



wwPDB EM Validation Summary Report ⓘ

Apr 24, 2023 – 12:24 PM JST

PDB ID : 8HSL
EMDB ID : EMD-35000
Title : Thermus thermophilus RNA polymerase bound with an inverted Rho hexamer
Authors : Murayama, Y.; Ehara, H.; Sekine, S.
Deposited on : 2022-12-19
Resolution : 5.80 Å (reported)

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

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<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:

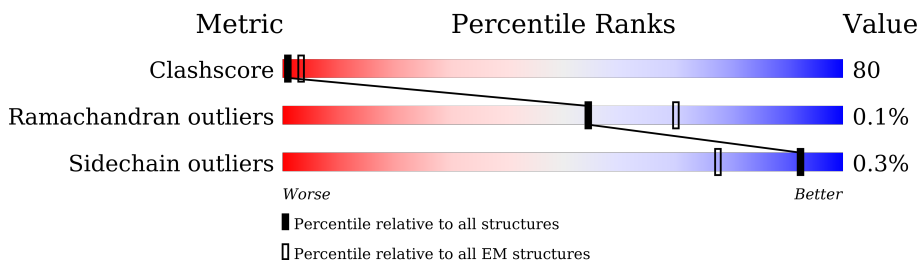
EMDB validation analysis : 0.0.1.dev50
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.32.2

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 5.80 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.



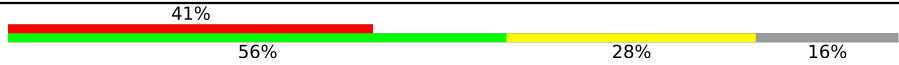


Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	315	
1	H	315	
2	I	1119	
3	J	1532	
4	K	99	
5	A	428	
5	B	428	
5	C	428	

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Mol	Chain	Length	Quality of chain
5	D	428	
5	E	428	
5	F	428	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
9	BEF	A	1002	-	-	X	-
9	BEF	F	1002	-	-	X	-

2 Entry composition i

There are 9 unique types of molecules in this entry. The entry contains 40350 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	G	229	Total	C	N	O	S	0	0
			1806	1153	313	337	3		
1	H	229	Total	C	N	O	S	0	0
			1806	1153	313	337	3		

- 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	1096	Total	C	N	O	S	0	0
			8644	5468	1543	1609	24		

- 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	1278	Total	C	N	O	S	0	0
			10078	6384	1783	1883	28		

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
J	1525	ASP	-	expression tag	UNP Q8RQE8
J	1526	TYR	-	expression tag	UNP Q8RQE8
J	1527	LYS	-	expression tag	UNP Q8RQE8
J	1528	ASP	-	expression tag	UNP Q8RQE8
J	1529	ASP	-	expression tag	UNP Q8RQE8
J	1530	ASP	-	expression tag	UNP Q8RQE8
J	1531	ASP	-	expression tag	UNP Q8RQE8
J	1532	LYS	-	expression tag	UNP Q8RQE8

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

Mol	Chain	Residues	Atoms					AltConf	Trace
4	K	95	Total	C	N	O	S	0	0
			770	491	133	142	4		

- Molecule 5 is a protein called Transcription termination factor Rho.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	A	361	Total	C	N	O	S	0	0
			2842	1790	517	528	7		
5	B	361	Total	C	N	O	S	0	0
			2842	1790	517	528	7		
5	C	361	Total	C	N	O	S	0	0
			2842	1790	517	528	7		
5	D	361	Total	C	N	O	S	0	0
			2842	1790	517	528	7		
5	E	361	Total	C	N	O	S	0	0
			2842	1790	517	528	7		
5	F	361	Total	C	N	O	S	0	0
			2842	1790	517	528	7		

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	expression tag	UNP Q5SJE9
A	0	PRO	-	expression tag	UNP Q5SJE9
B	-1	GLY	-	expression tag	UNP Q5SJE9
B	0	PRO	-	expression tag	UNP Q5SJE9
C	-1	GLY	-	expression tag	UNP Q5SJE9
C	0	PRO	-	expression tag	UNP Q5SJE9
D	-1	GLY	-	expression tag	UNP Q5SJE9
D	0	PRO	-	expression tag	UNP Q5SJE9
E	-1	GLY	-	expression tag	UNP Q5SJE9
E	0	PRO	-	expression tag	UNP Q5SJE9
F	-1	GLY	-	expression tag	UNP Q5SJE9
F	0	PRO	-	expression tag	UNP Q5SJE9

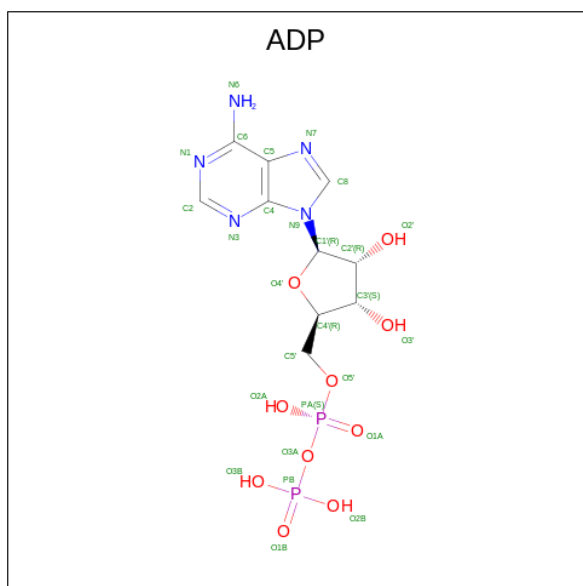
- Molecule 6 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
6	J	1	Total	Zn	0
			1	1	

- Molecule 7 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	AltConf
7	J	1	Total Mg 1 1	0
7	A	1	Total Mg 1 1	0
7	B	1	Total Mg 1 1	0
7	C	1	Total Mg 1 1	0
7	D	1	Total Mg 1 1	0
7	E	1	Total Mg 1 1	0
7	F	1	Total Mg 1 1	0

- Molecule 8 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



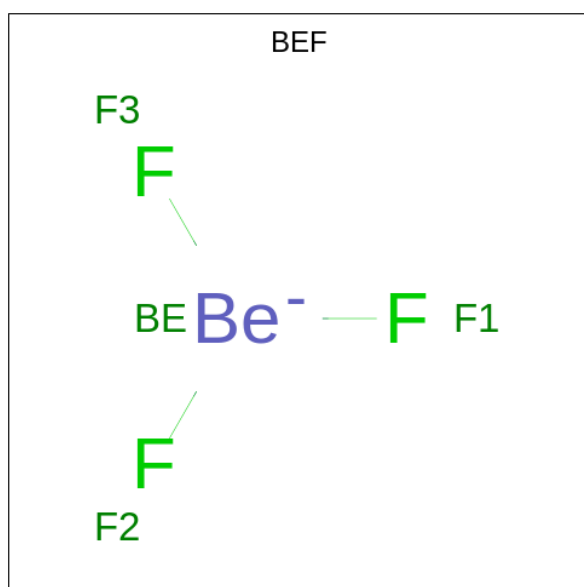
Mol	Chain	Residues	Atoms	AltConf
8	A	1	Total C N O P 27 10 5 10 2	0
8	B	1	Total C N O P 27 10 5 10 2	0
8	C	1	Total C N O P 27 10 5 10 2	0
8	D	1	Total C N O P 27 10 5 10 2	0

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Mol	Chain	Residues	Atoms				AltConf	
			Total	C	N	O		P
8	E	1	27	10	5	10	2	0
8	F	1	27	10	5	10	2	0

- Molecule 9 is BERYLLIUM TRIFLUORIDE ION (three-letter code: BEF) (formula: BeF₃).

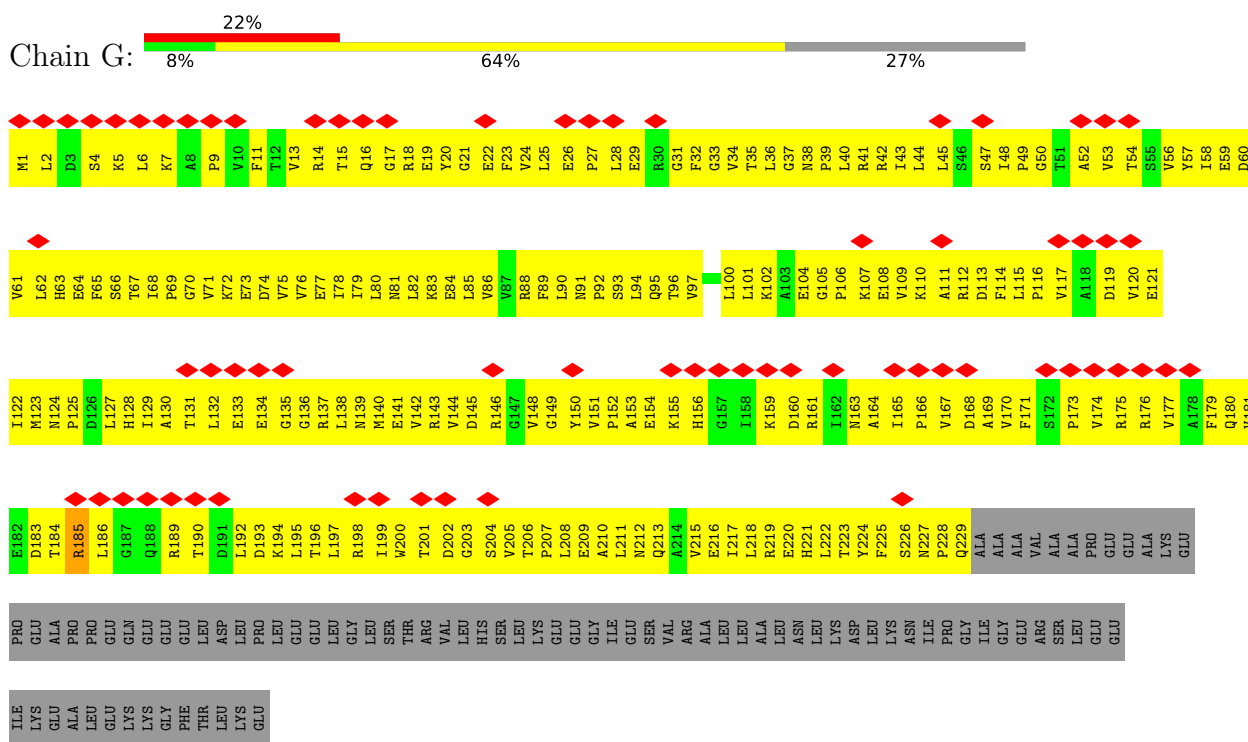


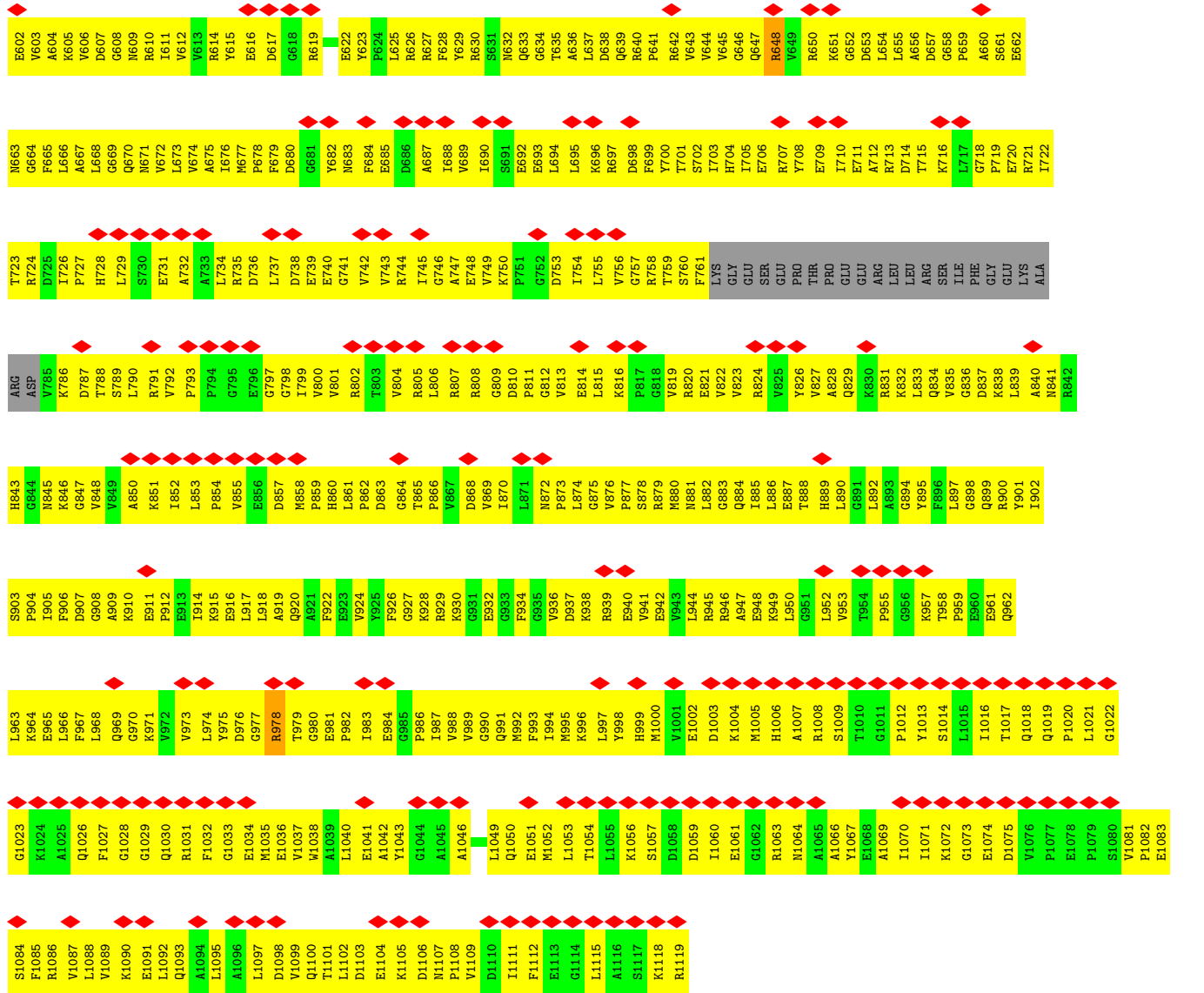
Mol	Chain	Residues	Atoms			AltConf
			Total	Be	F	
9	A	1	4	1	3	0
9	B	1	4	1	3	0
9	C	1	4	1	3	0
9	D	1	4	1	3	0
9	E	1	4	1	3	0
9	F	1	4	1	3	0

3 Residue-property plots

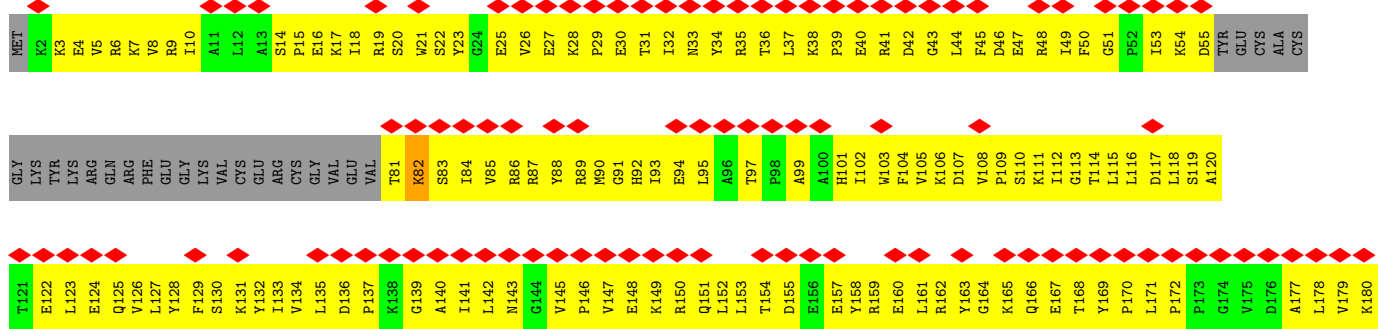
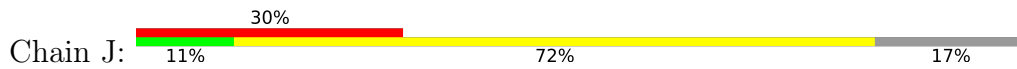
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

- Molecule 1: DNA-directed RNA polymerase subunit alpha



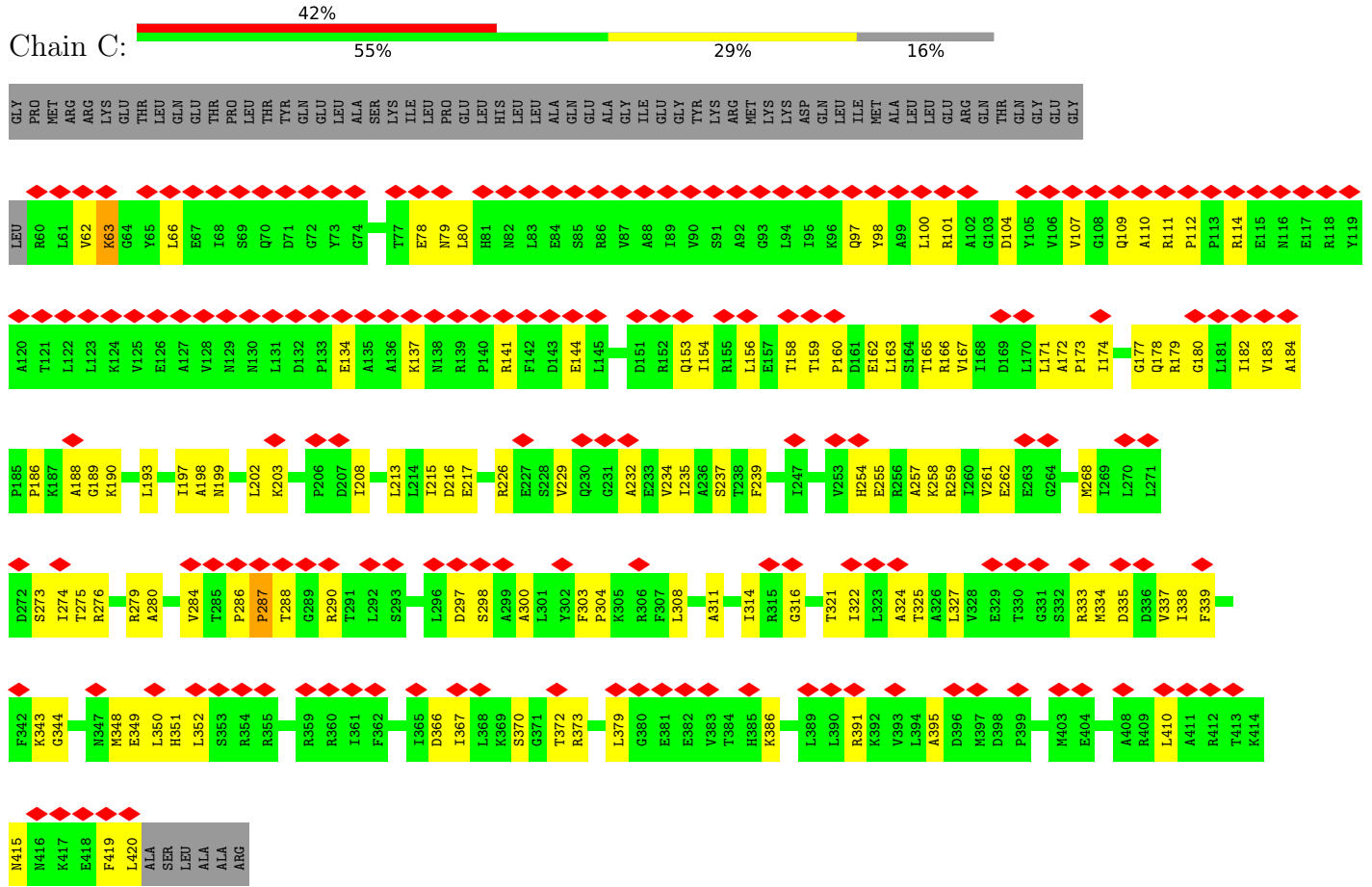


• Molecule 3: DNA-directed RNA polymerase subunit beta'

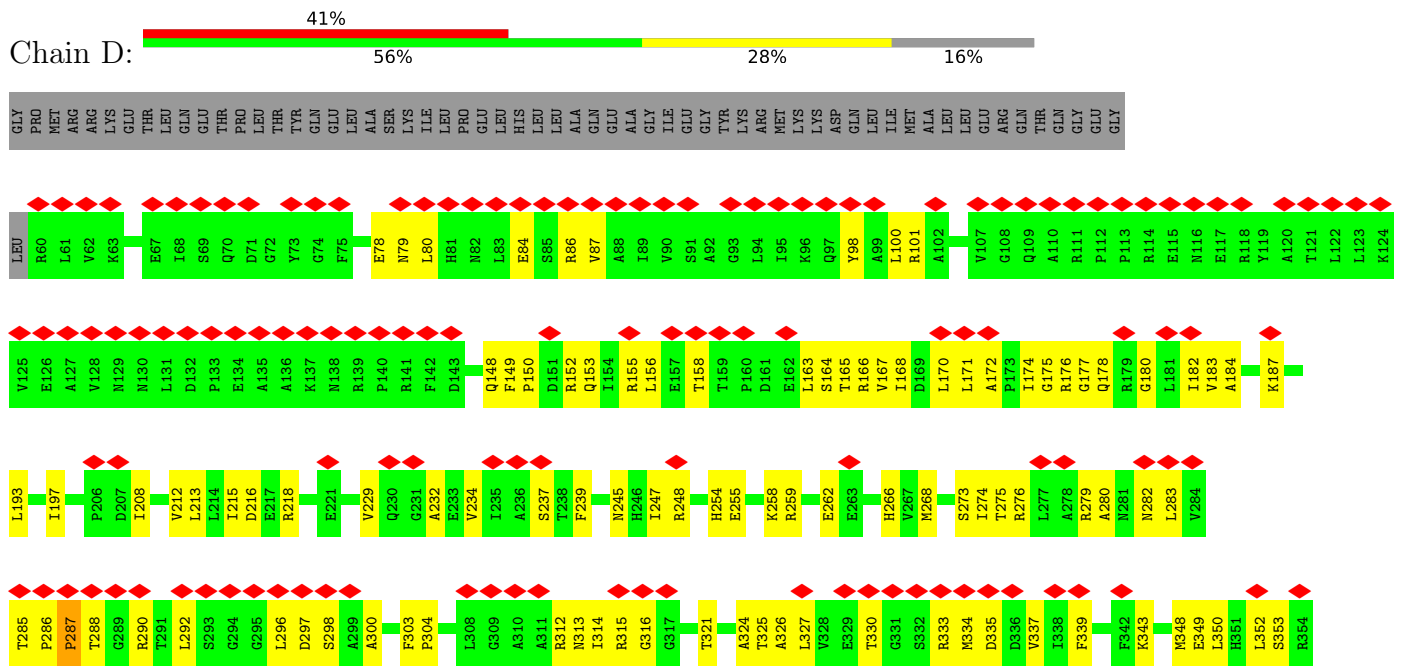


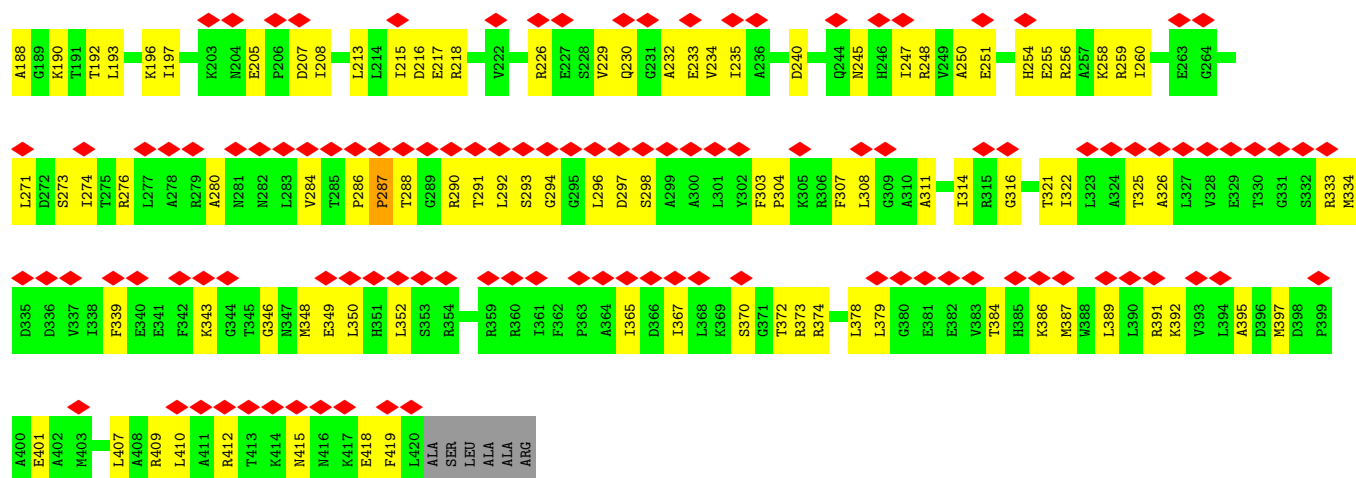
D181	G182	E183	E184	V185	V186	K187	G188	Q189	E190	L191	A192	P193	G194	V195	V196	S197	R198	L199	D200	G201	V202	A203	L204	Y205	R206	F207	PRO	ARG	ARG	ARG	VAL	VAL	GLU	GLU	TYR	VAL	VAL	LYS	LYS	GLU	ARG	ALA	GLY	LEU	LEU	ARG	LEU	PRO	PRO	LEU	ALA	ALA	TRP	VAL	GLU	LYS						
L421	A422	D423	G424	C425	K426	V427	K428	S429	D430	V431	Y432	G433	R434	V435	E436	V437	D438	L439	V440	R441	M442	V443	V444	R445	V446	V447	E448	S449	Y450	D451	L394	V395	V396	K397	A398	R399	R455	V400	Y401	P402	F403	E404	D405	D406	V407	E408	V409	S410	T411	G412	D413	L470	E471	A472	L473	E474	K475	E476	L477	L478	E480	
M481	K482	H483	P484	S485	R486	A487	R488	R489	A490	R493	K494	R495	G496	E497	V498	V499	R500	A501	F502	L503	D504	S505	G506	M507	R508	P509	E510	M511	M512	I513	L514	E515	A516	V517	P518	V519	L520	P521	P522	D523	L524	R525	P526	M527	V528	Q529	V530	D531	G532	G533	G534	R534	F535	A536	T537	S538	D539	N541				
D542	L543	Y544	R545	I666	L547	I548	R549	N550	N551	N552	R553	L554	K555	K556	L557	L558	A559	Q560	G561	A562	P563	E564	I565	I566	S626	G627	R568	M699	E570	K631	R572	M573	L574	Q575	E576	A577	V578	D579	A580	L581	D582	D583	N584	G585	R586	R587	G588	A589	P590	G591	G592	T592	N593	P594	G595	S596	D597	L600	R601			
S602	L603	T604	D605	I606	L607	S608	G609	K610	Q611	R612	R613	F614	R615	Q616	M617	L618	L619	G620	K621	R622	V623	D624	Y625	S626	G627	R628	S629	V630	V632	I631	R633	G634	P635	Q636	L637	K638	L639	H640	C641	G642	G643	L644	P645	R646	M648	A649	L650	E651	L652	G653	F653	K654	F655	L657	L658	K659	M661					
E662	E663	K664	G665	A667	P668	N669	M670	K671	A672	A673	R674	R675	M676	L677	E678	R679	Q680	R681	D682	I683	K684	D685	E686	V687	M688	D689	A690	L691	E692	L693	G694	I695	H696	G697	K698	V699	L700	L702	N703	R704	A705	P706	T707	L708	H709	R710	L711	G712	I713	T714	A715	F716	Q717	P718	V719	L720	W721					
E722	G723	Q724	S725	I726	Q727	L728	H729	P730	L731	W732	C733	F736	M737	A738	D739	F740	D741	G742	D743	M745	A746	W747	H748	V749	P750	L751	S752	S753	F754	A755	Q756	A757	E758	A759	R760	I761	Q762	M763	L764	A766	W768	L769	L770	S771	F772	A773	S774	G775	E776	P777	L778	A779	K780	P781	S782							
R783	D784	I785	I786	L787	G788	L789	Y790	Y791	I792	T793	Q794	V795	R796	K797	E798	R799	K800	G801	A802	G803	L804	E805	F806	A807	R808	P809	E810	F811	A812	L813	A814	A815	H816	E817	A759	R818	G819	E820	V821	A822	L823	N824	A825	P826	I827	K828	V829	A830	G831	R832	E833	T834	S835	V836	R837	R838	L839	Q801	Y841	V842		
P843	A844	N845	P846	D847	E848	K908	N909	L850	L851	L852	V853	A854	G855	G856	L857	V858	D859	L860	Q861	D862	V863	V864	T865	R867	Y868	M869	G870	K871	R872	L873	E874	T875	S876	P877	G878	R879	L880	L881	F882	A883	R884	L885	V886	A887	E888	A889	V890	E891	D892	E893	K894	V895	A896	W897	E898	P899	E958	P1019	L1020	K961	Q962	L902
D903	Y904	P905	Q906	E907	K908	N909	S910	L911	L912	D913	L914	Y915	G916	Q917	A918	F919	L920	R921	L922	G923	H924	E925	K926	A928	R929	L930	L931	D932	A933	L934	K935	Y936	G938	E939	F939	T940	F941	T1000	S942	T943	T944	S945	G946	I947	T948	I949	G950	I951	D952	D953	A954	V955	P1016	F1017	N1018	P1019	L1020	Y1021	I1022			
Y963	L964	E965	E966	A967	D968	R969	K970	L971	L972	Q973	L974	E975	Q976	A977	Y978	E979	M980	G981	F982	L983	T984	D985	R986	E987	R988	Y989	D990	Q991	I992	L995	V996	E998	T999	T1000	K1001	V1003	T1004	Q1005	A1006	V1007	F1008	K1009	N1010	F1011	E1012	E1013	N1014	Y1015	P1016	F1017	N1018	P1019	L1020	Y1021	I1022							

• Molecule 5: Transcription termination factor Rho



• Molecule 5: Transcription termination factor Rho





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	147189	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.023	Depositor
Minimum map value	-0.006	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.009	Depositor
Map size (\AA)	339.19998, 339.19998, 339.19998	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.06, 1.06, 1.06	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: ADP, MG, BEF, 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	0.33	0/1838	0.55	0/2498
1	H	0.30	0/1838	0.56	0/2498
2	I	0.30	0/8808	0.56	0/11910
3	J	0.31	0/10246	0.56	0/13842
4	K	0.28	0/784	0.53	0/1057
5	A	0.27	0/2886	0.57	0/3900
5	B	0.27	0/2886	0.56	0/3900
5	C	0.27	0/2886	0.55	0/3900
5	D	0.28	0/2886	0.56	0/3900
5	E	0.30	0/2886	0.60	0/3900
5	F	0.29	0/2886	0.58	0/3900
All	All	0.29	0/40830	0.56	0/55205

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	G	1806	0	1861	476	0
1	H	1806	0	1861	518	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	I	8644	0	8749	2224	0
3	J	10078	0	10316	2647	0
4	K	770	0	784	208	0
5	A	2842	0	2925	115	0
5	B	2842	0	2925	127	0
5	C	2842	0	2925	110	0
5	D	2842	0	2925	102	0
5	E	2842	0	2926	152	0
5	F	2842	0	2925	125	0
6	J	1	0	0	0	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
7	C	1	0	0	0	0
7	D	1	0	0	0	0
7	E	1	0	0	0	0
7	F	1	0	0	0	0
7	J	1	0	0	0	0
8	A	27	0	12	4	0
8	B	27	0	12	0	0
8	C	27	0	12	3	0
8	D	27	0	12	1	0
8	E	27	0	12	2	0
8	F	27	0	12	3	0
9	A	4	0	0	2	0
9	B	4	0	0	1	0
9	C	4	0	0	1	0
9	D	4	0	0	0	0
9	E	4	0	0	1	0
9	F	4	0	0	2	0
All	All	40350	0	41194	6511	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 80.

The worst 5 of 6511 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:J:699:VAL:HA	3:J:718:PRO:HD3	1.23	1.17
3:J:792:ILE:HG13	3:J:860:LEU:HD21	1.26	1.16
3:J:800:LYS:HE3	3:J:804:LEU:HB3	1.23	1.16
2:I:755:LEU:HB2	2:I:790:LEU:HG	1.15	1.14

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:151:VAL:HB	1:H:169:ALA:HB3	1.22	1.13

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	227/315 (72%)	211 (93%)	16 (7%)	0	100	100
1	H	227/315 (72%)	213 (94%)	14 (6%)	0	100	100
2	I	1092/1119 (98%)	975 (89%)	117 (11%)	0	100	100
3	J	1270/1532 (83%)	1138 (90%)	131 (10%)	1 (0%)	51	85
4	K	93/99 (94%)	87 (94%)	6 (6%)	0	100	100
5	A	359/428 (84%)	345 (96%)	13 (4%)	1 (0%)	41	76
5	B	359/428 (84%)	345 (96%)	13 (4%)	1 (0%)	41	76
5	C	359/428 (84%)	345 (96%)	13 (4%)	1 (0%)	41	76
5	D	359/428 (84%)	345 (96%)	13 (4%)	1 (0%)	41	76
5	E	359/428 (84%)	343 (96%)	15 (4%)	1 (0%)	41	76
5	F	359/428 (84%)	343 (96%)	15 (4%)	1 (0%)	41	76
All	All	5063/5948 (85%)	4690 (93%)	366 (7%)	7 (0%)	54	85

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	A	287	PRO
5	B	287	PRO
5	C	287	PRO
5	D	287	PRO
5	E	287	PRO

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	G	202/273 (74%)	201 (100%)	1 (0%)	88	93
1	H	202/273 (74%)	199 (98%)	3 (2%)	65	80
2	I	921/941 (98%)	918 (100%)	3 (0%)	92	94
3	J	1079/1287 (84%)	1075 (100%)	4 (0%)	91	94
4	K	84/88 (96%)	84 (100%)	0	100	100
5	A	304/359 (85%)	302 (99%)	2 (1%)	84	90
5	B	304/359 (85%)	304 (100%)	0	100	100
5	C	304/359 (85%)	303 (100%)	1 (0%)	92	94
5	D	304/359 (85%)	304 (100%)	0	100	100
5	E	304/359 (85%)	304 (100%)	0	100	100
5	F	304/359 (85%)	304 (100%)	0	100	100
All	All	4312/5016 (86%)	4298 (100%)	14 (0%)	92	94

5 of 14 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	J	525	ARG
3	J	1009	LYS
5	C	63	LYS
5	A	63	LYS
5	A	152	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 39 such sidechains are listed below:

Mol	Chain	Res	Type
3	J	1014	ASN
3	J	1489	GLN
3	J	1195	GLN
3	J	1353	GLN
4	K	37	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 20 ligands modelled in this entry, 8 are monoatomic - leaving 12 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	ADP	A	1000	9,7	24,29,29	0.92	1 (4%)	29,45,45	1.55	5 (17%)
8	ADP	C	1000	7	24,29,29	0.98	1 (4%)	29,45,45	1.61	5 (17%)
8	ADP	D	1000	7	24,29,29	0.95	1 (4%)	29,45,45	1.59	4 (13%)
8	ADP	F	1000	7	24,29,29	0.96	1 (4%)	29,45,45	1.53	4 (13%)
9	BEF	A	1002	8	0,3,3	-	-	-	-	-
9	BEF	C	1002	-	0,3,3	-	-	-	-	-
9	BEF	B	1002	8	0,3,3	-	-	-	-	-
9	BEF	E	1002	-	0,3,3	-	-	-	-	-
9	BEF	D	1002	-	0,3,3	-	-	-	-	-
8	ADP	B	1000	9,7	24,29,29	0.97	1 (4%)	29,45,45	1.46	4 (13%)
8	ADP	E	1000	7	24,29,29	0.98	1 (4%)	29,45,45	1.54	5 (17%)
9	BEF	F	1002	-	0,3,3	-	-	-	-	-

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	ADP	A	1000	9,7	-	0/12/32/32	0/3/3/3
8	ADP	C	1000	7	-	2/12/32/32	0/3/3/3
8	ADP	D	1000	7	-	2/12/32/32	0/3/3/3
8	ADP	F	1000	7	-	5/12/32/32	0/3/3/3
8	ADP	B	1000	9,7	-	3/12/32/32	0/3/3/3
8	ADP	E	1000	7	-	5/12/32/32	0/3/3/3

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	C	1000	ADP	C5-C4	2.47	1.47	1.40
8	B	1000	ADP	C5-C4	2.44	1.47	1.40
8	E	1000	ADP	C5-C4	2.40	1.47	1.40
8	D	1000	ADP	C5-C4	2.38	1.47	1.40
8	F	1000	ADP	C5-C4	2.36	1.47	1.40

The worst 5 of 27 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	D	1000	ADP	PA-O3A-PB	-4.26	118.22	132.83
8	C	1000	ADP	PA-O3A-PB	-4.16	118.55	132.83
8	A	1000	ADP	PA-O3A-PB	-3.82	119.72	132.83
8	A	1000	ADP	N3-C2-N1	-3.74	122.83	128.68
8	C	1000	ADP	C3'-C2'-C1'	3.74	106.60	100.98

There are no chirality outliers.

5 of 17 torsion outliers are listed below:

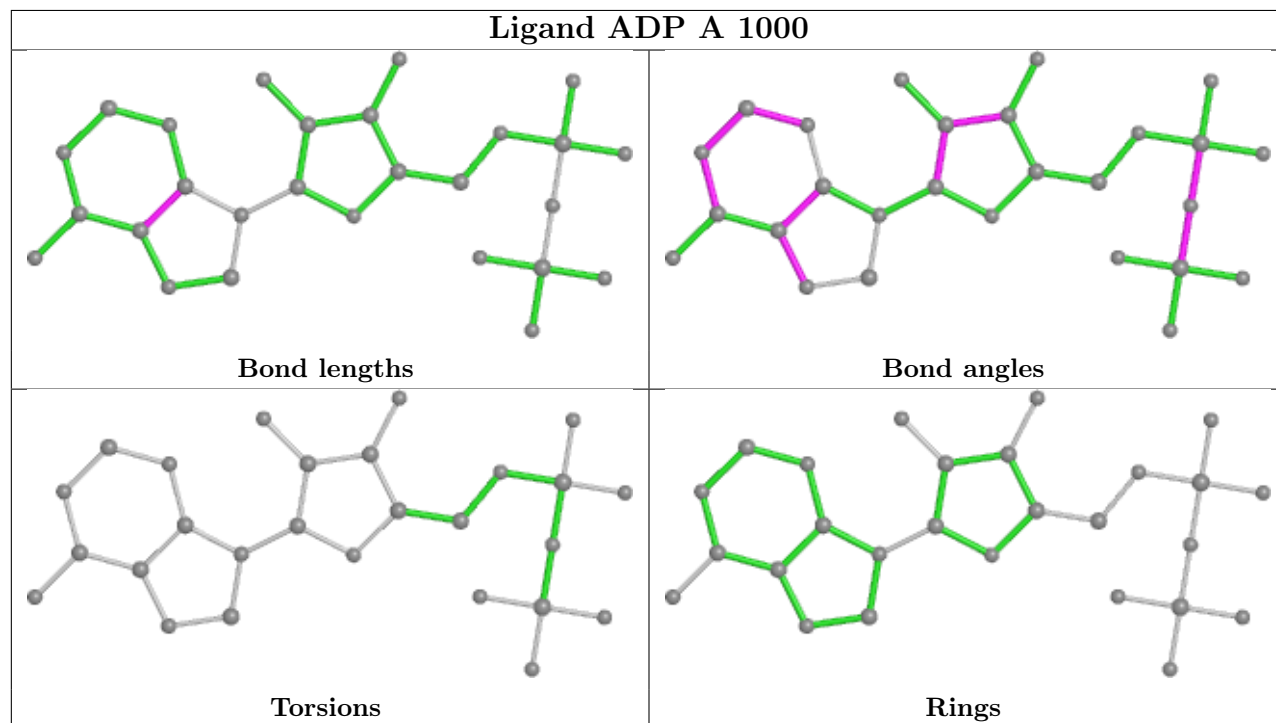
Mol	Chain	Res	Type	Atoms
8	B	1000	ADP	C5'-O5'-PA-O1A
8	B	1000	ADP	C5'-O5'-PA-O2A
8	B	1000	ADP	C5'-O5'-PA-O3A
8	C	1000	ADP	C5'-O5'-PA-O1A
8	E	1000	ADP	C5'-O5'-PA-O1A

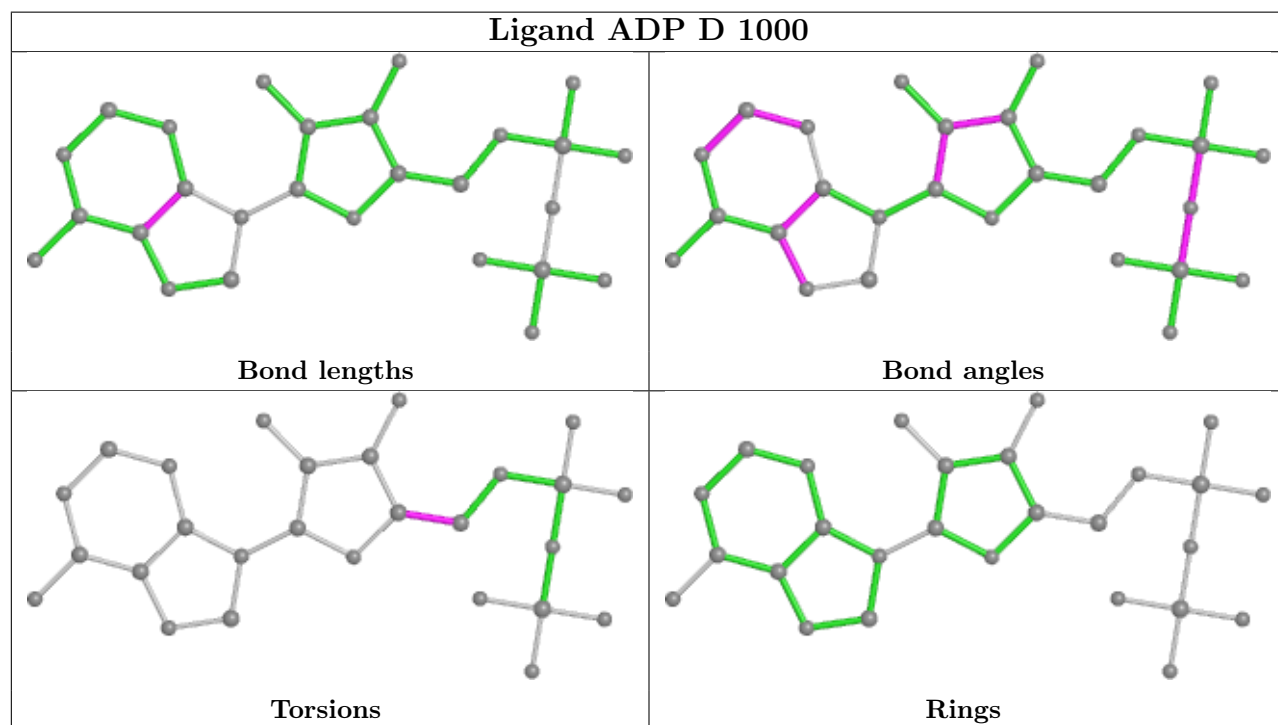
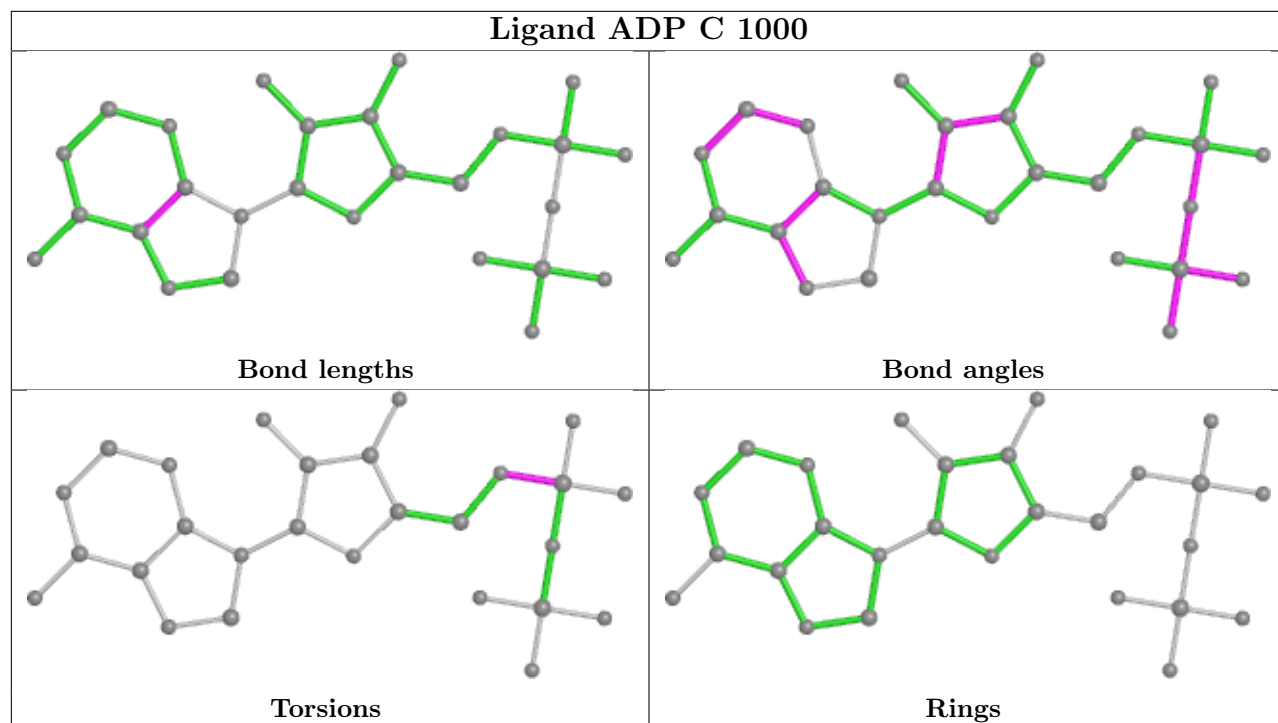
There are no ring outliers.

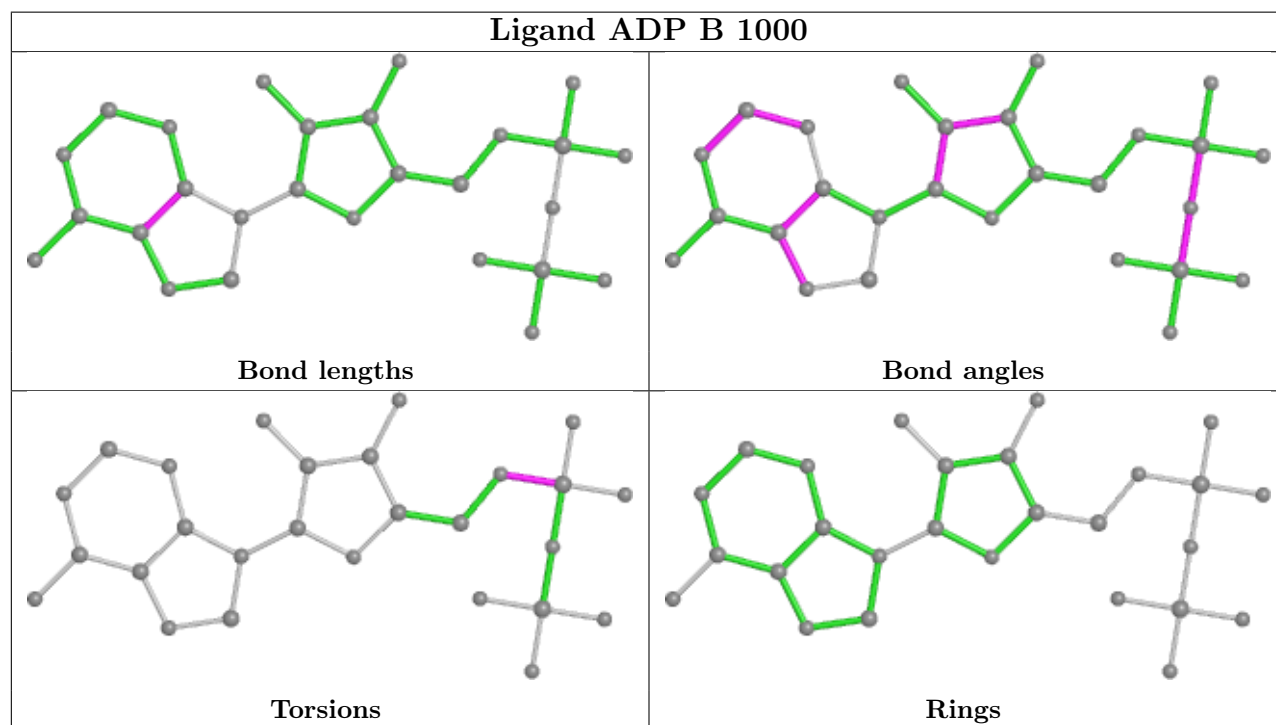
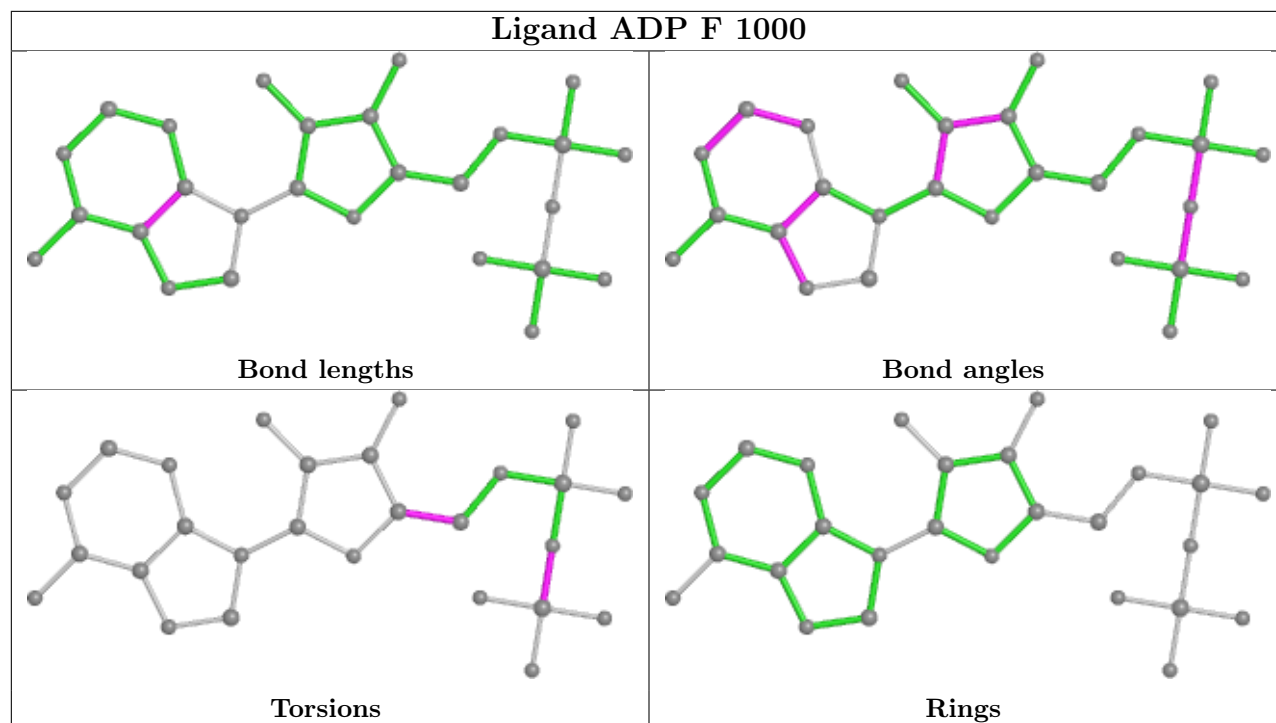
10 monomers are involved in 16 short contacts:

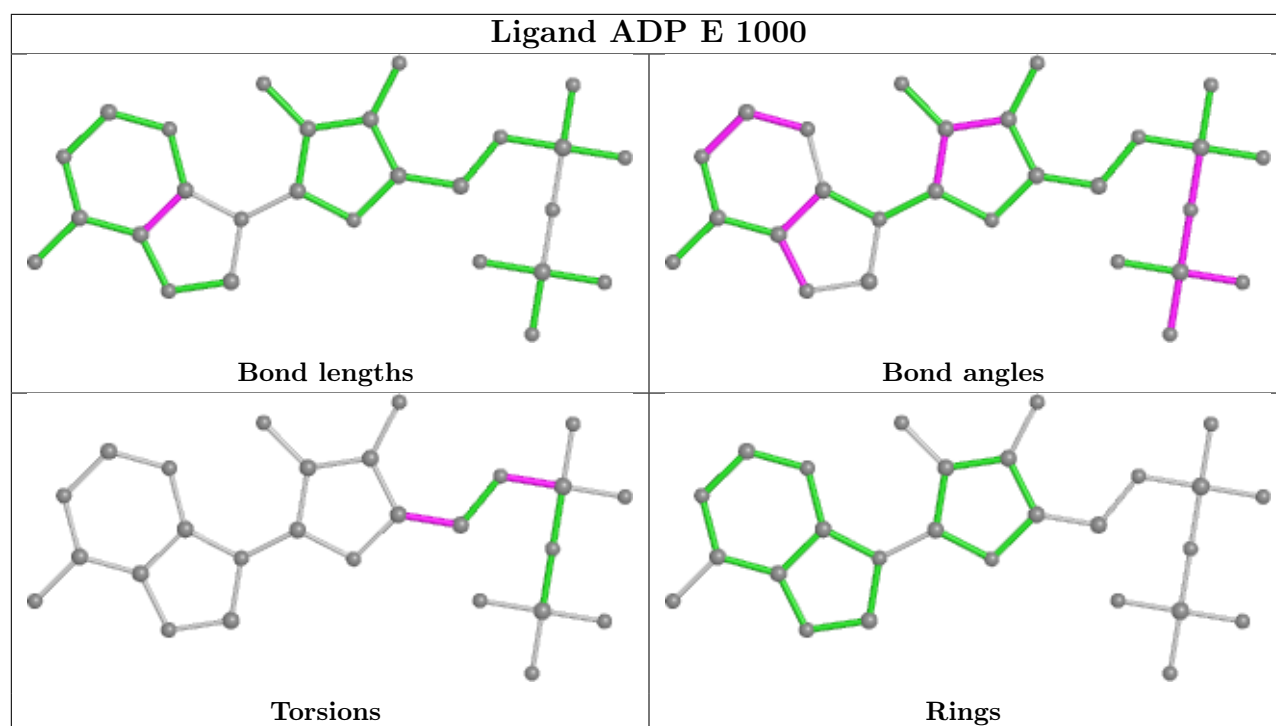
Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	A	1000	ADP	4	0
8	C	1000	ADP	3	0
8	D	1000	ADP	1	0
8	F	1000	ADP	3	0
9	A	1002	BEF	2	0
9	C	1002	BEF	1	0
9	B	1002	BEF	1	0
9	E	1002	BEF	1	0
8	E	1000	ADP	2	0
9	F	1002	BEF	2	0

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 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.

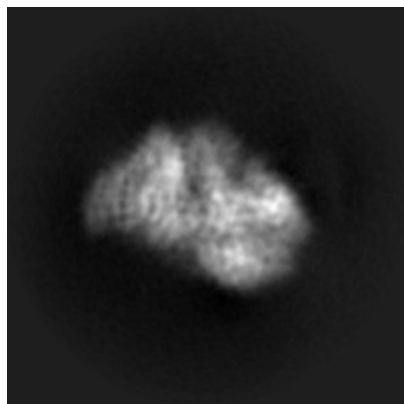
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-35000. These allow visual inspection of the internal detail of the map and identification of artifacts.

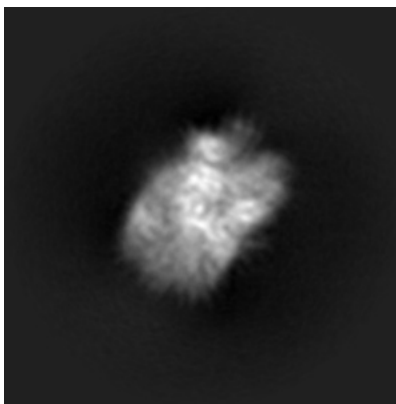
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

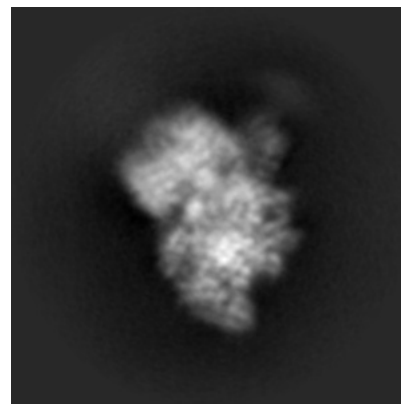
6.1.1 Primary map



X

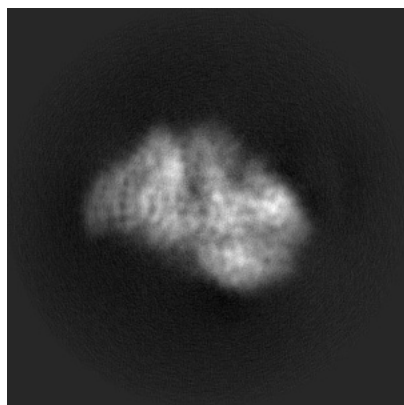


Y

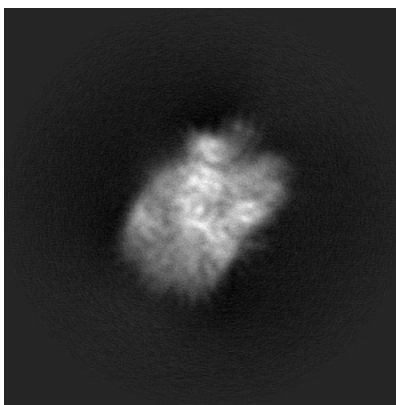


Z

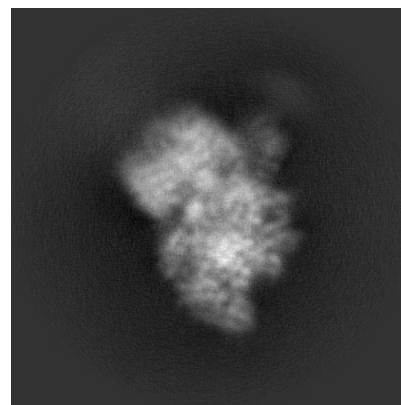
6.1.2 Raw map



X



Y

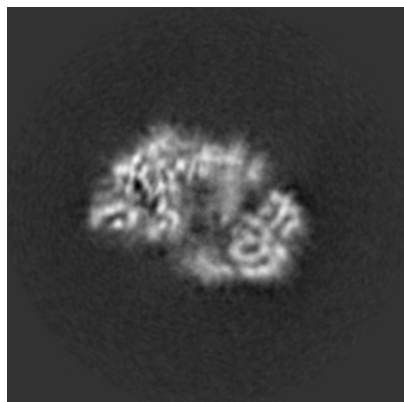


Z

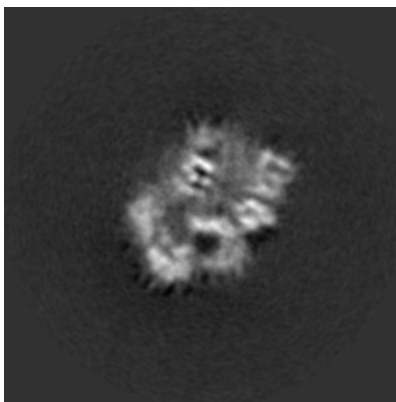
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

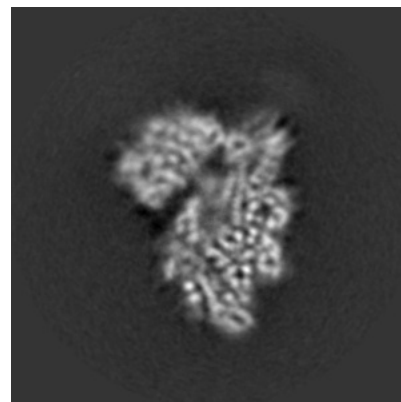
6.2.1 Primary map



X Index: 160

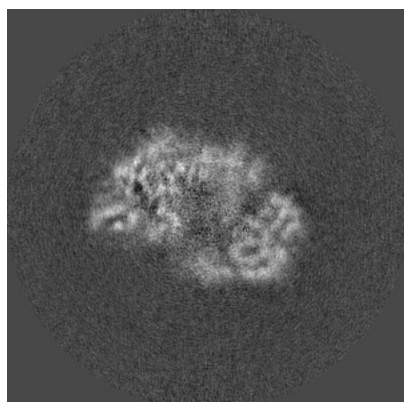


Y Index: 160

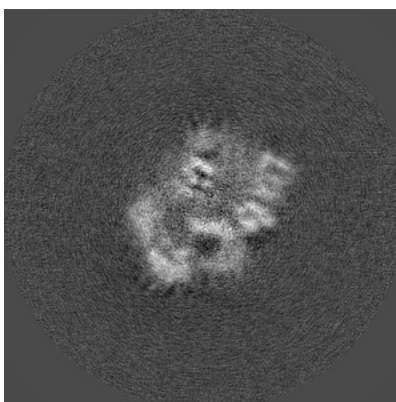


Z Index: 160

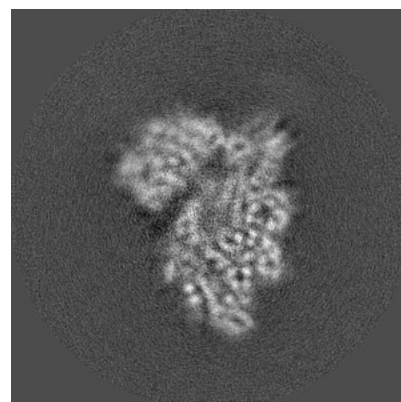
6.2.2 Raw map



X Index: 160



Y Index: 160

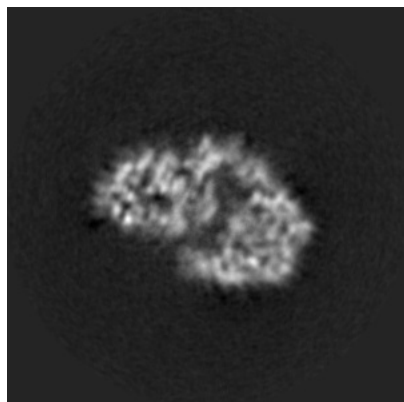


Z Index: 160

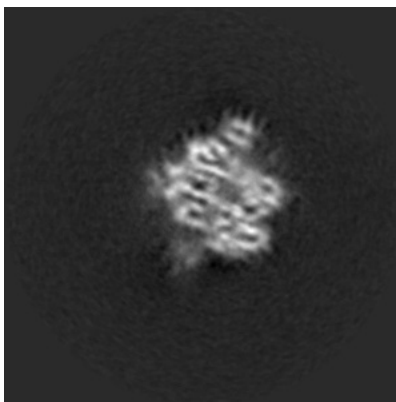
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

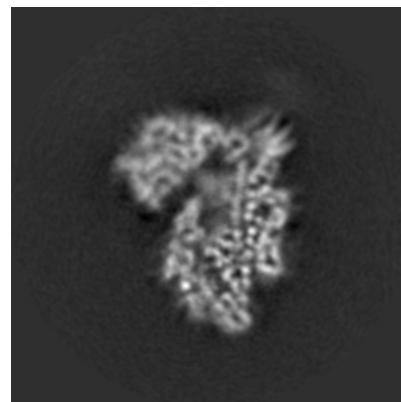
6.3.1 Primary map



X Index: 149

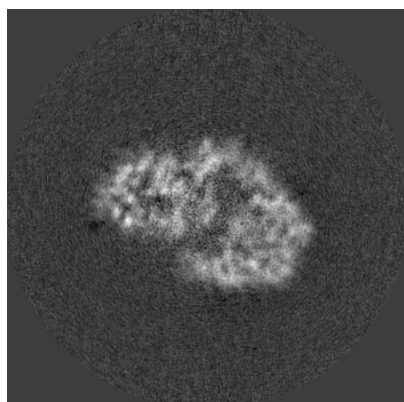


Y Index: 132

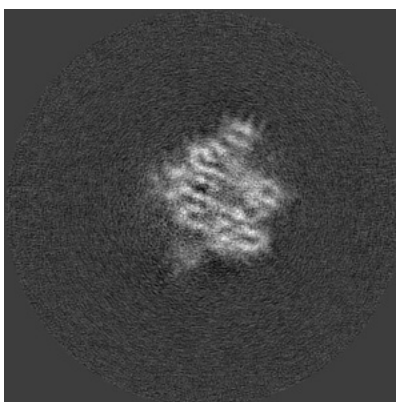


Z Index: 163

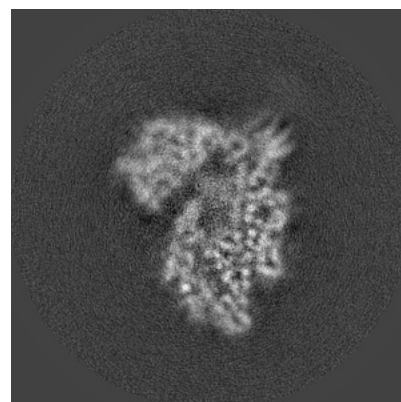
6.3.2 Raw map



X Index: 149



Y Index: 133

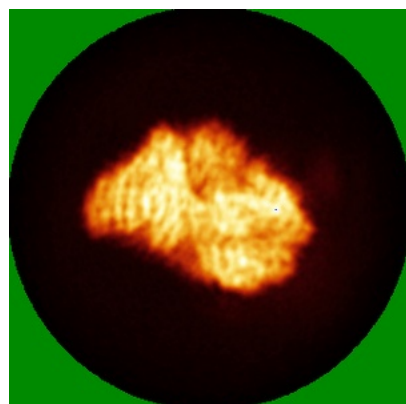


Z Index: 163

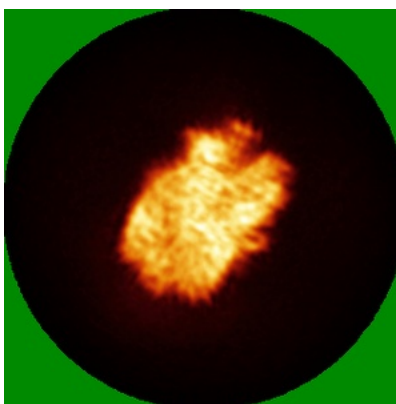
The images above show the largest variance slices of the map in three orthogonal directions.

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

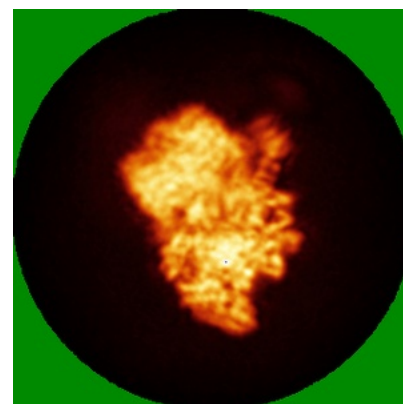
6.4.1 Primary map



X

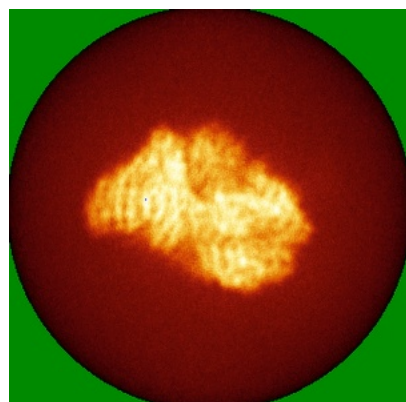


Y

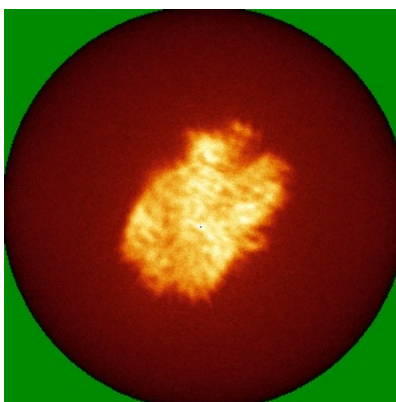


Z

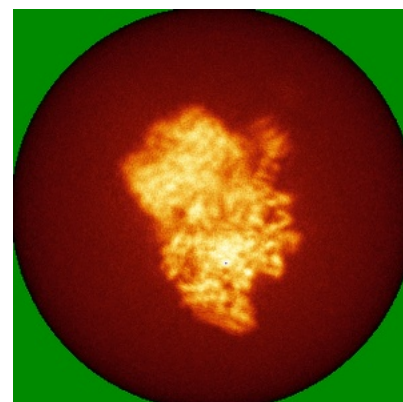
6.4.2 Raw map



X



Y

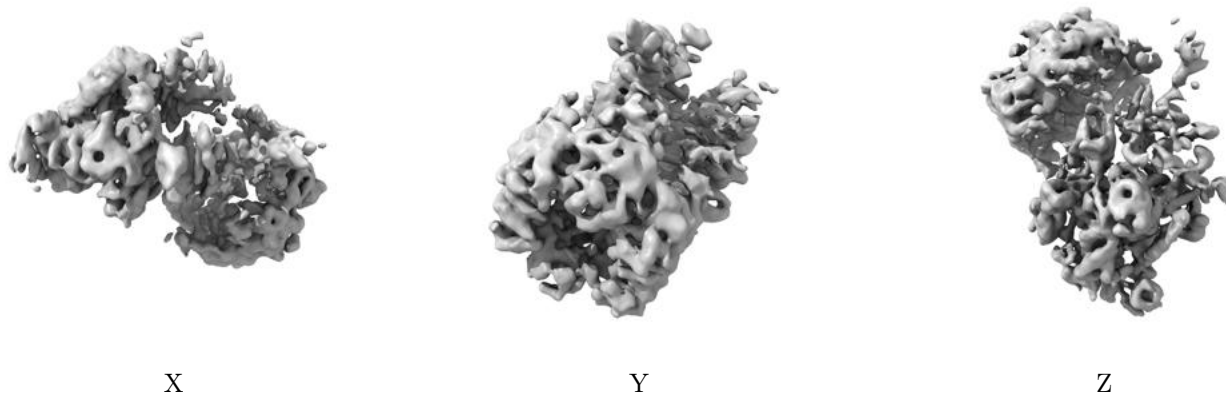


Z

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

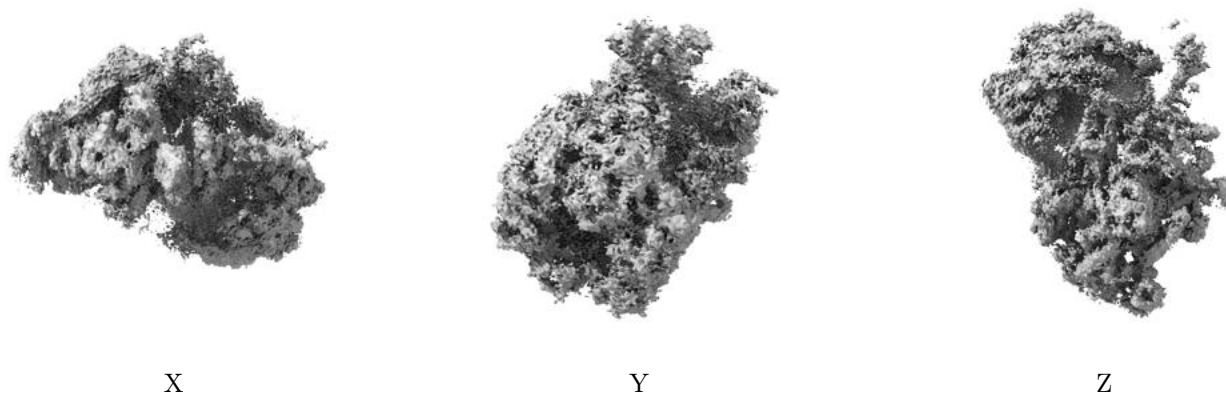
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.009. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



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

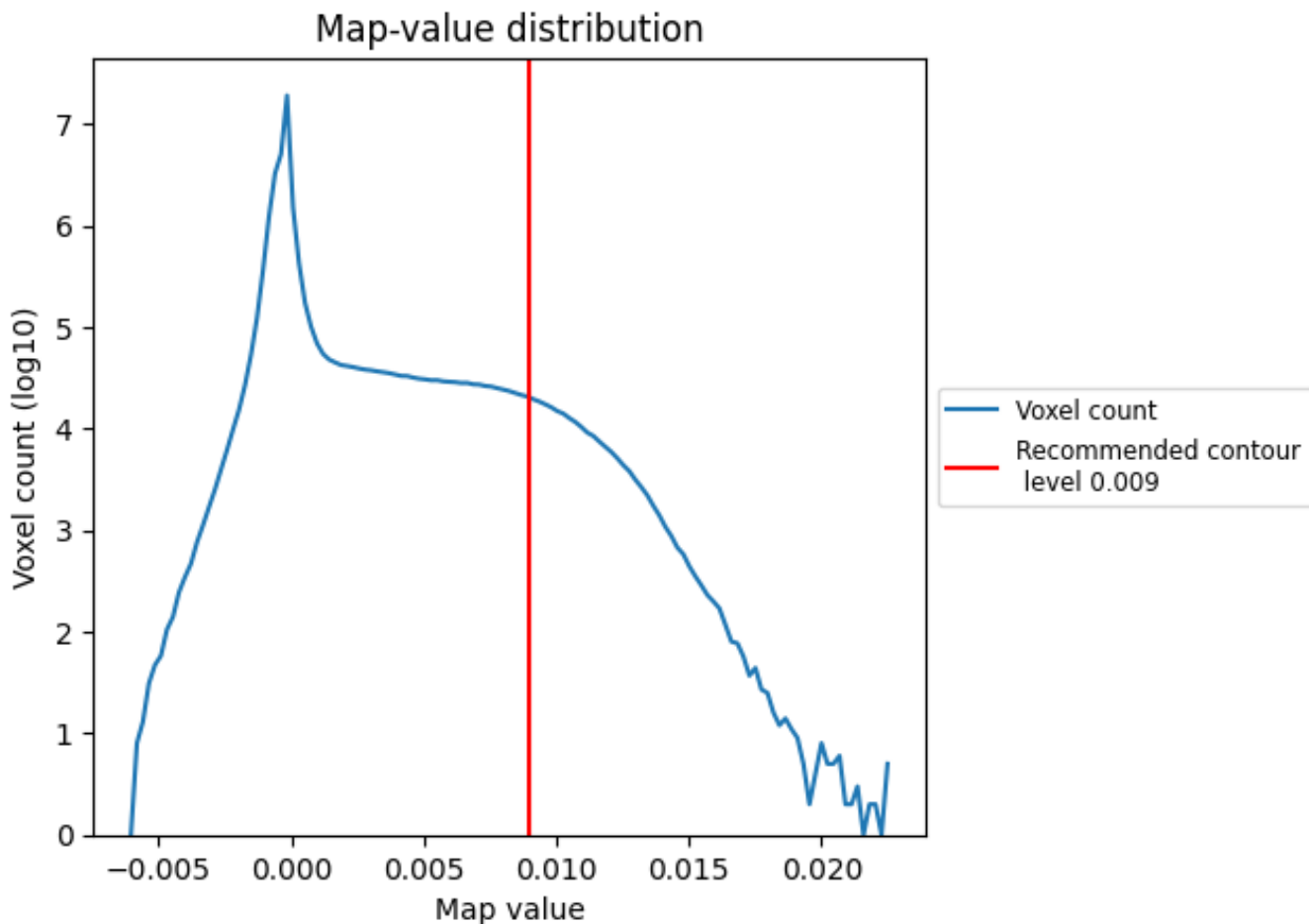
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

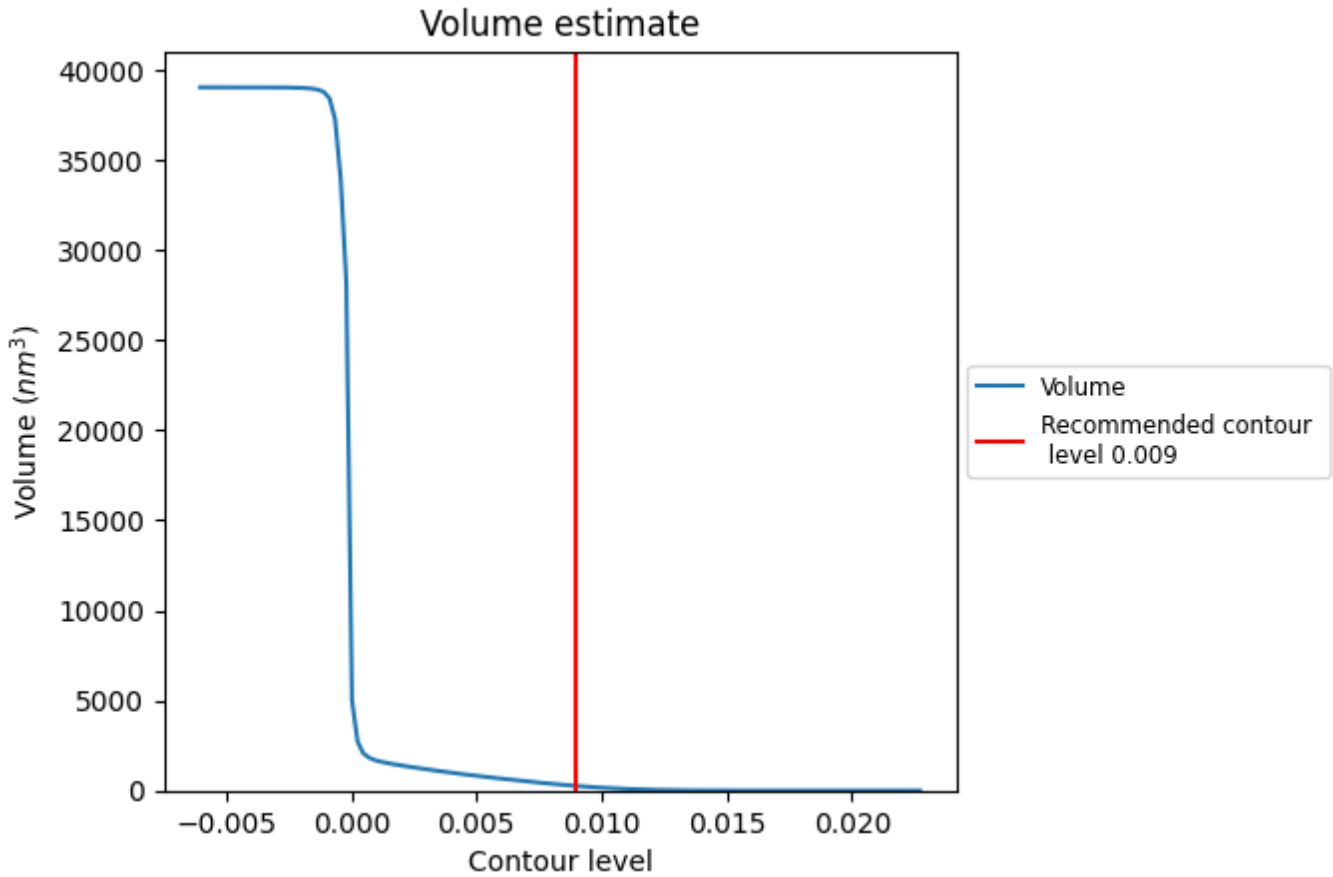
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

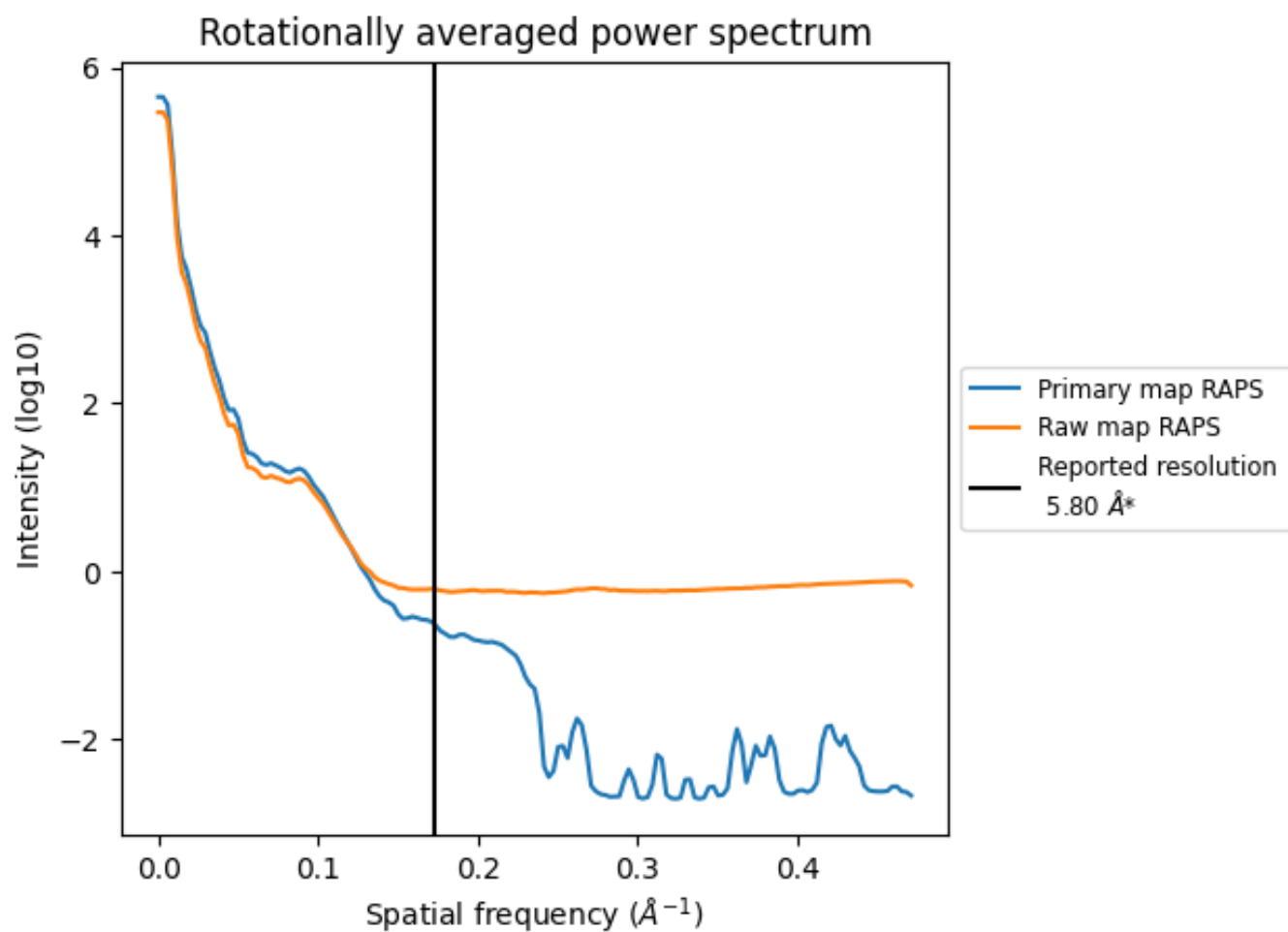
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 256 nm³; this corresponds to an approximate mass of 231 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](#)

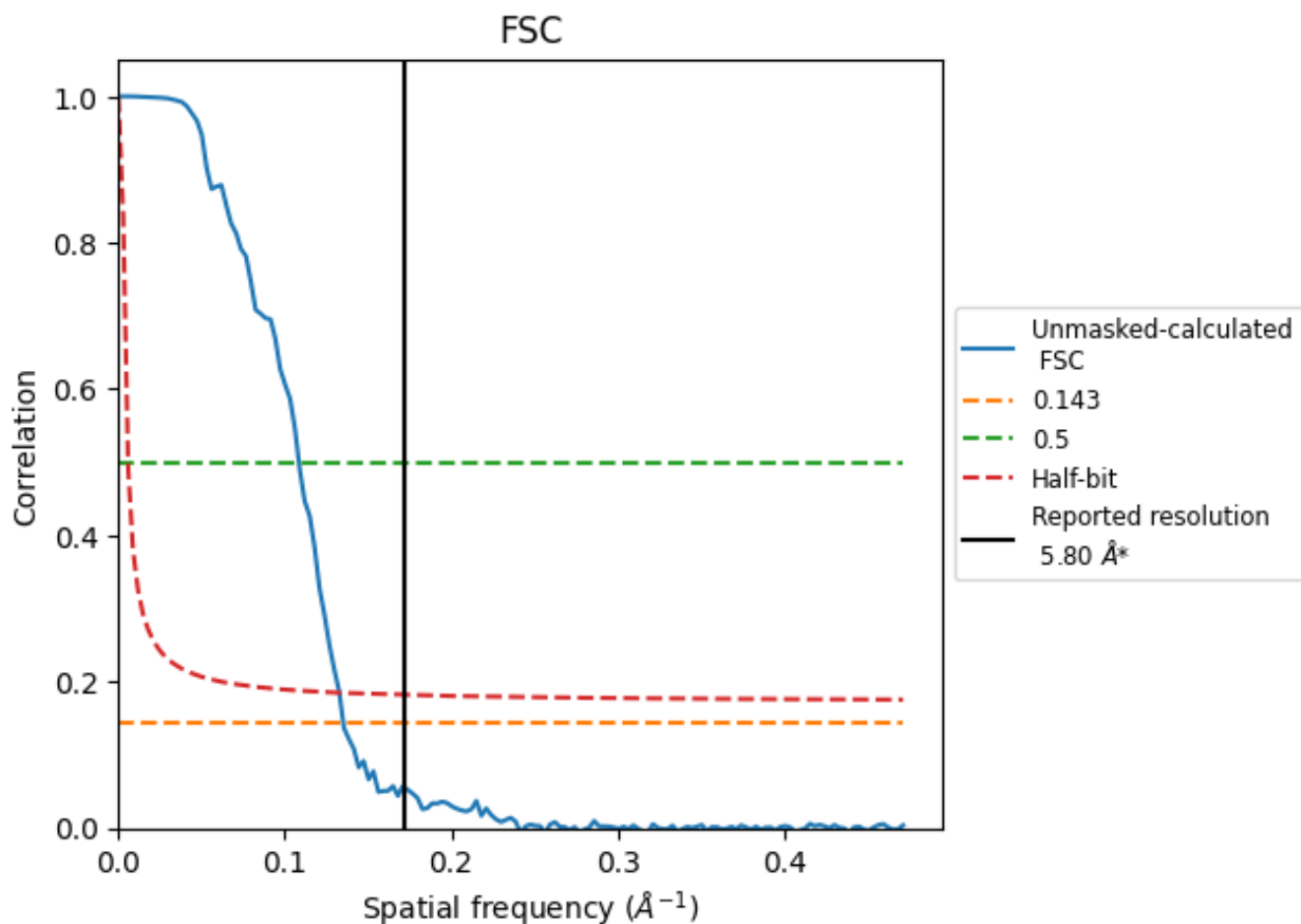


*Reported resolution corresponds to spatial frequency of 0.172 Å⁻¹

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 0.172 Å⁻¹

8.2 Resolution estimates [i](#)

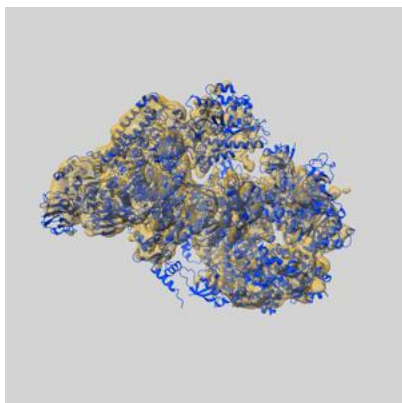
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	5.80	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	7.40	9.22	7.53

*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 7.40 differs from the reported value 5.8 by more than 10 %

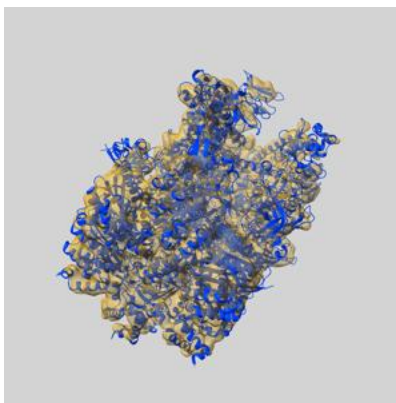
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-35000 and PDB model 8HSL. Per-residue inclusion information can be found in section 3 on page 8.

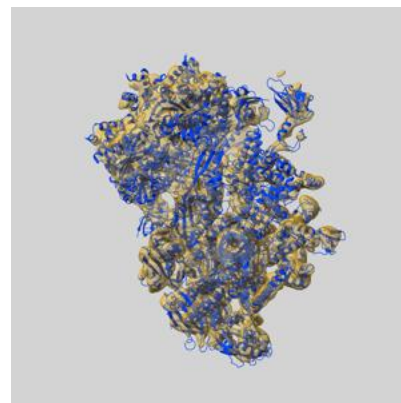
9.1 Map-model overlay [i](#)



X



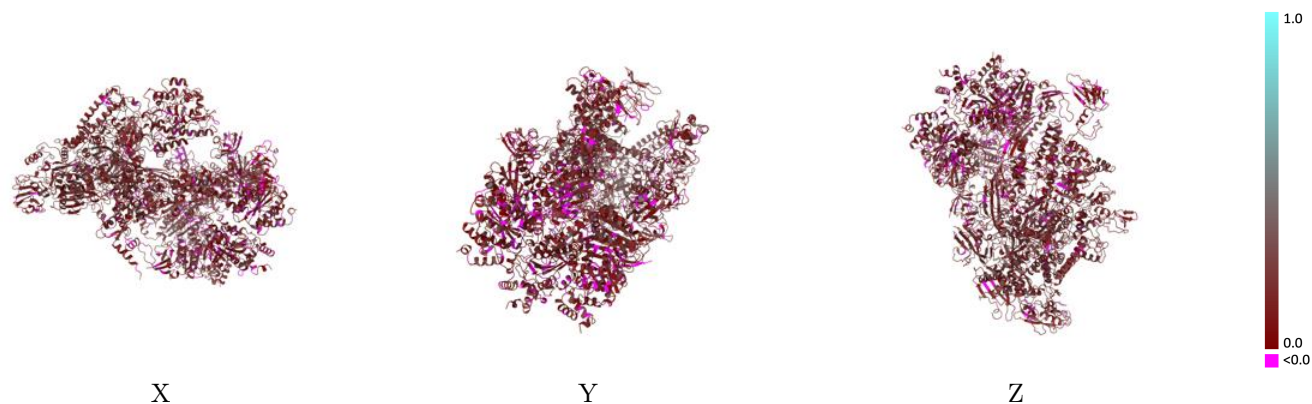
Y



Z

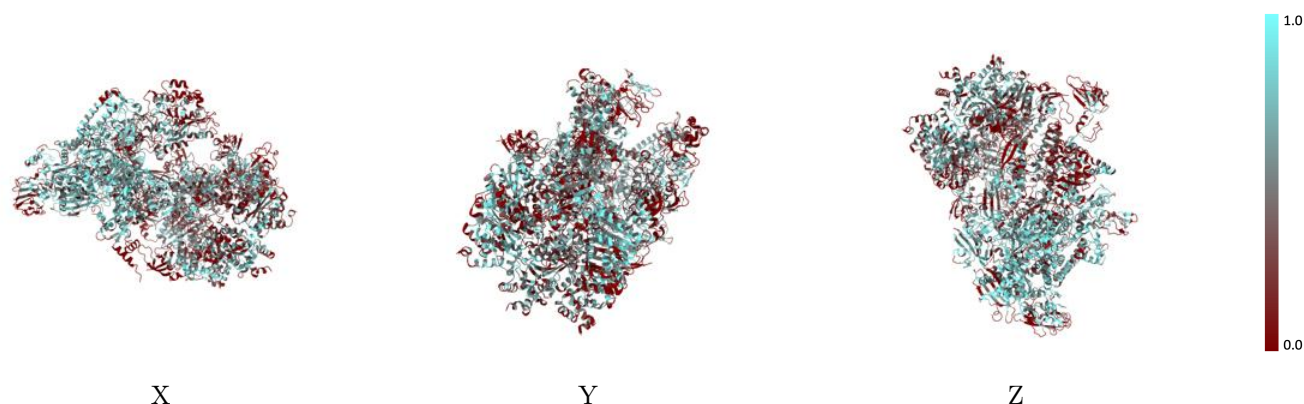
The images above show the 3D surface view of the map at the recommended contour level 0.009 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



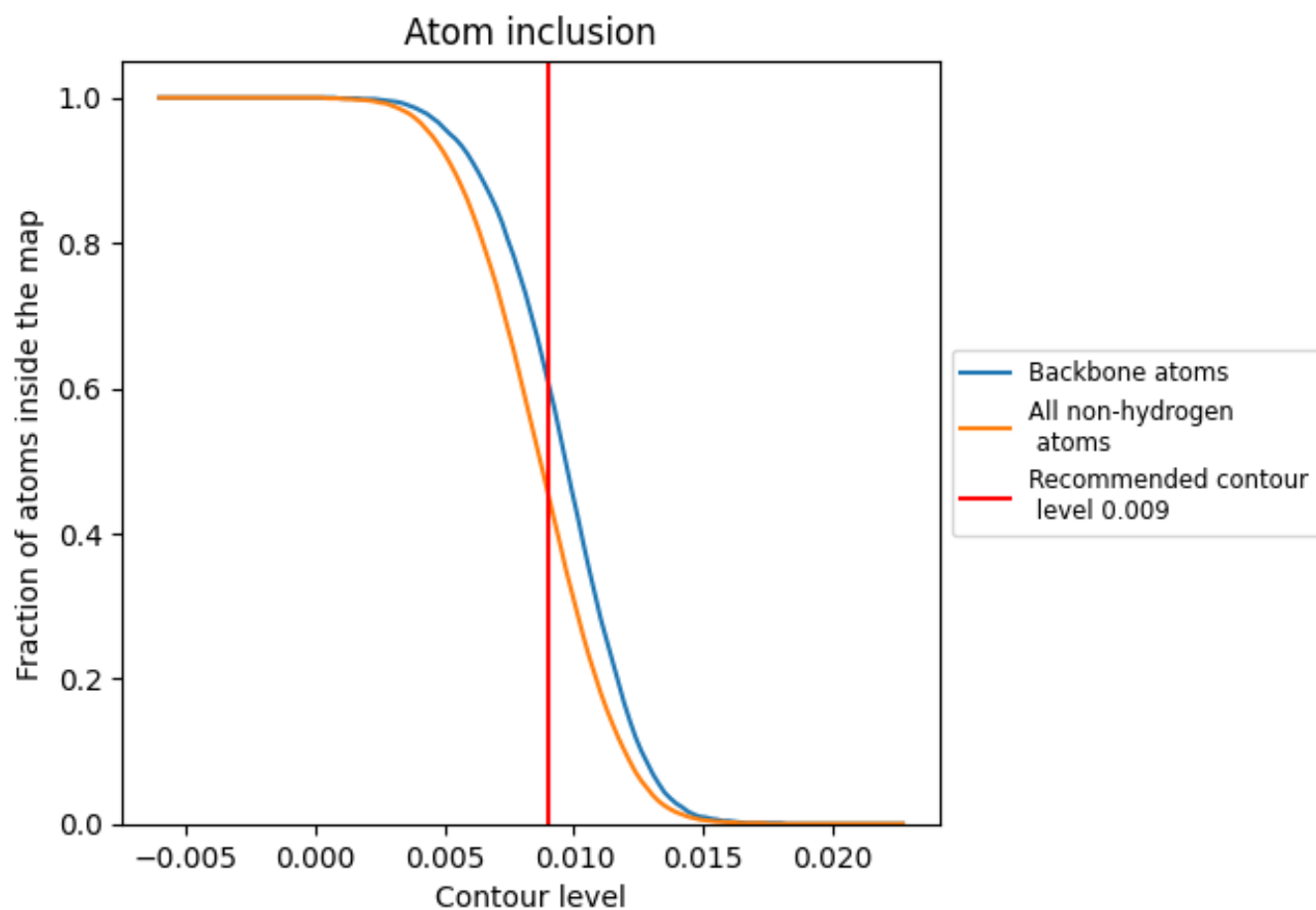
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.009).

9.4 Atom inclusion [i](#)



At the recommended contour level, 61% of all backbone atoms, 46% 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 (0.009) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	■ 0.4550	■ 0.1660
A	■ 0.4520	■ 0.1240
B	■ 0.3950	■ 0.1400
C	■ 0.3960	■ 0.1290
D	■ 0.4150	■ 0.1270
E	■ 0.3960	■ 0.1330
F	■ 0.3960	■ 0.1210
G	■ 0.5380	■ 0.2090
H	■ 0.4000	■ 0.1910
I	■ 0.4770	■ 0.1980
J	■ 0.5060	■ 0.1930
K	■ 0.4990	■ 0.1580

