



Full wwPDB EM Validation Report ⓘ

Aug 12, 2024 – 09:48 AM EDT

PDB ID : 9B27
EMDB ID : EMD-44099
Title : Dia1 at the Barbed End of F-Actin
Authors : Palmer, N.J.; Barrie, K.R.; Dominguez, R.
Deposited on : 2024-03-14
Resolution : 3.51 Å(reported)
Based on initial models : ., 8f8p

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev92
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 : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.37.1

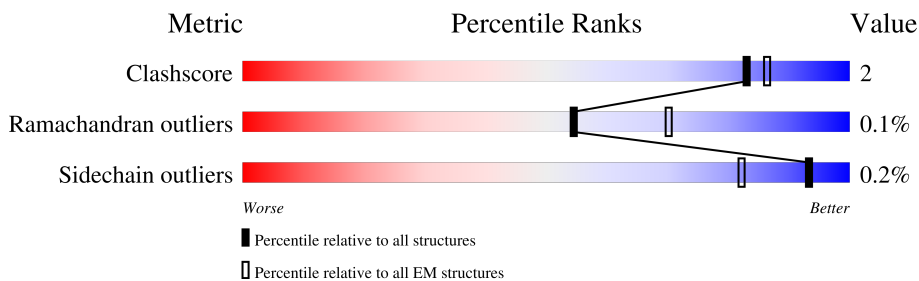
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.51 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	A	371	
1	B	371	
1	C	371	
1	D	371	
1	E	371	
1	F	371	
2	G	422	
2	H	422	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 23828 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 Actin, alpha skeletal muscle.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	371	2900	1837	489	553	21	0	0
1	B	371	2900	1837	489	553	21	0	0
1	C	371	2900	1837	489	553	21	0	0
1	D	371	2900	1837	489	553	21	0	0
1	E	371	2900	1837	489	553	21	0	0
1	F	371	2900	1837	489	553	21	0	0

- Molecule 2 is a protein called Protein diaphanous homolog 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	G	397	3259	2067	558	615	19	0	0
2	H	368	3001	1908	502	573	18	0	0

- Molecule 3 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



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

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

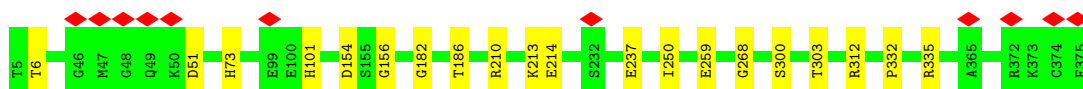
Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
4	A	1	Total	Mg	0
			1	1	
4	B	1	Total	Mg	0
			1	1	
4	C	1	Total	Mg	0
			1	1	
4	D	1	Total	Mg	0
			1	1	
4	E	1	Total	Mg	0
			1	1	
4	F	1	Total	Mg	0
			1	1	

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.

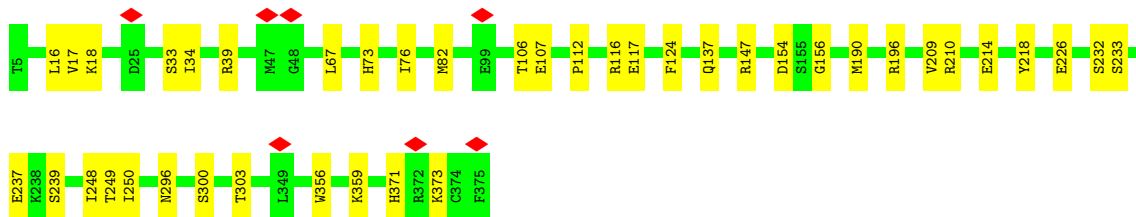
- Molecule 1: Actin, alpha skeletal muscle

Chain A: 



- Molecule 1: Actin, alpha skeletal muscle

Chain B: 



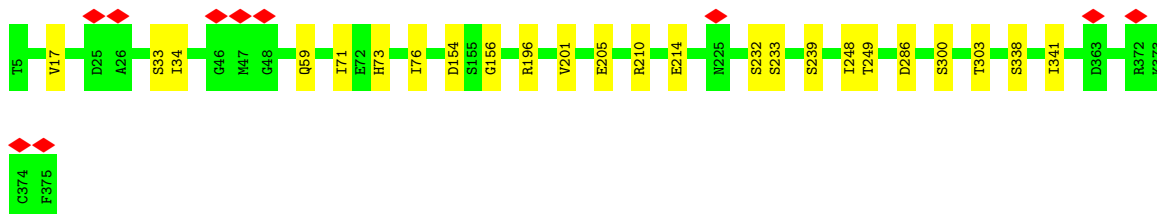
- Molecule 1: Actin, alpha skeletal muscle

Chain C: 

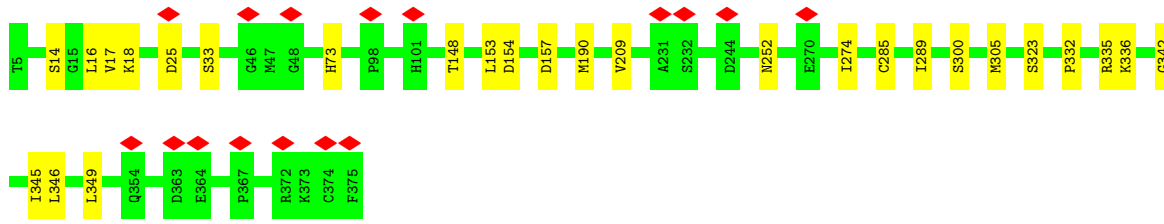
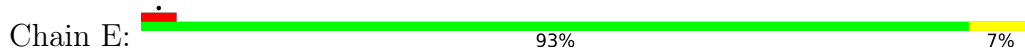


- Molecule 1: Actin, alpha skeletal muscle

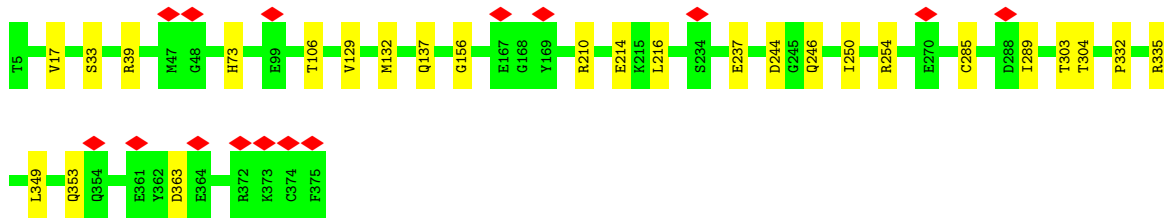
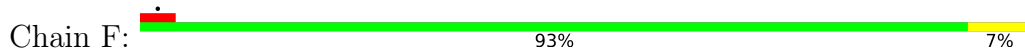
Chain D: 



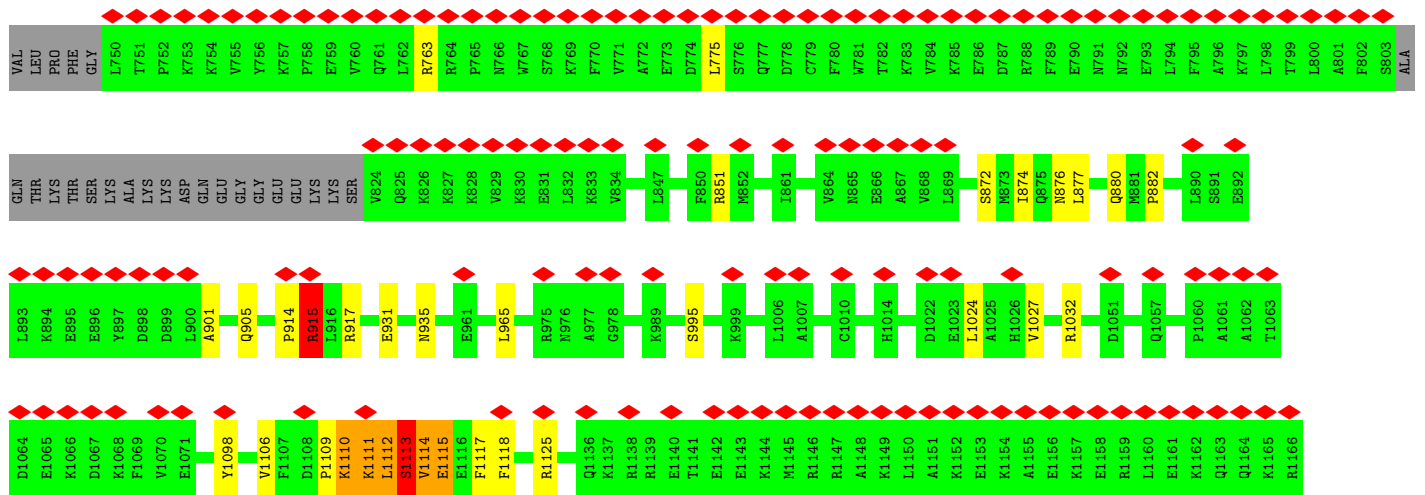
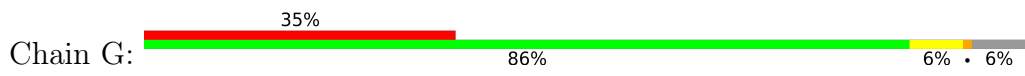
• Molecule 1: Actin, alpha skeletal muscle



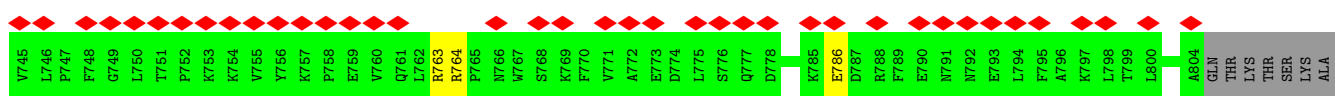
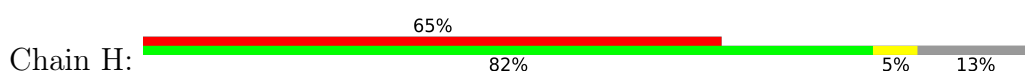
• Molecule 1: Actin, alpha skeletal muscle



• Molecule 2: Protein diaphanous homolog 1



• Molecule 2: Protein diaphanous homolog 1



LYS	LYS	LYS	ASP	GLN	GLU	GLY	GLY	GLU	GLU	LYS	LYS	SER	VAL	GLN	LYS	LYS	LYS	VAL	LYS	GLU	LEU	LEU	VAL	LEU	D836	S837	G848	S849	F850	R851	M852	P853	Y854	Q855	E856	L862	E863	V864	N865	E866	A867	V868	L869	T870	E871	S872	M873	I874	Q875	N876	L877	M881	P882	E885	Q886	L887	K888	M889	L890	S891	E892	L893	K894	E895	E896	Y897	D898	D899	L900	A901	E902	G907	V908	T912	V913	P914	R915	L916	R917	P918	R919	L920	Q928	E931	Q932	V933	E934	K937	I940	V941	S942	V943	T944	A945	A946	C947	E948	E949	L950	R951	K952	S953	E954	N955	F956	S957	S958	L959	L960	E961	L962	T963	L964	L965	V966	G967	N968	Y969	M970	N971	A972	G973	S974	R975	N976	A977	G978	A979	F980	G981	F982	N983	I984	S985	F986	L987	C988	K989	L990	R991	D992	T993	K994	S995	A996	D997	Q998	K999	M1000	T1001	L1002	L1003	H1004	F1005	L1006	A1007	E1008	L1009	C1010	E1011	N1012	D1013	H1014	P1015	E1016	V1017	L1018	K1019	F1020	P1021	D1022	E1023	L1024	A1025	H1026	V1027	E1028	K1029	A1030	S1031	R1032	V1033	S1034	A1035	E1036	N1037	L1038	Q1039	K1040	S1041	L1042	D1043	Q1044	M1045	K1046	K1047	Q1048	V1052	D1055	V1056	Q1057	N1058	F1059	A1060	A1061	A1062	T1063	D1064	E1065	K1066	D1067	K1068	F1069	V1070	E1071	K1072	M1073	T1074	S1075	F1076	V1077	K1078	D1079	A1080	Q1081	E1082	Q1083	L1087	R1088	M1089	M1090	H1091	S1092	T1096	L1097	Y1098	K1099	E1100	L1101	G1102	D1103	Y1104	F1105	V1106	F1107	D1108	P1109	K1110	K1111	L1112	S1113	V1114	E1115	E1116	F1117	F1118	M1119	D1120	L1121	H1122	M1123	F1124	R1125	M1126	M1127	F1128	L1129	Q1130	A1131	V1132	K1133	E1134	M1135	Q1136	K1137	R1138	R1139	E1140	T1141	E1142	E1143	LYS	MET	ARG	ARG	ALA
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-----	-----	-----	-----	-----

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	36931	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 ($e^-/\text{\AA}^2$)	42.00	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.737	Depositor
Minimum map value	-0.265	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.020	Depositor
Recommended contour level	0.183	Depositor
Map size (\AA)	444.96002, 444.96002, 444.96002	wwPDB
Map dimensions	412, 412, 412	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.08, 1.08, 1.08	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.28	0/2950	0.54	0/3994
1	B	0.28	0/2950	0.56	0/3994
1	C	0.29	0/2950	0.54	0/3994
1	D	0.28	0/2950	0.55	0/3994
1	E	0.29	0/2950	0.54	0/3994
1	F	0.28	0/2950	0.54	0/3994
2	G	0.31	0/3311	0.51	0/4435
2	H	0.31	0/3055	0.52	0/4107
All	All	0.29	0/24066	0.54	0/32506

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	G	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	G	915	ARG	Sidechain

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2900	0	2871	11	0
1	B	2900	0	2871	21	0
1	C	2900	0	2872	10	0
1	D	2900	0	2871	12	0
1	E	2900	0	2871	15	0
1	F	2900	0	2871	14	0
2	G	3259	0	3299	27	0
2	H	3001	0	2989	14	0
3	A	27	0	12	0	0
3	B	27	0	12	0	0
3	C	27	0	12	1	0
3	D	27	0	12	0	0
3	E	27	0	12	0	0
3	F	27	0	12	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
4	E	1	0	0	0	0
4	F	1	0	0	0	0
All	All	23828	0	23587	113	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 2.

All (113) 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)
2:G:915:ARG:CZ	2:G:917:ARG:HB2	1.86	0.85
2:G:1098:TYR:CE1	2:G:1114:VAL:HG13	2.31	0.65
2:G:1098:TYR:CZ	2:G:1114:VAL:HG22	2.34	0.63
2:G:1098:TYR:CE2	2:G:1114:VAL:HG22	2.34	0.61
2:G:914:PRO:O	2:G:915:ARG:C	2.43	0.56
2:G:1114:VAL:O	2:G:1117:PHE:N	2.39	0.55
2:G:1110:LYS:HE3	2:G:1111:LYS:HE2	1.89	0.53

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:G:1111:LYS:HE2	2:G:1111:LYS:H	1.74	0.53
2:H:1001:THR:H	2:H:1004:HIS:HB2	1.75	0.52
1:E:305:MET:HG3	1:E:336:LYS:HD3	1.91	0.52
1:D:286:ASP:OD2	1:F:39:ARG:NH2	2.43	0.52
2:H:872:SER:O	2:H:876:ASN:ND2	2.43	0.51
2:H:914:PRO:O	2:H:915:ARG:HG3	2.10	0.51
2:G:1113:SER:O	2:G:1114:VAL:C	2.49	0.51
1:F:237:GLU:HA	1:F:250:ILE:O	2.10	0.51
1:E:148:THR:OG1	2:G:880:GLN:NE2	2.45	0.50
1:F:216:LEU:O	1:F:254:ARG:NH1	2.45	0.49
2:G:872:SER:O	2:G:876:ASN:ND2	2.43	0.49
2:G:1024:LEU:O	2:G:1125:ARG:NH1	2.45	0.49
2:G:1111:LYS:O	2:G:1112:LEU:C	2.51	0.49
2:G:775:LEU:HD23	2:H:1106:VAL:HG21	1.95	0.49
1:A:6:THR:O	1:A:101:HIS:ND1	2.45	0.49
1:A:210:ARG:NH1	1:A:214:GLU:OE2	2.47	0.48
1:A:259:GLU:OE2	1:A:312:ARG:NH1	2.42	0.48
1:C:14:SER:HB2	1:C:157:ASP:HB3	1.95	0.48
1:A:268:GLY:O	1:B:39:ARG:NH2	2.45	0.48
1:F:332:PRO:O	1:F:335:ARG:NH1	2.47	0.48
2:G:882:PRO:O	2:G:917:ARG:NH2	2.46	0.48
1:D:196:ARG:NH1	1:D:249:THR:O	2.47	0.48
1:A:237:GLU:HA	1:A:250:ILE:O	2.13	0.48
1:B:210:ARG:NH1	1:B:214:GLU:OE2	2.47	0.48
1:D:210:ARG:NH1	1:D:214:GLU:OE2	2.47	0.48
1:C:332:PRO:O	1:C:335:ARG:NH1	2.46	0.48
1:E:342:GLY:HA2	1:E:345:ILE:HD12	1.95	0.48
1:B:190:MET:HG3	1:B:209:VAL:HG11	1.96	0.47
1:B:124:PHE:O	1:B:359:LYS:NZ	2.48	0.47
1:B:147:ARG:NH1	1:B:296:ASN:OD1	2.48	0.47
1:C:14:SER:O	1:C:183:ARG:NH2	2.47	0.47
1:F:285:CYS:HB3	1:F:289:ILE:HD11	1.97	0.47
2:G:965:LEU:HD13	2:H:786:GLU:HG3	1.96	0.47
1:F:349:LEU:O	1:F:353:GLN:NE2	2.47	0.47
1:B:237:GLU:HA	1:B:250:ILE:O	2.15	0.46
2:H:914:PRO:C	2:H:915:ARG:HG3	2.36	0.46
1:D:338:SER:HA	1:D:341:ILE:HD12	1.96	0.46
1:C:6:THR:O	1:C:101:HIS:ND1	2.46	0.46
1:E:16:LEU:O	1:E:18:LYS:NZ	2.48	0.46
1:D:34:ILE:HD11	1:D:59:GLN:HG2	1.97	0.46
1:E:25:ASP:OD1	2:G:851:ARG:NH1	2.49	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:106:THR:HB	1:F:137:GLN:HG2	1.98	0.45
1:B:196:ARG:NH1	1:B:249:THR:O	2.49	0.45
1:F:210:ARG:NH1	1:F:214:GLU:OE2	2.49	0.45
1:B:239:SER:HA	1:B:248:ILE:O	2.16	0.45
1:C:190:MET:HG3	1:C:209:VAL:HG11	1.98	0.45
2:G:763:ARG:NH1	2:H:995:SER:O	2.49	0.45
1:B:117:GLU:OE2	1:B:371:HIS:NE2	2.50	0.45
2:G:995:SER:O	2:H:763:ARG:NH1	2.49	0.45
1:E:190:MET:HG3	1:E:209:VAL:HG11	1.99	0.45
1:D:71:ILE:HG12	1:D:76:ILE:HG12	2.00	0.44
1:A:332:PRO:O	1:A:335:ARG:NH1	2.50	0.44
1:B:76:ILE:HD13	1:B:82:MET:HG2	1.98	0.44
1:B:154:ASP:OD1	1:B:300:SER:OG	2.35	0.44
1:F:363:ASP:O	2:H:764:ARG:NH2	2.50	0.44
1:A:154:ASP:OD1	1:A:300:SER:OG	2.35	0.44
2:G:1106:VAL:HG22	2:G:1109:PRO:HD3	2.00	0.44
1:D:239:SER:HA	1:D:248:ILE:O	2.17	0.44
1:E:14:SER:HB2	1:E:157:ASP:HB3	2.00	0.44
1:E:323:SER:OG	2:G:1032:ARG:O	2.36	0.44
1:F:156:GLY:O	1:F:303:THR:OG1	2.36	0.43
2:H:962:LEU:HD21	2:H:1009:LEU:HD23	1.99	0.43
1:C:300:SER:HA	1:C:335:ARG:HB2	2.00	0.43
1:B:106:THR:HB	1:B:137:GLN:HG2	1.99	0.43
1:D:17:VAL:HG23	1:D:33:SER:HB2	2.00	0.43
2:G:931:GLU:O	2:G:935:ASN:ND2	2.51	0.43
2:G:1110:LYS:HA	2:G:1110:LYS:HD2	1.48	0.43
1:E:346:LEU:HD12	1:E:349:LEU:HD12	2.00	0.42
1:C:17:VAL:HG23	1:C:33:SER:HB2	2.01	0.42
1:B:16:LEU:O	1:B:18:LYS:NZ	2.52	0.42
1:B:17:VAL:HG23	1:B:33:SER:HB2	2.02	0.42
1:F:304:THR:O	1:F:335:ARG:NE	2.50	0.42
2:H:890:LEU:HD13	2:H:907:GLY:HA3	2.01	0.42
2:G:874:ILE:HD13	2:G:877:LEU:HD12	2.01	0.42
2:H:1062:ALA:HB1	2:H:1067:ASP:HB3	2.02	0.42
1:B:218:TYR:OH	1:B:226:GLU:OE1	2.35	0.42
1:E:17:VAL:HG23	1:E:33:SER:HB2	2.00	0.42
2:G:901:ALA:O	2:G:905:GLN:N	2.52	0.42
2:H:1028:GLU:O	2:H:1032:ARG:NH2	2.47	0.42
1:A:186:THR:OG1	1:A:213:LYS:NZ	2.46	0.41
1:D:154:ASP:OD1	1:D:300:SER:OG	2.37	0.41
1:E:154:ASP:OD1	1:E:300:SER:OG	2.37	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:129:VAL:HG21	1:F:132:MET:HB3	2.02	0.41
1:B:232:SER:OG	1:B:233:SER:N	2.53	0.41
1:A:182:GLY:O	1:A:213:LYS:NZ	2.53	0.41
1:B:107:GLU:OE1	1:B:116:ARG:NE	2.48	0.41
1:D:232:SER:OG	1:D:233:SER:N	2.54	0.41
1:C:154:ASP:OD1	1:C:300:SER:OG	2.38	0.41
1:A:51:ASP:OD1	1:A:51:ASP:N	2.54	0.41
2:G:1027:VAL:HG13	2:G:1118:PHE:HD1	1.86	0.41
1:A:156:GLY:O	1:A:303:THR:OG1	2.39	0.41
1:B:34:ILE:HD12	1:B:67:LEU:HD22	2.02	0.41
1:F:244:ASP:OD2	1:F:246:GLN:NE2	2.51	0.41
1:D:156:GLY:O	1:D:303:THR:OG1	2.38	0.41
1:B:156:GLY:O	1:B:303:THR:OG1	2.39	0.41
1:E:153:LEU:HD11	1:E:274:ILE:HB	2.02	0.41
2:G:1113:SER:O	2:G:1115:GLU:N	2.54	0.41
1:E:252:ASN:OD1	1:E:252:ASN:N	2.53	0.40
1:B:112:PRO:HG3	1:C:197:GLY:HA2	2.03	0.40
1:B:356:TRP:O	1:B:373:LYS:NZ	2.54	0.40
1:F:17:VAL:HG23	1:F:33:SER:HB2	2.03	0.40
2:H:915:ARG:NE	2:H:919:ARG:HB2	2.36	0.40
1:E:332:PRO:O	1:E:335:ARG:NH1	2.55	0.40
1:C:157:ASP:OD1	3:C:401:ADP:O3'	2.37	0.40
1:E:285:CYS:HB3	1:E:289:ILE:HD11	2.03	0.40
1:D:201:VAL:N	1:D:205:GLU:OE1	2.54	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [\(i\)](#)

5.3.1 Protein backbone [\(i\)](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	368/371 (99%)	355 (96%)	13 (4%)	0	100 100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	368/371 (99%)	357 (97%)	11 (3%)	0	100	100
1	C	368/371 (99%)	355 (96%)	13 (4%)	0	100	100
1	D	368/371 (99%)	354 (96%)	14 (4%)	0	100	100
1	E	368/371 (99%)	351 (95%)	17 (5%)	0	100	100
1	F	368/371 (99%)	352 (96%)	16 (4%)	0	100	100
2	G	393/422 (93%)	375 (95%)	14 (4%)	4 (1%)	15	54
2	H	364/422 (86%)	352 (97%)	12 (3%)	0	100	100
All	All	2965/3070 (97%)	2851 (96%)	110 (4%)	4 (0%)	54	84

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	G	1113	SER
2	G	1114	VAL
2	G	915	ARG
2	G	1115	GLU

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	313/313 (100%)	313 (100%)	0	100	100
1	B	313/313 (100%)	313 (100%)	0	100	100
1	C	313/313 (100%)	313 (100%)	0	100	100
1	D	313/313 (100%)	313 (100%)	0	100	100
1	E	313/313 (100%)	313 (100%)	0	100	100
1	F	313/313 (100%)	313 (100%)	0	100	100
2	G	364/384 (95%)	359 (99%)	5 (1%)	67	85
2	H	336/384 (88%)	335 (100%)	1 (0%)	92	97
All	All	2578/2646 (97%)	2572 (100%)	6 (0%)	93	98

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	G	915	ARG
2	G	1110	LYS
2	G	1111	LYS
2	G	1112	LEU
2	G	1113	SER
2	H	915	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	92	ASN
1	C	115	ASN
1	E	162	ASN
1	E	246	GLN
1	F	162	ASN
2	G	880	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

6 non-standard protein/DNA/RNA residues are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	HIC	D	73	1	8,11,12	1.60	2 (25%)	6,14,16	1.56	1 (16%)
1	HIC	C	73	1	8,11,12	1.61	2 (25%)	6,14,16	1.53	1 (16%)
1	HIC	E	73	1	8,11,12	1.61	2 (25%)	6,14,16	1.47	1 (16%)
1	HIC	B	73	1	8,11,12	1.66	2 (25%)	6,14,16	1.47	1 (16%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	HIC	A	73	1	8,11,12	1.62	2 (25%)	6,14,16	1.52	1 (16%)
1	HIC	F	73	1	8,11,12	1.64	2 (25%)	6,14,16	1.43	1 (16%)

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
1	HIC	D	73	1	-	1/5/6/8	0/1/1/1
1	HIC	C	73	1	-	2/5/6/8	0/1/1/1
1	HIC	E	73	1	-	1/5/6/8	0/1/1/1
1	HIC	B	73	1	-	2/5/6/8	0/1/1/1
1	HIC	A	73	1	-	3/5/6/8	0/1/1/1
1	HIC	F	73	1	-	1/5/6/8	0/1/1/1

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	73	HIC	CD2-CG	3.67	1.41	1.36
1	F	73	HIC	CD2-CG	3.61	1.41	1.36
1	E	73	HIC	CD2-CG	3.57	1.41	1.36
1	C	73	HIC	CD2-CG	3.54	1.41	1.36
1	A	73	HIC	CD2-CG	3.54	1.41	1.36
1	D	73	HIC	CD2-CG	3.48	1.41	1.36
1	B	73	HIC	CZ-NE2	-2.08	1.42	1.48
1	A	73	HIC	CZ-NE2	-2.07	1.42	1.48
1	E	73	HIC	CZ-NE2	-2.06	1.42	1.48
1	D	73	HIC	CZ-NE2	-2.06	1.42	1.48
1	F	73	HIC	CZ-NE2	-2.05	1.42	1.48
1	C	73	HIC	CZ-NE2	-2.05	1.42	1.48

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	73	HIC	CB-CA-C	-3.23	105.41	111.47
1	A	73	HIC	CB-CA-C	-3.11	105.64	111.47
1	C	73	HIC	CB-CA-C	-3.07	105.70	111.47
1	B	73	HIC	CB-CA-C	-2.94	105.96	111.47
1	E	73	HIC	CB-CA-C	-2.91	106.01	111.47
1	F	73	HIC	CB-CA-C	-2.81	106.19	111.47

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	73	HIC	CA-CB-CG-ND1
1	D	73	HIC	CA-CB-CG-ND1
1	A	73	HIC	N-CA-CB-CG
1	C	73	HIC	N-CA-CB-CG
1	E	73	HIC	N-CA-CB-CG
1	B	73	HIC	CA-CB-CG-ND1
1	C	73	HIC	CA-CB-CG-ND1
1	F	73	HIC	CA-CB-CG-ND1
1	A	73	HIC	CA-CB-CG-CD2
1	B	73	HIC	CA-CB-CG-CD2

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 12 ligands modelled in this entry, 6 are monoatomic - leaving 6 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
3	ADP	D	401	4	24,29,29	0.95	1 (4%)	29,45,45	1.51	4 (13%)
3	ADP	F	401	4	24,29,29	0.93	1 (4%)	29,45,45	1.45	4 (13%)
3	ADP	C	401	4	24,29,29	0.96	1 (4%)	29,45,45	1.44	4 (13%)
3	ADP	E	401	4	24,29,29	0.94	1 (4%)	29,45,45	1.51	4 (13%)
3	ADP	B	401	4	24,29,29	0.94	1 (4%)	29,45,45	1.41	4 (13%)
3	ADP	A	401	4	24,29,29	0.95	1 (4%)	29,45,45	1.47	4 (13%)

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
3	ADP	D	401	4	-	2/12/32/32	0/3/3/3
3	ADP	F	401	4	-	3/12/32/32	0/3/3/3
3	ADP	C	401	4	-	2/12/32/32	0/3/3/3
3	ADP	E	401	4	-	2/12/32/32	0/3/3/3
3	ADP	B	401	4	-	1/12/32/32	0/3/3/3
3	ADP	A	401	4	-	1/12/32/32	0/3/3/3

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	401	ADP	C5-C4	2.50	1.47	1.40
3	D	401	ADP	C5-C4	2.47	1.47	1.40
3	A	401	ADP	C5-C4	2.43	1.47	1.40
3	F	401	ADP	C5-C4	2.42	1.47	1.40
3	E	401	ADP	C5-C4	2.42	1.47	1.40
3	B	401	ADP	C5-C4	2.38	1.47	1.40

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	401	ADP	C3'-C2'-C1'	3.52	106.28	100.98
3	E	401	ADP	C3'-C2'-C1'	3.44	106.16	100.98
3	C	401	ADP	N3-C2-N1	-3.41	123.35	128.68
3	A	401	ADP	C3'-C2'-C1'	3.38	106.06	100.98
3	F	401	ADP	C3'-C2'-C1'	3.38	106.06	100.98
3	B	401	ADP	N3-C2-N1	-3.29	123.53	128.68
3	A	401	ADP	N3-C2-N1	-3.28	123.54	128.68
3	F	401	ADP	N3-C2-N1	-3.27	123.56	128.68
3	D	401	ADP	PA-O3A-PB	-3.26	121.63	132.83
3	E	401	ADP	PA-O3A-PB	-3.24	121.70	132.83
3	E	401	ADP	N3-C2-N1	-3.22	123.65	128.68
3	D	401	ADP	N3-C2-N1	-3.21	123.67	128.68
3	B	401	ADP	C3'-C2'-C1'	3.21	105.81	100.98
3	F	401	ADP	PA-O3A-PB	-3.21	121.83	132.83
3	C	401	ADP	C3'-C2'-C1'	3.18	105.77	100.98
3	A	401	ADP	PA-O3A-PB	-3.17	121.94	132.83
3	C	401	ADP	PA-O3A-PB	-3.14	122.03	132.83
3	B	401	ADP	PA-O3A-PB	-2.78	123.27	132.83

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	401	ADP	C4-C5-N7	-2.68	106.61	109.40
3	E	401	ADP	C4-C5-N7	-2.64	106.65	109.40
3	B	401	ADP	C4-C5-N7	-2.54	106.75	109.40
3	A	401	ADP	C4-C5-N7	-2.47	106.83	109.40
3	C	401	ADP	C4-C5-N7	-2.46	106.84	109.40
3	D	401	ADP	C4-C5-N7	-2.28	107.03	109.40

There are no chirality outliers.

All (11) torsion outliers are listed below:

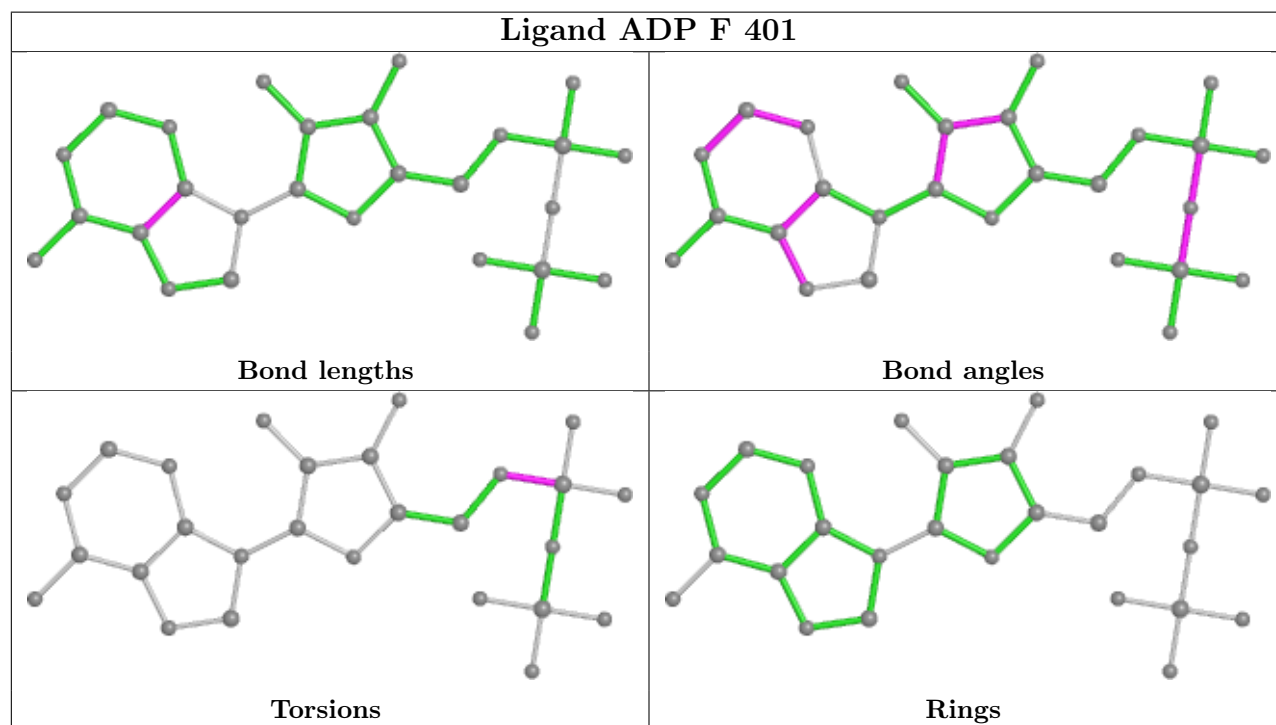
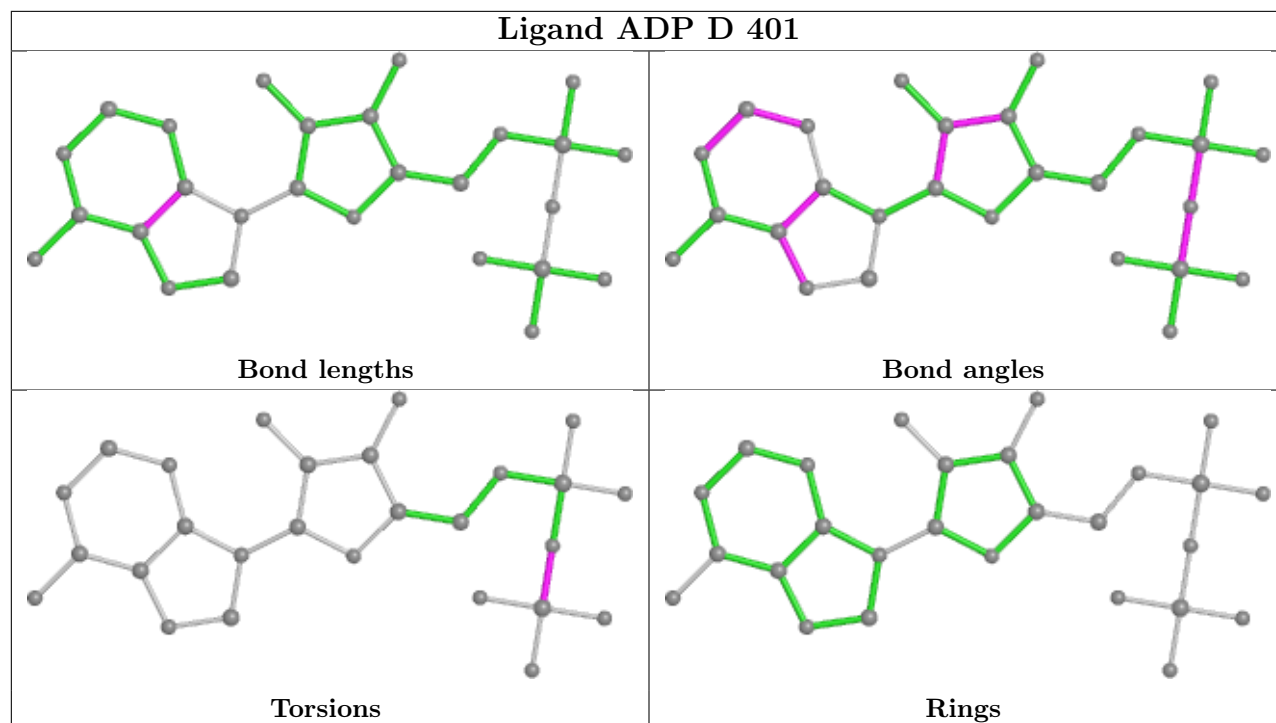
Mol	Chain	Res	Type	Atoms
3	C	401	ADP	C5'-O5'-PA-O2A
3	C	401	ADP	C5'-O5'-PA-O3A
3	D	401	ADP	PA-O3A-PB-O2B
3	D	401	ADP	PA-O3A-PB-O3B
3	E	401	ADP	PA-O3A-PB-O2B
3	E	401	ADP	PA-O3A-PB-O3B
3	F	401	ADP	C5'-O5'-PA-O1A
3	F	401	ADP	C5'-O5'-PA-O2A
3	A	401	ADP	C3'-C4'-C5'-O5'
3	B	401	ADP	PA-O3A-PB-O3B
3	F	401	ADP	C5'-O5'-PA-O3A

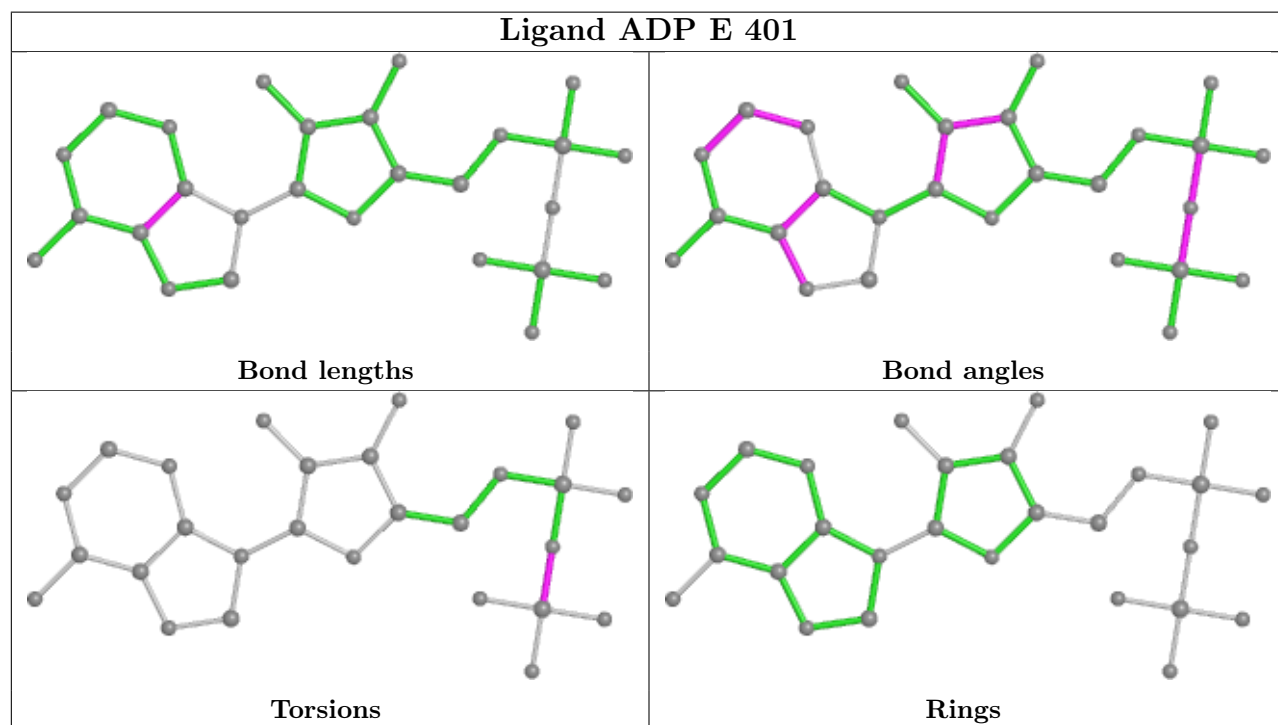
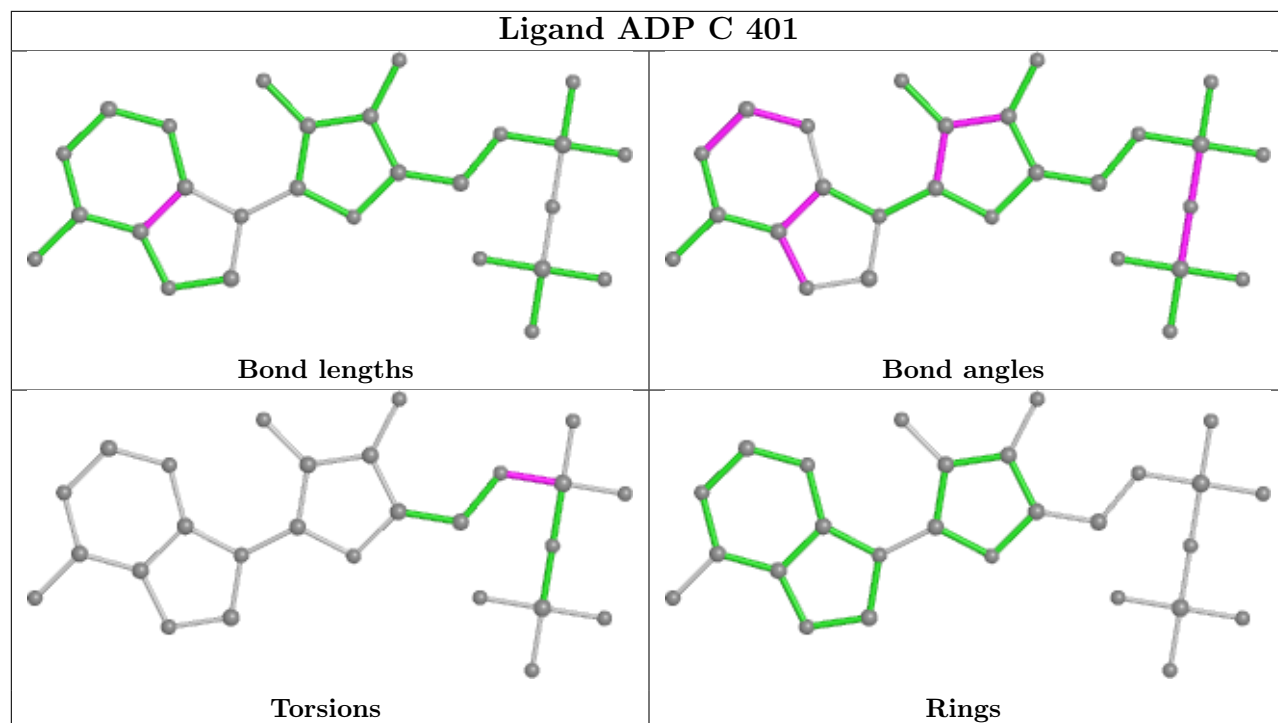
There are no ring outliers.

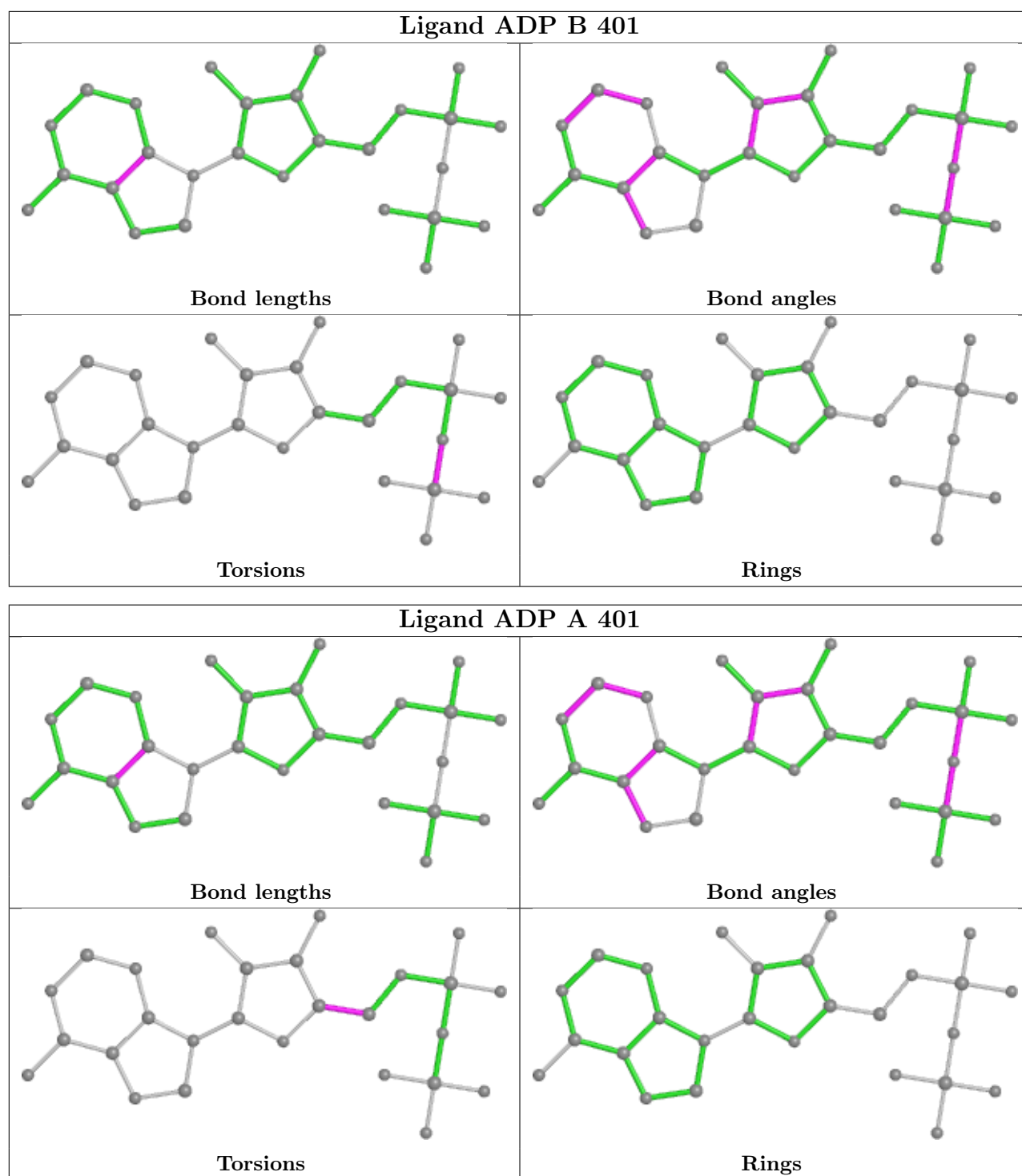
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	401	ADP	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.







5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

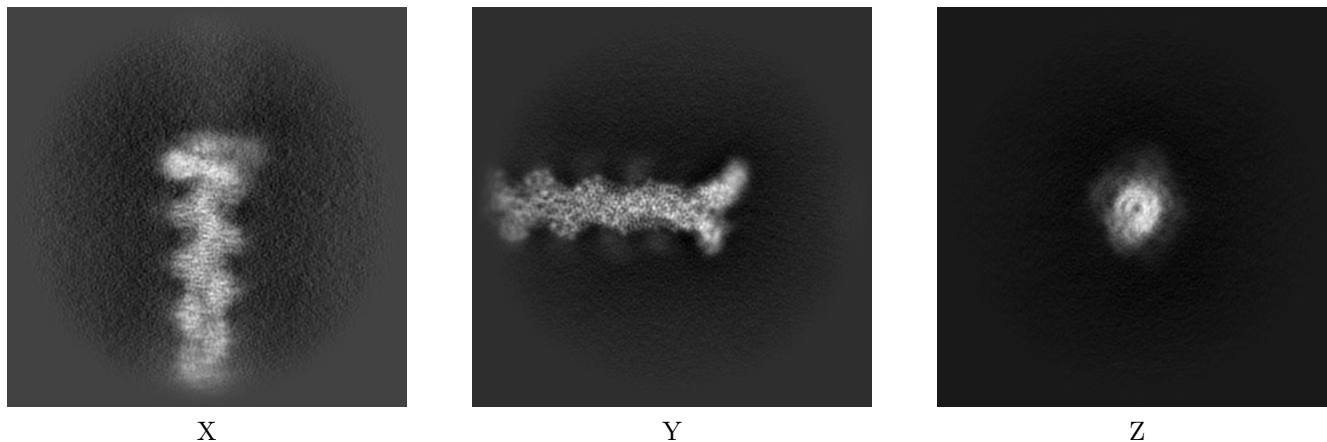
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-44099. These allow visual inspection of the internal detail of the map and identification of artifacts.

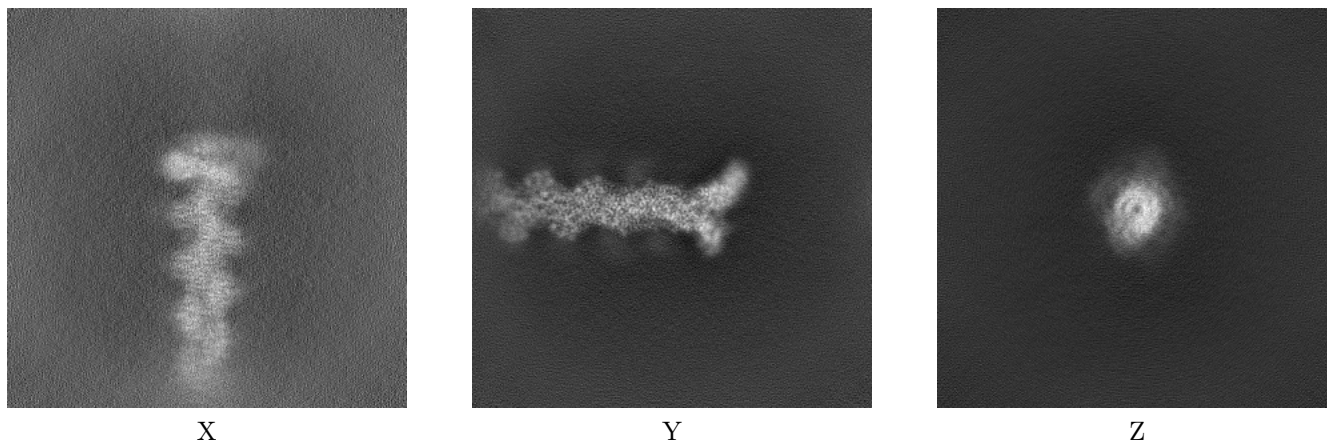
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

6.1.1 Primary map



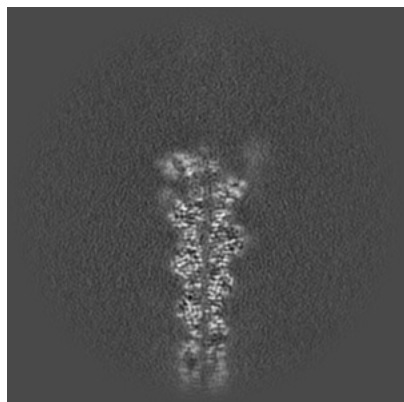
6.1.2 Raw map



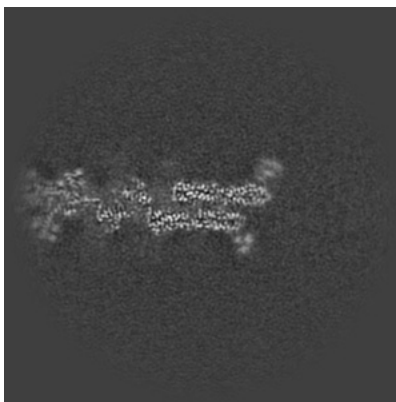
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

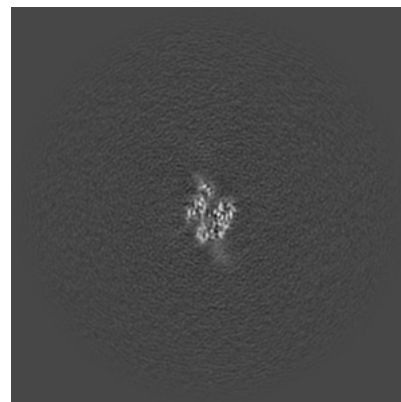
6.2.1 Primary map



X Index: 206

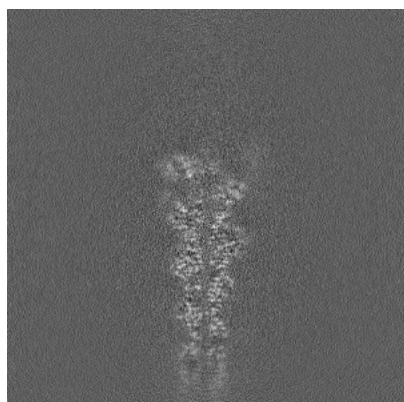


Y Index: 206

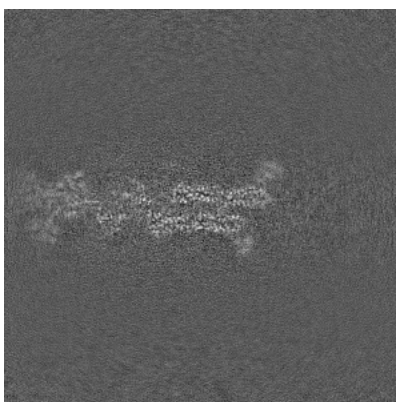


Z Index: 206

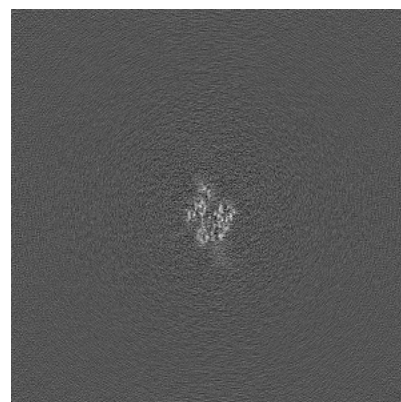
6.2.2 Raw map



X Index: 206



Y Index: 206

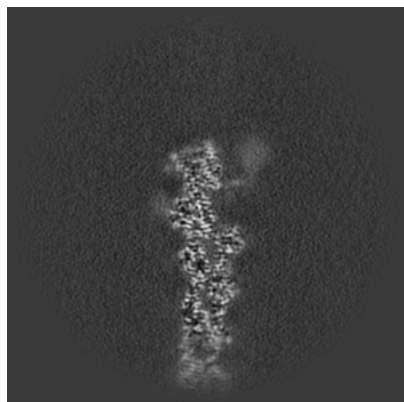


Z Index: 206

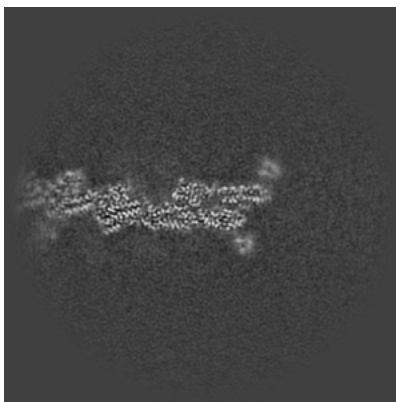
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

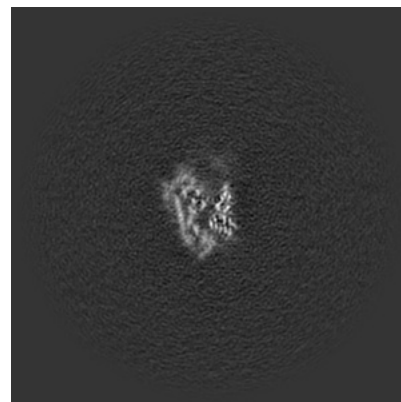
6.3.1 Primary map



X Index: 213

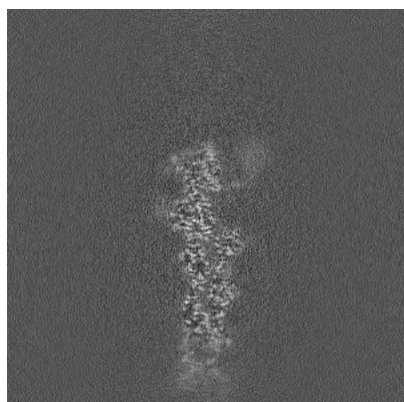


Y Index: 211

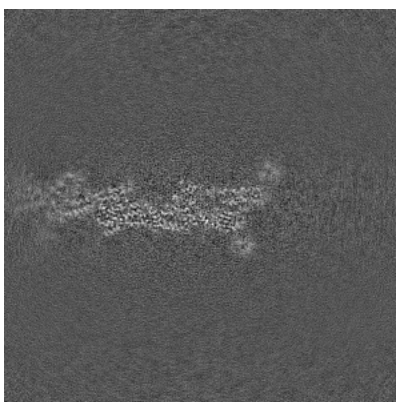


Z Index: 241

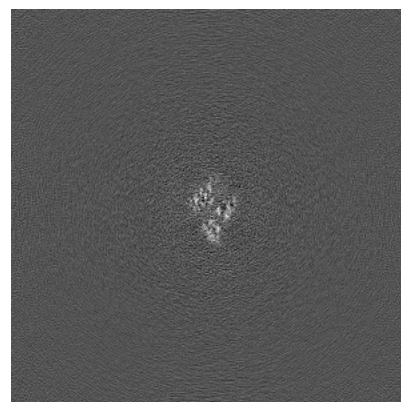
6.3.2 Raw map



X Index: 213



Y Index: 212

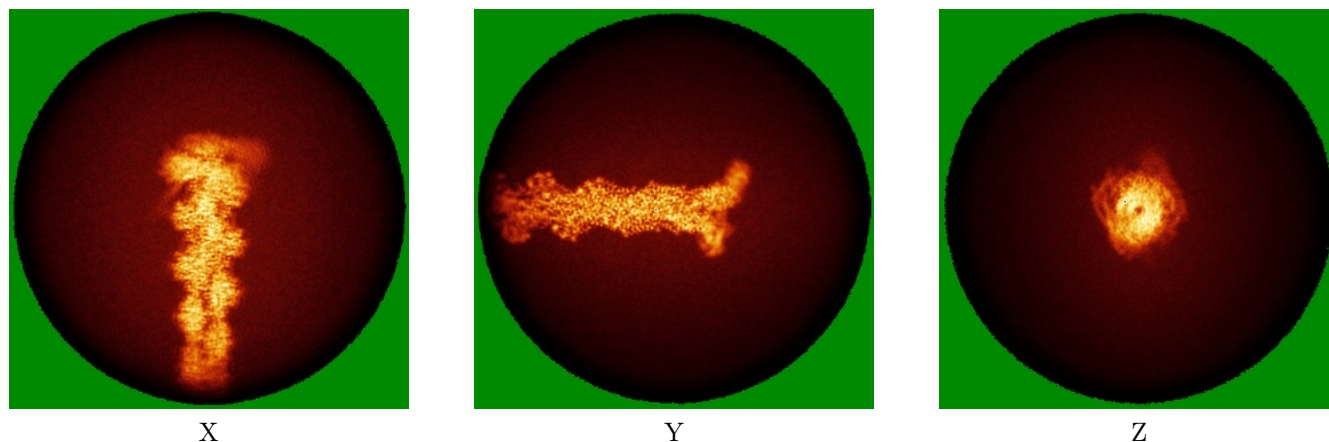


Z Index: 186

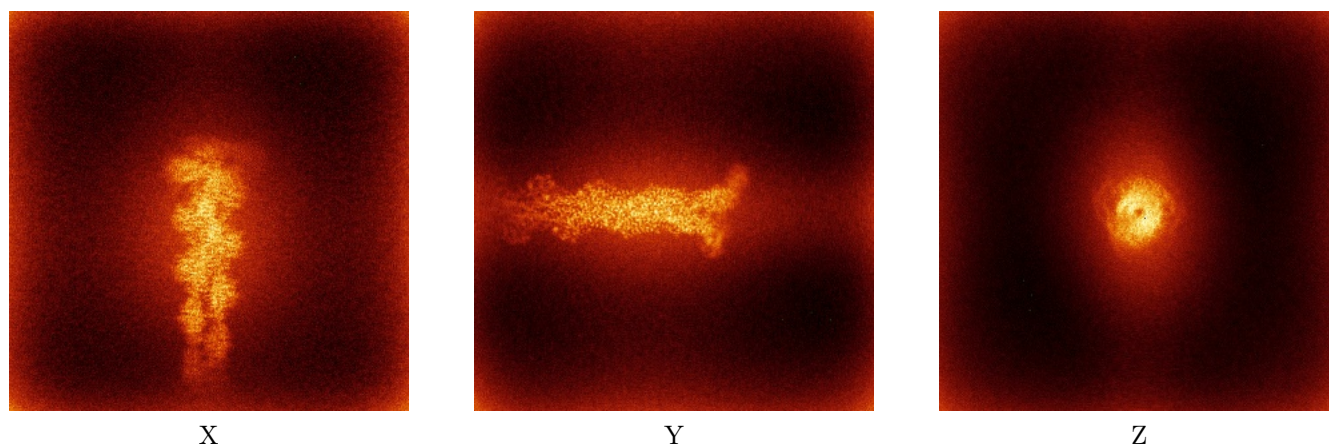
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



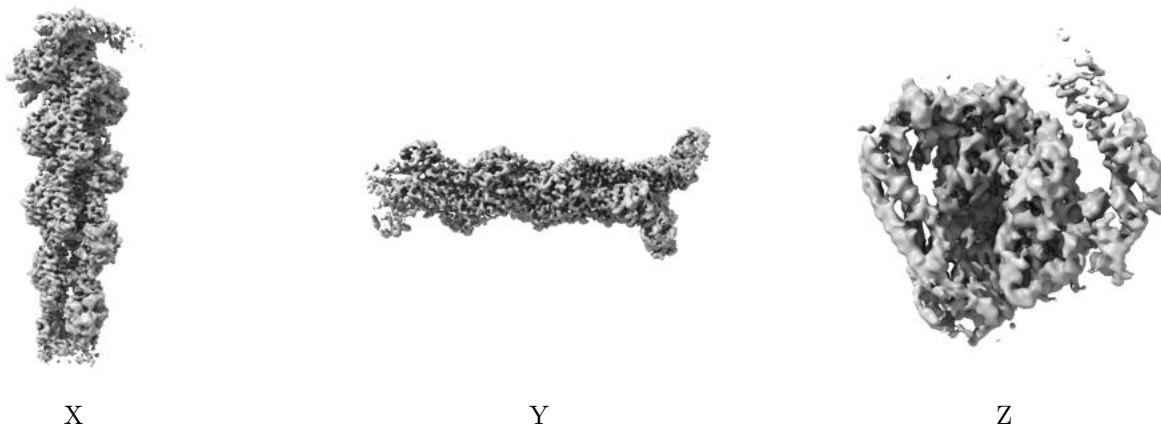
6.4.2 Raw map



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.

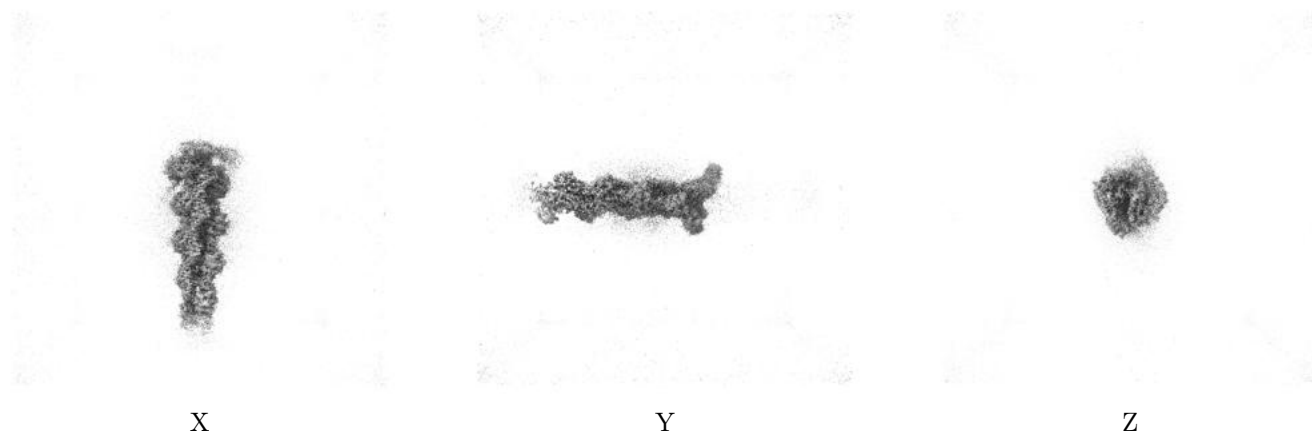
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.183. 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.

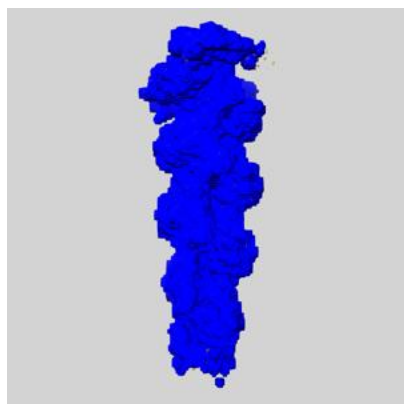
6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

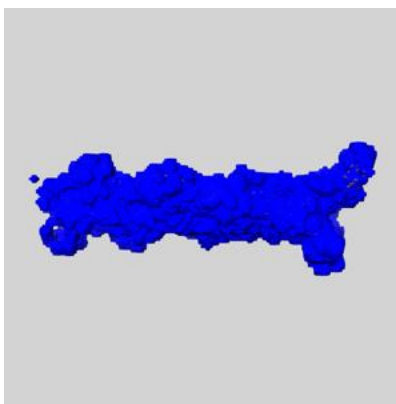
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

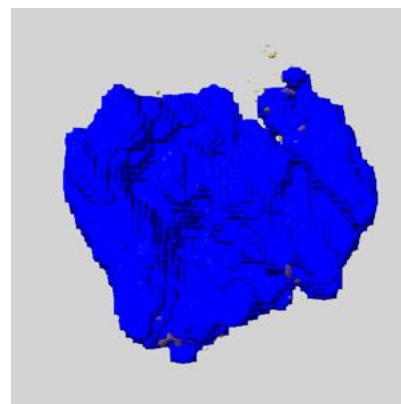
6.6.1 emd_44099_msk_1.map [i](#)



X



Y

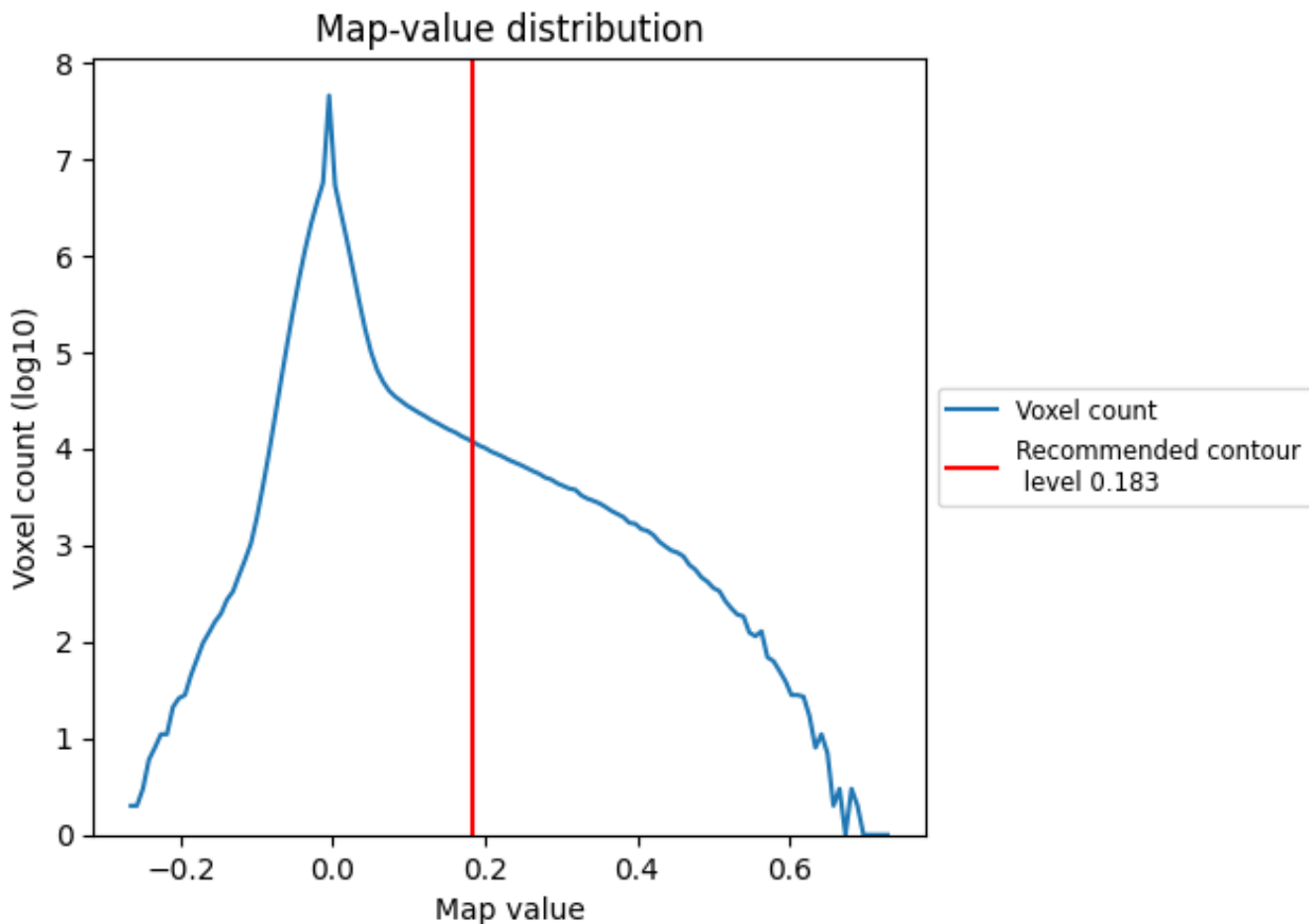


Z

7 Map analysis [i](#)

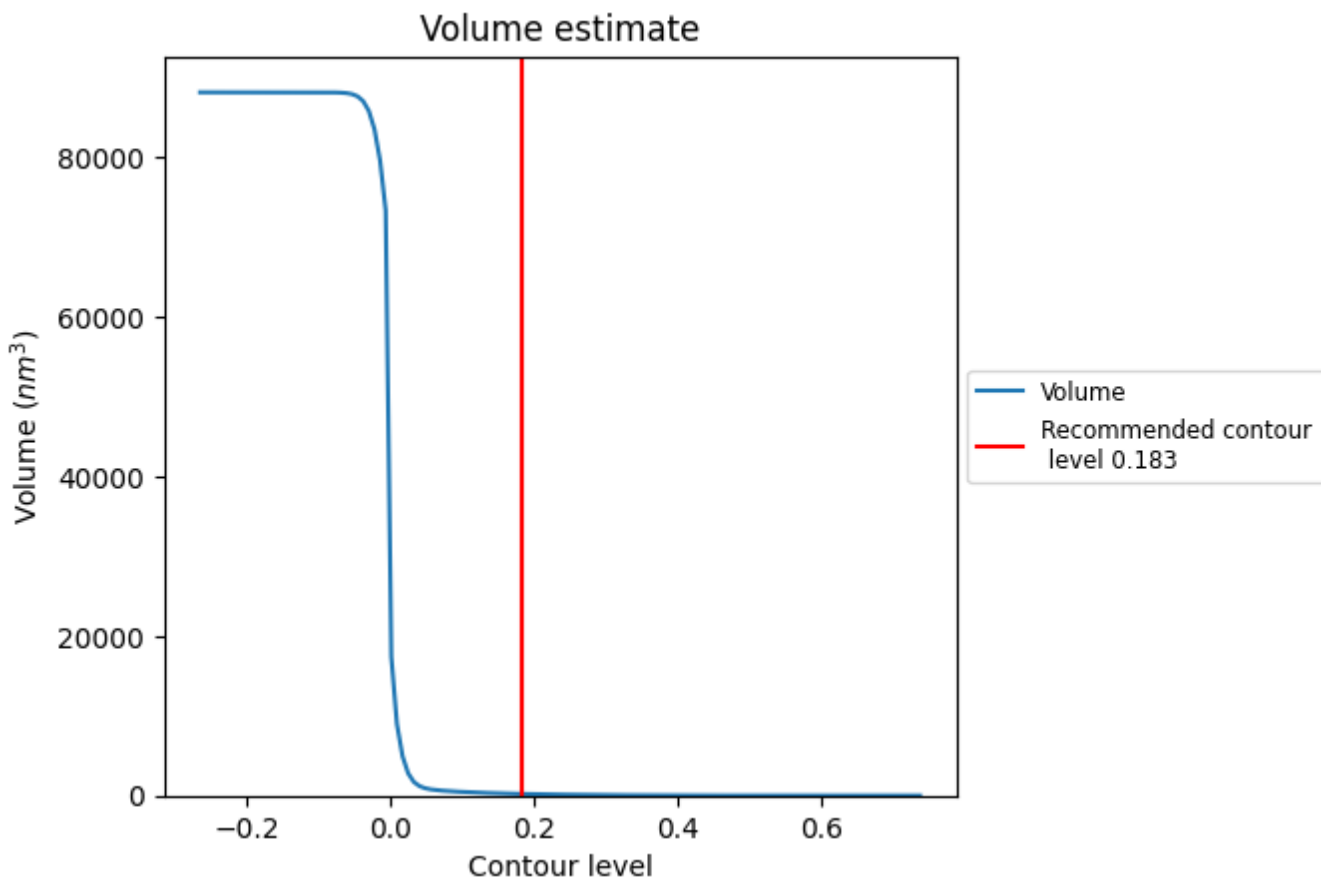
This section contains the results of statistical analysis of the map.

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.

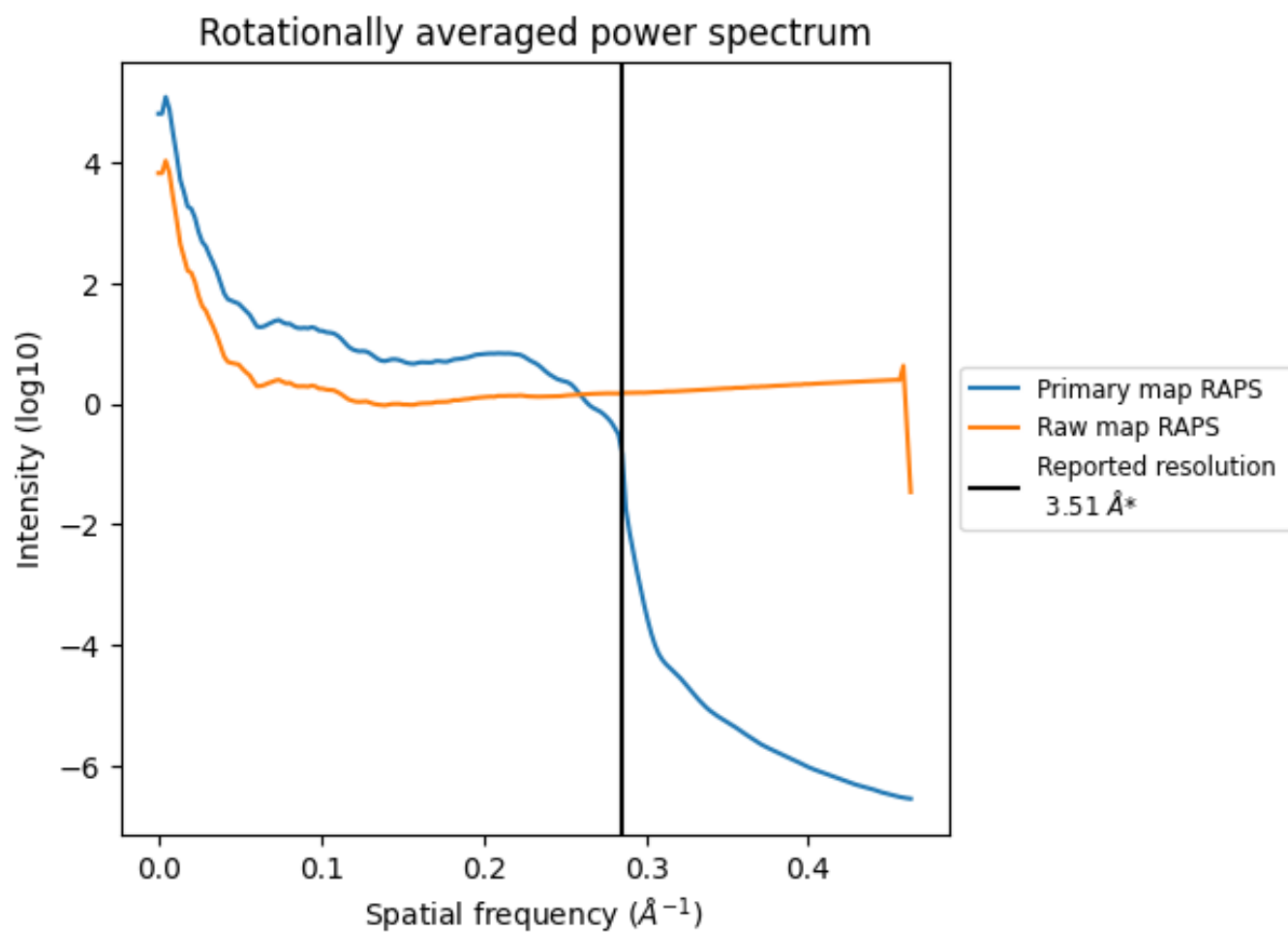
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 205 nm³; this corresponds to an approximate mass of 186 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

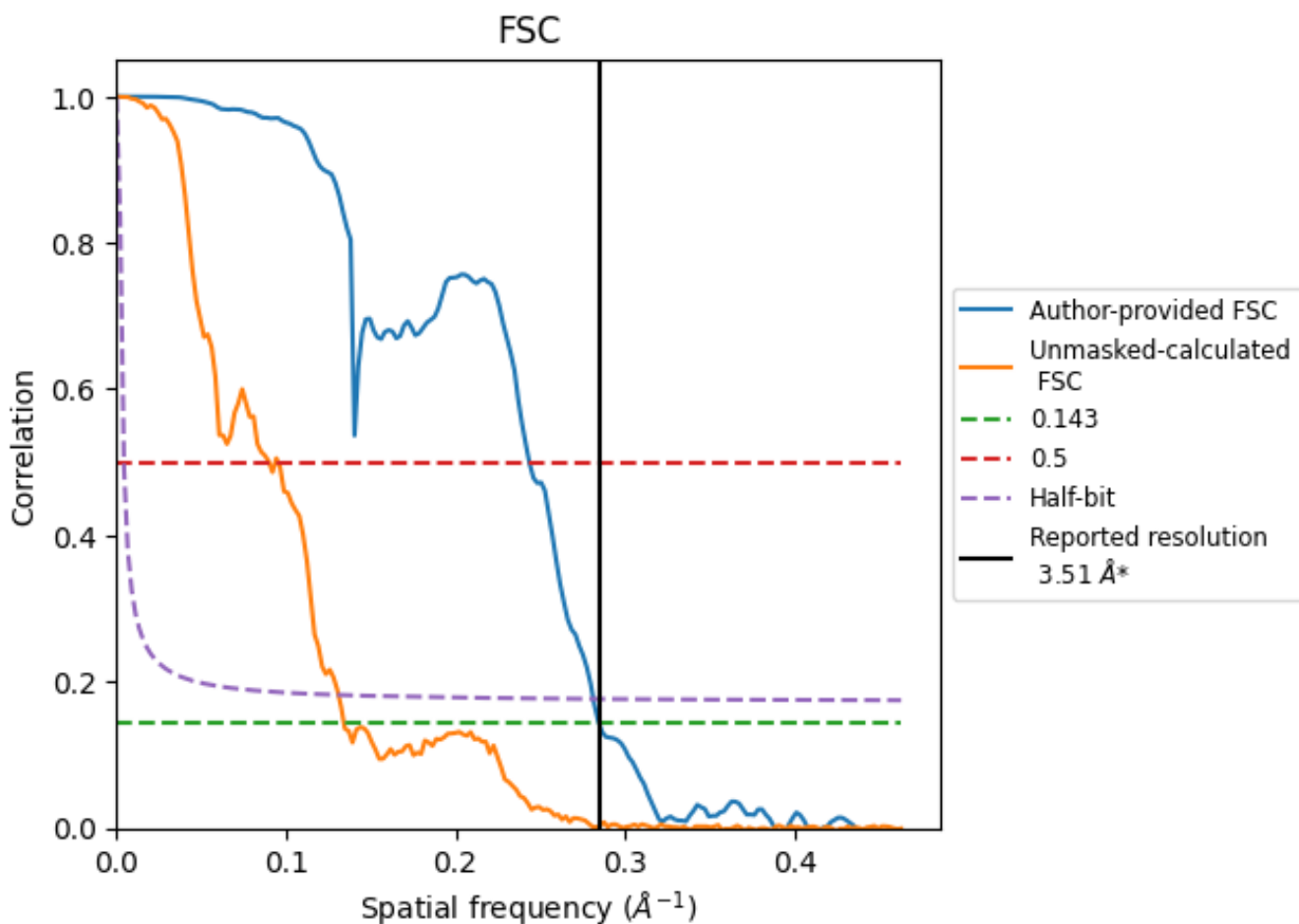


*Reported resolution corresponds to spatial frequency of 0.285 Å⁻¹

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 0.285 Å⁻¹

8.2 Resolution estimates [i](#)

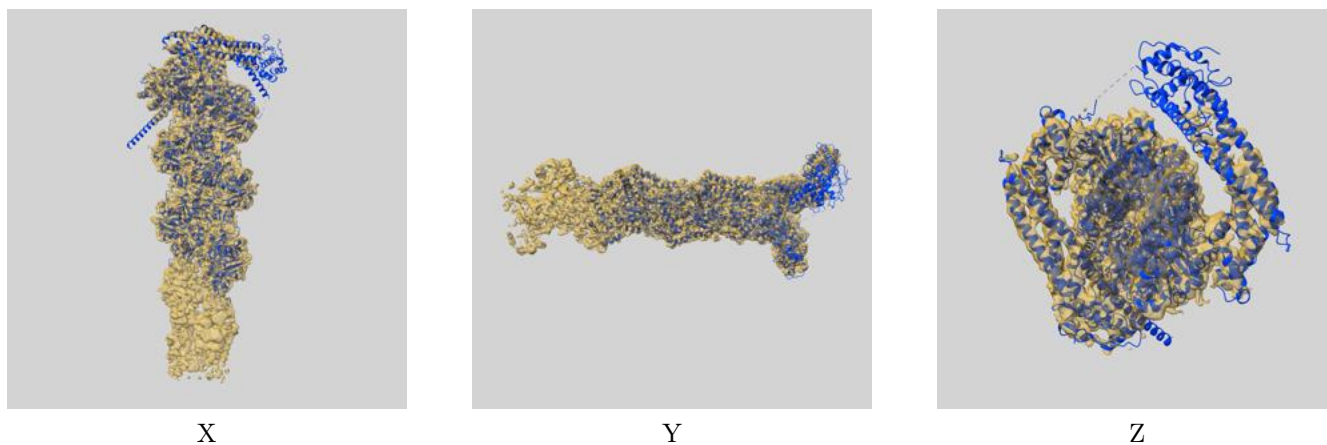
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.51	-	-
Author-provided FSC curve	3.51	4.10	3.55
Unmasked-calculated*	7.45	11.11	7.63

*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 7.45 differs from the reported value 3.51 by more than 10 %

9 Map-model fit [i](#)

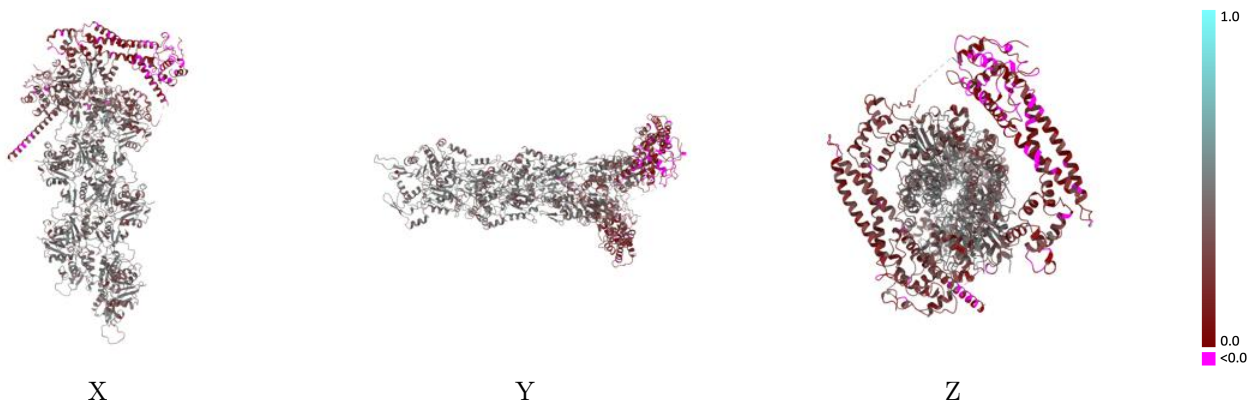
This section contains information regarding the fit between EMDB map EMD-44099 and PDB model 9B27. Per-residue inclusion information can be found in section 3 on page 5.

9.1 Map-model overlay [i](#)



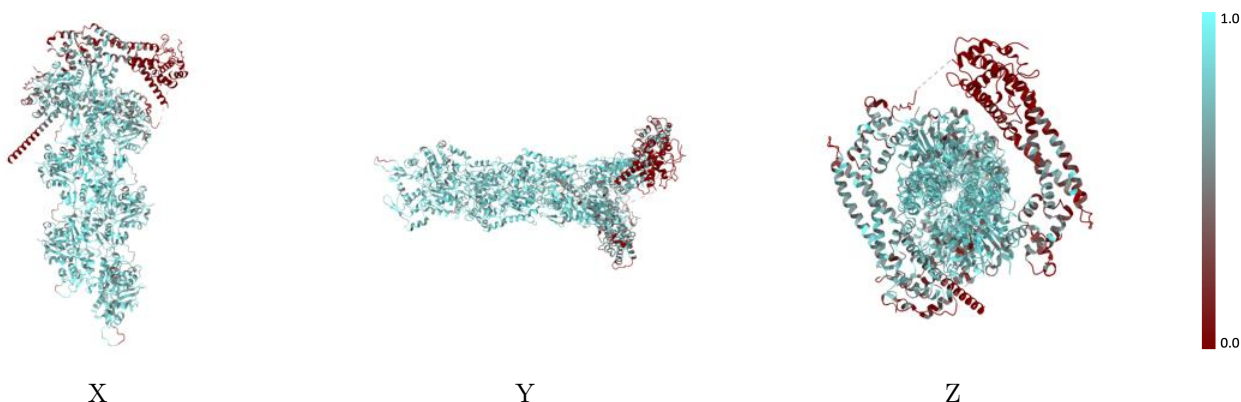
The images above show the 3D surface view of the map at the recommended contour level 0.183 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



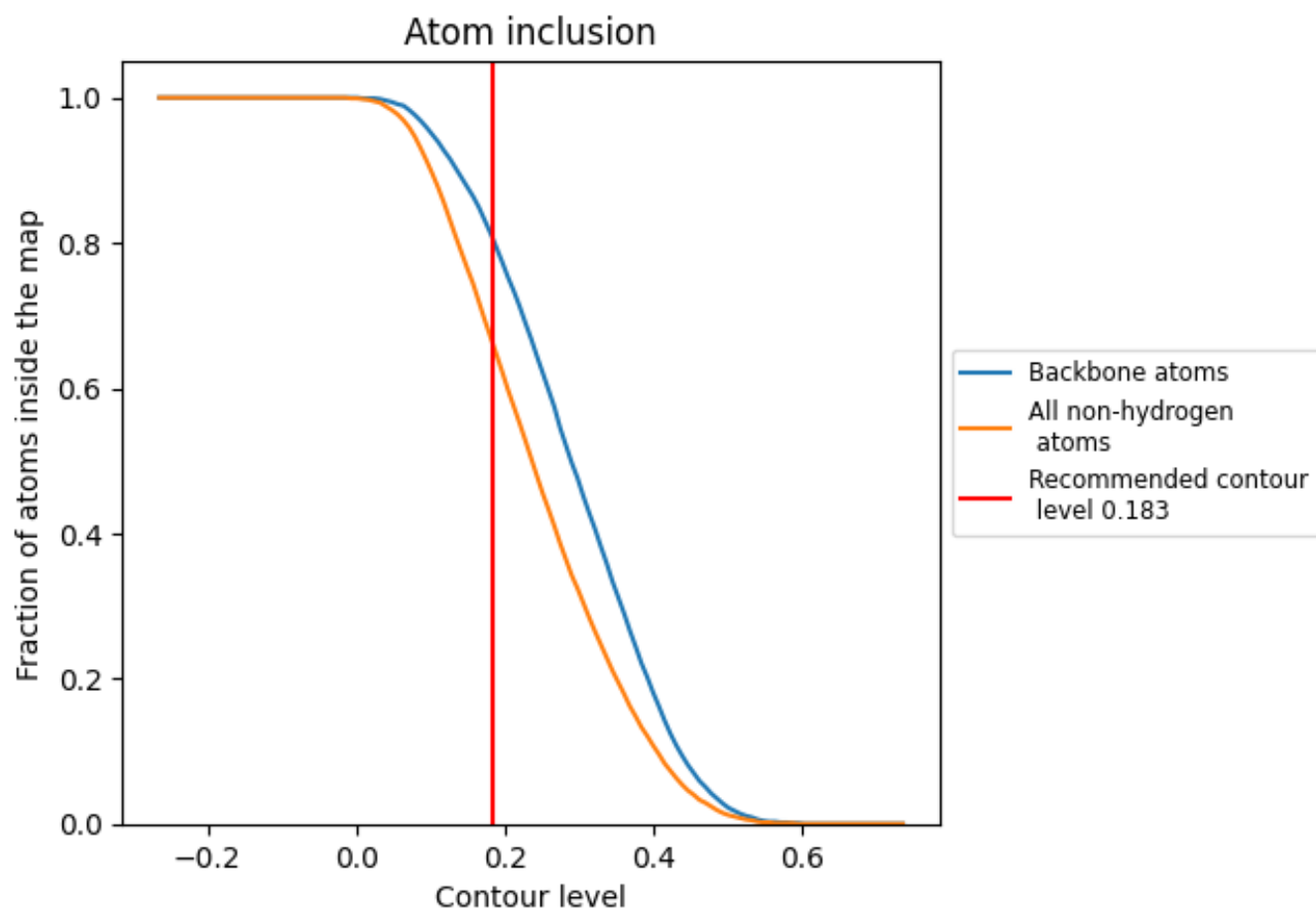
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.183).



















9.4 Atom inclusion [i](#)



At the recommended contour level, 81% of all backbone atoms, 66% 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 (0.183) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6650	 0.3550
A	 0.7610	 0.4320
B	 0.7920	 0.4400
C	 0.8010	 0.4390
D	 0.8130	 0.4390
E	 0.7720	 0.4000
F	 0.7550	 0.3880
G	 0.4350	 0.2010
H	 0.2340	 0.1280

