



wwPDB EM Validation Summary Report ⓘ

Mar 6, 2026 – 10:17 PM UTC

PDB ID : 6OUL / pdb_00006oul
EMDB ID : EMD-20203
Title : Cryo-EM structure of Escherichia coli RNAP polymerase bound to rpsTP2 promoter DNA
Authors : Chen, J.; Chiu, C.E.; Campbell, E.A.; Darst, S.A.
Deposited on : 2019-05-04
Resolution : 3.40 Å(reported)

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

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

A user guide is available at

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

The types of validation reports are described at

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

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

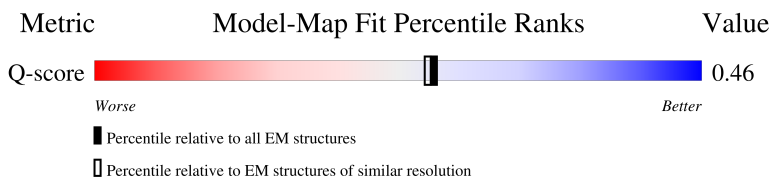
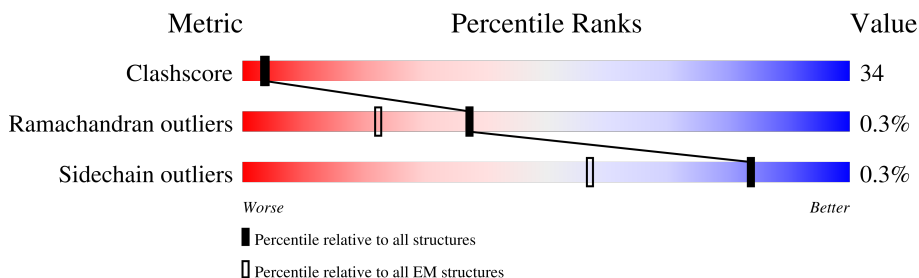
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

1 Overall quality at a glance

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

The reported resolution of this entry is 3.40 Å.

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



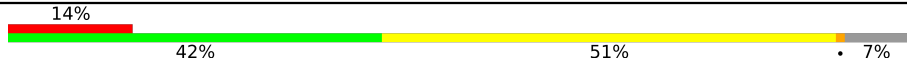
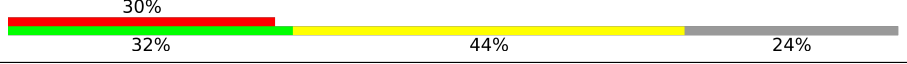
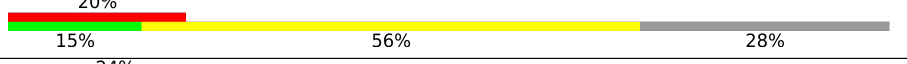
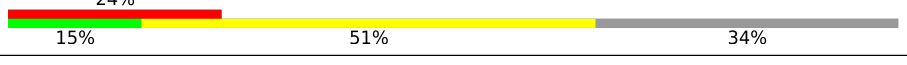
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	14717 (2.90 - 3.90)

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

Mol	Chain	Length	Quality of chain
1	G	329	
1	H	329	
1	R	329	
2	I	1342	

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Mol	Chain	Length	Quality of chain
3	J	1430	
4	K	91	
5	L	616	
6	P	85	
7	Q	85	

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 32044 atoms, of which 117 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
1	G	231	Total	C	N	O	S	0	0
			1785	1112	318	349	6		
1	H	219	Total	C	N	O	S	0	0
			1681	1050	295	330	6		
1	R	73	Total	C	N	O	S	0	0
			572	362	100	108	2		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
2	I	1341	Total	C	N	O	S	0	0
			10575	6634	1842	2056	43		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
3	J	1337	Total	C	N	O	S	0	0
			10386	6525	1851	1961	49		

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
J	1	VAL	-	expression tag	UNP U9YPW3
J	1408	LEU	-	expression tag	UNP U9YPW3
J	1409	GLU	-	expression tag	UNP U9YPW3
J	1410	LEU	-	expression tag	UNP U9YPW3
J	1411	GLU	-	expression tag	UNP U9YPW3
J	1412	VAL	-	expression tag	UNP U9YPW3
J	1413	LEU	-	expression tag	UNP U9YPW3
J	1414	PHE	-	expression tag	UNP U9YPW3
J	1415	GLN	-	expression tag	UNP U9YPW3
J	1416	GLY	-	expression tag	UNP U9YPW3
J	1417	PRO	-	expression tag	UNP U9YPW3

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Chain	Residue	Modelled	Actual	Comment	Reference
J	1418	SER	-	expression tag	UNP U9YPW3
J	1419	SER	-	expression tag	UNP U9YPW3
J	1420	GLY	-	expression tag	UNP U9YPW3
J	1421	HIS	-	expression tag	UNP U9YPW3
J	1422	HIS	-	expression tag	UNP U9YPW3
J	1423	HIS	-	expression tag	UNP U9YPW3
J	1424	HIS	-	expression tag	UNP U9YPW3
J	1425	HIS	-	expression tag	UNP U9YPW3
J	1426	HIS	-	expression tag	UNP U9YPW3
J	1427	HIS	-	expression tag	UNP U9YPW3
J	1428	HIS	-	expression tag	UNP U9YPW3
J	1429	HIS	-	expression tag	UNP U9YPW3
J	1430	HIS	-	expression tag	UNP U9YPW3

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

Mol	Chain	Residues	Atoms					AltConf	Trace
4	K	79	Total	C	N	O	S	0	0
			627	382	118	126	1		

- Molecule 5 is a protein called RNA polymerase sigma factor RpoD.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	L	471	Total	C	N	O	S	0	0
			3821	2397	681	720	23		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	-2	SER	-	expression tag	UNP Q0P6L9
L	-1	GLU	-	expression tag	UNP Q0P6L9
L	0	PHE	-	expression tag	UNP Q0P6L9

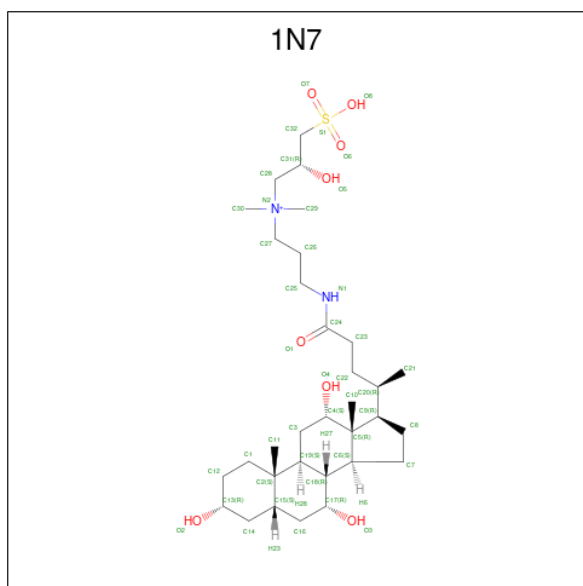
- Molecule 6 is a DNA chain called Non-template strand of rpsTP2 DNA promoter.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	P	61	Total	C	N	O	P	0	0
			1253	599	235	358	61		

- Molecule 7 is a DNA chain called Template strand of rpsTP2 DNA promoter.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	Q	56	Total	C	N	O	P	0	0
			1143	549	192	346	56		

- Molecule 8 is CHAPSO (CCD ID: 1N7) (formula: $C_{32}H_{59}N_2O_8S$).



Mol	Chain	Residues	Atoms				AltConf
8	I	1	Total	C	H	O	0
			66	24	39	3	
8	J	1	Total	C	H	O	0
			66	24	39	3	
8	L	1	Total	C	H	O	0
			66	24	39	3	

- Molecule 9 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

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

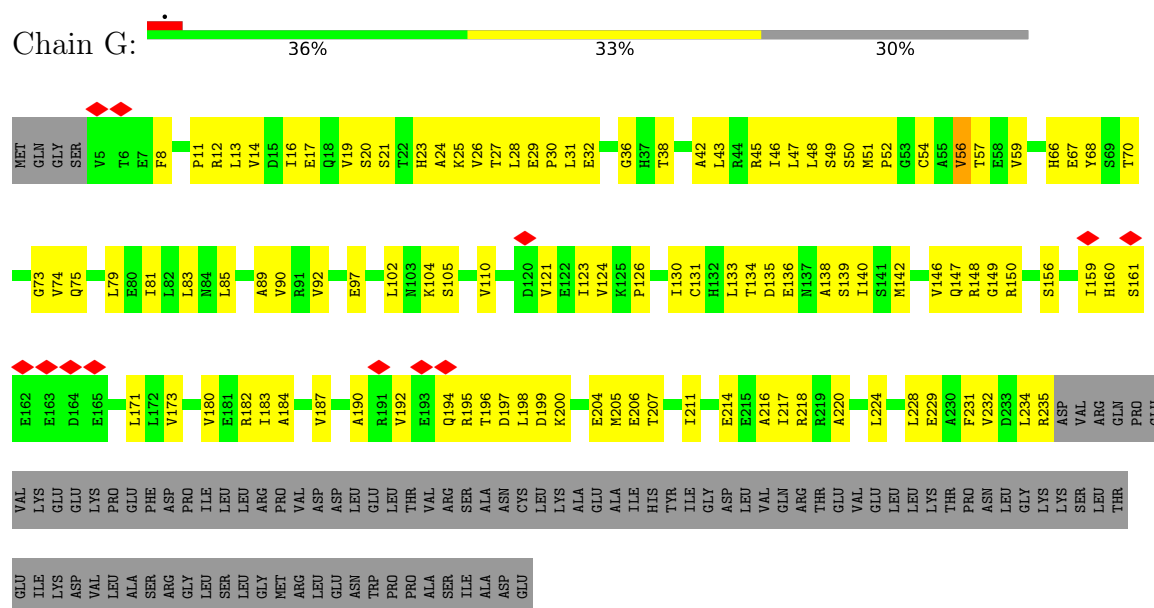
- Molecule 10 is ZINC ION (CCD ID: ZN) (formula: Zn).

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

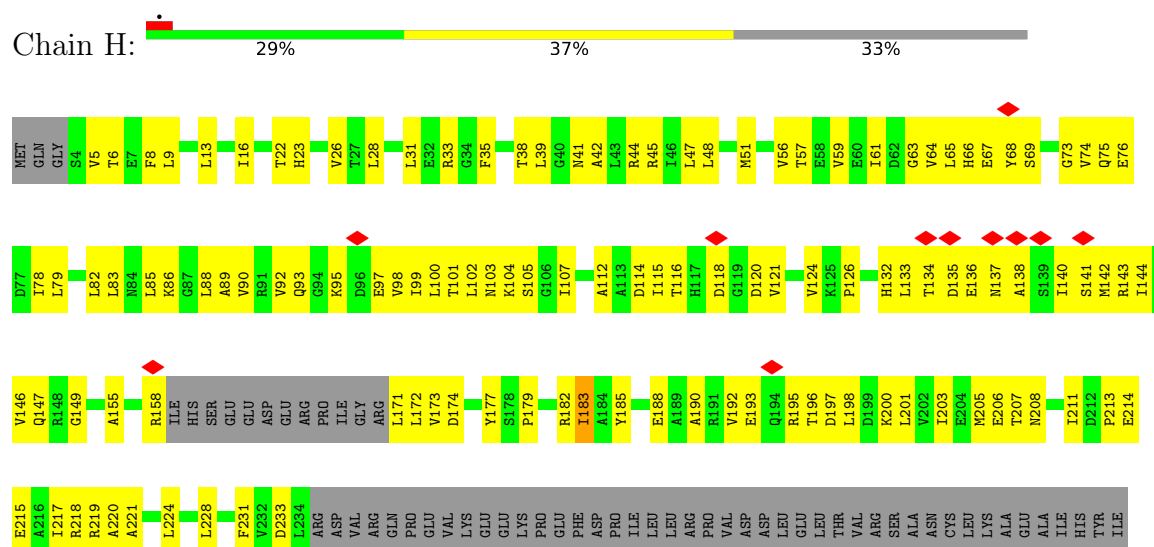
3 Residue-property plots

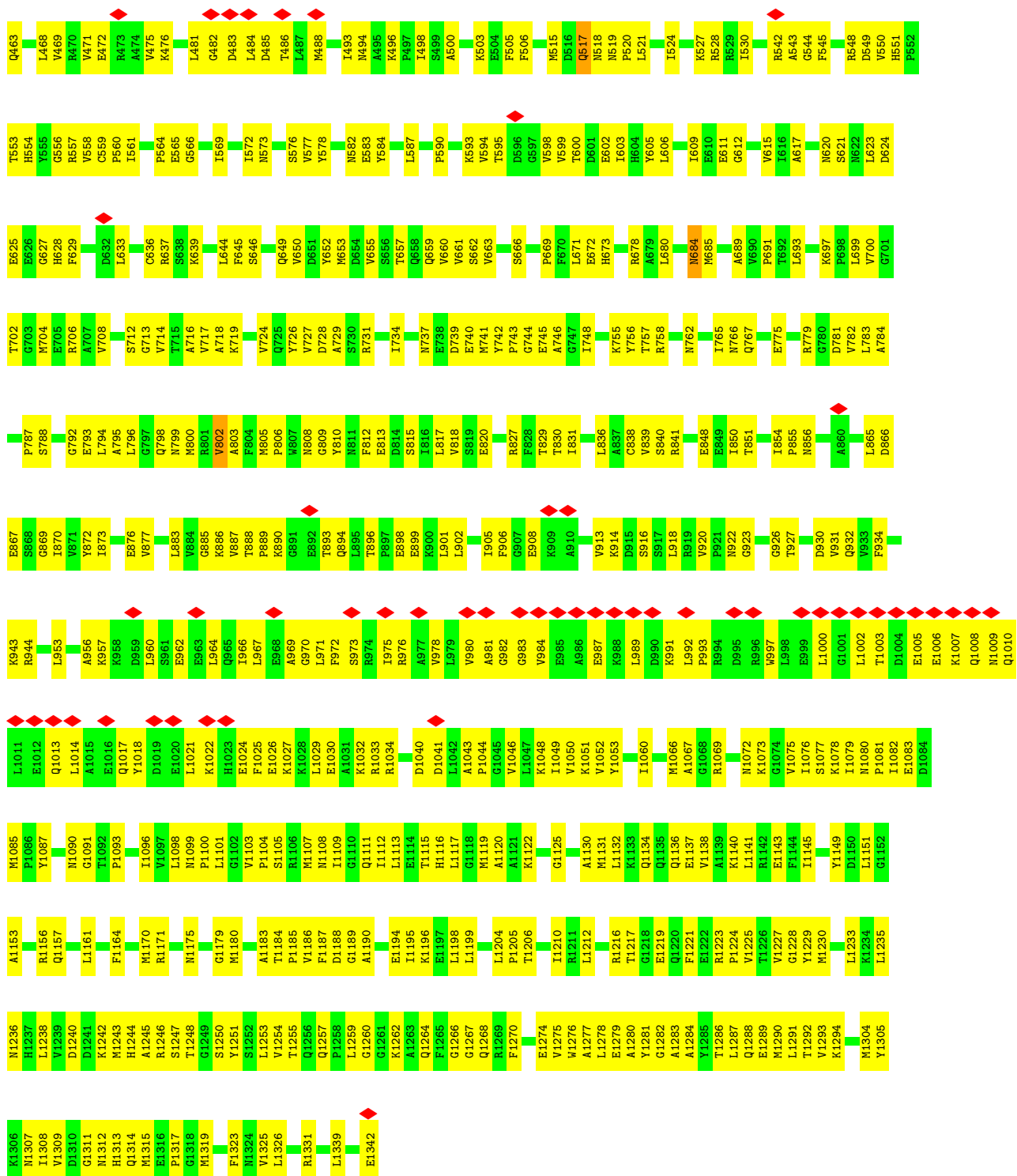
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

• Molecule 1: DNA-directed RNA polymerase subunit alpha

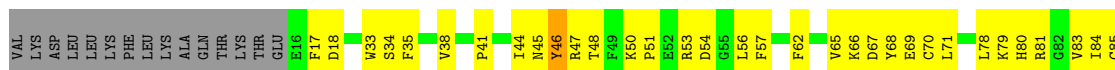
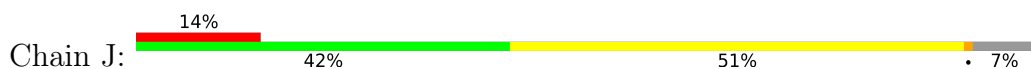


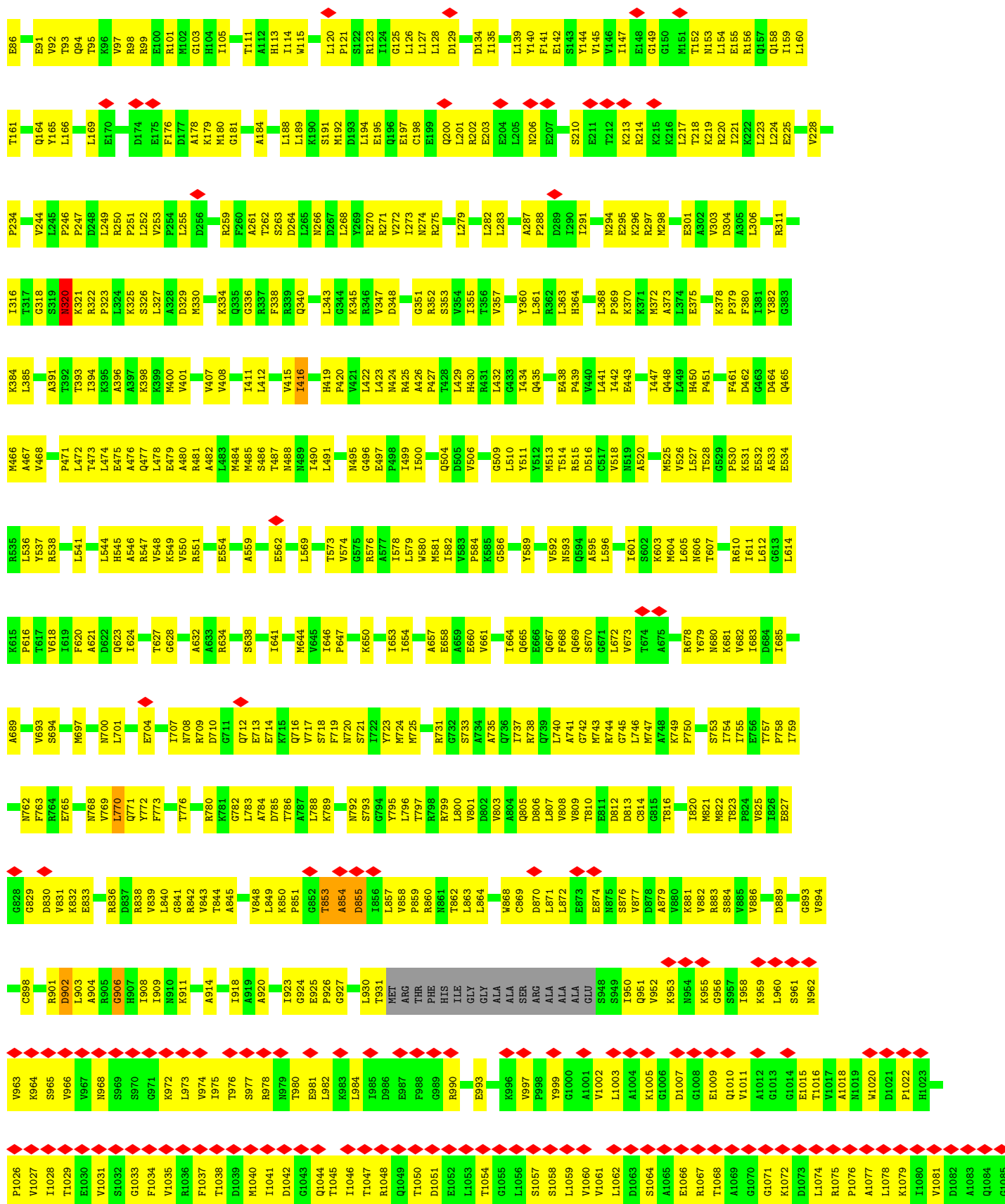
• Molecule 1: DNA-directed RNA polymerase subunit alpha

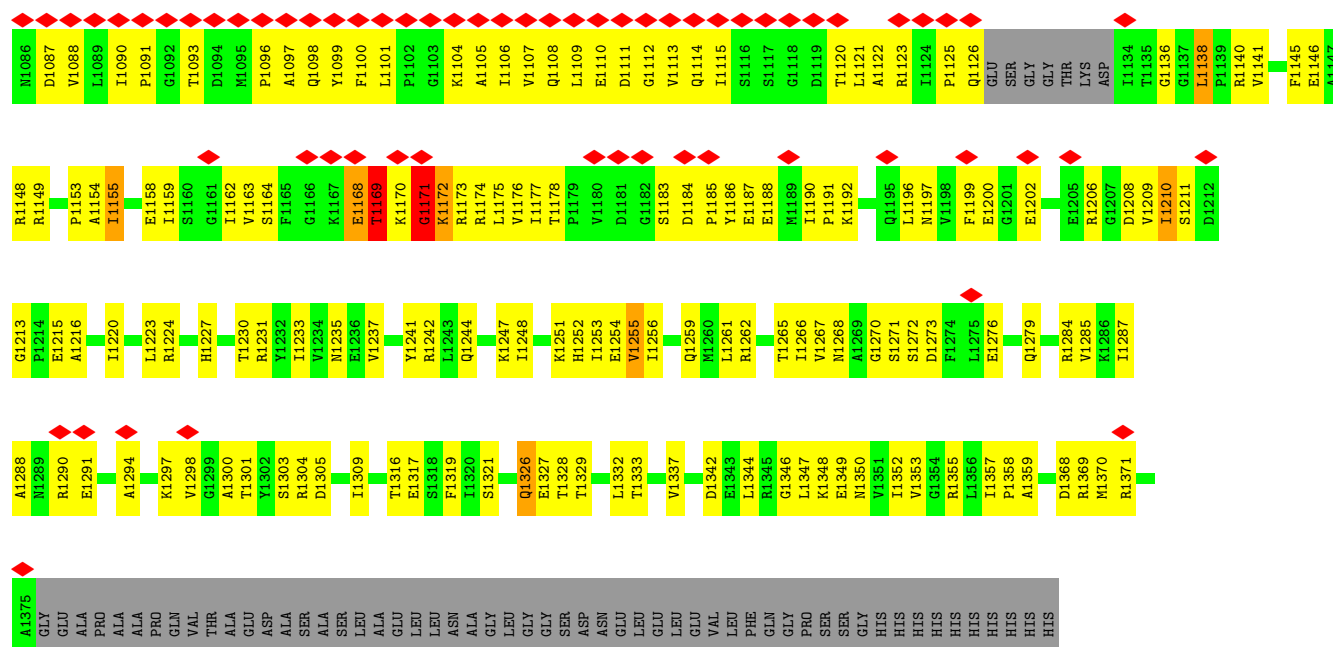




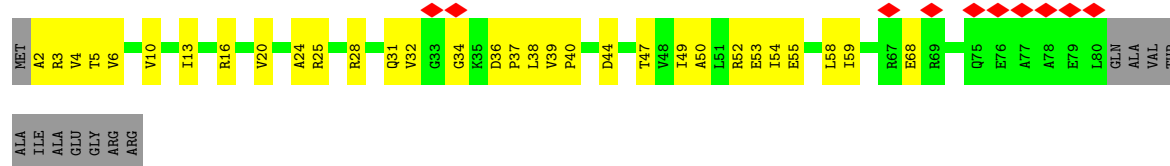
• Molecule 3: DNA-directed RNA polymerase subunit beta'



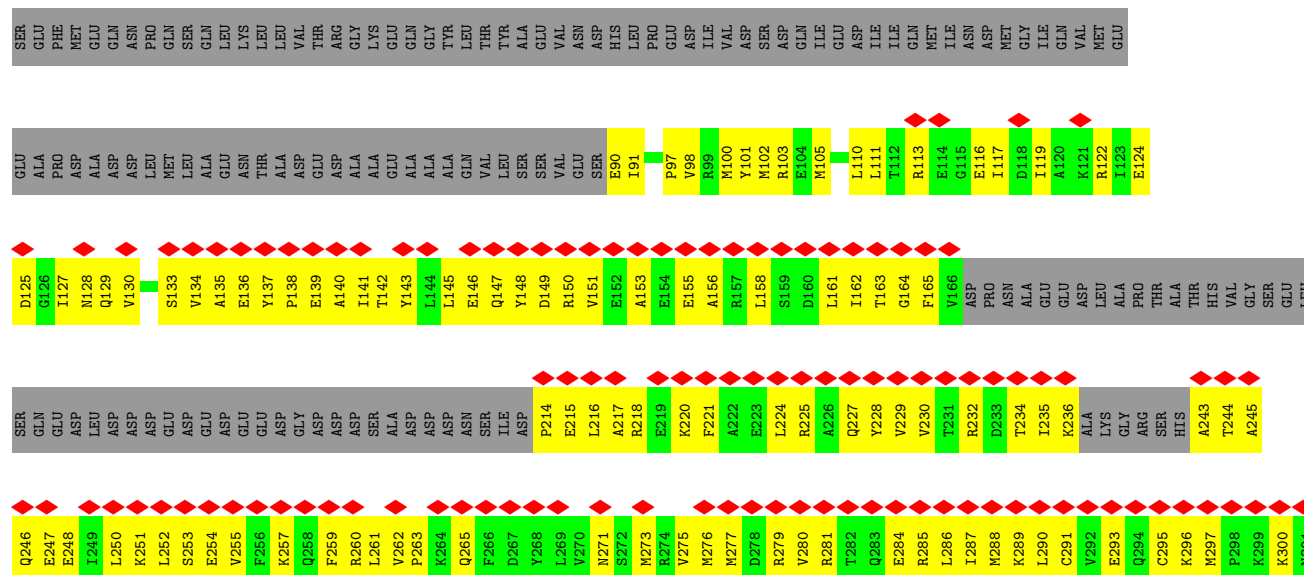


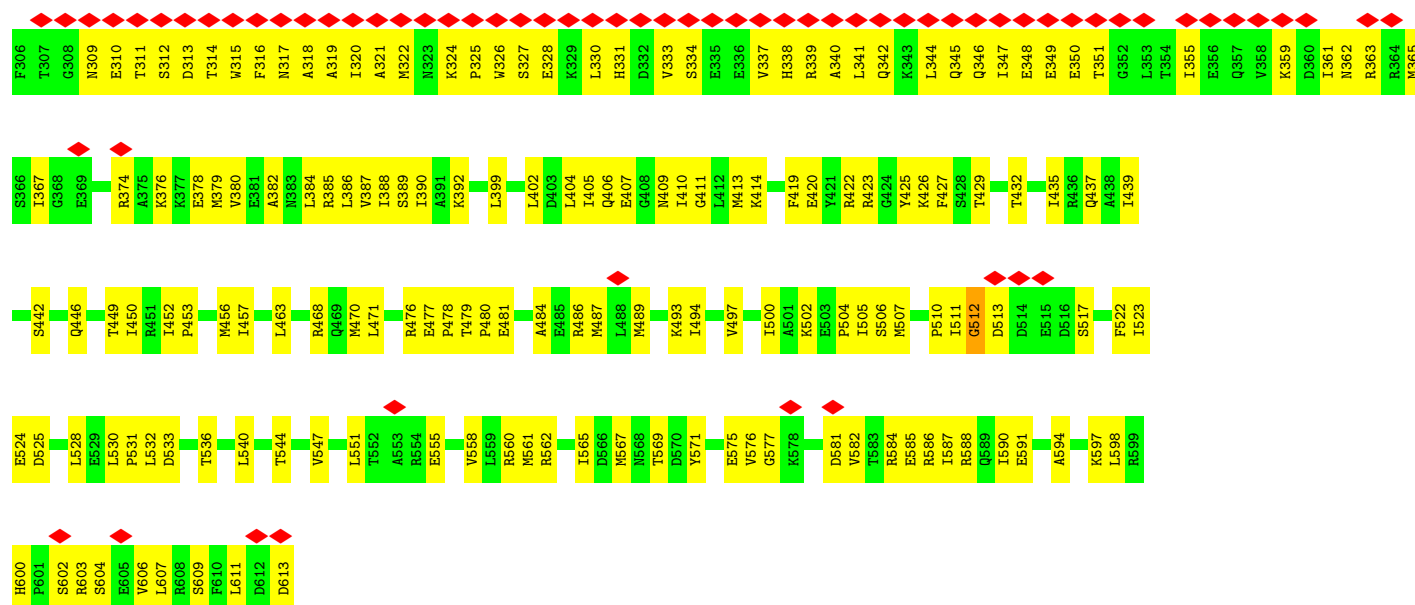


• Molecule 4: DNA-directed RNA polymerase subunit omega

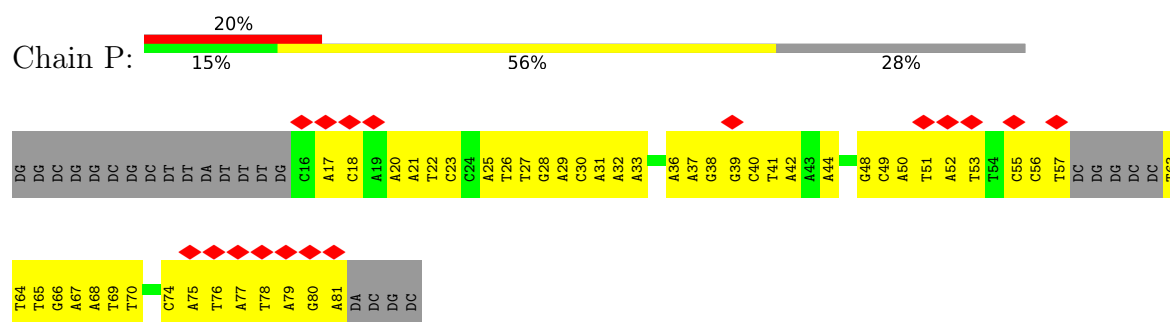


• Molecule 5: RNA polymerase sigma factor RpoD

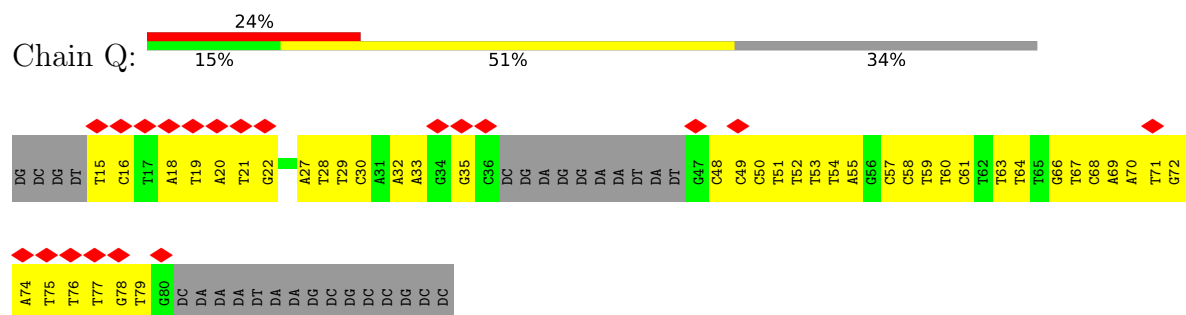




- Molecule 6: Non-template strand of rpsTP2 DNA promoter



- Molecule 7: Template strand of rpsTP2 DNA promoter



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	289670	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 ($e^-/\text{\AA}^2$)	1.0	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.251	Depositor
Minimum map value	-0.158	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.025	Depositor
Map size (Å)	332.8, 332.8, 332.8	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	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: MG, 1N7, ZN

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	G	0.68	0/1807	0.76	0/2449
1	H	0.54	0/1700	0.68	0/2305
1	R	0.19	0/579	0.48	0/784
2	I	0.70	0/10744	0.75	2/14496 (0.0%)
3	J	0.65	0/10543	0.73	5/14239 (0.0%)
4	K	0.47	0/629	0.59	0/847
5	L	0.39	0/3872	0.57	2/5204 (0.0%)
6	P	0.31	0/1407	0.45	0/2166
7	Q	0.31	0/1276	0.45	0/1965
All	All	0.61	0/32557	0.69	9/44455 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	I	0	1
3	J	0	10
All	All	0	11

There are no bond length outliers.

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	I	517	GLN	N-CA-C	6.86	119.91	109.62
3	J	765	GLU	CA-C-N	-6.48	116.71	122.73
3	J	765	GLU	C-N-CA	-6.48	116.71	122.73
5	L	512	GLY	CA-C-N	5.73	132.02	121.70
5	L	512	GLY	C-N-CA	5.73	132.02	121.70

There are no chirality outliers.

5 of 11 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	I	1185	PRO	Peptide
3	J	320	ASN	Peptide
3	J	416	ILE	Peptide
3	J	853	THR	Peptide
3	J	855	ASP	Peptide

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	G	1785	0	1806	122	0
1	H	1681	0	1708	150	0
1	R	572	0	602	85	0
2	I	10575	0	10584	707	0
3	J	10386	0	10594	806	0
4	K	627	0	634	39	0
5	L	3821	0	3891	325	0
6	P	1253	0	689	73	0
7	Q	1143	0	640	52	0
8	I	27	39	37	6	0
8	J	27	39	37	4	0
8	L	27	39	38	4	0
9	J	1	0	0	0	0
10	J	2	0	0	0	0
All	All	31927	117	31260	2170	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 34.

The worst 5 of 2170 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:1401:1N7:C3	8:I:1401:1N7:C19	1.83	1.55
8:J:1504:1N7:C19	8:J:1504:1N7:C3	1.84	1.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:L:701:1N7:C19	8:L:701:1N7:C3	1.84	1.52
1:H:105:SER:HA	1:H:138:ALA:HB2	1.42	1.01
2:I:75:LEU:HD11	2:I:127:ILE:HD11	1.43	1.00

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	G	229/329 (70%)	194 (85%)	35 (15%)	0	100	100
1	H	215/329 (65%)	185 (86%)	30 (14%)	0	100	100
1	R	71/329 (22%)	62 (87%)	9 (13%)	0	100	100
2	I	1339/1342 (100%)	1161 (87%)	175 (13%)	3 (0%)	43	71
3	J	1331/1430 (93%)	1167 (88%)	157 (12%)	7 (0%)	24	54
4	K	77/91 (85%)	67 (87%)	10 (13%)	0	100	100
5	L	465/616 (76%)	428 (92%)	37 (8%)	0	100	100
All	All	3727/4466 (84%)	3264 (88%)	453 (12%)	10 (0%)	37	65

5 of 10 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	J	854	ALA
3	J	1169	THR
2	I	399	ALA
3	J	320	ASN
3	J	1172	LYS

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	G	196/286 (68%)	194 (99%)	2 (1%)	68	75
1	H	186/286 (65%)	185 (100%)	1 (0%)	81	81
1	R	65/286 (23%)	65 (100%)	0	100	100
2	I	1155/1157 (100%)	1151 (100%)	4 (0%)	86	84
3	J	1118/1189 (94%)	1115 (100%)	3 (0%)	86	84
4	K	67/75 (89%)	67 (100%)	0	100	100
5	L	415/543 (76%)	415 (100%)	0	100	100
All	All	3202/3822 (84%)	3192 (100%)	10 (0%)	84	84

5 of 10 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	J	770	LEU
3	J	1155	ILE
3	J	1255	VAL
2	I	91	THR
2	I	138	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 47 such sidechains are listed below:

Mol	Chain	Res	Type
3	J	450	HIS
3	J	1326	GLN
3	J	477	GLN
3	J	1114	GLN
3	J	1366	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 6 ligands modelled in this entry, 3 are monoatomic - leaving 3 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	L	701	-	30,30,46	5.17	15 (50%)	47,48,72	2.68	16 (34%)
8	1N7	I	1401	-	30,30,46	5.17	16 (53%)	47,48,72	2.60	18 (38%)
8	1N7	J	1504	-	30,30,46	5.26	15 (50%)	47,48,72	2.85	25 (53%)

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	L	701	-	-	0/7/72/92	0/4/4/4
8	1N7	I	1401	-	-	1/7/72/92	0/4/4/4
8	1N7	J	1504	-	-	7/7/72/92	0/4/4/4

The worst 5 of 46 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	J	1504	1N7	C3-C19	19.03	1.84	1.53
8	L	701	1N7	C3-C19	19.00	1.84	1.53
8	I	1401	1N7	C3-C19	18.48	1.83	1.53
8	I	1401	1N7	C3-C4	12.66	1.73	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	L	701	1N7	C3-C4	12.08	1.73	1.53

The worst 5 of 59 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	J	1504	1N7	C9-C5-C4	-8.69	109.84	117.67
8	L	701	1N7	C7-C6-C18	-7.26	108.40	118.36
8	L	701	1N7	C9-C5-C6	6.83	106.97	100.11
8	I	1401	1N7	C9-C5-C6	6.45	106.59	100.11
8	L	701	1N7	C9-C5-C4	-6.24	112.05	117.67

There are no chirality outliers.

5 of 8 torsion outliers are listed below:

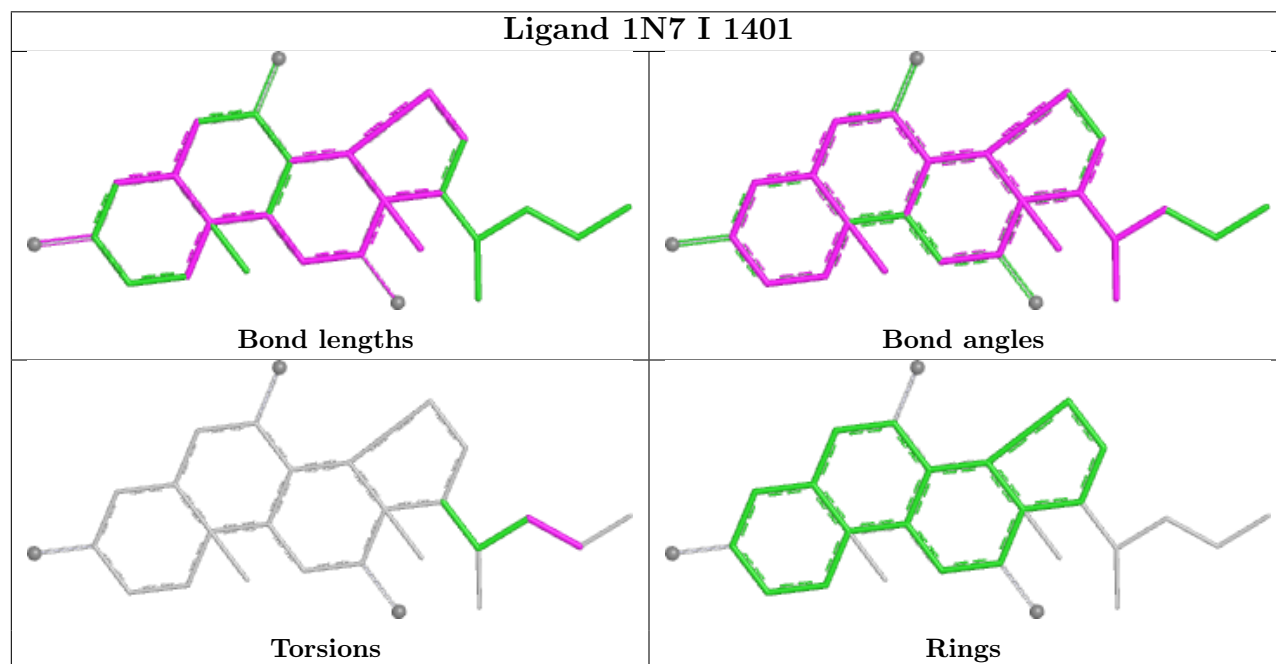
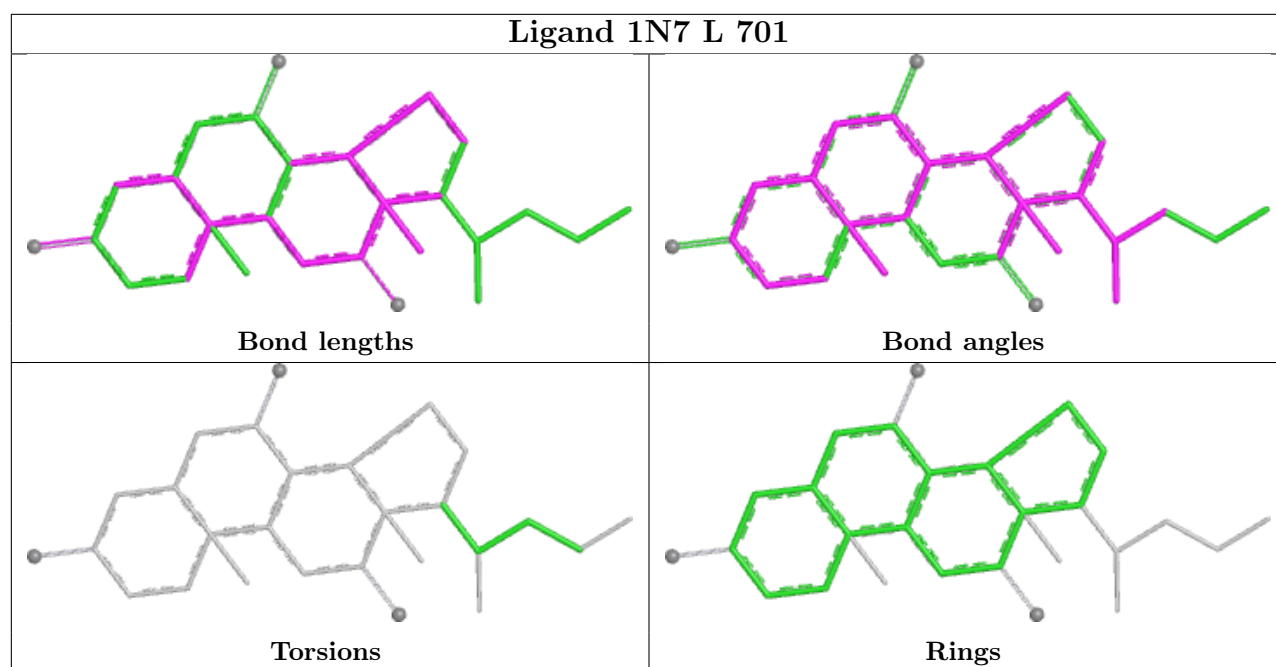
Mol	Chain	Res	Type	Atoms
8	J	1504	1N7	C21-C20-C9-C5
8	J	1504	1N7	C21-C20-C9-C8
8	J	1504	1N7	C22-C20-C9-C5
8	J	1504	1N7	C22-C20-C9-C8
8	J	1504	1N7	C9-C20-C22-C23

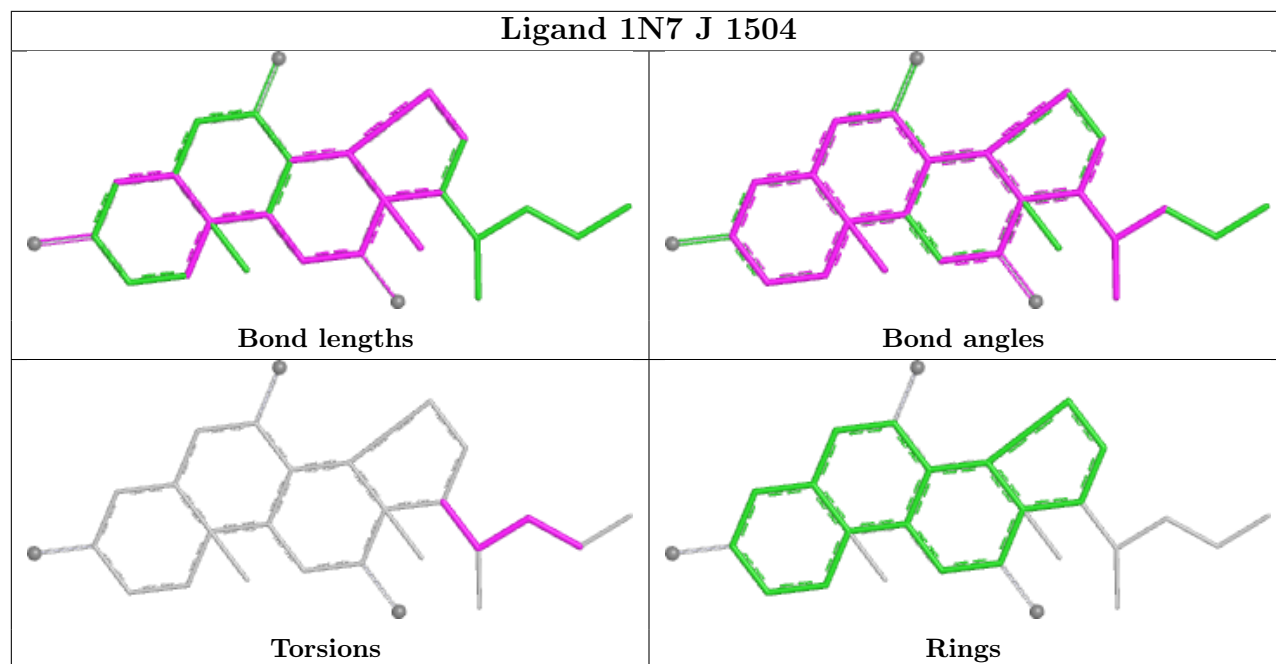
There are no ring outliers.

3 monomers are involved in 14 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	L	701	1N7	4	0
8	I	1401	1N7	6	0
8	J	1504	1N7	4	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.

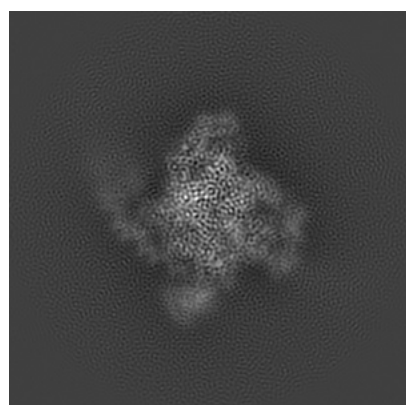
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-20203. These allow visual inspection of the internal detail of the map and identification of artifacts.

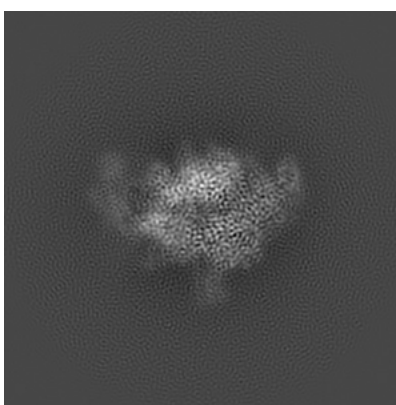
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

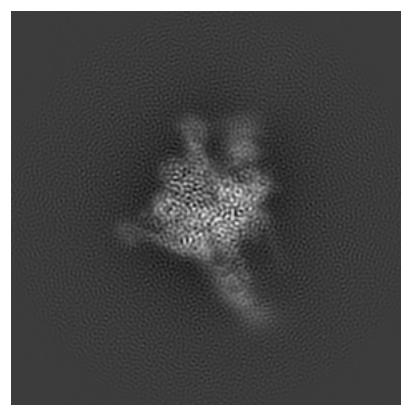
6.1.1 Primary map



X



Y

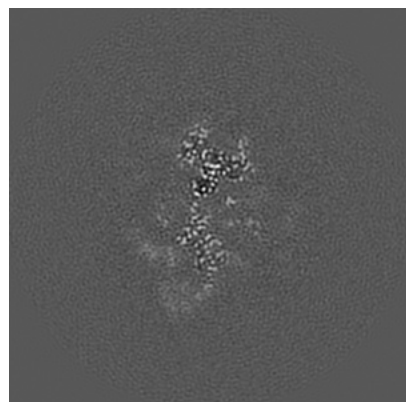


Z

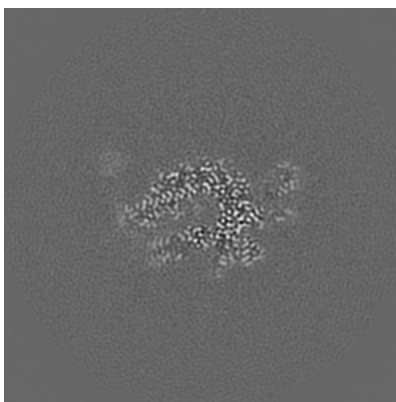
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

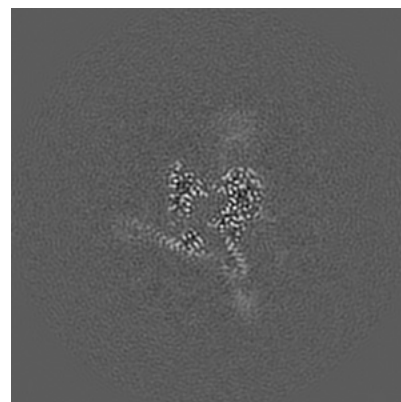
6.2.1 Primary map



X Index: 128



Y Index: 128

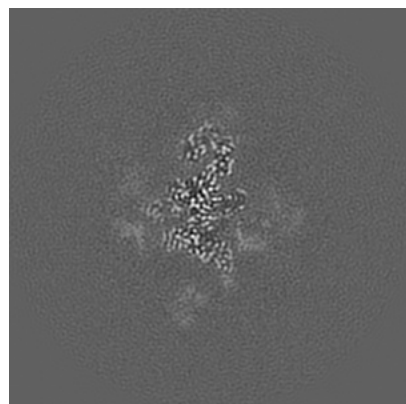


Z Index: 128

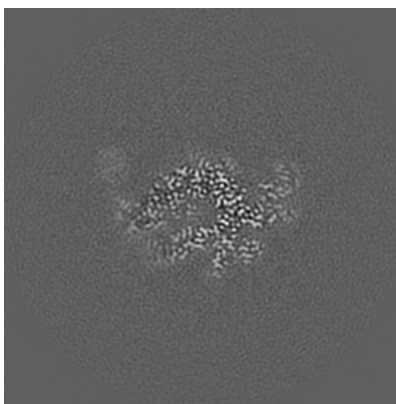
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

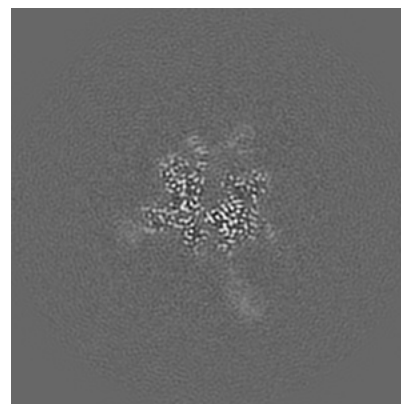
6.3.1 Primary map



X Index: 138



Y Index: 126

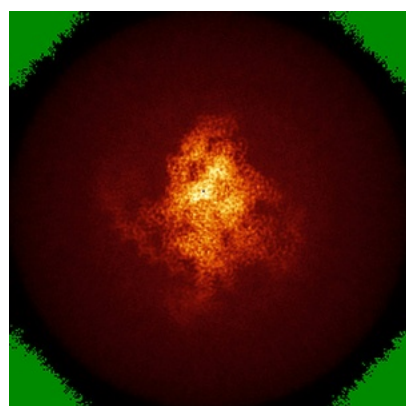


Z Index: 136

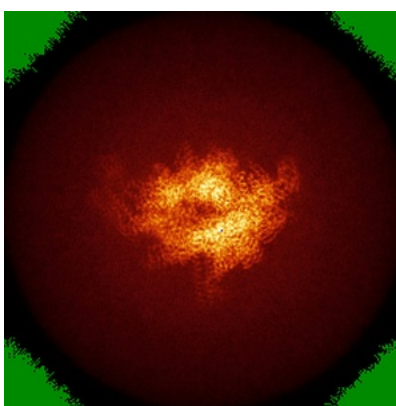
The images above show the largest variance slices of the map in three orthogonal directions.

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

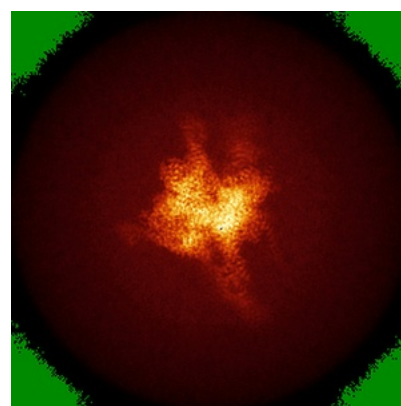
6.4.1 Primary map



X



Y

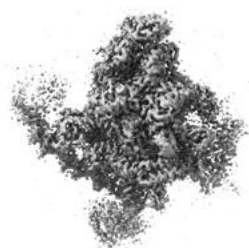


Z

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 0.025. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

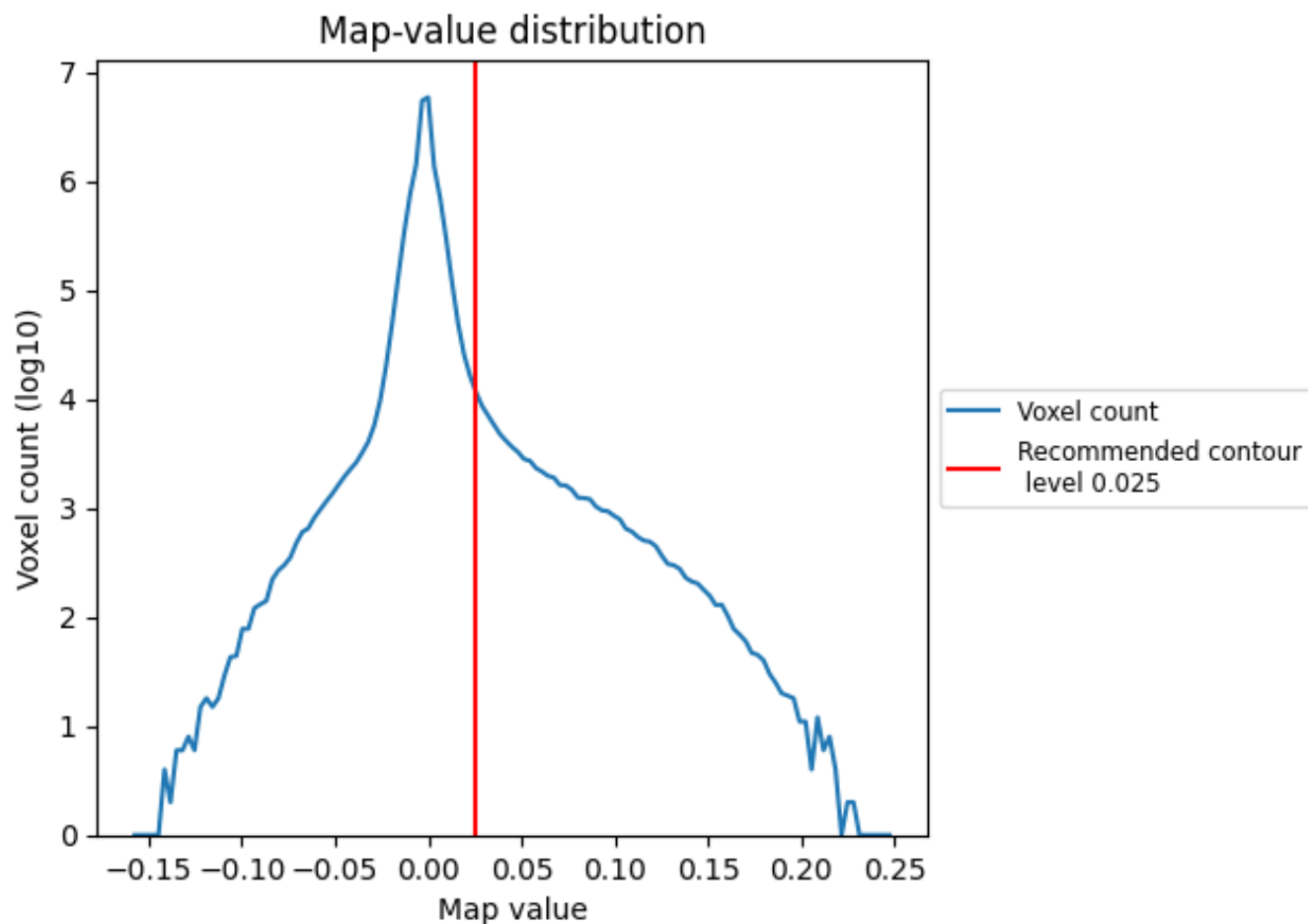
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

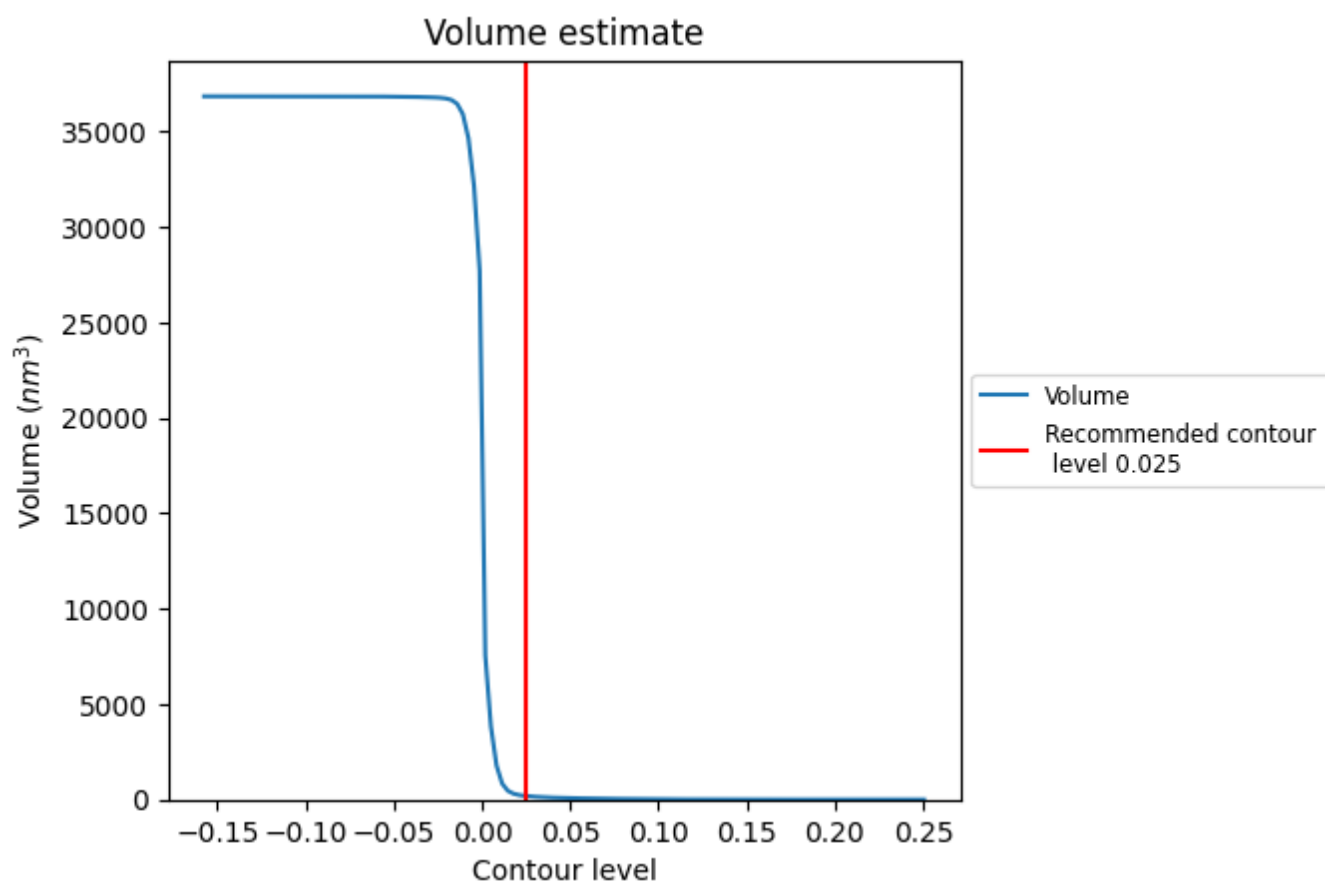
This section contains the results of statistical analysis of the map.

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.

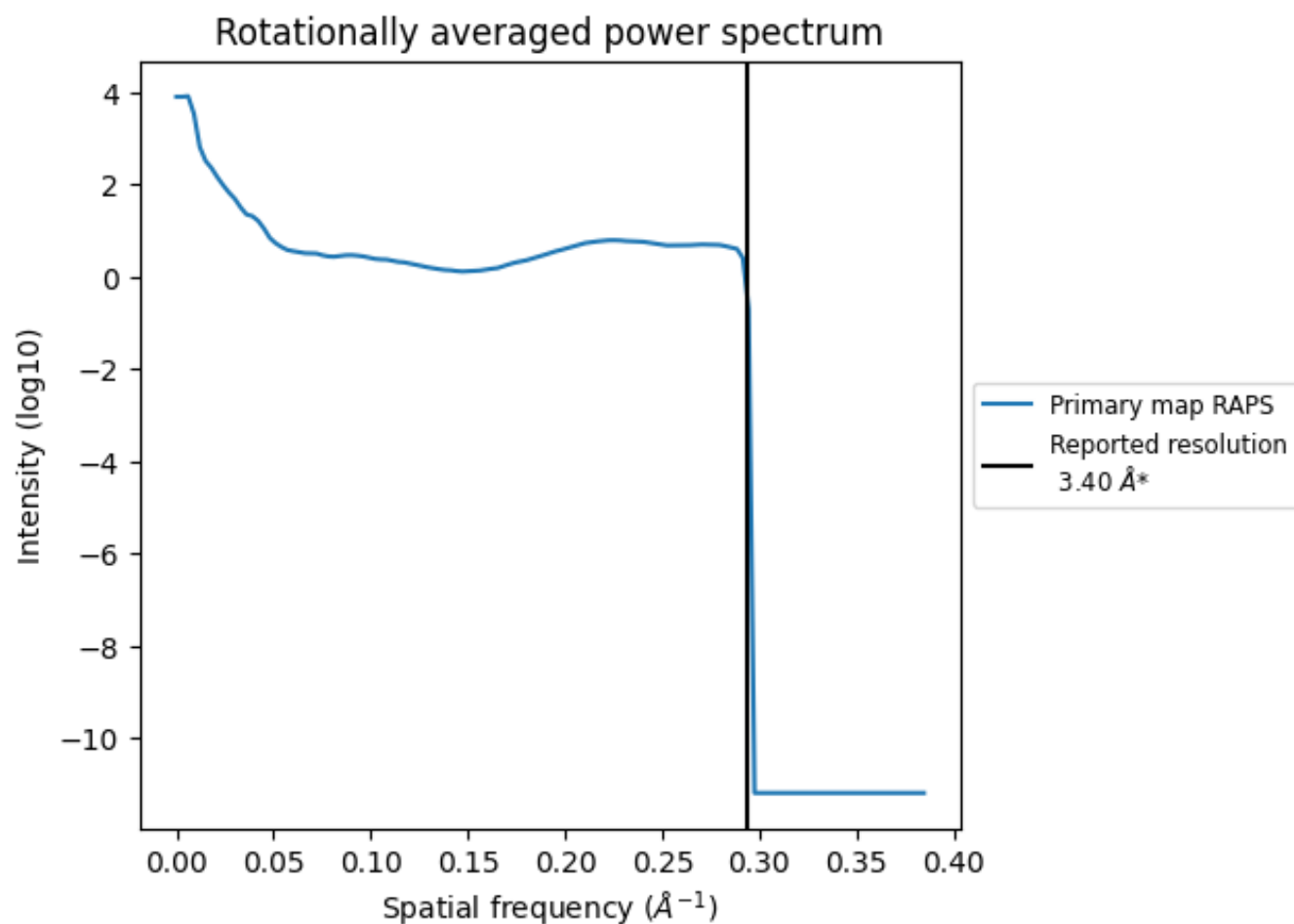
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 187 nm³; this corresponds to an approximate mass of 169 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum ⓘ

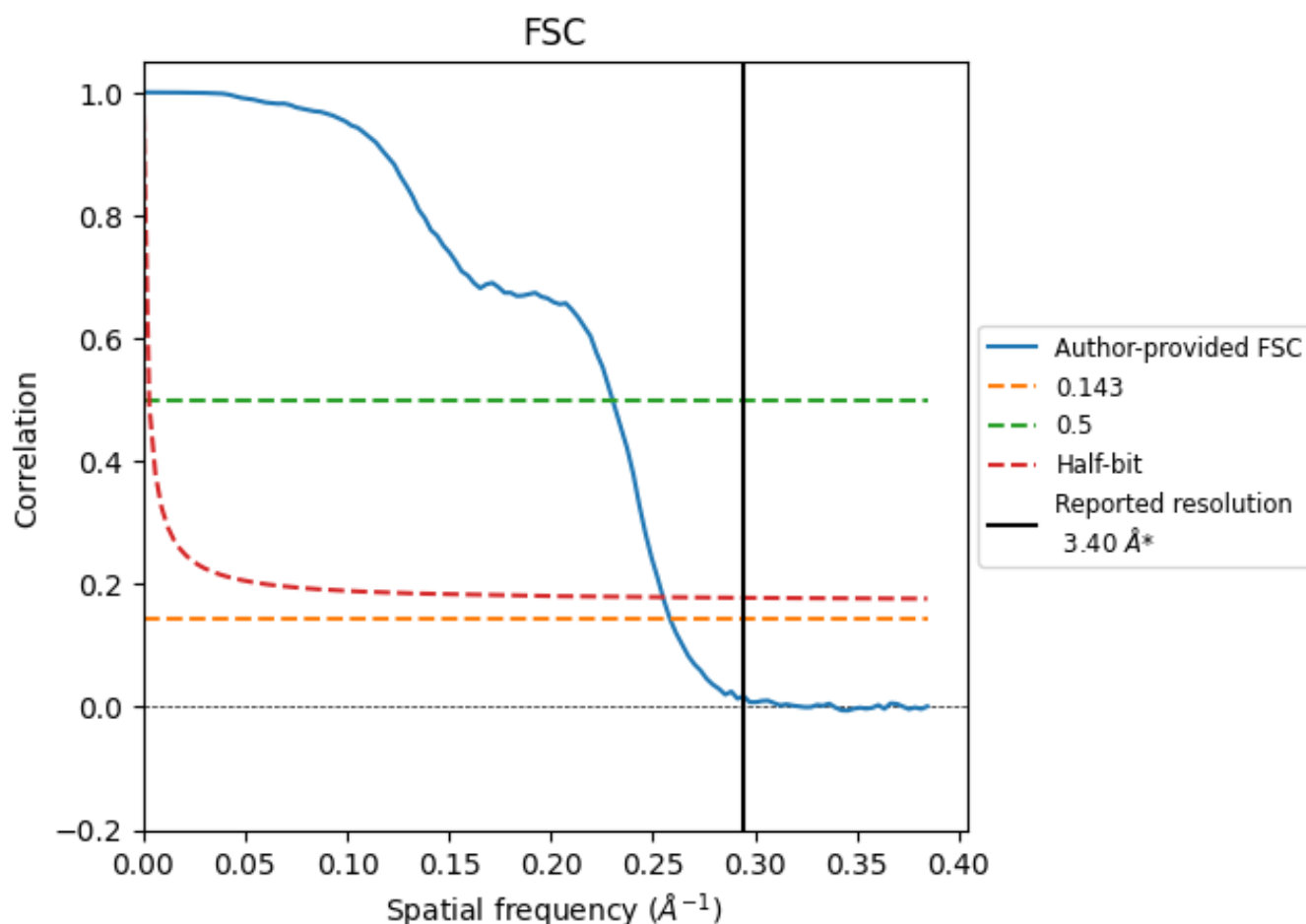


*Reported resolution corresponds to spatial frequency of 0.294 Å⁻¹

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 0.294 Å⁻¹

8.2 Resolution estimates [i](#)

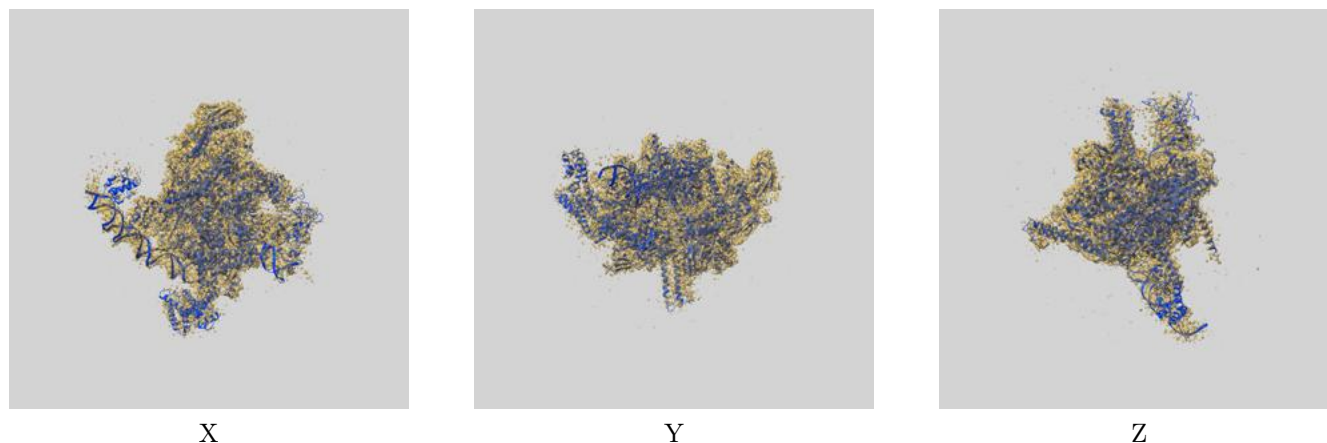
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	3.87	4.34	3.92
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from author-provided FSC intersecting FSC 0.143 CUT-OFF 3.87 differs from the reported value 3.4 by more than 10 %

9 Map-model fit [i](#)

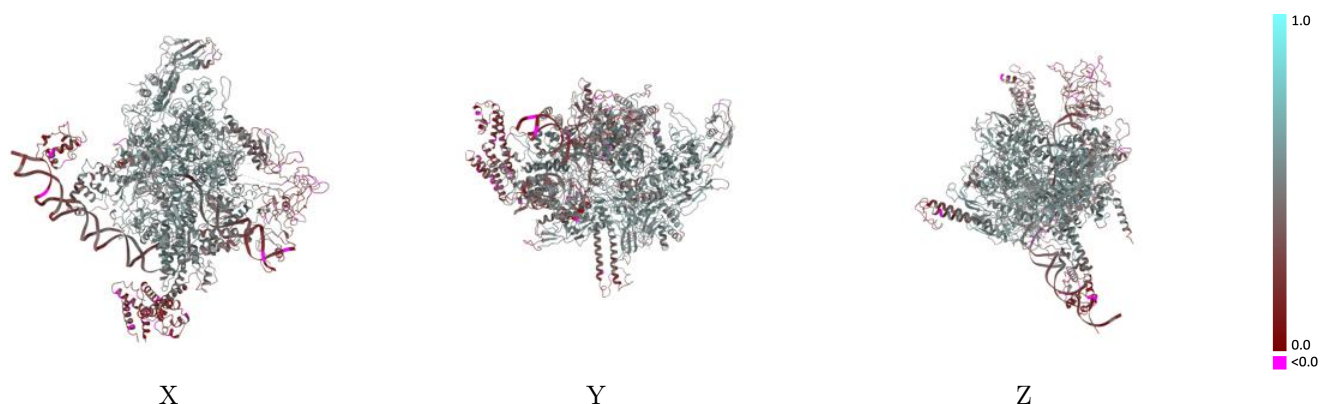
This section contains information regarding the fit between EMDB map EMD-20203 and PDB model 6OUL. Per-residue inclusion information can be found in [section 3](#) on [page 7](#).

9.1 Map-model overlay [i](#)



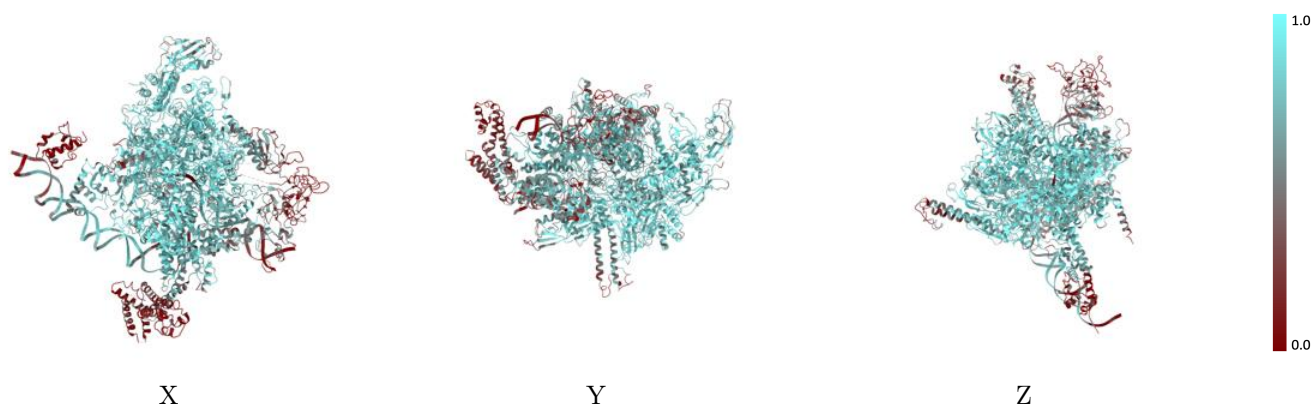
The images above show the 3D surface view of the map at the recommended contour level 0.025 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



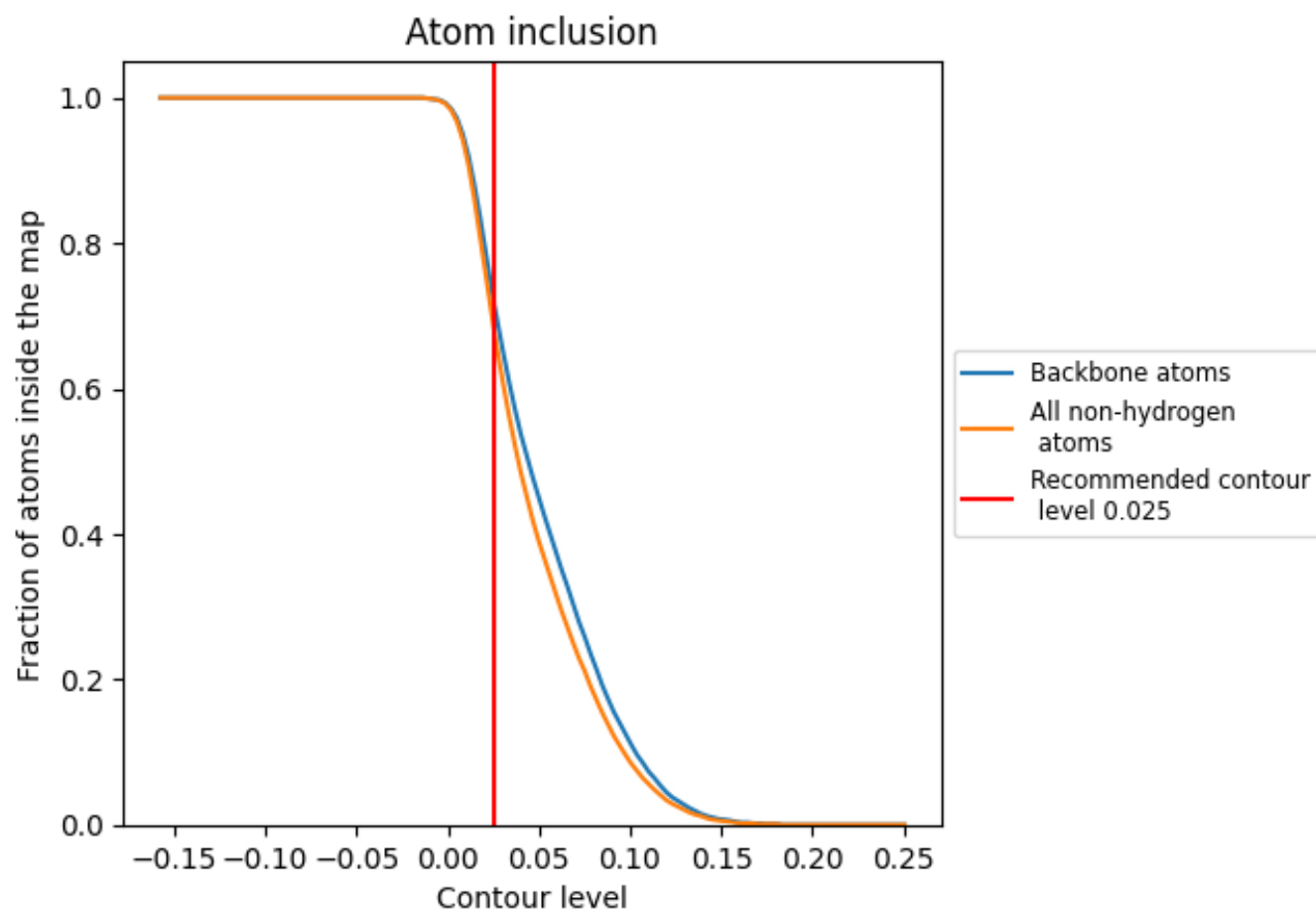
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.025).

9.4 Atom inclusion [i](#)



At the recommended contour level, 72% of all backbone atoms, 69% 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 (0.025) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6860	0.4600
G	0.7840	0.5150
H	0.7480	0.4900
I	0.7640	0.4990
J	0.7240	0.4850
K	0.6790	0.4830
L	0.5050	0.3730
P	0.5540	0.3180
Q	0.5380	0.2950
R	0.0770	0.2020

1.0

0.0

<0.0