VAL:HG11	1.92	0.52
6:J:1026:PRO:HB2	6:J:1028:ILE:HG23	1.91	0.52
7:K:58:LEU:HD12	7:K:59:ILE:HG12	1.92	0.52
3:R:8:G:H2'	3:R:9:C:C6	2.43	0.52
4:G:74:VAL:HG22	4:G:133:LEU:HD23	1.92	0.52
6:J:425:ARG:HD2	6:J:459:ALA:HB2	1.91	0.52
7:K:44:ASP:OD2	7:K:52:ARG:NH1	2.42	0.52
5:I:444:ASP:OD1	5:I:444:ASP:N	2.36	0.52
5:I:485:ASP:OD1	5:I:485:ASP:N	2.40	0.52
5:I:839:VAL:HG12	5:I:1049:ILE:HG12	1.92	0.52
4:G:175:ALA:HB1	4:G:177:TYR:CZ	2.45	0.52
5:I:715:THR:HG22	5:I:785:ASP:HA	1.90	0.52
5:I:1246:ARG:NH1	5:I:1265:PHE:O	2.43	0.52
6:J:1046:ILE:HG22	6:J:1061:VAL:HG22	1.91	0.52
4:G:190:ALA:HB2	4:G:200:LYS:HB2	1.90	0.51
5:I:1291:LEU:O	6:J:345:LYS:NZ	2.36	0.51
1:A:16:DT:H2''	5:I:200:ARG:HD3	1.92	0.51
5:I:1115:THR:HG23	5:I:1228:GLY:HA3	1.92	0.51
5:I:309:LEU:HD21	5:I:312:ALA:HB2	1.92	0.51
6:J:955:LYS:HD3	6:J:1013:GLY:H	1.76	0.51
6:J:1172:LYS:HD2	6:J:1189:MET:HB3	1.93	0.51
5:I:850:ILE:HG13	5:I:1048:LYS:HD2	1.92	0.51
5:I:1014:LEU:O	5:I:1017:GLN:HG2	2.11	0.51
7:K:3:ARG:NH2	7:K:5:THR:O	2.40	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:1212:LEU:HD22	5:I:1225:VAL:HG21	1.92	0.51
8:I:1402:1N7:H4	8:I:1402:1N7:H17	1.91	0.51
6:J:850:LYS:N	6:J:855:ASP:O	2.37	0.51
6:J:1061:VAL:O	6:J:1104:LYS:N	2.44	0.50
6:J:517:CYS:SG	6:J:520:ALA:HB2	2.50	0.50
4:H:47:LEU:HD13	4:H:205:MET:HE1	1.94	0.50
6:J:749:LYS:HZ2	6:J:753:SER:HB2	1.76	0.50
4:H:20:SER:O	4:H:22:THR:N	2.44	0.50
5:I:57:PHE:CD2	5:I:70:TYR:HB2	2.41	0.50
5:I:883:LEU:HD11	5:I:1054:LEU:HD11	1.92	0.50
4:G:104:LYS:HG2	4:G:110:VAL:HG22	1.94	0.50
6:J:123:ARG:HH11	6:J:223:LEU:HD13	1.77	0.50
6:J:308:ASP:OD2	6:J:311:ARG:NE	2.38	0.50
6:J:1368:ASP:HA	6:J:1371:ARG:HH11	1.77	0.50
4:G:42:ALA:HB1	4:G:224:LEU:HD11	1.93	0.49
4:H:86:LYS:HE2	4:H:174:ASP:HB2	1.93	0.49
6:J:135:ILE:HA	6:J:138:VAL:HG12	1.94	0.49
5:I:759:SER:OG	5:I:763:THR:OG1	2.28	0.49
6:J:772:TYR:O	6:J:776:THR:HG23	2.12	0.49
5:I:17:LYS:N	5:I:1188:ASP:OD1	2.45	0.49
6:J:957:SER:HA	6:J:1010:GLN:HA	1.94	0.49
5:I:453:ILE:HD12	5:I:530:ILE:HD12	1.94	0.49
6:J:1035:VAL:HG23	6:J:1115:ILE:HG12	1.94	0.49
5:I:161:LYS:HA	5:I:170:VAL:HG12	1.95	0.49
6:J:1330:ARG:O	6:J:1334:GLU:HG2	2.12	0.49
2:B:23:DT:H5''	5:I:141:THR:HG21	1.95	0.48
6:J:978:ARG:HD2	6:J:1197:ASN:HD21	1.78	0.48
4:G:158:ARG:NH2	4:G:173:VAL:O	2.42	0.48
5:I:811:ASN:HA	5:I:815:SER:HB2	1.95	0.48
6:J:53:ARG:NH1	6:J:88:CYS:O	2.37	0.48
4:H:16:ILE:HG12	4:H:26:VAL:HG13	1.96	0.48
5:I:942:ASP:OD1	5:I:942:ASP:N	2.46	0.48
5:I:400:VAL:HG22	5:I:584:TYR:HB3	1.95	0.48
6:J:1150:PRO:HG3	6:J:1214:PRO:HB2	1.95	0.48
5:I:141:THR:HB	5:I:514:PHE:HE1	1.77	0.48
5:I:178:PRO:HA	5:I:397:LEU:HD23	1.96	0.48
5:I:877:VAL:HG21	5:I:883:LEU:HD21	1.94	0.48
2:B:18:DA:H1'	6:J:426:ALA:HB1	1.96	0.48
8:I:1402:1N7:H14	8:I:1402:1N7:H29	1.74	0.48
5:I:91:THR:OG1	5:I:138:ILE:O	2.26	0.48
6:J:799:ARG:HG2	6:J:1325:PHE:HZ	1.78	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:J:1167:LYS:HD3	6:J:1170:LYS:HB2	1.96	0.47
5:I:255:ILE:HB	5:I:263:VAL:HB	1.95	0.47
5:I:1192:GLU:O	5:I:1196:LYS:HG2	2.15	0.47
6:J:1288:ALA:O	6:J:1291:GLU:HG3	2.14	0.47
4:G:92:VAL:O	4:G:148:ARG:NH2	2.48	0.47
5:I:61:SER:OG	5:I:63:SER:O	2.28	0.47
6:J:264:ASP:OD1	6:J:264:ASP:N	2.40	0.47
5:I:241:LEU:HD13	5:I:285:ILE:HG12	1.96	0.47
6:J:127:LEU:HD21	6:J:234:PRO:HB3	1.96	0.47
4:G:110:VAL:HG11	4:G:140:ILE:HD11	1.95	0.47
5:I:1103:VAL:HG22	5:I:1111:GLN:HE21	1.79	0.47
5:I:1184:THR:HG23	5:I:1190:ALA:H	1.79	0.47
6:J:384:LYS:NZ	6:J:414:GLU:OE2	2.46	0.47
1:A:23:DT:H2''	1:A:24:DA:C8	2.49	0.47
6:J:749:LYS:NZ	6:J:753:SER:HB2	2.29	0.47
5:I:638:SER:HB2	5:I:645:PHE:CZ	2.51	0.46
6:J:1251:LYS:O	6:J:1255:VAL:HG12	2.15	0.46
6:J:474:LEU:HB2	7:K:28:ARG:HH21	1.79	0.46
6:J:1284:ARG:O	6:J:1287:ILE:HG13	2.16	0.46
1:A:5:DC:H2''	1:A:6:DC:C5	2.50	0.46
4:G:57:THR:HG22	4:G:58:GLU:HG3	1.97	0.46
5:I:524:ILE:HG21	5:I:708:VAL:HG13	1.96	0.46
5:I:646:SER:HB3	5:I:649:GLN:HG3	1.97	0.46
5:I:55:SER:OG	5:I:465:ARG:NH1	2.48	0.46
5:I:149:LEU:HD12	5:I:452:ARG:O	2.15	0.46
5:I:317:LEU:HA	5:I:321:LEU:HD12	1.97	0.46
6:J:473:THR:HG23	6:J:476:ALA:H	1.78	0.46
6:J:1041:ILE:O	6:J:1045:THR:OG1	2.25	0.46
4:G:10:LYS:HE3	4:H:226:GLU:HB3	1.98	0.46
6:J:495:ASN:ND2	6:J:1247:LYS:O	2.46	0.46
5:I:1327:LEU:HD21	5:I:1339:LEU:HD13	1.97	0.46
2:B:1:DT:H2''	2:B:2:DC:C5	2.51	0.46
6:J:527:LEU:HB2	6:J:550:VAL:HG12	1.98	0.46
4:G:9:LEU:HD12	4:G:198:LEU:HD21	1.96	0.46
6:J:62:PHE:O	6:J:101:ARG:HD2	2.16	0.46
6:J:128:LEU:HD21	6:J:189:LEU:HD12	1.97	0.46
4:G:50:SER:HB3	4:G:150:ARG:HD2	1.98	0.46
5:I:202:ARG:HH12	5:I:369:MET:HA	1.80	0.46
5:I:1223:ARG:NH2	6:J:721:SER:OG	2.47	0.46
5:I:1111:GLN:HG3	5:I:1112:ILE:HD12	1.97	0.45
5:I:1282:GLY:HA3	7:K:17:PHE:CE1	2.52	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:J:24:LEU:HD12	6:J:232:ASN:HB3	1.99	0.45
6:J:97:VAL:HA	6:J:100:GLU:HG2	1.98	0.45
6:J:134:ASP:HB3	6:J:159:ILE:HG21	1.99	0.45
6:J:475:GLU:OE1	7:K:28:ARG:NH2	2.38	0.45
4:G:179:PRO:HG3	4:G:211:ILE:HG13	1.97	0.45
5:I:447:HIS:CD2	5:I:553:THR:HG21	2.51	0.45
8:I:1402:1N7:C3	8:I:1402:1N7:H1	2.46	0.45
2:B:17:DC:H2'	2:B:18:DA:C8	2.51	0.45
2:B:18:DA:OP1	5:I:1269:ARG:NE	2.35	0.45
2:B:22:DA:H2'	2:B:23:DT:C6	2.51	0.45
5:I:358:ASP:O	5:I:361:SER:OG	2.34	0.45
8:I:1401:1N7:C3	8:I:1401:1N7:C1	2.94	0.45
6:J:1266:ILE:O	6:J:1277:GLY:HA2	2.17	0.45
5:I:841:ARG:HA	5:I:1046:VAL:HA	1.99	0.45
6:J:678:ARG:NH2	6:J:756:GLU:OE2	2.50	0.45
5:I:1103:VAL:HG22	5:I:1111:GLN:NE2	2.32	0.45
5:I:1225:VAL:HA	6:J:638:SER:HB2	1.97	0.45
8:I:1402:1N7:H34	8:I:1402:1N7:H10	1.44	0.45
6:J:423:LEU:HD12	6:J:437:PHE:CD2	2.51	0.45
6:J:832:LYS:HE2	6:J:1242:ARG:HE	1.80	0.45
6:J:1181:ASP:OD1	6:J:1181:ASP:N	2.47	0.45
1:A:21:DC:H2''	1:A:22:DG:C8	2.51	0.45
4:H:62:ASP:OD1	4:H:63:GLY:N	2.50	0.45
5:I:802:VAL:HG23	5:I:1096:ILE:HG22	1.98	0.45
5:I:1287:LEU:HD21	6:J:1351:VAL:HG22	1.99	0.45
6:J:482:ALA:HA	7:K:6:VAL:HG21	1.98	0.45
6:J:550:VAL:HG23	6:J:552:ILE:HG12	1.97	0.45
6:J:960:LEU:HD21	6:J:1003:LEU:HD11	1.98	0.45
6:J:978:ARG:HD2	6:J:1197:ASN:ND2	2.32	0.45
4:H:59:VAL:HB	4:H:144:ILE:HG22	2.00	0.44
5:I:94:ALA:HB2	5:I:129:LEU:HD11	1.99	0.44
5:I:257:ALA:HB3	5:I:262:TYR:HE2	1.82	0.44
5:I:746:ALA:HA	5:I:747:GLY:HA3	1.55	0.44
5:I:1082:ILE:HD11	5:I:1093:PRO:HG2	1.99	0.44
6:J:516:ASP:HB3	6:J:573:THR:HG21	1.98	0.44
6:J:668:PHE:CG	6:J:678:ARG:HD3	2.53	0.44
6:J:673:VAL:HB	6:J:677:GLU:HG3	1.98	0.44
6:J:423:LEU:HD22	6:J:466:MET:HE1	1.99	0.44
7:K:4:VAL:HG12	7:K:5:THR:HG23	1.99	0.44
4:H:102:LEU:HB3	4:H:142:MET:HG2	1.99	0.44
5:I:74:ARG:NH2	5:I:97:ARG:HD2	2.33	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:411:ARG:NH2	5:I:427:ASP:OD2	2.50	0.44
6:J:113:HIS:CE1	6:J:115:TRP:HB2	2.52	0.44
6:J:1259:GLN:O	6:J:1262:ARG:NH1	2.51	0.44
4:H:41:ASN:ND2	5:I:1217:THR:O	2.50	0.44
6:J:140:TYR:OH	6:J:304:ASP:OD2	2.24	0.44
2:B:17:DC:H2'	2:B:18:DA:H8	1.83	0.44
6:J:827:GLU:HB2	6:J:832:LYS:HD2	1.99	0.44
2:B:11:DC:H2''	2:B:12:DG:C8	2.53	0.44
5:I:118:LYS:HD3	5:I:488:MET:HA	1.99	0.44
5:I:960:LEU:O	5:I:963:GLU:HG3	2.17	0.44
5:I:1264:GLN:O	5:I:1266:GLY:N	2.51	0.44
5:I:946:LEU:O	5:I:950:GLU:HG2	2.17	0.44
5:I:1172:LEU:O	5:I:1176:LEU:HG	2.17	0.44
6:J:803:VAL:HA	6:J:1313:SER:HB3	1.98	0.44
2:B:26:DC:H4'	2:B:27:DG:OP2	2.18	0.44
5:I:106:GLU:OE1	5:I:106:GLU:N	2.47	0.44
5:I:364:VAL:HG23	5:I:376:PRO:HB2	1.99	0.44
5:I:1270:PHE:CD2	5:I:1290:MET:HG2	2.53	0.44
8:I:1401:1N7:C3	8:I:1401:1N7:H1	2.47	0.44
6:J:161:THR:OG1	6:J:162:GLU:N	2.51	0.44
6:J:615:LYS:HB2	6:J:616:PRO:HD3	1.99	0.44
6:J:661:VAL:HG12	6:J:685:ILE:HD11	1.99	0.44
6:J:885:VAL:HG13	6:J:894:VAL:HG21	1.99	0.44
5:I:1105:SER:OG	6:J:731:ARG:NH2	2.51	0.44
6:J:1273:ASP:OD1	6:J:1273:ASP:N	2.51	0.44
5:I:979:LEU:HD11	5:I:1011:LEU:HD21	2.00	0.43
6:J:697:MET:HG3	6:J:698:MET:N	2.33	0.43
5:I:339:ASN:OD1	5:I:340:ASP:N	2.51	0.43
5:I:548:ARG:HD2	5:I:569:ILE:O	2.18	0.43
5:I:1066:MET:SD	5:I:1076:ILE:HD11	2.58	0.43
6:J:657:ALA:O	6:J:661:VAL:HG13	2.18	0.43
5:I:235:ASN:O	5:I:238:GLN:NE2	2.51	0.43
5:I:339:ASN:HD22	5:I:342:ASP:HB2	1.84	0.43
5:I:735:LYS:HA	5:I:748:ILE:HG22	2.00	0.43
4:H:59:VAL:HG21	4:H:142:MET:HE2	2.00	0.43
5:I:254:ASP:HB2	5:I:265:LYS:HE3	2.01	0.43
2:B:2:DC:H2''	2:B:3:DT:H5'	2.00	0.43
5:I:624:ASP:OD2	5:I:628:HIS:HB2	2.19	0.43
5:I:1005:GLU:HG2	5:I:1007:LYS:H	1.83	0.43
8:I:1402:1N7:H13	8:I:1402:1N7:H27	1.85	0.43
6:J:115:TRP:O	6:J:119:SER:OG	2.22	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:J:868:TRP:CE3	6:J:871:LEU:HD21	2.54	0.43
6:J:1078:LEU:HB2	6:J:1101:LEU:HD11	2.01	0.43
6:J:1146:GLU:OE2	6:J:1310:THR:HG22	2.18	0.43
6:J:202:ARG:NH1	6:J:225:GLU:OE2	2.47	0.43
6:J:867:GLN:HA	6:J:870:ASP:OD2	2.19	0.43
6:J:1227:HIS:HA	6:J:1230:THR:HG22	1.99	0.43
5:I:339:ASN:HB3	5:I:343:HIS:H	1.84	0.43
5:I:819:SER:HB3	5:I:1085:MET:SD	2.58	0.43
5:I:1072:ASN:OD1	5:I:1072:ASN:N	2.49	0.43
6:J:200:GLN:O	6:J:203:GLU:HG3	2.18	0.43
2:B:26:DC:N4	6:J:255:LEU:HD13	2.32	0.43
4:H:98:VAL:HG11	4:H:121:VAL:HG21	2.01	0.43
5:I:277:LEU:HD23	5:I:282:VAL:HG21	2.01	0.43
5:I:598:VAL:HA	5:I:627:GLY:O	2.19	0.43
5:I:1003:THR:OG1	5:I:1005:GLU:OE1	2.30	0.43
6:J:113:HIS:HB3	6:J:116:PHE:HD2	1.83	0.43
2:B:30:DC:H2''	2:B:31:DG:H8	1.84	0.43
6:J:804:ALA:HB2	6:J:1259:GLN:HG3	2.00	0.43
4:H:39:LEU:HD23	4:H:39:LEU:HA	1.86	0.42
5:I:97:ARG:HB3	5:I:121:GLU:HG2	2.00	0.42
6:J:1107:VAL:HG22	6:J:1122:ALA:HB2	2.00	0.42
5:I:42:ASP:OD2	5:I:46:GLN:N	2.52	0.42
5:I:147:SER:HB2	5:I:530:ILE:HD13	2.00	0.42
5:I:658:GLN:HG2	5:I:1186:VAL:HG12	2.01	0.42
5:I:796:LEU:N	5:I:1231:TYR:OH	2.52	0.42
6:J:479:GLU:HG3	7:K:20:VAL:HG11	2.01	0.42
6:J:742:GLY:O	6:J:762:ASN:HB3	2.18	0.42
4:H:95:LYS:HE2	4:H:98:VAL:HB	2.00	0.42
5:I:241:LEU:HD11	5:I:246:LEU:HD21	2.01	0.42
5:I:426:ILE:HD13	5:I:426:ILE:HA	1.87	0.42
5:I:558:VAL:HG13	5:I:573:ASN:HB3	2.01	0.42
5:I:1256:GLN:O	5:I:1301:ARG:NH1	2.46	0.42
5:I:1334:GLY:H	6:J:113:HIS:HE2	1.67	0.42
6:J:925:GLU:HB3	6:J:926:PRO:HD3	2.01	0.42
6:J:930:LEU:HD11	6:J:1241:TYR:CE1	2.55	0.42
1:A:21:DC:H4'	6:J:1148:ARG:NH2	2.35	0.42
5:I:519:ASN:ND2	5:I:796:LEU:HD22	2.34	0.42
6:J:804:ALA:HA	6:J:1259:GLN:HE21	1.85	0.42
6:J:1261:LEU:HD23	6:J:1306:LEU:HD13	2.01	0.42
7:K:41:GLU:HG3	7:K:49:ILE:HD11	2.00	0.42
7:K:66:VAL:O	7:K:70:GLN:HG2	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:G:60:GLU:HG2	4:G:143:ARG:HH21	1.84	0.42
4:H:46:ILE:HD11	4:H:224:LEU:HD13	2.01	0.42
5:I:206:ALA:O	5:I:209:ILE:HG22	2.19	0.42
5:I:1151:LEU:HD22	5:I:1198:LEU:HD13	2.02	0.42
8:I:1401:1N7:C19	8:I:1401:1N7:C4	2.86	0.42
6:J:160:LEU:HD22	6:J:164:GLN:HB3	2.01	0.42
6:J:362:ARG:H	6:J:365:GLN:HE21	1.68	0.42
6:J:411:ILE:O	6:J:415:VAL:HG13	2.20	0.42
6:J:1000:GLY:HA2	6:J:1028:ILE:HD13	2.01	0.42
7:K:15:ASN:HD22	7:K:18:ASP:CG	2.23	0.42
5:I:350:THR:HA	5:I:353:VAL:HG12	2.01	0.42
5:I:550:VAL:HB	6:J:777:HIS:ND1	2.35	0.42
5:I:744:GLY:O	5:I:974:ARG:NH1	2.53	0.42
6:J:85:CYS:SG	6:J:86:GLU:N	2.93	0.42
6:J:639:VAL:HG23	6:J:722:ILE:HD11	2.02	0.42
4:H:150:ARG:HD3	4:H:150:ARG:HA	1.89	0.42
4:H:197:ASP:OD1	4:H:197:ASP:N	2.48	0.42
5:I:68:LEU:HD11	5:I:100:LEU:HB3	2.02	0.42
5:I:1292:THR:HG22	5:I:1320:PRO:HG3	2.02	0.42
8:I:1401:1N7:H30	8:I:1401:1N7:H36	1.61	0.42
5:I:1282:GLY:HA3	7:K:17:PHE:HE1	1.85	0.41
5:I:1298:VAL:HG12	5:I:1301:ARG:NH2	2.35	0.41
6:J:1263:LYS:HB2	6:J:1307:LEU:HD11	2.02	0.41
4:G:78:ILE:HD13	4:G:81:ILE:HD12	2.02	0.41
4:G:135:ASP:OD1	4:G:135:ASP:N	2.46	0.41
5:I:596:ASP:OD1	5:I:596:ASP:N	2.47	0.41
5:I:817:LEU:HB3	5:I:1097:VAL:HB	2.02	0.41
5:I:1287:LEU:O	5:I:1291:LEU:HG	2.20	0.41
6:J:1219:ASP:HA	6:J:1222:ARG:HG2	2.01	0.41
5:I:241:LEU:HD11	5:I:246:LEU:HD11	2.02	0.41
5:I:678:ARG:HD3	5:I:678:ARG:HA	1.75	0.41
5:I:1262:LYS:HE3	5:I:1262:LYS:HB2	1.87	0.41
6:J:1027:VAL:HG21	6:J:1122:ALA:HB3	2.03	0.41
5:I:194:LEU:HD12	5:I:194:LEU:HA	1.93	0.41
5:I:204:LEU:HD22	5:I:369:MET:SD	2.61	0.41
5:I:361:SER:HA	5:I:364:VAL:HG12	2.02	0.41
5:I:1307:ASN:HB3	5:I:1312:ASN:O	2.21	0.41
6:J:572:THR:HG22	6:J:593:ASN:OD1	2.20	0.41
7:K:25:ARG:NH2	7:K:68:GLU:HG3	2.35	0.41
5:I:32:LEU:HD23	5:I:130:MET:SD	2.61	0.41
5:I:38:PHE:HA	5:I:48:GLY:HA2	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:322:LEU:O	5:I:326:SER:OG	2.28	0.41
5:I:1186:VAL:HG13	5:I:1187:PHE:CD2	2.56	0.41
6:J:749:LYS:HG3	6:J:755:ILE:HG12	2.02	0.41
5:I:515:MET:HE2	5:I:517:GLN:HB2	2.03	0.41
5:I:785:ASP:OD1	5:I:785:ASP:N	2.53	0.41
6:J:74:LYS:HD2	6:J:75:TYR:CZ	2.56	0.41
6:J:111:THR:HG21	6:J:303:VAL:HB	2.02	0.41
2:B:9:DT:H2''	2:B:10:DA:C8	2.55	0.41
5:I:406:ASN:HB3	5:I:411:ARG:HB2	2.02	0.41
5:I:590:PRO:HG3	5:I:605:TYR:CE1	2.55	0.41
5:I:629:PHE:HB2	5:I:647:ARG:HG3	2.03	0.41
5:I:660:VAL:HG13	5:I:661:VAL:HG13	2.02	0.41
6:J:514:THR:OG1	6:J:596:LEU:HB2	2.20	0.41
6:J:516:ASP:N	6:J:516:ASP:OD1	2.54	0.41
6:J:986:ASP:OD2	6:J:990:ARG:NE	2.50	0.41
4:H:158:ARG:HH11	4:H:172:LEU:HD11	1.85	0.41
5:I:700:VAL:HG13	5:I:1117:LEU:HD22	2.03	0.41
5:I:862:LEU:HA	5:I:865:LEU:HD13	2.03	0.41
8:I:1402:1N7:C3	8:I:1402:1N7:C1	2.99	0.41
6:J:378:LYS:NZ	6:J:382:TYR:OH	2.30	0.41
6:J:410:ASP:OD1	6:J:410:ASP:N	2.54	0.41
6:J:697:MET:SD	6:J:738:ARG:HA	2.61	0.41
6:J:1138:LEU:HB3	6:J:1139:PRO:HD3	2.01	0.41
7:K:25:ARG:HH21	7:K:68:GLU:HG3	1.85	0.41
4:G:15:ASP:OD1	4:G:16:ILE:N	2.54	0.41
4:H:9:LEU:HA	4:H:9:LEU:HD23	1.83	0.41
6:J:363:LEU:O	6:J:486:SER:OG	2.33	0.41
6:J:511:TYR:OH	6:J:515:ARG:NH1	2.54	0.41
6:J:1163:VAL:HG23	6:J:1177:ILE:HG12	2.02	0.41
1:A:16:DT:H2'	1:A:17:DC:H6	1.86	0.40
4:H:104:LYS:HD3	4:H:110:VAL:HG22	2.02	0.40
5:I:814:ASP:CG	5:I:1106:ARG:HH12	2.24	0.40
5:I:1004:ASP:OD1	5:I:1004:ASP:N	2.46	0.40
6:J:490:ILE:HD12	6:J:500:ILE:HD13	2.02	0.40
6:J:505:ASP:HB2	6:J:629:PHE:HE1	1.85	0.40
6:J:555:TYR:HD1	6:J:565:ALA:HA	1.86	0.40
6:J:845:ALA:HB3	6:J:881:LYS:HG2	2.03	0.40
5:I:160:ASP:N	5:I:160:ASP:OD1	2.54	0.40
5:I:1085:MET:HA	5:I:1085:MET:HE2	2.03	0.40
6:J:591:ILE:HD12	6:J:591:ILE:HA	1.96	0.40
5:I:757:THR:HG23	5:I:765:ILE:HB	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:1119:MET:HB2	5:I:1228:GLY:HA2	2.03	0.40
6:J:144:TYR:HB2	6:J:160:LEU:HB2	2.03	0.40
6:J:658:GLU:HA	6:J:661:VAL:HG22	2.04	0.40
5:I:364:VAL:O	5:I:368:ARG:HG3	2.21	0.40
5:I:759:SER:HG	5:I:763:THR:HG1	1.66	0.40
5:I:966:ILE:HD11	8:I:1402:1N7:H27	2.02	0.40
5:I:1293:VAL:HG11	5:I:1304:MET:HG2	2.03	0.40
5:I:1073:LYS:HE3	5:I:1073:LYS:HB2	1.87	0.40
5:I:1122:LYS:HG2	5:I:1229:TYR:CZ	2.57	0.40
6:J:517:CYS:HB3	6:J:719:PHE:CZ	2.56	0.40
6:J:660:GLU:O	6:J:663:GLU:HG2	2.21	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	
4	G	214/239 (90%)	205 (96%)	9 (4%)	0	100	100
4	H	215/239 (90%)	204 (95%)	11 (5%)	0	100	100
5	I	1315/1342 (98%)	1239 (94%)	76 (6%)	0	100	100
6	J	1329/1407 (94%)	1253 (94%)	76 (6%)	0	100	100
7	K	81/91 (89%)	74 (91%)	7 (9%)	0	100	100
All	All	3154/3318 (95%)	2975 (94%)	179 (6%)	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	
4	G	183/206 (89%)	176 (96%)	7 (4%)	33	67
4	H	187/206 (91%)	181 (97%)	6 (3%)	39	71
5	I	1138/1157 (98%)	1111 (98%)	27 (2%)	49	77
6	J	1120/1168 (96%)	1094 (98%)	26 (2%)	50	78
7	K	70/75 (93%)	69 (99%)	1 (1%)	67	86
All	All	2698/2812 (96%)	2631 (98%)	67 (2%)	50	77

All (67) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	G	23	HIS
4	G	26	VAL
4	G	95	LYS
4	G	129	VAL
4	G	177	TYR
4	G	207	THR
4	G	211	ILE
4	H	19	VAL
4	H	23	HIS
4	H	28	LEU
4	H	38	THR
4	H	146	VAL
4	H	192	VAL
5	I	18	ARG
5	I	131	THR
5	I	358	ASP
5	I	377	THR
5	I	394	ARG
5	I	446	ASP
5	I	472	GLU
5	I	487	LEU
5	I	513	GLN
5	I	554	HIS
5	I	569	ILE
5	I	615	VAL
5	I	635	THR
5	I	696	ASP

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
5	I	697	LYS
5	I	728	ASP
5	I	754	THR
5	I	799	ASN
5	I	960	LEU
5	I	1002	LEU
5	I	1025	PHE
5	I	1041	ASP
5	I	1060	ILE
5	I	1096	ILE
5	I	1113	LEU
5	I	1134	GLN
5	I	1172	LEU
6	J	78	LEU
6	J	126	LEU
6	J	132	LEU
6	J	151	MET
6	J	227	PHE
6	J	248	ASP
6	J	253	VAL
6	J	255	LEU
6	J	264	ASP
6	J	281	ARG
6	J	324	LEU
6	J	429	LEU
6	J	545	HIS
6	J	553	THR
6	J	567	THR
6	J	652	GLU
6	J	706	VAL
6	J	709	ARG
6	J	802	ASP
6	J	905	ARG
6	J	1015	GLU
6	J	1068	THR
6	J	1072	LYS
6	J	1261	LEU
6	J	1344	LEU
6	J	1373	ARG
7	K	39	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
3	R	9/16 (56%)	1 (11%)	0

All (1) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
3	R	8	G

There are no RNA pucker outliers to report.

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

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

### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

Of 5 ligands modelled in this entry, 3 are monoatomic - leaving 2 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
8	1N7	I	1402	-	30,30,46	5.15	17 (56%)	47,48,72	2.41	15 (31%)
8	1N7	I	1401	-	30,30,46	5.04	16 (53%)	47,48,72	2.27	12 (25%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	1N7	I	1402	-	-	4/7/72/92	0/4/4/4
8	1N7	I	1401	-	-	6/7/72/92	0/4/4/4

All (33) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	I	1402	1N7	C3-C19	17.84	1.83	1.53
8	I	1401	1N7	C3-C19	17.35	1.82	1.53
8	I	1402	1N7	C3-C4	12.37	1.74	1.53
8	I	1401	1N7	C3-C4	11.69	1.73	1.53
8	I	1401	1N7	C5-C4	-9.27	1.40	1.54
8	I	1402	1N7	C5-C4	-9.20	1.40	1.54
8	I	1401	1N7	C2-C19	-8.62	1.40	1.56
8	I	1402	1N7	C2-C19	-8.30	1.40	1.56
8	I	1401	1N7	C8-C7	6.21	1.71	1.54
8	I	1402	1N7	C8-C7	6.14	1.70	1.54
8	I	1401	1N7	C5-C6	-4.67	1.47	1.55
8	I	1402	1N7	C5-C6	-4.54	1.47	1.55
8	I	1402	1N7	C18-C6	-4.35	1.45	1.53
8	I	1401	1N7	C18-C6	-4.24	1.45	1.53
8	I	1401	1N7	O4-C4	-4.09	1.36	1.43
8	I	1402	1N7	O4-C4	-3.93	1.37	1.43
8	I	1402	1N7	C2-C15	3.57	1.61	1.55
8	I	1401	1N7	C7-C6	3.25	1.61	1.54
8	I	1402	1N7	C7-C6	3.14	1.60	1.54
8	I	1402	1N7	C14-C15	-3.01	1.49	1.53
8	I	1401	1N7	C14-C15	-3.00	1.49	1.53
8	I	1402	1N7	C5-C9	2.99	1.60	1.55
8	I	1401	1N7	C2-C15	2.73	1.59	1.55
8	I	1401	1N7	C5-C9	2.60	1.60	1.55
8	I	1401	1N7	C20-C9	-2.34	1.50	1.54
8	I	1402	1N7	C16-C15	2.27	1.57	1.53
8	I	1401	1N7	O2-C13	-2.26	1.36	1.43
8	I	1402	1N7	C20-C9	-2.21	1.50	1.54
8	I	1402	1N7	O2-C13	-2.21	1.36	1.43
8	I	1401	1N7	C14-C13	2.21	1.56	1.51
8	I	1402	1N7	C14-C13	2.06	1.55	1.51
8	I	1402	1N7	C1-C2	2.03	1.57	1.54
8	I	1401	1N7	C16-C15	2.01	1.57	1.53

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	I	1402	1N7	C9-C5-C4	-8.47	109.93	117.67
8	I	1401	1N7	C9-C5-C4	-7.49	110.83	117.67
8	I	1402	1N7	C9-C5-C6	5.65	105.79	100.09
8	I	1402	1N7	C5-C9-C20	-5.63	112.78	119.50
8	I	1401	1N7	C7-C6-C18	-5.29	110.94	118.33
8	I	1401	1N7	C6-C5-C4	5.15	112.19	107.40
8	I	1401	1N7	C19-C3-C4	-5.06	107.62	114.30
8	I	1401	1N7	C5-C9-C20	-4.90	113.65	119.50
8	I	1402	1N7	C7-C6-C18	-4.70	111.76	118.33
8	I	1402	1N7	C8-C9-C5	4.14	107.61	103.55
8	I	1401	1N7	C3-C19-C2	-3.56	110.06	113.73
8	I	1402	1N7	C6-C5-C4	3.24	110.42	107.40
8	I	1402	1N7	C3-C19-C2	-3.22	110.40	113.73
8	I	1401	1N7	C9-C5-C6	3.19	103.31	100.09
8	I	1402	1N7	C8-C7-C6	-2.91	99.37	105.13
8	I	1401	1N7	C16-C15-C2	-2.80	109.68	112.66
8	I	1401	1N7	C21-C20-C9	-2.79	108.65	112.92
8	I	1402	1N7	C19-C18-C17	-2.55	108.83	111.88
8	I	1402	1N7	C16-C15-C14	-2.44	108.38	111.19
8	I	1402	1N7	C3-C19-C18	-2.41	107.34	110.88
8	I	1402	1N7	C14-C13-C12	-2.36	107.74	110.55
8	I	1402	1N7	C21-C20-C9	-2.28	109.42	112.92
8	I	1402	1N7	C1-C2-C15	2.28	111.14	107.77
8	I	1401	1N7	C3-C19-C18	-2.25	107.58	110.88
8	I	1401	1N7	C19-C18-C17	-2.09	109.37	111.88
8	I	1402	1N7	C7-C6-C5	2.01	105.53	103.55
8	I	1401	1N7	C6-C18-C17	-2.01	109.14	111.81

There are no chirality outliers.

All (10) torsion outliers are listed below:

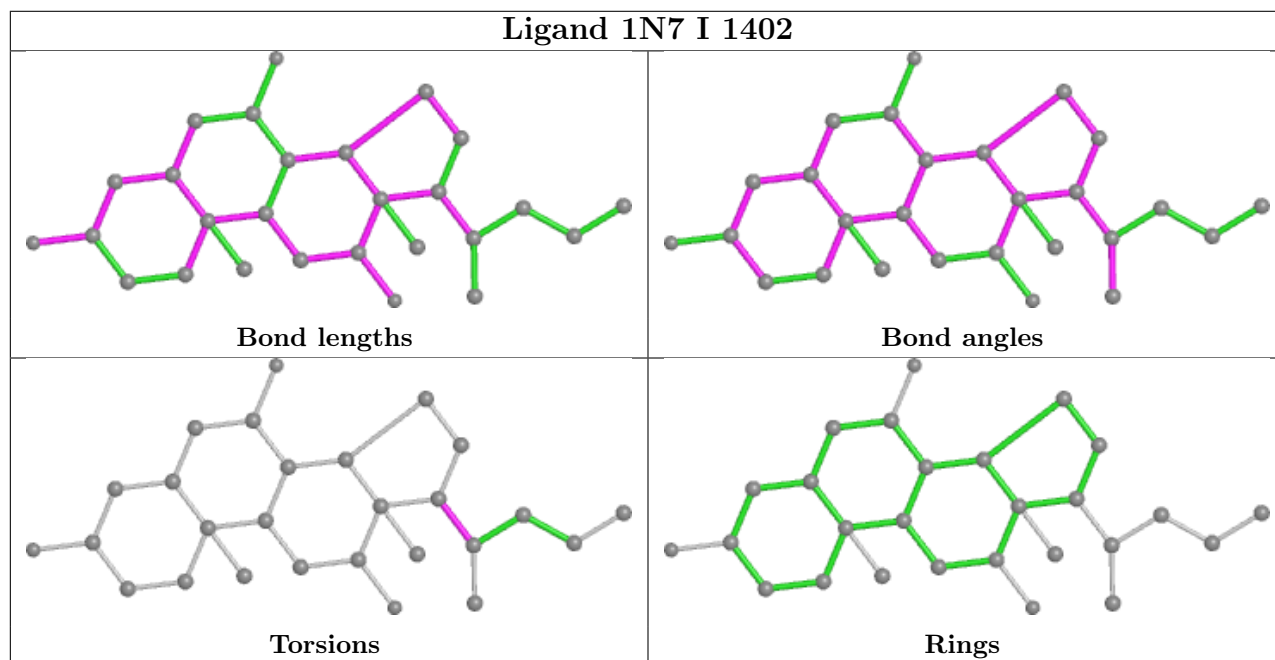
Mol	Chain	Res	Type	Atoms
8	I	1401	1N7	C21-C20-C9-C5
8	I	1402	1N7	C21-C20-C9-C5
8	I	1401	1N7	C21-C20-C9-C8
8	I	1402	1N7	C21-C20-C9-C8
8	I	1401	1N7	C22-C20-C9-C5
8	I	1402	1N7	C22-C20-C9-C5
8	I	1401	1N7	C22-C20-C9-C8
8	I	1402	1N7	C22-C20-C9-C8
8	I	1401	1N7	C21-C20-C22-C23
8	I	1401	1N7	C20-C22-C23-C24

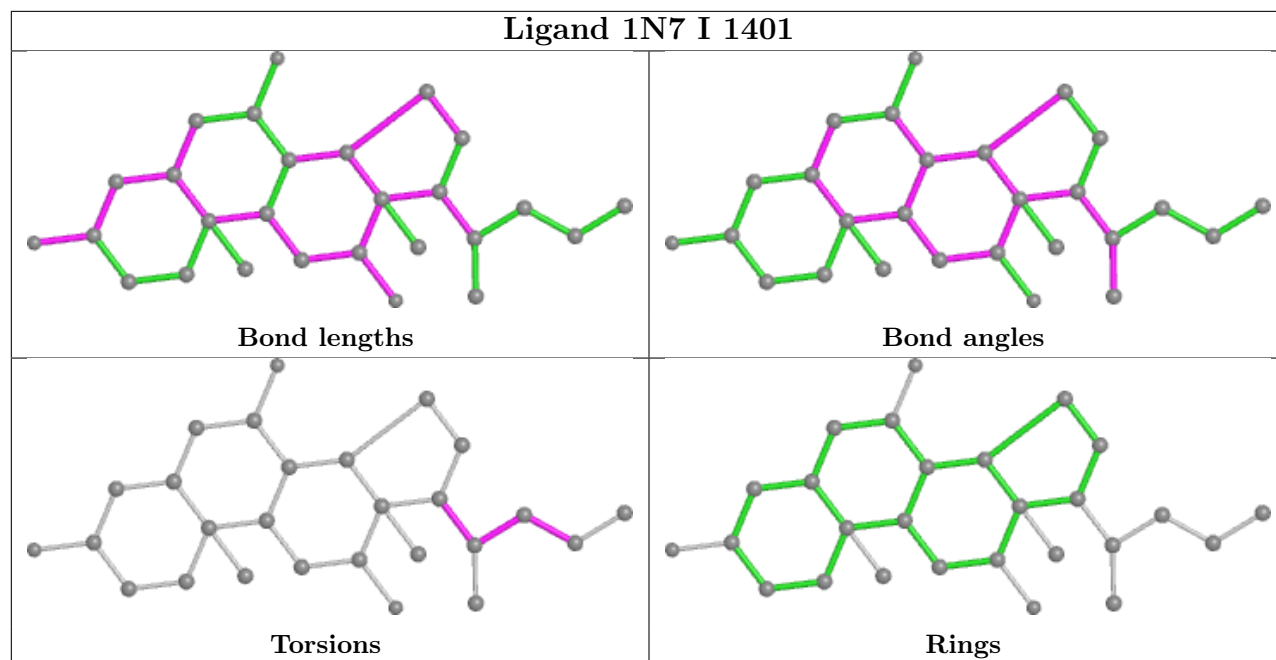
There are no ring outliers.

2 monomers are involved in 19 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	I	1402	1N7	12	0
8	I	1401	1N7	7	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.

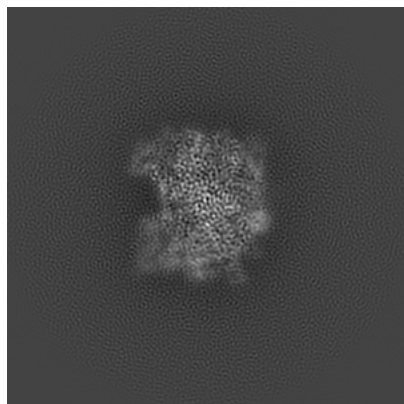
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-28109. These allow visual inspection of the internal detail of the map and identification of artifacts.

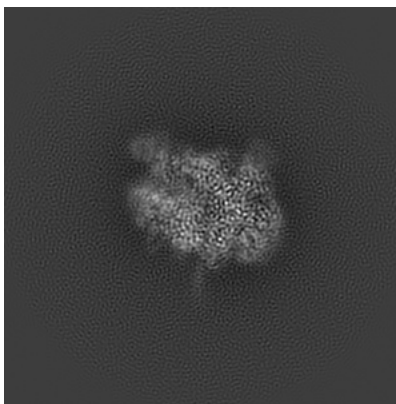
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

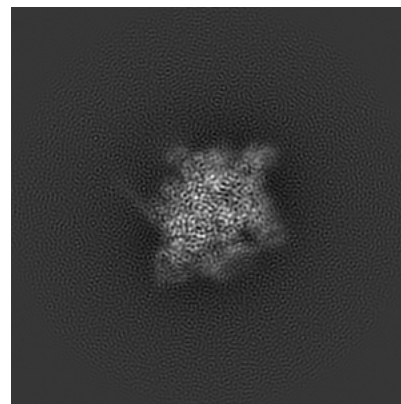
#### 6.1.1 Primary map



X

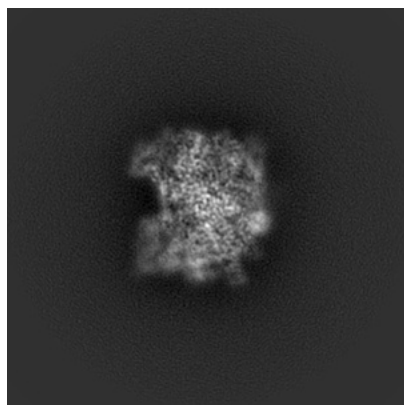


Y

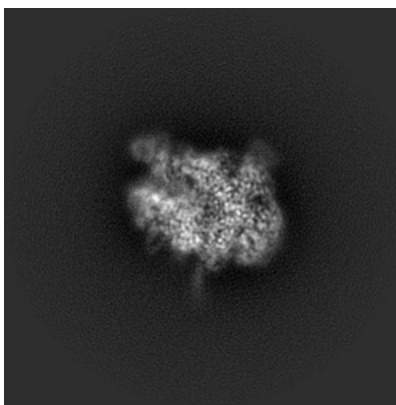


Z

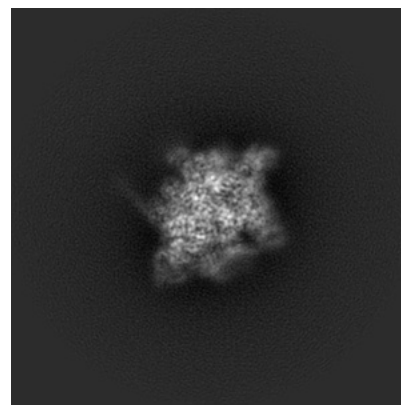
#### 6.1.2 Raw map



X



Y



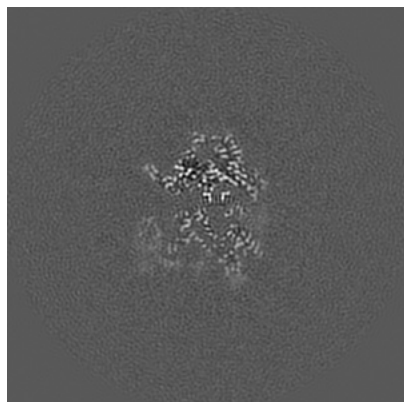
Z

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

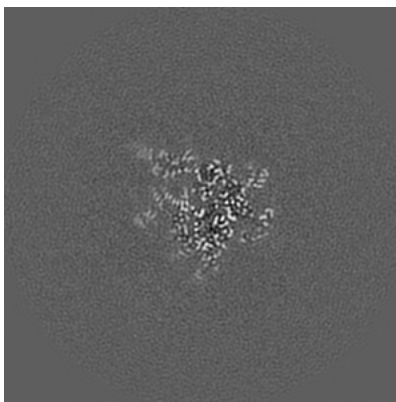


## 6.2 Central slices [i](#)

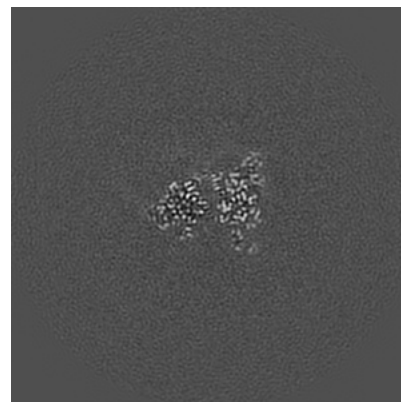
### 6.2.1 Primary map



X Index: 128

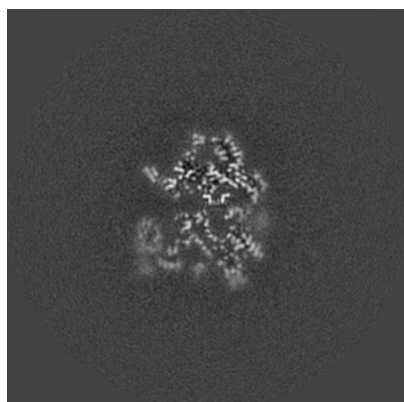


Y Index: 128

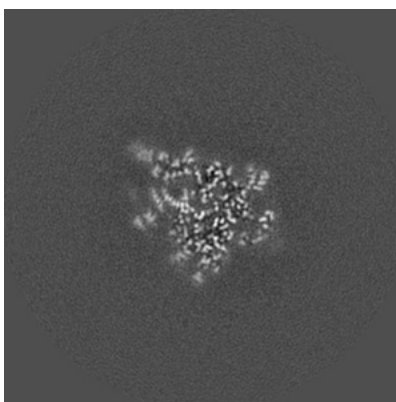


Z Index: 128

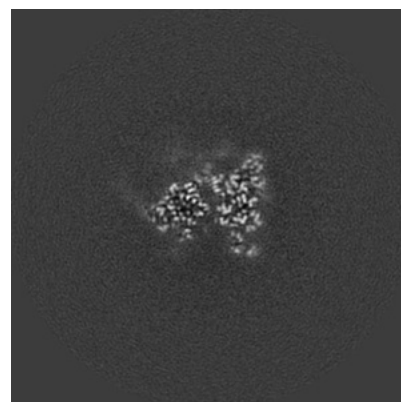
### 6.2.2 Raw map



X Index: 128



Y Index: 128

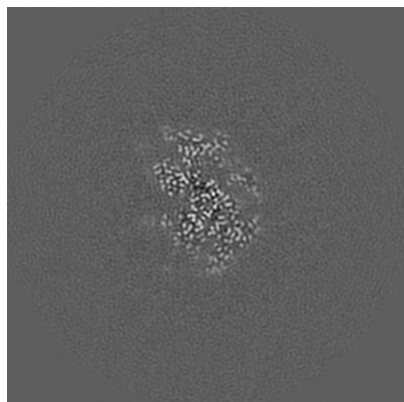


Z Index: 128

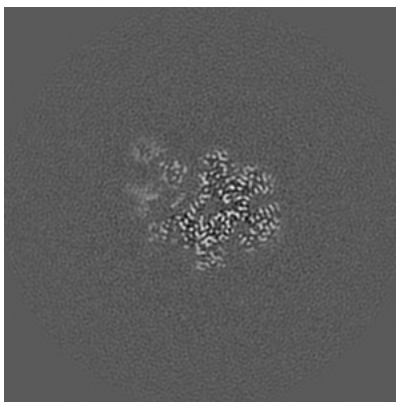
The images above show central slices of the map in three orthogonal directions.

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

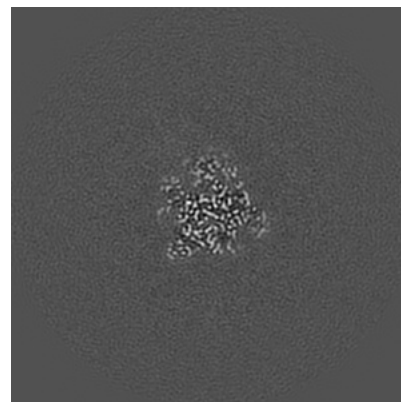
### 6.3.1 Primary map



X Index: 117

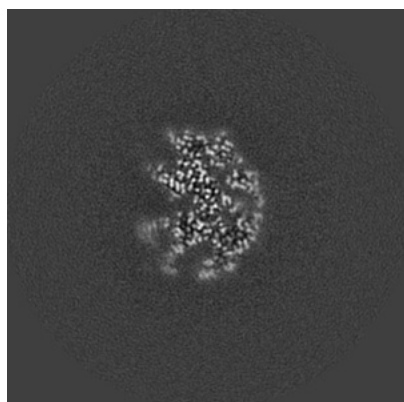


Y Index: 121

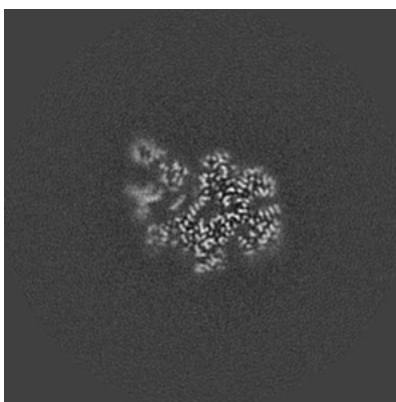


Z Index: 142

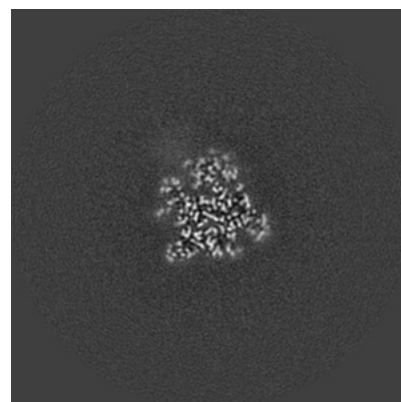
### 6.3.2 Raw map



X Index: 120



Y Index: 121

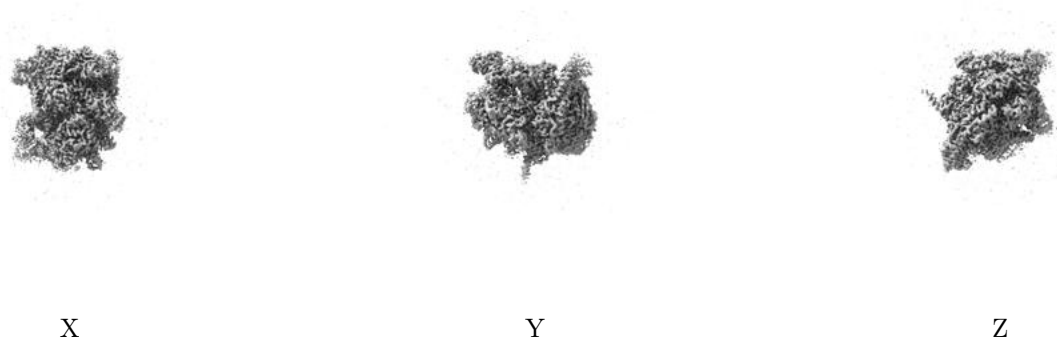


Z Index: 142

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

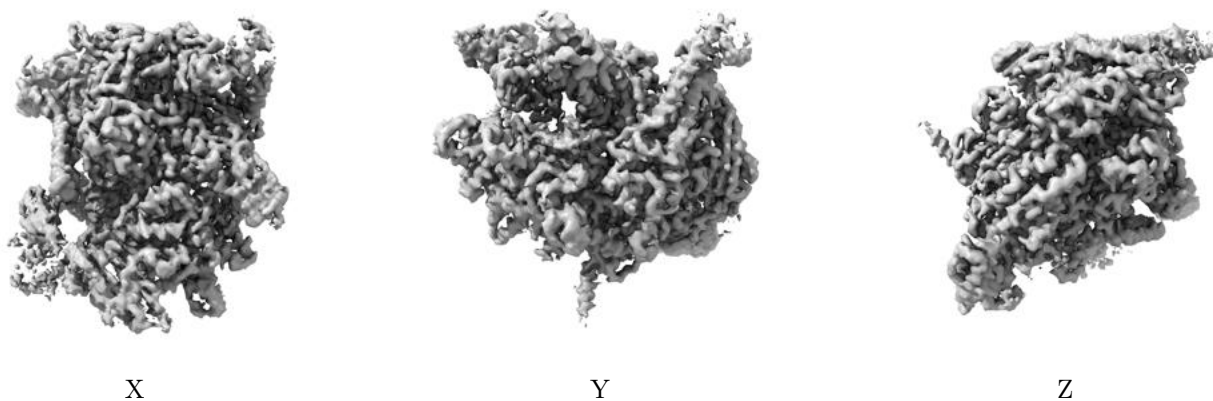
## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.028. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.4.2 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.

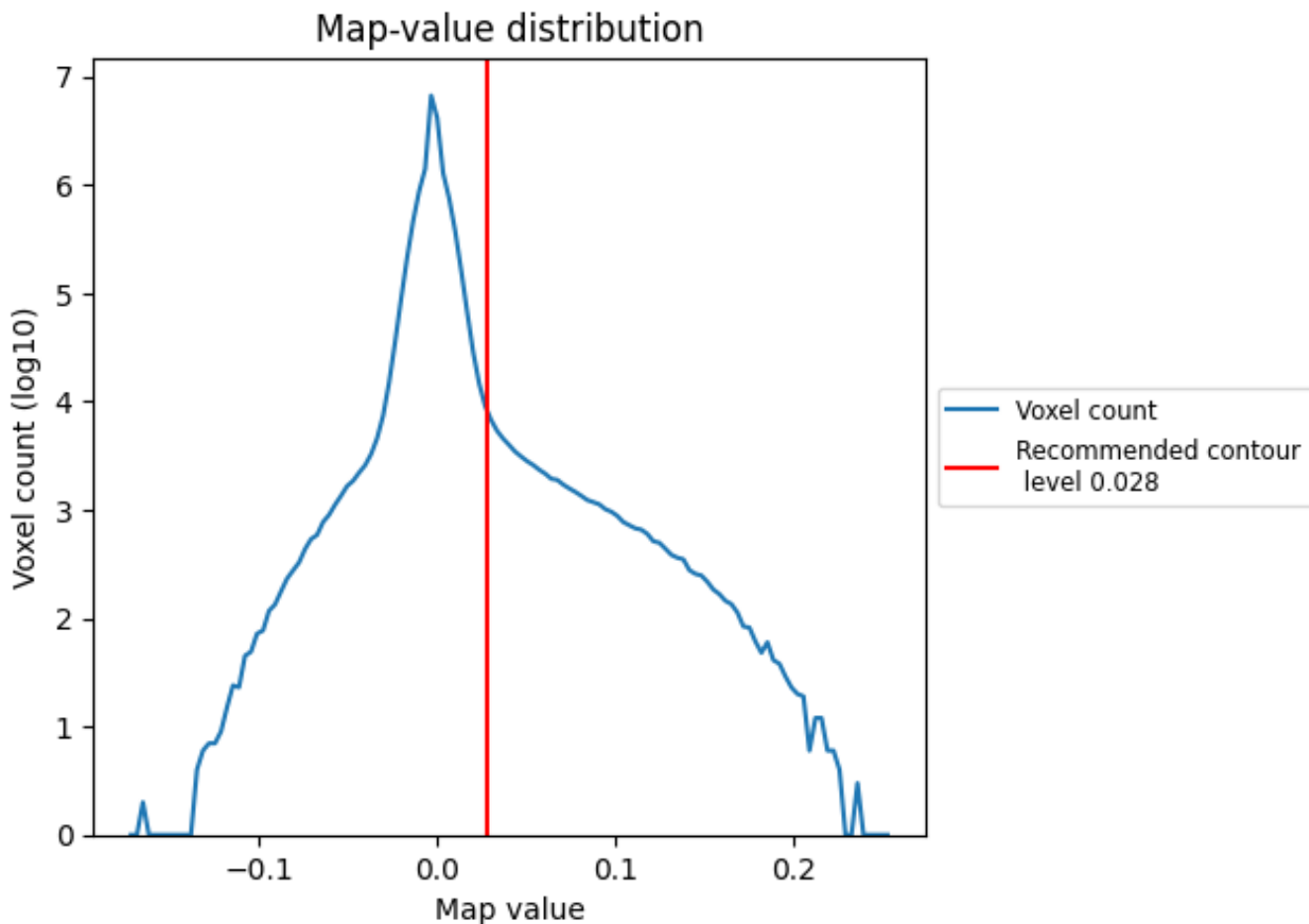
## 6.5 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

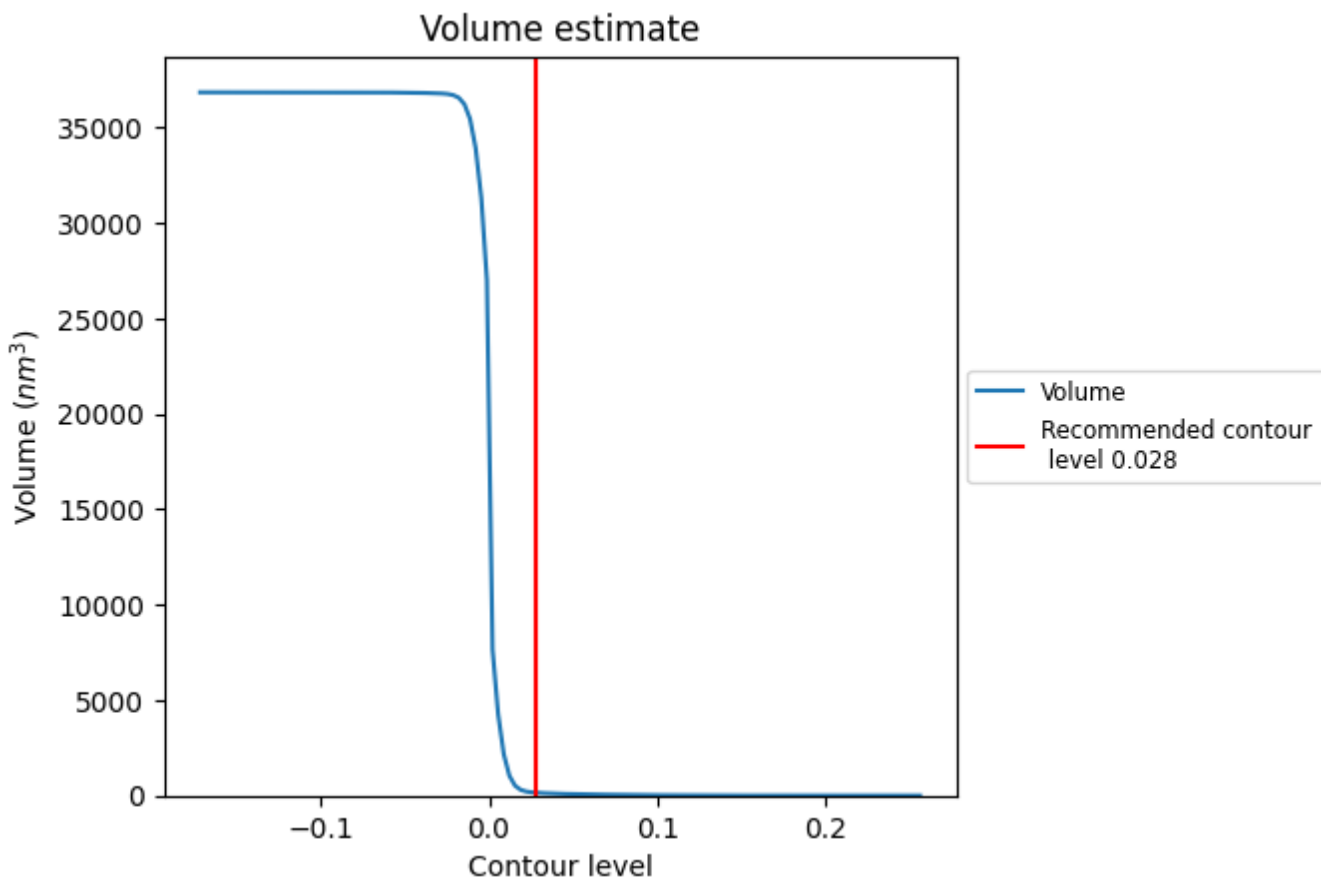
This section contains the results of statistical analysis of the map.

### 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.

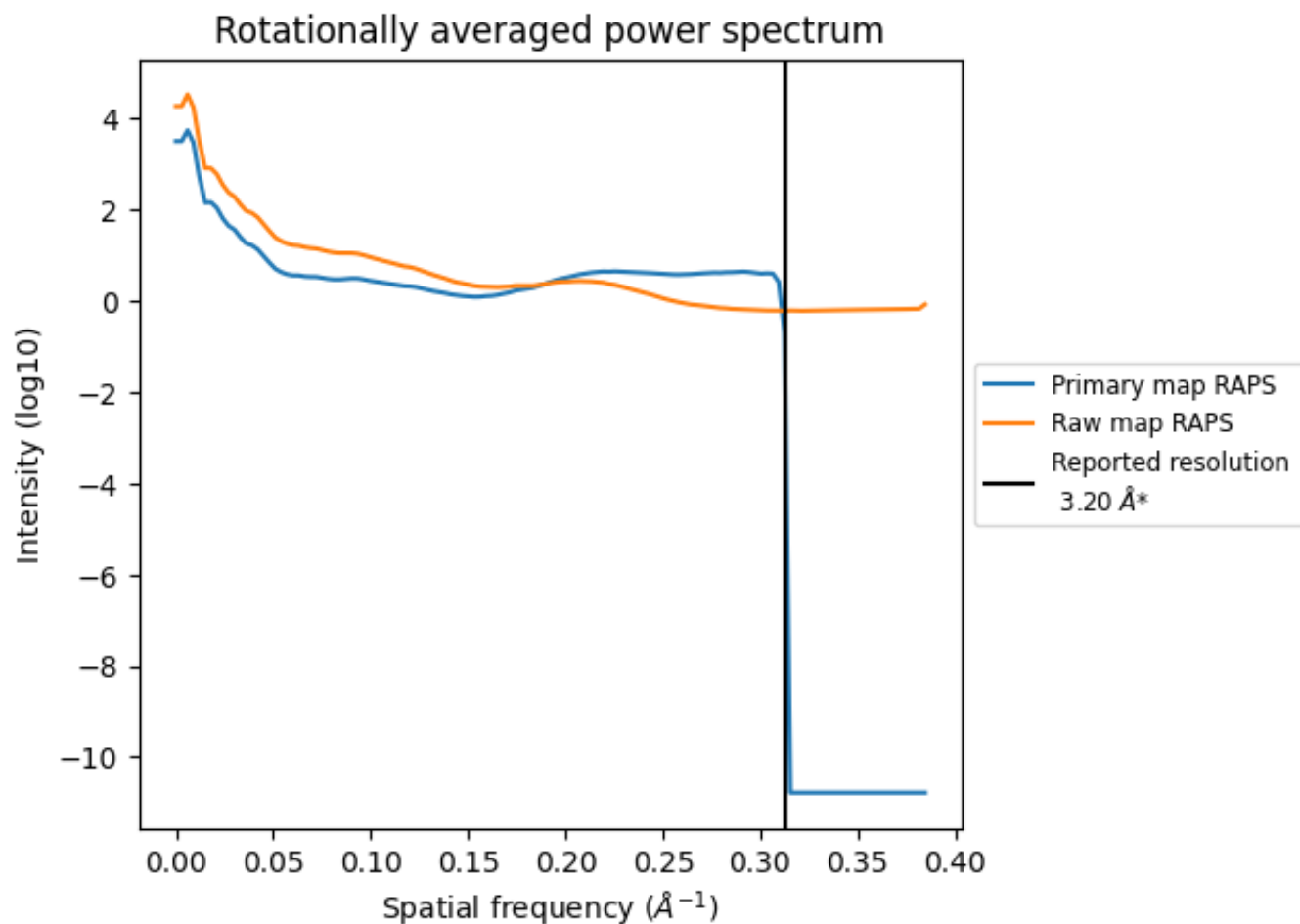
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 151  $\text{nm}^3$ ; this corresponds to an approximate mass of 136 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](#)

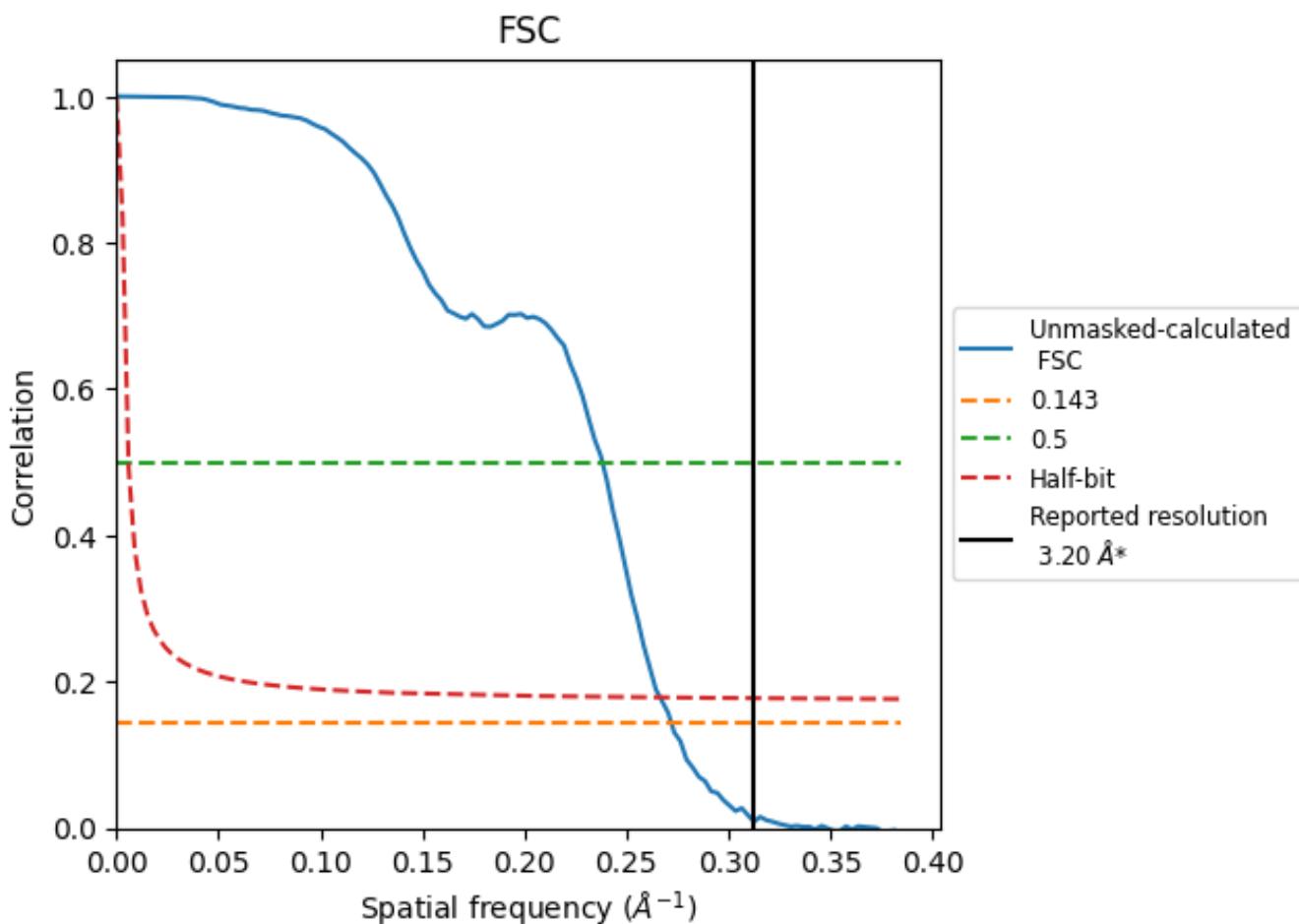


\*Reported resolution corresponds to spatial frequency of 0.312 Å<sup>-1</sup>

## 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 0.312 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.20	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.68	4.20	3.75

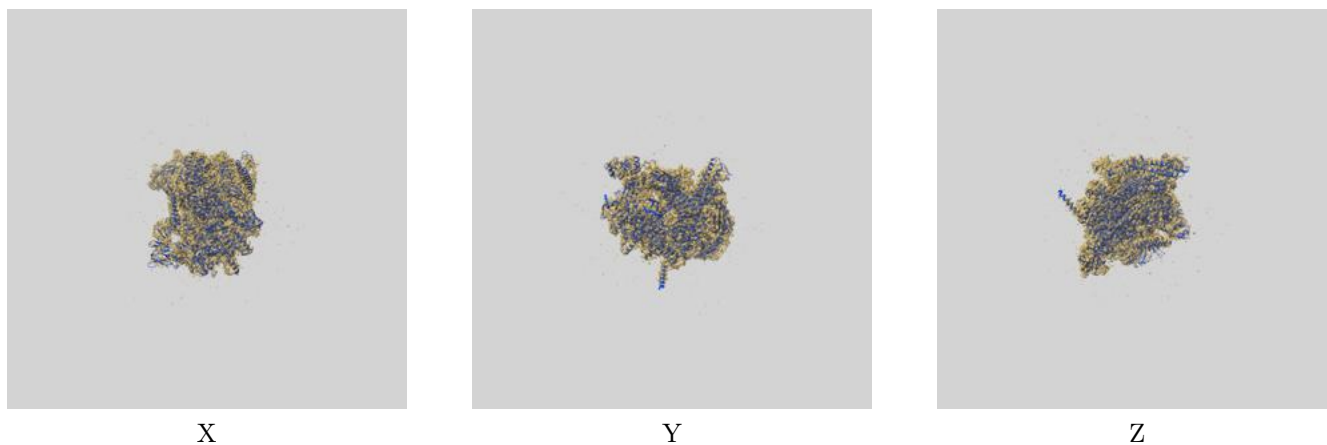
\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.68 differs from the reported value 3.2 by more than 10 %



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

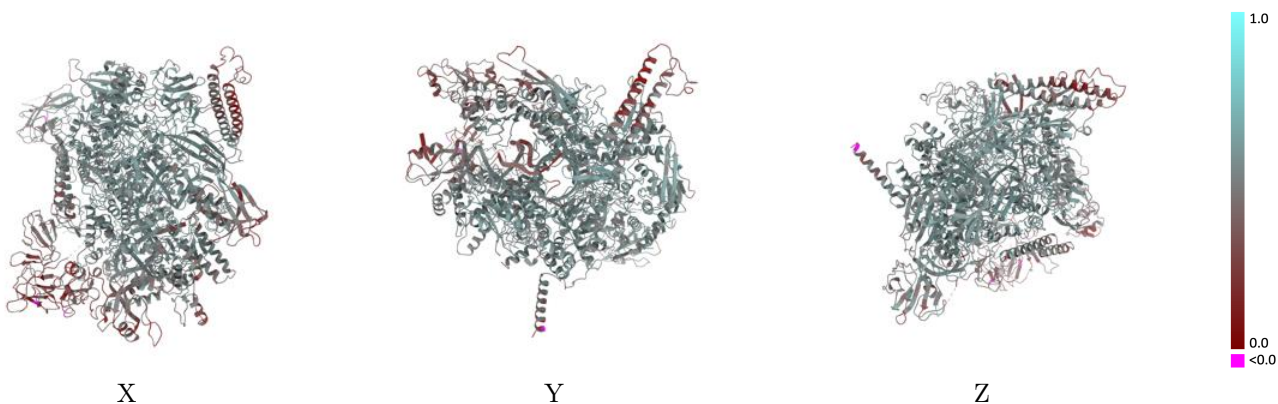
This section contains information regarding the fit between EMDB map EMD-28109 and PDB model 8EG7. Per-residue inclusion information can be found in section 3 on page 7.

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



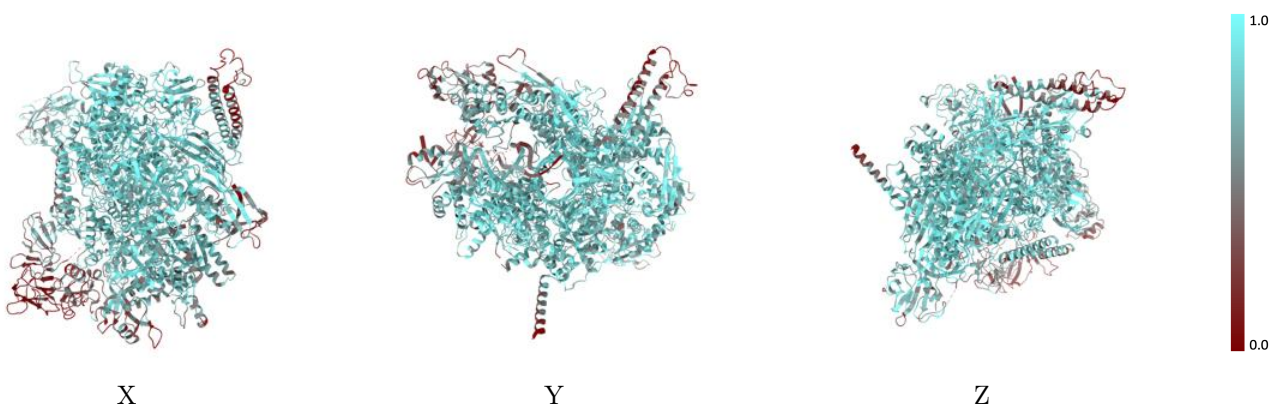
The images above show the 3D surface view of the map at the recommended contour level 0.028 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



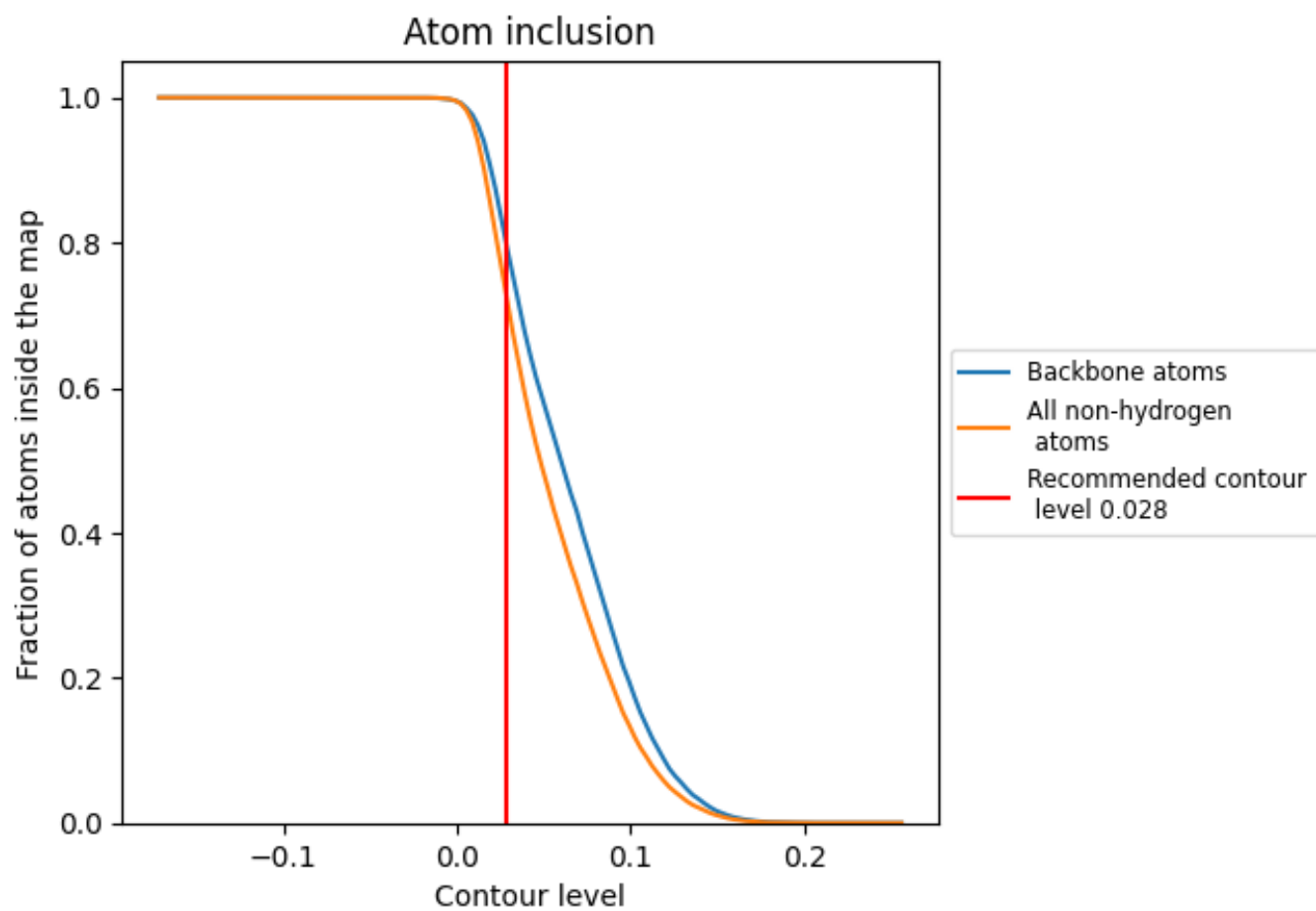
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.028).



















## 9.4 Atom inclusion [i](#)



At the recommended contour level, 80% of all backbone atoms, 73% 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 (0.028) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7325	 0.5040
A	 0.6119	 0.4030
B	 0.7551	 0.4670
G	 0.8089	 0.5460
H	 0.7320	 0.5080
I	 0.7460	 0.5080
J	 0.7110	 0.4980
K	 0.6682	 0.5010
R	 0.9259	 0.5500

