Full wwPDB EM Validation Report ⓘ

Oct 2, 2023 – 02:16 PM JST

PDB ID	:	8IFF
EMDB ID	:	EMD-35415
Title	:	Cryo-EM structure of Arabidopsis phytochrome A.
Authors	:	Ma, L.; Zhou, C.; Wang, J.; Guan, Z.; Yin, P.
Deposited on	:	2023-02-17
Resolution	:	3.10 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ 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:

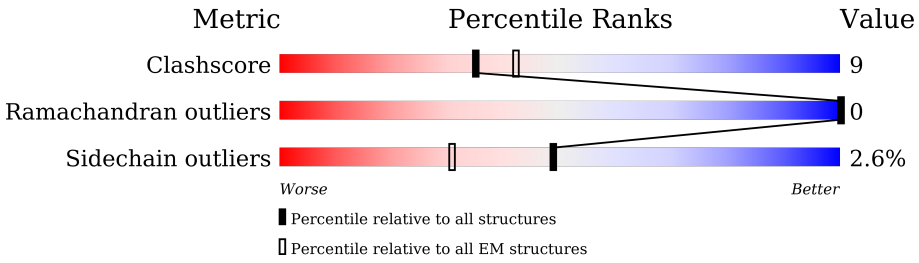
EMDB validation analysis	:	0.0.1.dev50
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

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 3.10 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 <=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	1122	22% 60% 17% 23%
1	B	1122	24% 60% 16% . 23%

2 Entry composition

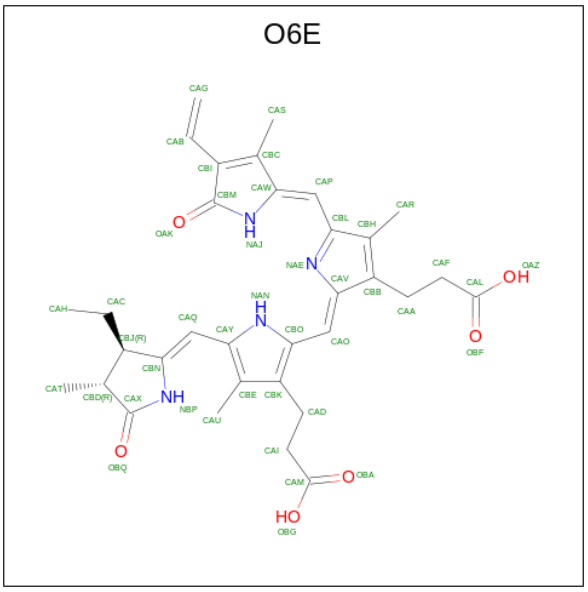
There are 2 unique types of molecules in this entry. The entry contains 13698 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Phytochrome A.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	868	Total	C	N	O	S	0	0
			6800	4314	1179	1255	52		
1	B	868	Total	C	N	O	S	0	0
			6812	4325	1179	1256	52		

- Molecule 2 is 3-[5-[[(3 {R},4 {R})-3-ethyl-4-methyl-5-oxidanylidene-3,4-dihydropyrrol-2-yl]methyl]-2-[[5-[(4-ethyl-3-methyl-5-oxidanylidene-pyrrol-2-yl)methyl]-3-(3-hydroxy-3-oxopropyl)-4-methyl-1 {H}-pyrrol-2-yl]methyl]-4-methyl-1 {H}-pyrrol-3-yl]propanoic acid (three-letter code: O6E) (formula: $C_{33}H_{38}N_4O_6$).



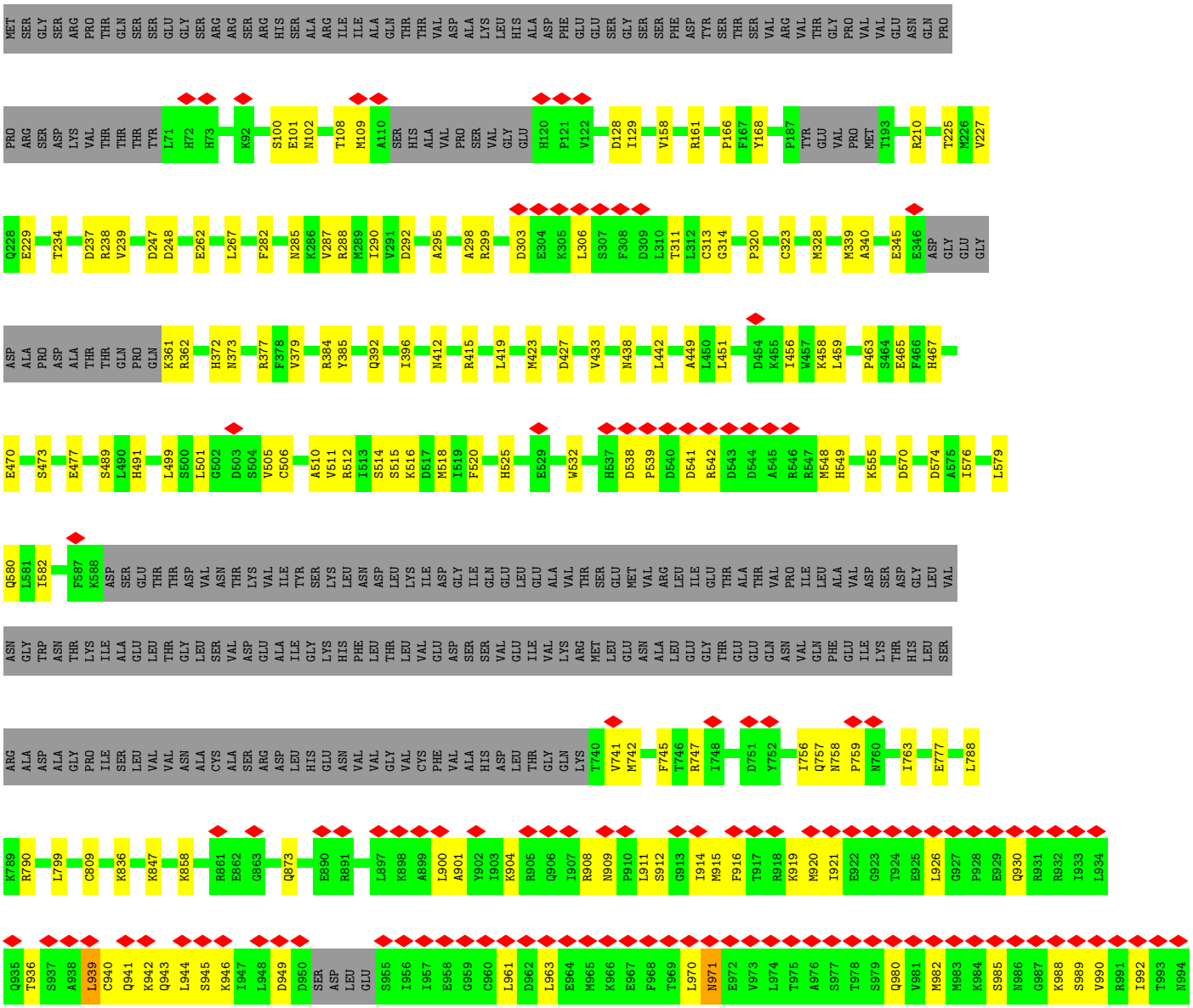
Mol	Chain	Residues	Atoms				AltConf
2	A	1	Total	C	N	O	0
			43	33	4	6	
2	B	1	Total	C	N	O	0
			43	33	4	6	

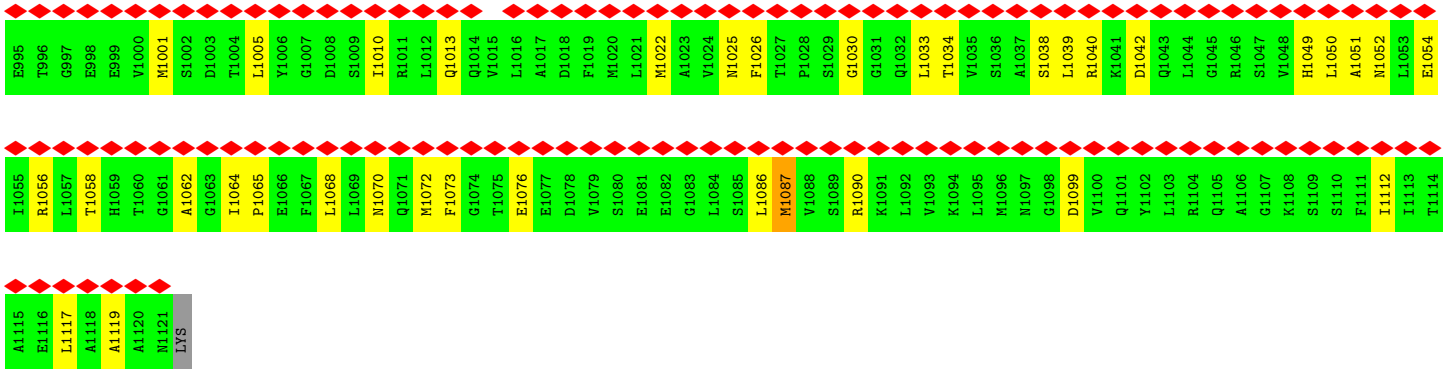
3 Residue-property plots (i)

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: Phytochrome A

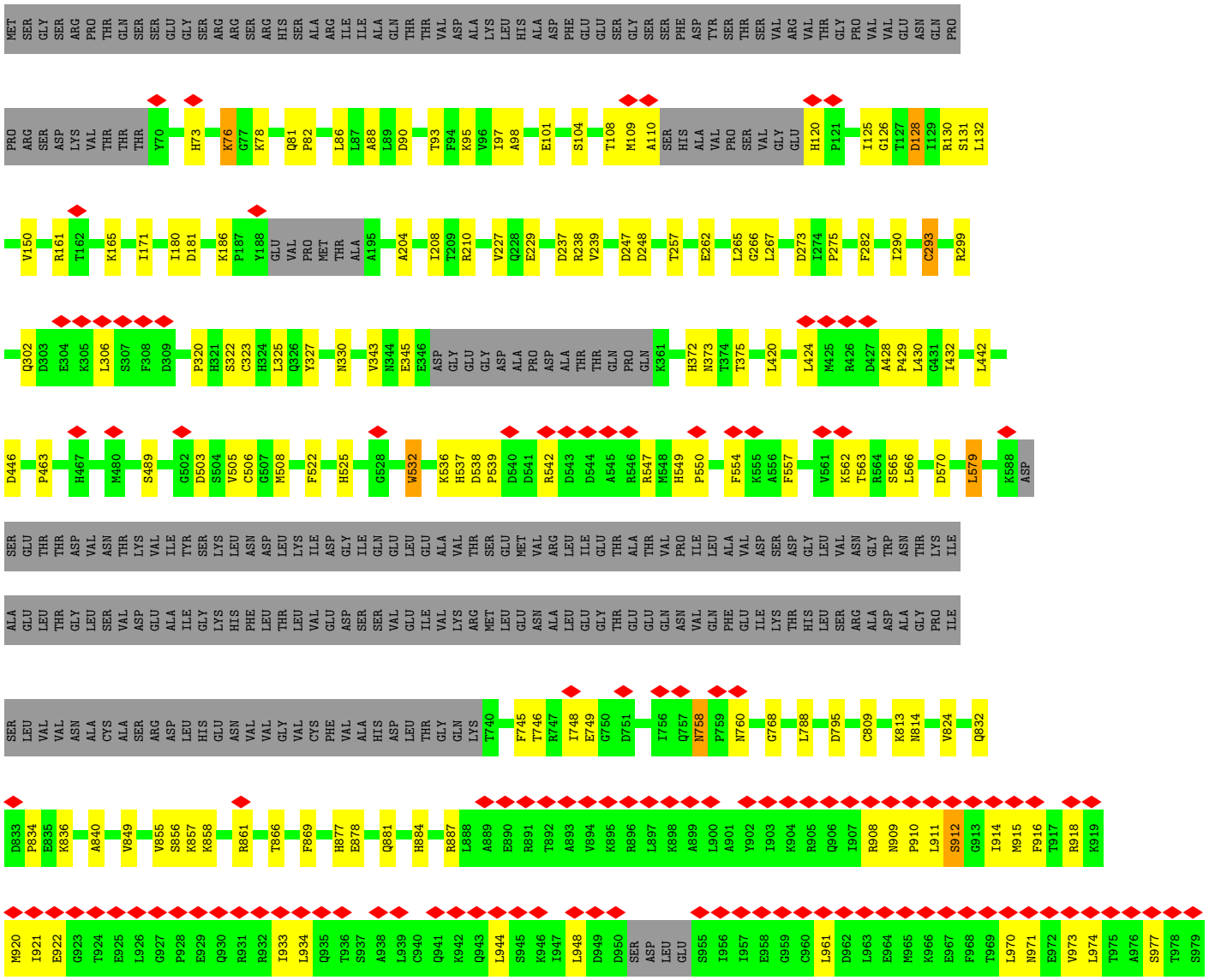
Chain A:

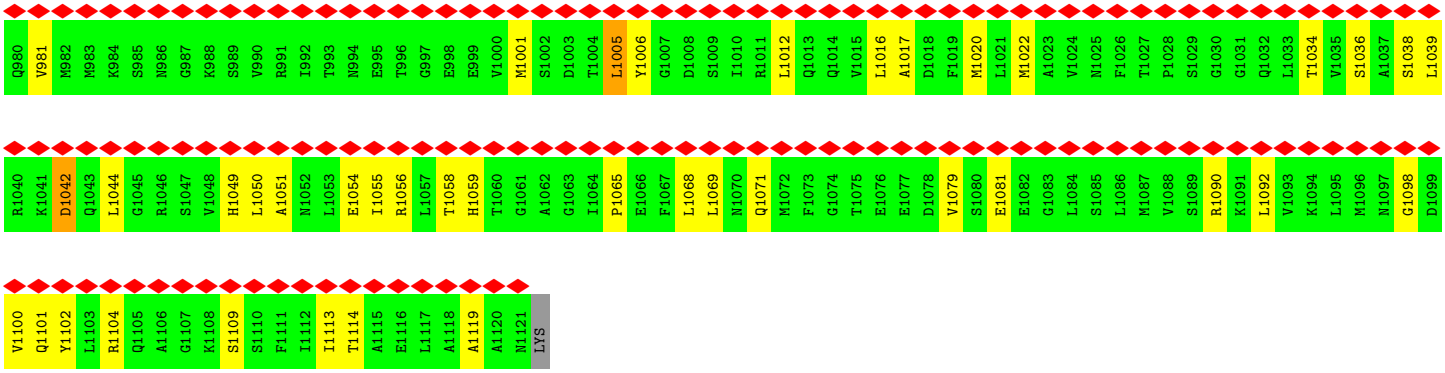




• Molecule 1: Phytochrome A

Chain B:




Q980 V981 M982 M983 K984 S985 N986 G987 K988 S989 V990 R991 I992 T993 N994 E995 T996 G997 E998 E999 V1000 M1001 S1002 D1003 T1004 L1005 Y1006 G1007 D1008 S1009 I1010 R1011 L1012 Q1013 Q1014 V1015 L1016 A1017 D1018 F1019 M1020 L1021 M1022 A1023 V1024 N1025 F1026 T1027 P1028 S1029 G1030 G1031 Q1032 L1033 T1034 V1035 S1036 A1037 S1038 L1039
R1040 K1041 D1042 Q1043 L1044 G1045 R1046 S1047 V1048 H1049 L1050 A1051 N1052 L1053 E1054 I1055 R1056 L1057 T1058 H1059 T1060 G1061 A1062 G1063 I1064 P1065 E1066 F1067 L1068 L1069 N1070 Q1071 M1072 F1073 G1074 T1075 E1076 E1077 D1078 V1079 S1080 E1081 E1082 G1083 L1084 S1085 L1086 M1087 V1088 S1089 R1090 K1091 L1092 V1093 K1094 L1095 M1096 N1097 G1098 D1099
V1100 Q1101 Y1102 L1103 R1104 Q1105 A1106 G1107 K1108 S1109 S1110 F1111 I1112 I1113 T1114 A1115 E1116 L1117 A1118 A1119 A1120 N1121 LYS

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	498817	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	3.795	Depositor
Minimum map value	-2.320	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.088	Depositor
Recommended contour level	0.3	Depositor
Map size (Å)	238.0, 238.0, 238.0	wwPDB
Map dimensions	280, 280, 280	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.85, 0.85, 0.85	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: O6E

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	0.27	0/6923	0.52	0/9343
1	B	0.26	0/6937	0.51	0/9362
All	All	0.27	0/13860	0.51	0/18705

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

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	6800	0	6893	119	0
1	B	6812	0	6899	121	0
2	A	43	0	0	2	0
2	B	43	0	0	3	0
All	All	13698	0	13792	238	0

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

All (238) 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)
1:A:323:CYS:SG	2:A:1201:O6E:CAC	2.20	1.28
1:B:323:CYS:SG	2:B:1201:O6E:CAC	2.21	1.28
1:A:345:GLU:O	1:A:362:ARG:HB3	1.76	0.86
1:B:323:CYS:HG	2:B:1201:O6E:CAC	1.95	0.79
1:B:150:VAL:HG21	1:B:171:ILE:HD11	1.68	0.75
1:A:1073:PHE:HA	1:A:1090:ARG:HH12	1.51	0.73
1:B:532:TRP:HA	1:B:557:PHE:HB3	1.72	0.72
1:A:901:ALA:HA	1:A:904:LYS:HE2	1.72	0.71
1:A:942:LYS:HG3	1:A:1010:ILE:HD11	1.72	0.71
1:A:961:LEU:HG	1:A:963:LEU:H	1.56	0.69
1:B:858:LYS:HD2	1:B:869:PHE:HE2	1.57	0.69
1:B:1049:HIS:HB2	1:B:1119:ALA:HB3	1.72	0.69
1:B:204:ALA:O	1:B:208:ILE:HG13	1.95	0.67
1:A:741:VAL:HG12	1:A:742:MET:H	1.57	0.67
1:B:977:SER:HB2	1:B:1017:ALA:HB2	1.75	0.67
1:A:946:LYS:HA	1:A:949:ASP:HB2	1.76	0.66
1:B:538:ASP:HB2	1:B:542:ARG:HG3	1.77	0.66
1:A:227:VAL:HG22	1:A:239:VAL:HG23	1.77	0.66
1:A:1049:HIS:HB2	1:A:1119:ALA:HB3	1.77	0.66
1:B:330:ASN:OD1	1:B:549:HIS:NE2	2.26	0.66
1:B:322:SER:HA	1:B:325:LEU:HD23	1.78	0.65
1:A:262:GLU:OE2	1:A:262:GLU:N	2.30	0.65
1:B:1100:VAL:HG22	1:B:1113:ILE:HG23	1.78	0.65
1:A:539:PRO:O	1:A:542:ARG:NH2	2.31	0.64
1:A:463:PRO:HD3	1:A:505:VAL:HG21	1.78	0.64
1:B:227:VAL:HG13	1:B:239:VAL:HG23	1.80	0.64
1:B:1090:ARG:NH1	1:B:1100:VAL:O	2.31	0.63
1:A:745:PHE:HE1	1:A:747:ARG:HE	1.47	0.63
1:A:788:LEU:HD21	1:A:809:CYS:HB3	1.80	0.63
1:B:267:LEU:HD22	1:B:532:TRP:HD1	1.62	0.63
1:A:282:PHE:HD2	1:A:340:ALA:HB2	1.64	0.62
1:B:267:LEU:HD22	1:B:532:TRP:CD1	2.34	0.62
1:A:323:CYS:HG	2:A:1201:O6E:CAC	2.09	0.62
1:B:489:SER:HB2	1:B:563:THR:HG22	1.82	0.62
1:A:210:ARG:NH1	1:A:229:GLU:OE1	2.33	0.61
1:B:88:ALA:HB3	1:B:98:ALA:HB3	1.82	0.61
1:A:777:GLU:OE2	1:A:858:LYS:NZ	2.31	0.61
1:A:100:SER:OG	1:A:102:ASN:OD1	2.15	0.61
1:A:574:ASP:OD1	1:A:758:ASN:ND2	2.34	0.61
1:A:1005:LEU:HD11	1:A:1117:LEU:HD23	1.83	0.60
1:A:982:MET:SD	1:A:992:ILE:HD11	2.42	0.60
1:B:93:THR:HG22	1:B:95:LYS:HG2	1.83	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:503:ASP:OD1	1:B:503:ASP:N	2.36	0.59
1:B:210:ARG:NH1	1:B:229:GLU:OE1	2.37	0.58
1:B:128:ASP:HB2	1:B:130:ARG:HH21	1.68	0.58
1:B:1100:VAL:HG13	1:B:1113:ILE:HG12	1.85	0.58
1:B:916:PHE:O	1:B:920:MET:HG2	2.04	0.58
1:A:943:GLN:OE1	1:A:1013:GLN:NE2	2.36	0.58
1:B:463:PRO:HD3	1:B:505:VAL:HG11	1.84	0.58
1:A:982:MET:HA	1:A:982:MET:HE2	1.86	0.58
1:A:1040:ARG:HB2	1:A:1052:ASN:HB2	1.86	0.58
1:A:237:ASP:HB2	1:A:373:ASN:HA	1.86	0.57
1:B:131:SER:O	1:B:161:ARG:NH2	2.38	0.56
1:B:908:ARG:NH2	1:B:948:LEU:O	2.37	0.56
1:A:1026:PHE:HB3	1:A:1062:ALA:HB3	1.87	0.56
1:A:944:LEU:HD13	1:B:910:PRO:HB2	1.87	0.56
1:A:419:LEU:O	1:A:423:MET:HG3	2.06	0.56
1:B:171:ILE:HG22	1:B:180:ILE:HG23	1.87	0.56
1:A:582:ILE:HD11	1:A:763:ILE:HD11	1.88	0.55
1:A:756:ILE:HG23	1:A:758:ASN:H	1.70	0.55
1:A:511:VAL:HG21	1:A:576:ILE:HG22	1.89	0.55
1:B:238:ARG:HB2	1:B:257:THR:HG22	1.87	0.55
1:A:985:SER:HB3	1:A:990:VAL:HB	1.88	0.55
1:B:1051:ALA:HB2	1:B:1119:ALA:HB2	1.87	0.55
1:A:1072:MET:HG2	1:A:1086:LEU:HG	1.87	0.55
1:B:237:ASP:HB2	1:B:373:ASN:HA	1.87	0.55
1:B:537:HIS:CE1	1:B:539:PRO:HG3	2.42	0.55
1:B:832:GLN:HA	1:B:857:LYS:HB3	1.89	0.55
1:A:1033:LEU:HA	1:A:1058:THR:HG21	1.88	0.55
1:B:1038:SER:HB3	1:B:1054:GLU:HB2	1.89	0.54
1:A:756:ILE:HG23	1:A:759:PRO:HD3	1.89	0.54
1:A:1042:ASP:HB3	1:A:1050:LEU:HB2	1.88	0.54
1:A:456:ILE:HD12	1:A:465:GLU:HG2	1.90	0.54
1:A:510:ALA:HA	1:A:520:PHE:HB3	1.90	0.53
1:B:922:GLU:HG3	1:B:934:LEU:HD13	1.89	0.53
1:B:1044:LEU:HB2	1:B:1050:LEU:HD12	1.91	0.53
1:A:158:VAL:O	1:A:166:PRO:HA	2.09	0.53
1:B:262:GLU:OE1	1:B:262:GLU:N	2.39	0.52
1:B:1071:GLN:HB3	1:B:1079:VAL:HG13	1.92	0.52
1:B:877:HIS:O	1:B:881:GLN:HG2	2.10	0.51
1:A:433:VAL:HG23	1:A:459:LEU:HD11	1.92	0.51
1:B:911:LEU:O	1:B:914:ILE:HG22	2.11	0.51
1:A:1034:THR:H	1:A:1058:THR:HB	1.76	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1005:LEU:HD22	1:B:1039:LEU:HD21	1.92	0.51
1:A:915:MET:HG3	1:A:941:GLN:NE2	2.26	0.51
1:B:238:ARG:HG2	1:B:372:HIS:HB2	1.92	0.51
1:A:971:ASN:ND2	1:A:1001:MET:HG2	2.26	0.51
1:B:911:LEU:O	1:B:915:MET:HG3	2.11	0.51
1:B:532:TRP:HZ3	1:B:536:LYS:HZ3	1.59	0.50
1:B:562:LYS:NZ	1:B:563:THR:H	2.09	0.50
1:A:379:VAL:O	1:A:384:ARG:NH1	2.45	0.50
1:A:467:HIS:HA	1:A:470:GLU:OE2	2.11	0.50
1:A:1051:ALA:HB2	1:A:1119:ALA:HB2	1.93	0.50
1:A:1070:ASN:ND2	1:A:1076:GLU:OE2	2.45	0.50
1:B:538:ASP:OD1	1:B:538:ASP:N	2.44	0.50
1:A:427:ASP:N	1:A:427:ASP:OD1	2.44	0.50
1:B:971:ASN:HB2	1:B:1001:MET:HG3	1.94	0.49
1:A:225:THR:O	1:A:229:GLU:HG2	2.12	0.49
1:B:1036:SER:OG	1:B:1056:ARG:NH1	2.45	0.49
1:A:290:ILE:HD13	1:A:320:PRO:HG3	1.95	0.49
1:A:908:ARG:CZ	1:A:908:ARG:HA	2.42	0.49
1:A:909:ASN:O	1:A:912:SER:OG	2.22	0.49
1:B:1098:GLY:HA2	1:B:1114:THR:O	2.11	0.49
1:B:343:VAL:HG12	1:B:345:GLU:HG2	1.93	0.49
1:B:1059:HIS:HB3	1:B:1109:SER:HB3	1.95	0.49
1:B:918:ARG:NH1	1:B:922:GLU:OE2	2.45	0.49
1:A:926:LEU:HB3	1:A:930:GLN:HG3	1.95	0.49
1:B:813:LYS:HG3	1:B:814:ASN:HD22	1.78	0.49
1:B:746:THR:O	1:B:746:THR:OG1	2.30	0.48
1:A:467:HIS:NE2	1:A:501:LEU:HB3	2.28	0.48
1:A:989:SER:HB2	1:A:1030:GLY:H	1.78	0.48
1:B:961:LEU:HD22	1:B:1092:LEU:HD21	1.96	0.48
1:B:788:LEU:HD21	1:B:809:CYS:HB3	1.95	0.48
1:B:824:VAL:HG22	1:B:855:VAL:HG11	1.95	0.48
1:A:290:ILE:HD12	1:A:328:MET:HE1	1.95	0.48
1:B:1104:ARG:HA	1:B:1109:SER:HB2	1.95	0.48
1:B:1081:GLU:CD	1:B:1081:GLU:H	2.16	0.48
1:A:467:HIS:CD2	1:A:501:LEU:HB3	2.49	0.47
1:A:512:ARG:HG2	1:A:518:MET:HG2	1.96	0.47
1:A:438:ASN:HD22	1:A:459:LEU:HD22	1.79	0.47
1:B:171:ILE:HG22	1:B:180:ILE:HG12	1.95	0.47
1:B:970:LEU:O	1:B:974:LEU:HB2	2.14	0.47
1:A:900:LEU:O	1:A:904:LYS:HG3	2.14	0.47
1:B:97:ILE:HA	1:B:125:ILE:HG23	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1042:ASP:OD1	1:B:1042:ASP:N	2.46	0.47
1:B:267:LEU:HD22	1:B:532:TRP:HB2	1.95	0.47
1:A:756:ILE:HG13	1:A:757:GLN:H	1.78	0.47
1:A:1064:ILE:HG23	1:A:1068:LEU:HB2	1.96	0.47
1:B:273:ASP:OD2	1:B:327:TYR:OH	2.31	0.47
1:B:290:ILE:HD13	1:B:320:PRO:HG3	1.97	0.47
1:B:758:ASN:O	1:B:760:ASN:N	2.38	0.47
1:B:858:LYS:HD3	1:B:866:THR:HB	1.97	0.47
1:A:491:HIS:CE1	1:A:499:LEU:HD23	2.51	0.46
1:B:275:PRO:HD2	2:B:1201:O6E:NAN	2.30	0.46
1:A:451:LEU:HD12	1:A:456:ILE:HG12	1.96	0.46
1:A:238:ARG:HG2	1:A:372:HIS:HB2	1.98	0.46
1:A:836:LYS:HD3	1:A:873:GLN:NE2	2.30	0.46
1:A:548:MET:SD	1:A:549:HIS:N	2.89	0.46
1:A:303:ASP:HB3	1:A:306:LEU:HG	1.98	0.46
1:B:1049:HIS:O	1:B:1119:ALA:N	2.49	0.46
1:B:373:ASN:ND2	1:B:375:THR:O	2.41	0.45
1:B:110:ALA:O	1:B:120:HIS:NE2	2.49	0.45
1:B:1054:GLU:HB3	1:B:1056:ARG:HH21	1.81	0.45
1:A:128:ASP:OD1	1:A:129:ILE:N	2.49	0.45
1:A:532:TRP:NE1	1:A:555:LYS:O	2.49	0.45
1:A:1065:PRO:HD2	1:A:1068:LEU:HD12	1.98	0.45
1:B:95:LYS:HD2	1:B:126:GLY:O	2.16	0.45
1:B:508:MET:HG3	1:B:522:PHE:CE1	2.51	0.45
1:B:1055:ILE:HB	1:B:1113:ILE:HB	1.97	0.45
1:A:345:GLU:O	1:A:362:ARG:CB	2.56	0.45
1:A:491:HIS:HE1	1:A:499:LEU:HD23	1.81	0.45
1:A:936:THR:O	1:A:939:LEU:HD23	2.16	0.45
1:A:514:SER:OG	1:A:515:SER:N	2.49	0.45
1:B:918:ARG:O	1:B:921:ILE:HG22	2.16	0.45
1:B:1034:THR:H	1:B:1058:THR:HG22	1.82	0.45
1:B:1090:ARG:HH12	1:B:1101:GLN:HA	1.81	0.45
1:A:392:GLN:O	1:A:396:ILE:HG23	2.16	0.45
1:B:97:ILE:HD12	1:B:306:LEU:HD11	1.98	0.45
1:B:128:ASP:OD1	1:B:131:SER:N	2.49	0.45
1:B:429:PRO:HD2	1:B:430:LEU:HD22	1.98	0.45
1:B:302:GLN:HE21	1:B:306:LEU:HD12	1.81	0.45
1:B:565:SER:OG	1:B:566:LEU:N	2.50	0.45
1:B:768:GLY:HA3	1:B:869:PHE:CD1	2.51	0.45
1:B:547:ARG:HE	1:B:550:PRO:HG2	1.82	0.45
1:B:909:ASN:HB2	1:B:910:PRO:HD3	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:919:LYS:HA	1:A:919:LYS:HD3	1.83	0.44
1:A:921:ILE:HB	1:B:933:ILE:HG21	1.99	0.44
1:B:420:LEU:HD12	1:B:420:LEU:O	2.17	0.44
1:B:1065:PRO:HD2	1:B:1068:LEU:HD12	1.98	0.44
1:A:438:ASN:OD1	1:A:438:ASN:N	2.47	0.44
1:A:267:LEU:HD22	1:A:532:TRP:CD1	2.53	0.44
1:B:748:ILE:HG23	1:B:749:GLU:H	1.82	0.44
1:A:489:SER:HA	1:A:506:CYS:SG	2.58	0.44
1:A:412:ASN:OD1	1:A:415:ARG:NH2	2.44	0.44
1:B:73:HIS:HA	1:B:76:LYS:HZ2	1.83	0.44
1:B:442:LEU:HD22	1:B:579:LEU:HD13	2.00	0.44
1:A:756:ILE:C	1:A:758:ASN:H	2.21	0.44
1:A:473:SER:O	1:A:477:GLU:HG3	2.18	0.44
1:A:912:SER:HA	1:A:915:MET:HE2	2.00	0.44
1:B:834:PRO:HA	1:B:855:VAL:O	2.18	0.43
1:A:1099:ASP:OD1	1:A:1099:ASP:N	2.51	0.43
1:B:109:MET:HG2	1:B:165:LYS:HE2	2.00	0.43
1:B:293:CYS:HB2	1:B:325:LEU:HD12	2.00	0.43
1:A:292:ASP:HB3	1:A:295:ALA:HB2	2.01	0.43
1:A:516:LYS:HE2	1:A:516:LYS:HB2	1.84	0.43
1:A:908:ARG:HH12	1:A:911:LEU:HD23	1.83	0.43
1:A:1022:MET:O	1:A:1025:ASN:HB2	2.18	0.43
1:A:511:VAL:HG11	1:A:580:GLN:HB2	1.99	0.43
1:A:970:LEU:HB2	1:A:1005:LEU:HD22	2.01	0.43
1:B:981:VAL:HG11	1:B:1020:MET:SD	2.58	0.43
1:A:908:ARG:HA	1:A:908:ARG:NH1	2.33	0.43
1:B:78:LYS:HB2	1:B:78:LYS:HE2	1.71	0.43
1:B:840:ALA:HA	1:B:849:VAL:O	2.19	0.43
1:B:912:SER:HA	1:B:915:MET:SD	2.58	0.43
1:A:234:THR:O	1:A:377:ARG:NH2	2.47	0.43
1:A:285:ASN:HD21	1:A:314:GLY:HA2	1.84	0.43
1:B:506:CYS:SG	1:B:525:HIS:HB2	2.59	0.43
1:A:102:ASN:OD1	1:A:102:ASN:N	2.49	0.42
1:B:429:PRO:O	1:B:432:ILE:HG12	2.19	0.42
1:A:361:LYS:HB3	1:A:362:ARG:H	1.57	0.42
1:B:1069:LEU:HD13	1:B:1102:TYR:CE1	2.54	0.42
1:A:940:CYS:SG	1:A:980:GLN:NE2	2.92	0.42
1:A:945:SER:O	1:A:949:ASP:N	2.53	0.42
1:A:1056:ARG:NH1	1:A:1112:ILE:HG23	2.35	0.42
1:B:247:ASP:O	1:B:248:ASP:HB2	2.20	0.42
1:B:562:LYS:HZ2	1:B:563:THR:H	1.68	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1012:LEU:O	1:B:1016:LEU:HG	2.20	0.42
1:A:449:ALA:HB3	1:A:520:PHE:CE1	2.54	0.42
1:A:799:LEU:HD12	1:A:799:LEU:HA	1.84	0.42
1:B:562:LYS:HD2	1:B:562:LYS:HA	1.82	0.42
1:A:538:ASP:N	1:A:538:ASP:OD1	2.53	0.41
1:A:311:THR:HG1	1:A:313:CYS:HG	1.64	0.41
1:A:538:ASP:HB2	1:A:542:ARG:NH1	2.35	0.41
1:A:911:LEU:HA	1:A:914:ILE:HD12	2.01	0.41
1:A:247:ASP:O	1:A:248:ASP:HB2	2.20	0.41
1:A:971:ASN:HD22	1:A:1001:MET:HG2	1.85	0.41
1:B:265:LEU:HD23	1:B:266:GLY:N	2.36	0.41
1:A:101:GLU:HG2	1:A:298:ALA:HB1	2.01	0.41
1:A:108:THR:OG1	1:A:109:MET:N	2.54	0.41
1:A:847:LYS:HE3	1:A:847:LYS:HB3	1.84	0.41
1:B:81:GLN:HA	1:B:82:PRO:HD3	1.90	0.41
1:B:90:ASP:OD1	1:B:90:ASP:N	2.47	0.41
1:B:424:LEU:O	1:B:428:ALA:HB2	2.20	0.41
1:B:570:ASP:OD1	1:B:570:ASP:N	2.49	0.41
1:A:458:LYS:NZ	1:A:465:GLU:HB2	2.35	0.41
1:A:442:LEU:HD22	1:A:579:LEU:HD13	2.02	0.41
1:A:1038:SER:HB3	1:A:1054:GLU:OE1	2.20	0.41
1:B:836:LYS:N	1:B:836:LYS:HD2	2.35	0.41
1:A:1087:MET:SD	1:A:1087:MET:N	2.88	0.41
1:B:104:SER:O	1:B:108:THR:OG1	2.38	0.41
1:B:878:GLU:H	1:B:878:GLU:HG2	1.71	0.41
1:B:186:LYS:HA	1:B:186:LYS:HD3	1.93	0.40
1:A:287:VAL:HG22	1:A:339:MET:HG2	2.03	0.40
1:A:541:ASP:OD1	1:A:541:ASP:N	2.53	0.40
1:B:101:GLU:HG2	1:B:299:ARG:O	2.21	0.40
1:B:973:VAL:HG21	1:B:1012:LEU:HB3	2.04	0.40
1:B:420:LEU:O	1:B:424:LEU:HD23	2.21	0.40
1:B:1098:GLY:CA	1:B:1114:THR:O	2.70	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	856/1122 (76%)	809 (94%)	47 (6%)	0	100	100
1	B	856/1122 (76%)	814 (95%)	42 (5%)	0	100	100
All	All	1712/2244 (76%)	1623 (95%)	89 (5%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	750/970 (77%)	735 (98%)	15 (2%)	55	80
1	B	751/970 (77%)	727 (97%)	24 (3%)	39	69
All	All	1501/1940 (77%)	1462 (97%)	39 (3%)	49	74

All (39) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	161	ARG
1	A	168	TYR
1	A	288	ARG
1	A	299	ARG
1	A	385	TYR
1	A	525	HIS
1	A	570	ASP
1	A	790	ARG
1	A	916	PHE
1	A	920	MET
1	A	939	LEU
1	A	971	ASN
1	A	988	LYS
1	A	1039	LEU

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Mol	Chain	Res	Type
1	A	1087	MET
1	B	76	LYS
1	B	86	LEU
1	B	128	ASP
1	B	132	LEU
1	B	181	ASP
1	B	282	PHE
1	B	293	CYS
1	B	446	ASP
1	B	532	TRP
1	B	554	PHE
1	B	579	LEU
1	B	745	PHE
1	B	758	ASN
1	B	795	ASP
1	B	856	SER
1	B	861	ARG
1	B	884	HIS
1	B	887	ARG
1	B	912	SER
1	B	944	LEU
1	B	1005	LEU
1	B	1006	TYR
1	B	1022	MET
1	B	1042	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	760	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)

2 ligands 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	$\#\|Z\| > 2$
2	O6E	B	1201	-	42,46,46	1.08	2 (4%)	50,67,67	1.18	4 (8%)
2	O6E	A	1201	-	42,46,46	1.11	4 (9%)	50,67,67	1.05	3 (6%)

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
2	O6E	B	1201	-	-	14/25/74/74	0/4/4/4
2	O6E	A	1201	-	-	17/25/74/74	0/4/4/4

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1201	O6E	CAB-CBI	-3.59	1.37	1.47
2	A	1201	O6E	CAO-CAV	3.58	1.38	1.35
2	A	1201	O6E	CAB-CBI	-3.17	1.38	1.47
2	B	1201	O6E	CAO-CAV	2.72	1.37	1.35
2	A	1201	O6E	CBI-CBC	2.06	1.41	1.37
2	A	1201	O6E	OAZ-CAL	-2.05	1.23	1.30

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	1201	O6E	CAS-CBC-CAW	3.19	128.15	124.17
2	B	1201	O6E	CAO-CAV-NAE	-2.74	125.03	128.83
2	A	1201	O6E	CAS-CBC-CAW	2.54	127.34	124.17
2	B	1201	O6E	CAC-CBJ-CBD	-2.49	108.04	114.26
2	B	1201	O6E	CAQ-CBN-NBP	2.47	128.14	125.20
2	A	1201	O6E	CAO-CAV-NAE	-2.19	125.79	128.83
2	A	1201	O6E	CBD-CBJ-CBN	2.14	104.54	101.34

There are no chirality outliers.

All (31) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1201	O6E	CAH-CAC-CBJ-CBD
2	A	1201	O6E	CAH-CAC-CBJ-CBN
2	A	1201	O6E	CAY-CAQ-CBN-NBP
2	A	1201	O6E	CBK-CAD-CAI-CAM
2	A	1201	O6E	CAV-CAO-CBO-NAN
2	A	1201	O6E	CAV-CAO-CBO-CBK
2	A	1201	O6E	CAW-CAP-CBL-NAE
2	A	1201	O6E	CAW-CAP-CBL-CBH
2	B	1201	O6E	CAH-CAC-CBJ-CBD
2	B	1201	O6E	CAH-CAC-CBJ-CBN
2	B	1201	O6E	CBN-CAQ-CAY-NAN
2	B	1201	O6E	CBN-CAQ-CAY-CBE
2	B	1201	O6E	CAV-CAO-CBO-NAN
2	B	1201	O6E	CAV-CAO-CBO-CBK
2	B	1201	O6E	CAW-CAP-CBL-NAE
2	B	1201	O6E	CAW-CAP-CBL-CBH
2	A	1201	O6E	CBL-CAP-CAW-NAJ
2	B	1201	O6E	CBL-CAP-CAW-NAJ
2	A	1201	O6E	CBL-CAP-CAW-CBC
2	B	1201	O6E	CBL-CAP-CAW-CBC
2	B	1201	O6E	CBB-CAA-CAF-CAL
2	A	1201	O6E	CAF-CAA-CBB-CAV
2	A	1201	O6E	CAF-CAA-CBB-CBH
2	B	1201	O6E	CBK-CAD-CAI-CAM
2	A	1201	O6E	CAI-CAD-CBK-CBE
2	A	1201	O6E	CAI-CAD-CBK-CBO
2	A	1201	O6E	CAA-CAF-CAL-OBF
2	A	1201	O6E	CAA-CAF-CAL-OAZ
2	B	1201	O6E	CAD-CAI-CAM-OBG
2	A	1201	O6E	CBB-CAA-CAF-CAL
2	B	1201	O6E	CAD-CAI-CAM-OBA

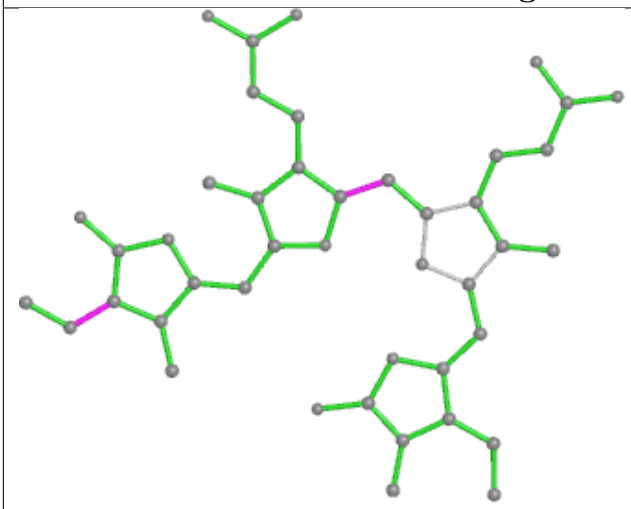
There are no ring outliers.

2 monomers are involved in 5 short contacts:

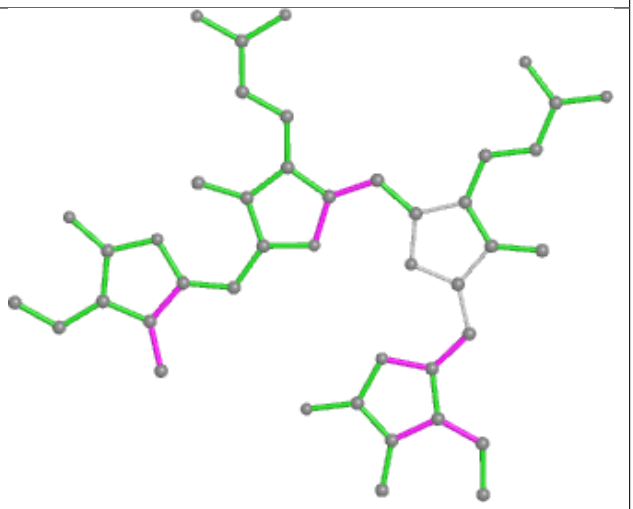
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1201	O6E	3	0
2	A	1201	O6E	2	0

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

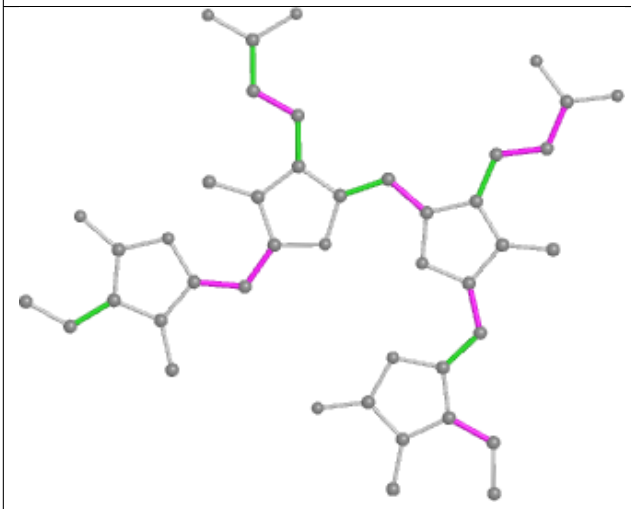
Ligand O6E B 1201



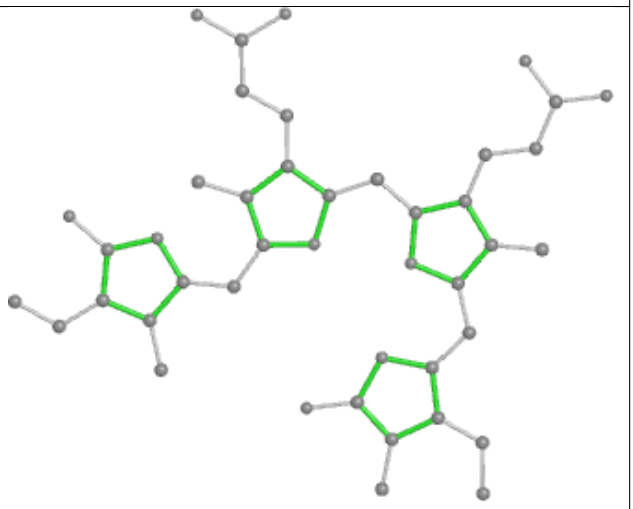
Bond lengths



Bond angles

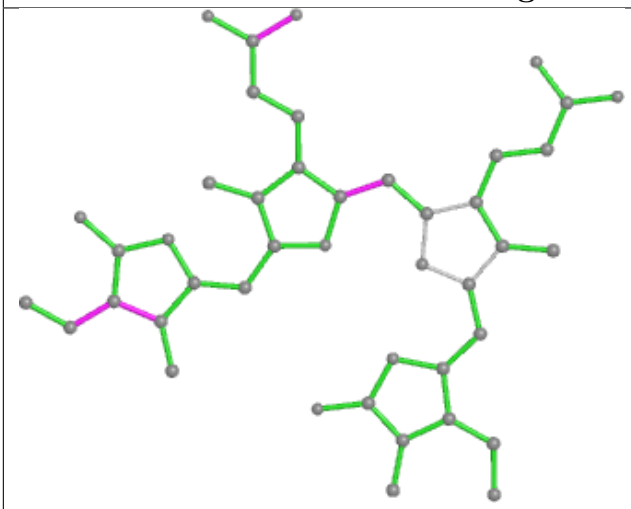


Torsions

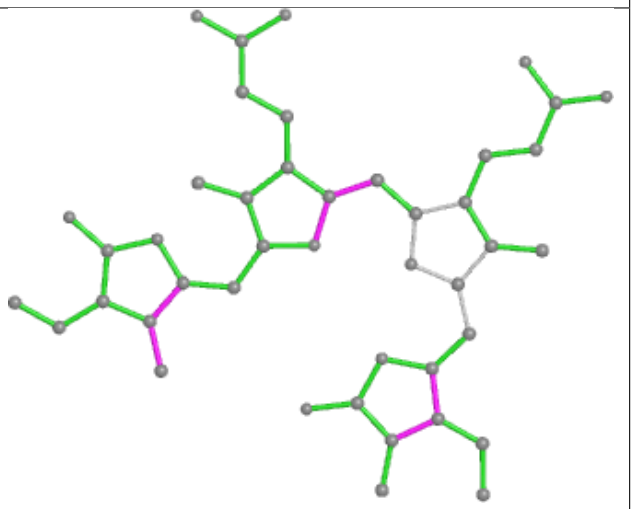


Rings

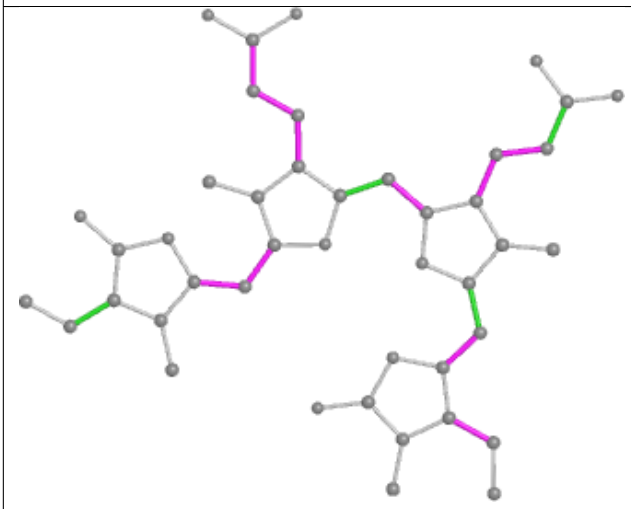
Ligand O6E A 1201



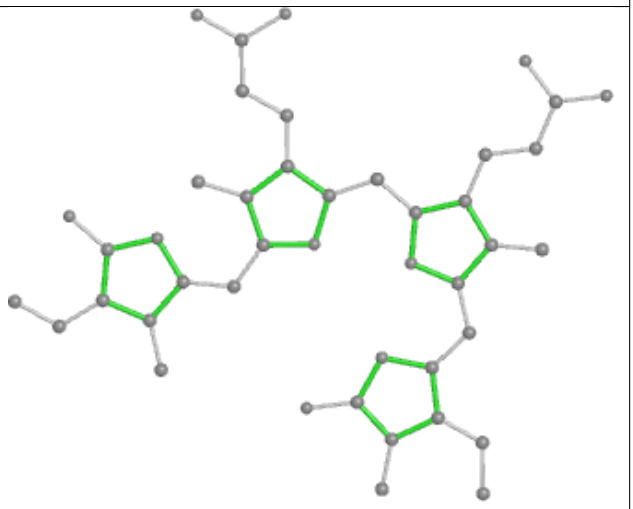
Bond lengths



Bond angles



Torsions



Rings

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.

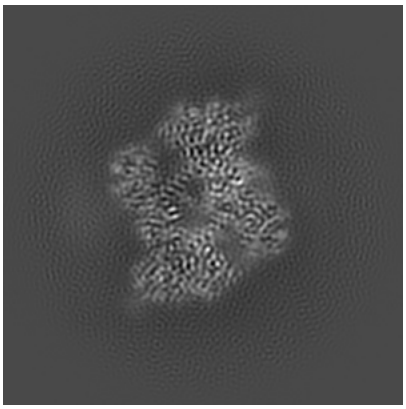
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-35415. These allow visual inspection of the internal detail of the map and identification of artifacts.

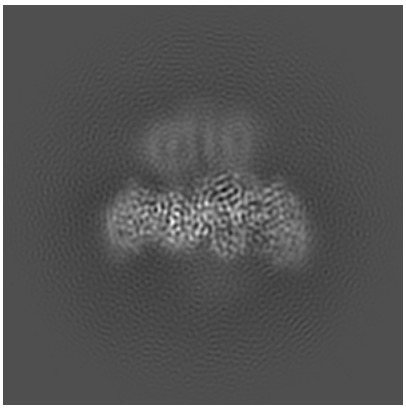
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

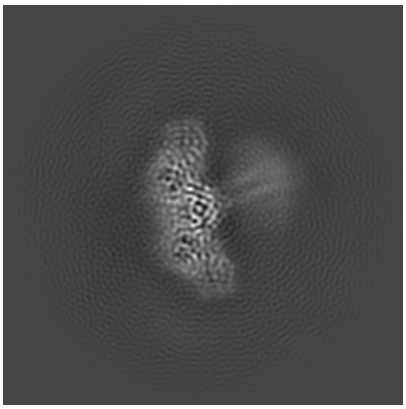
6.1.1 Primary map



X

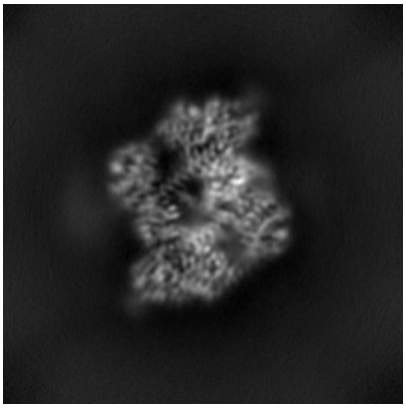


Y

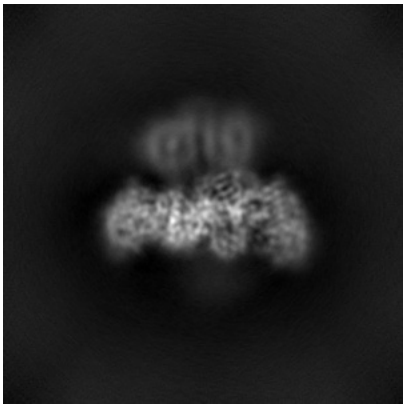


Z

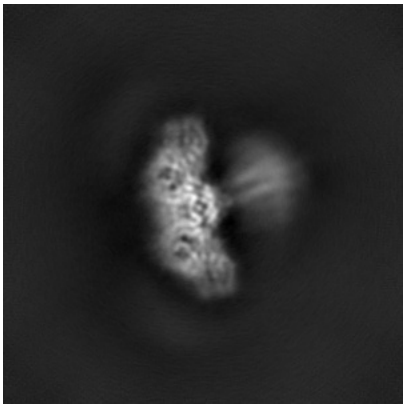
6.1.2 Raw map



X



Y

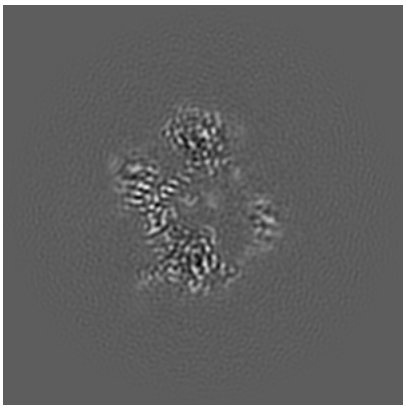


Z

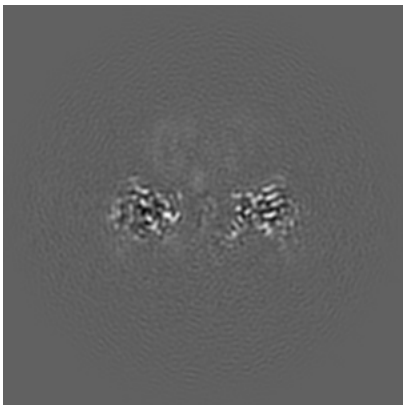
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

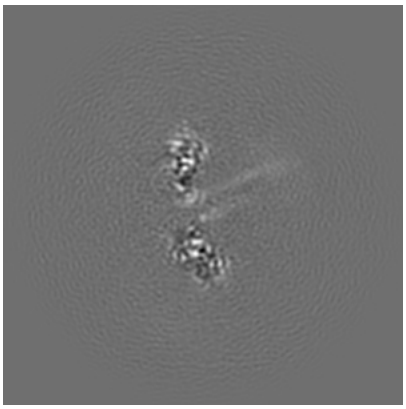
6.2.1 Primary map



X Index: 140

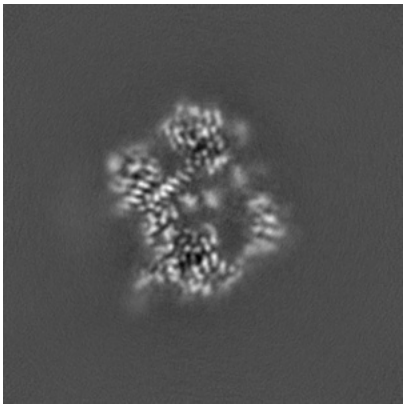


Y Index: 140

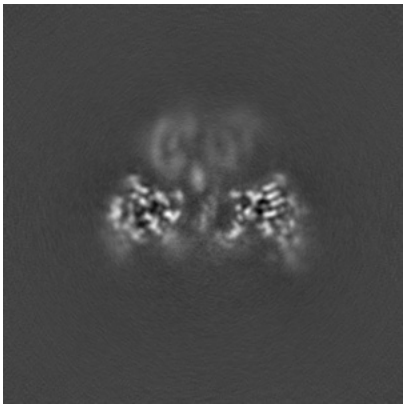


Z Index: 140

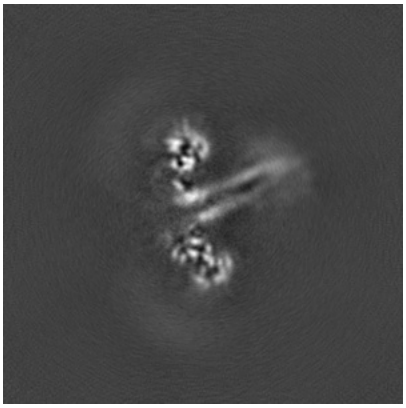
6.2.2 Raw map



X Index: 140



Y Index: 140

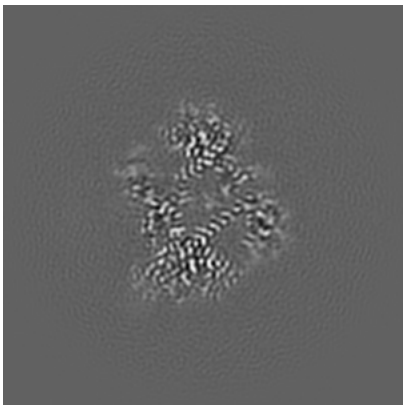


Z Index: 140

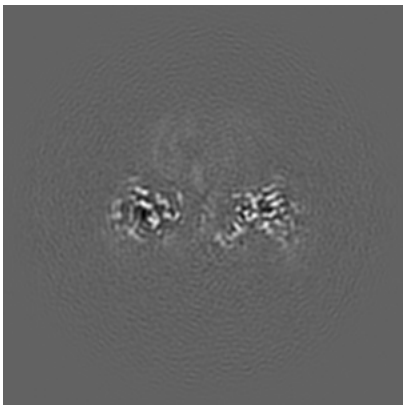
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

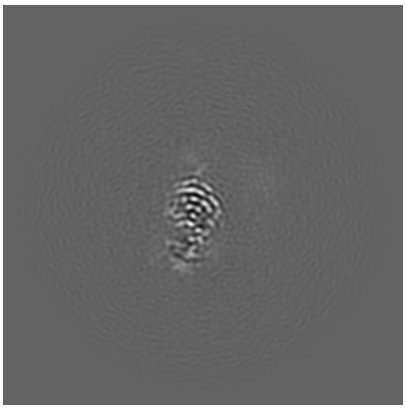
6.3.1 Primary map



X Index: 133

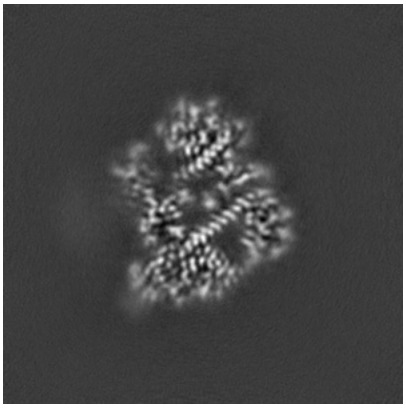


Y Index: 141

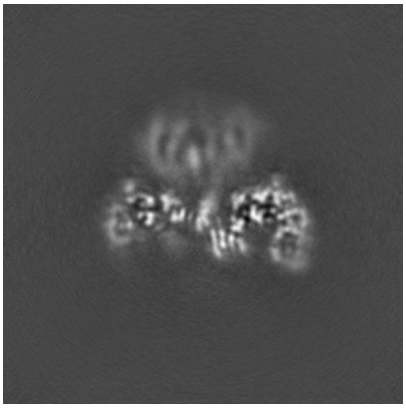


Z Index: 98

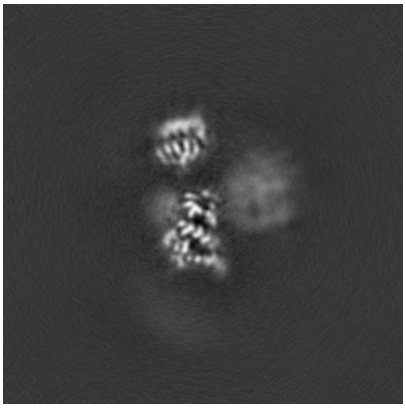
6.3.2 Raw map



X Index: 132



Y Index: 146

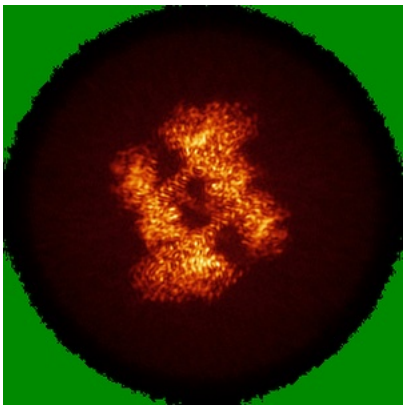


Z Index: 118

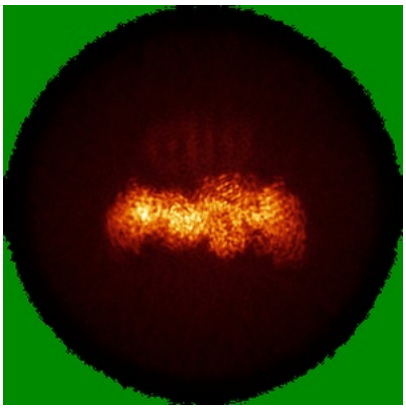
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

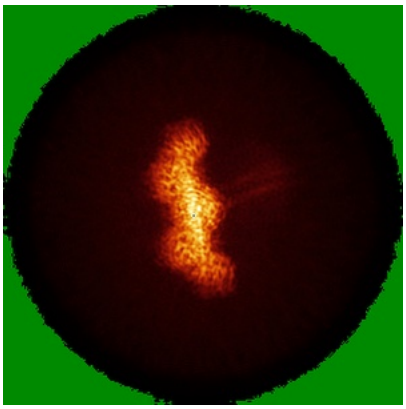
6.4.1 Primary map



X

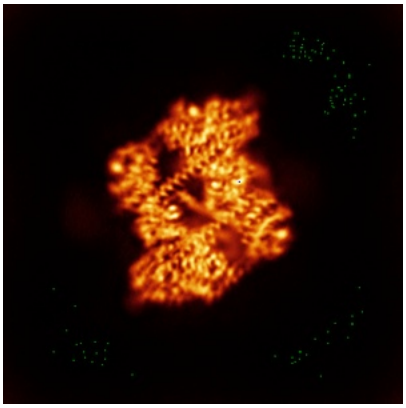


Y

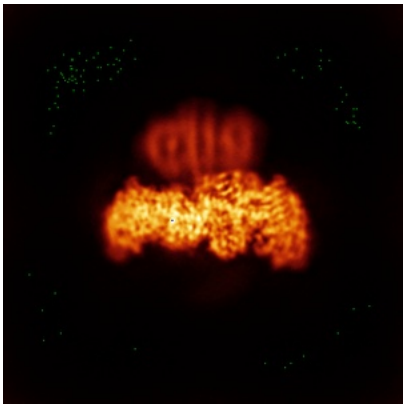


Z

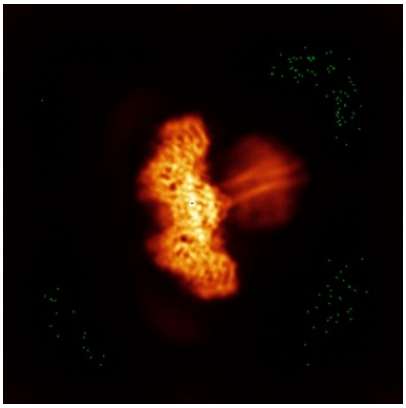
6.4.2 Raw map



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.

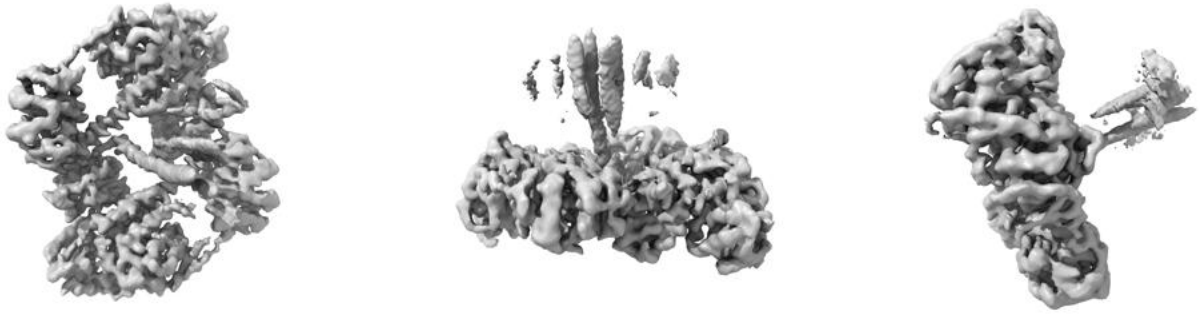
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.3. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

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

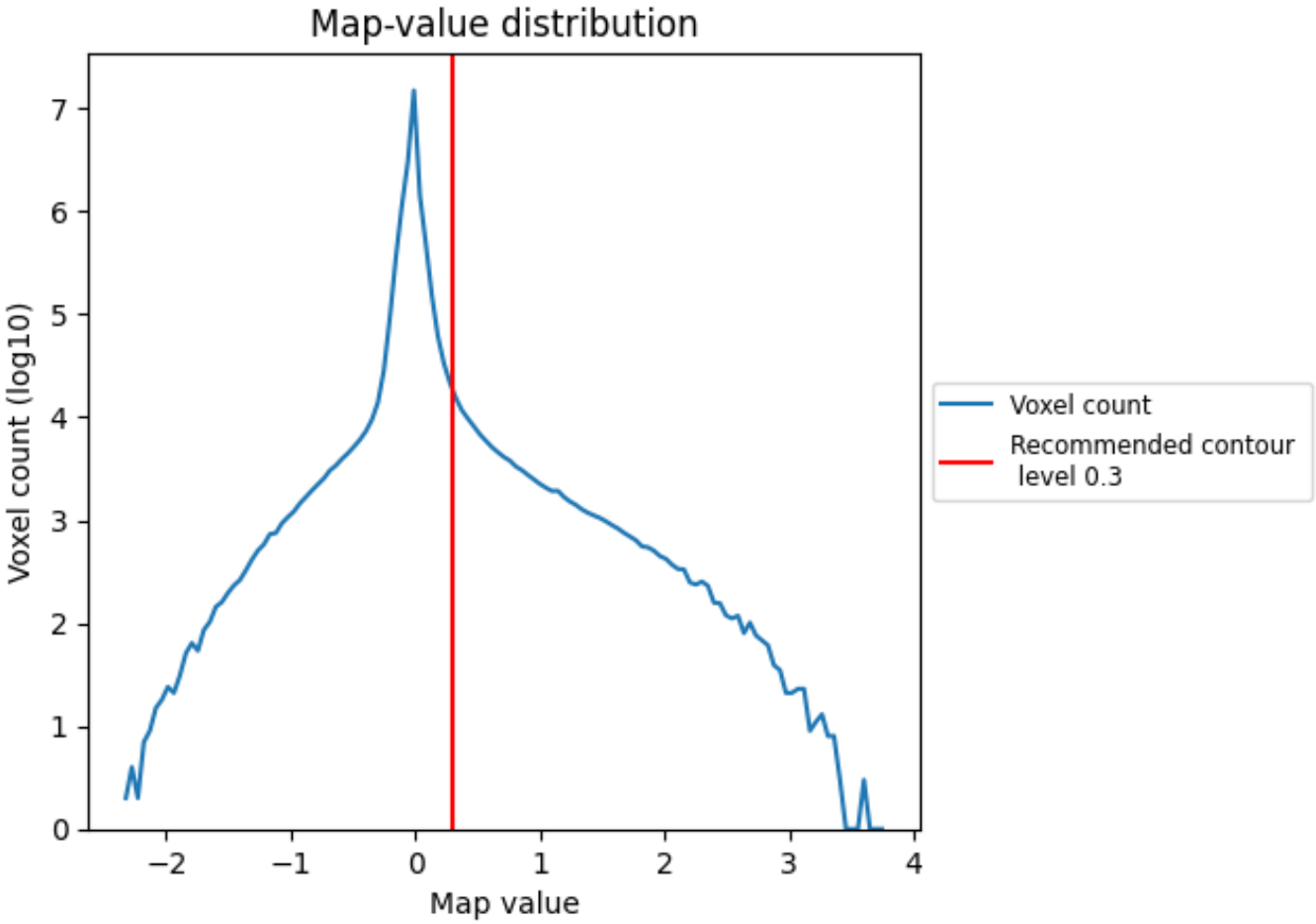
6.6 Mask visualisation (i)

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

7 Map analysis

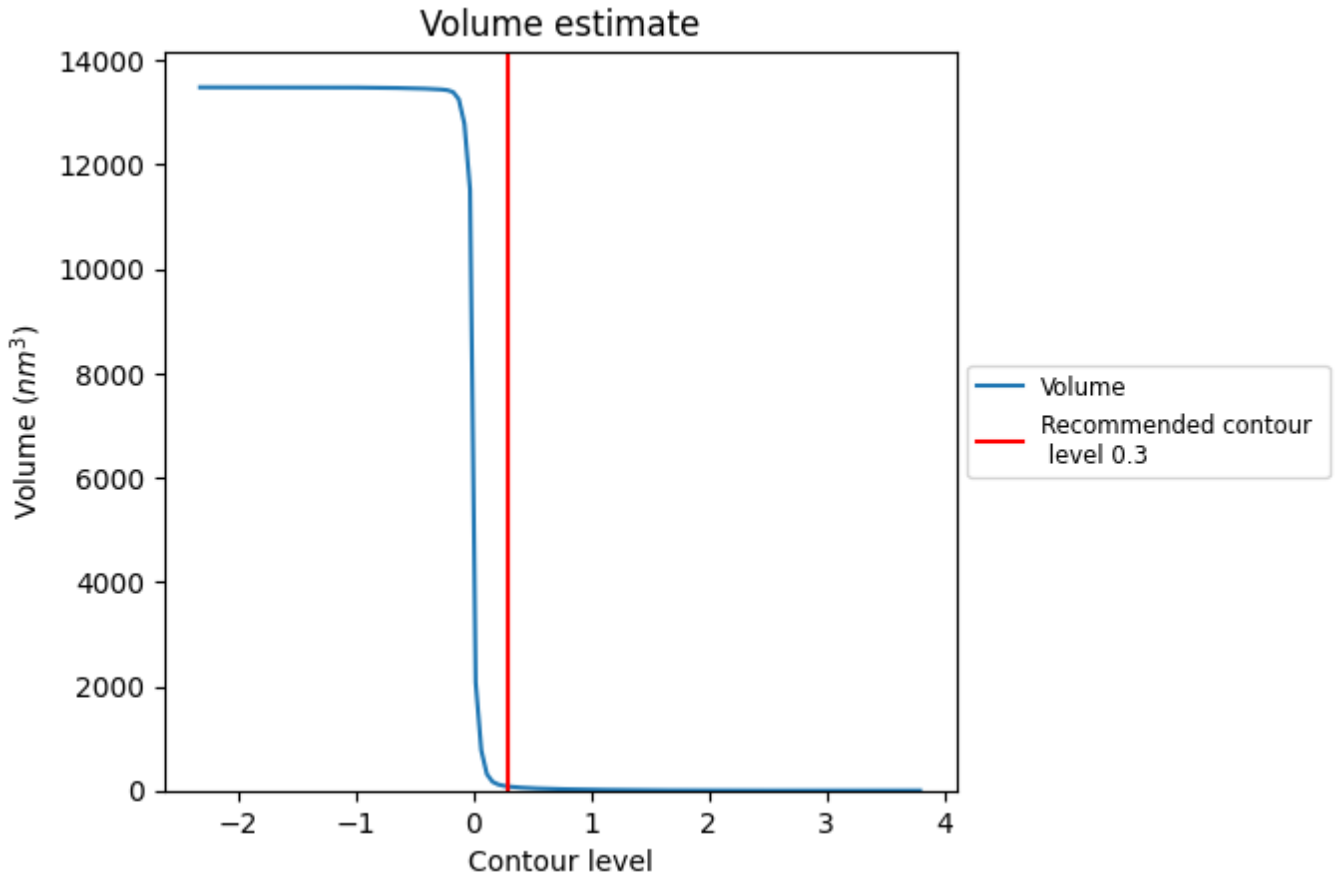
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

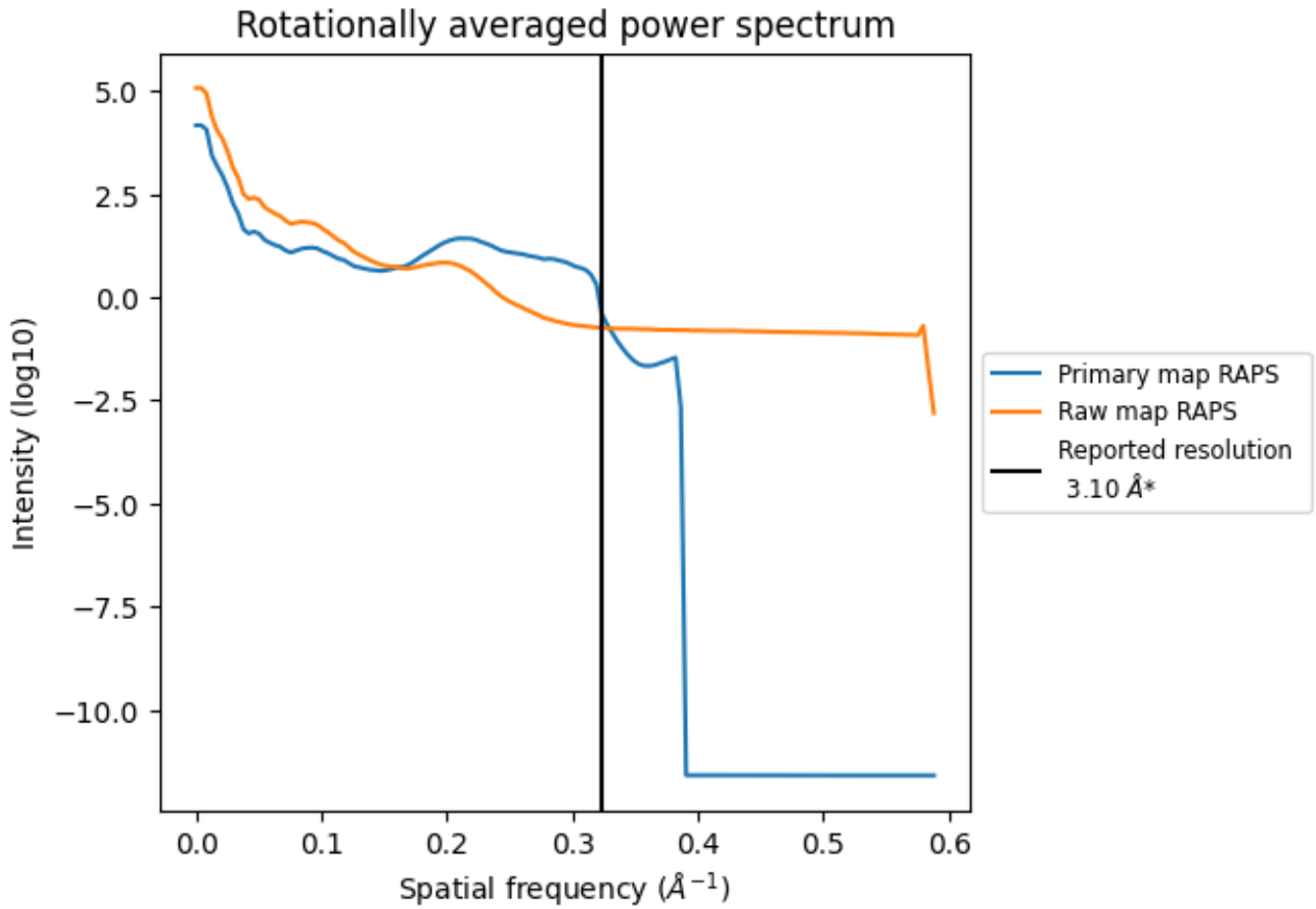
7.2 Volume estimate



The volume at the recommended contour level is 78 nm^3; this corresponds to an approximate mass of 70 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)

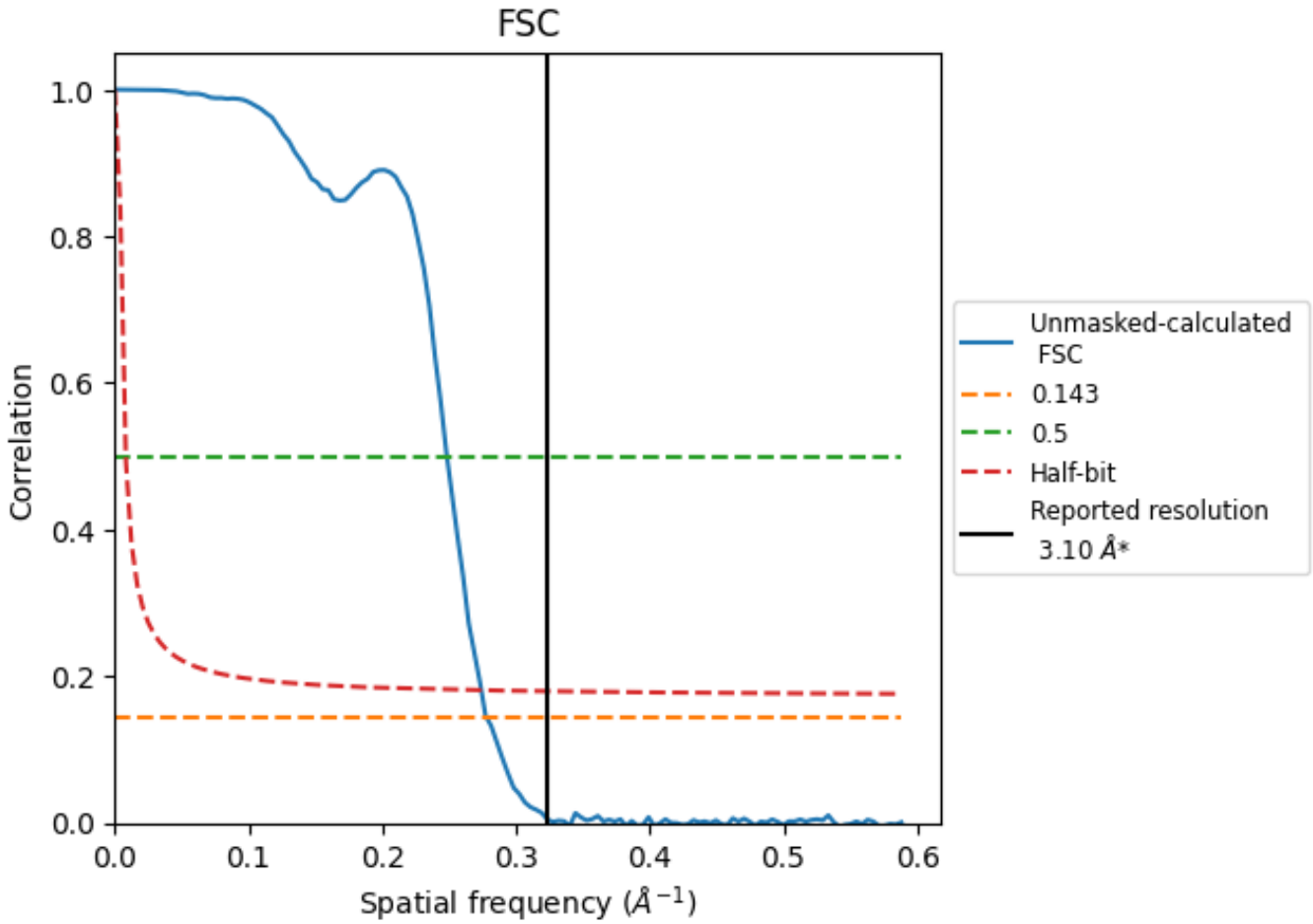


*Reported resolution corresponds to spatial frequency of 0.323 $Å^{-1}$

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.323 Å^{-1}

8.2 Resolution estimates (i)

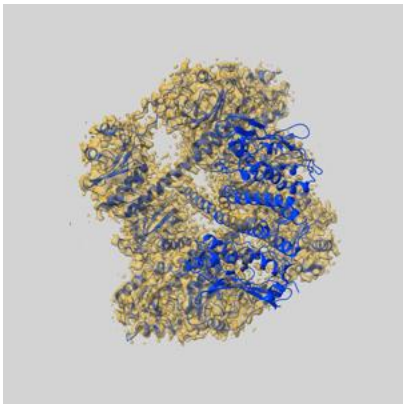
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.10	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.59	4.03	3.65

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.59 differs from the reported value 3.1 by more than 10 %

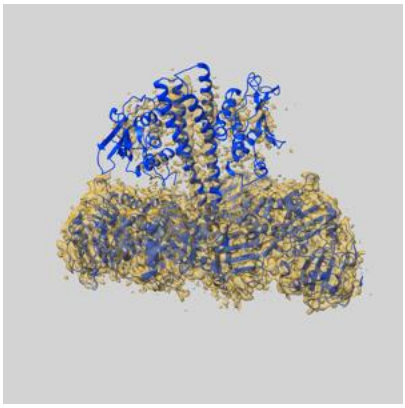
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-35415 and PDB model 8IFF. Per-residue inclusion information can be found in section 3 on page 4.

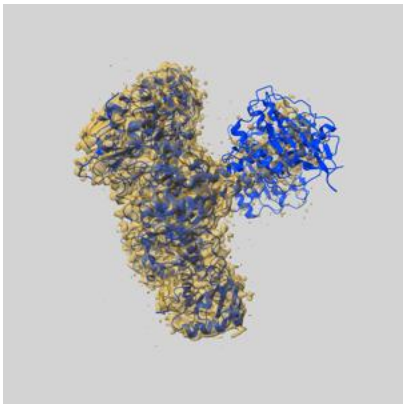
9.1 Map-model overlay



X



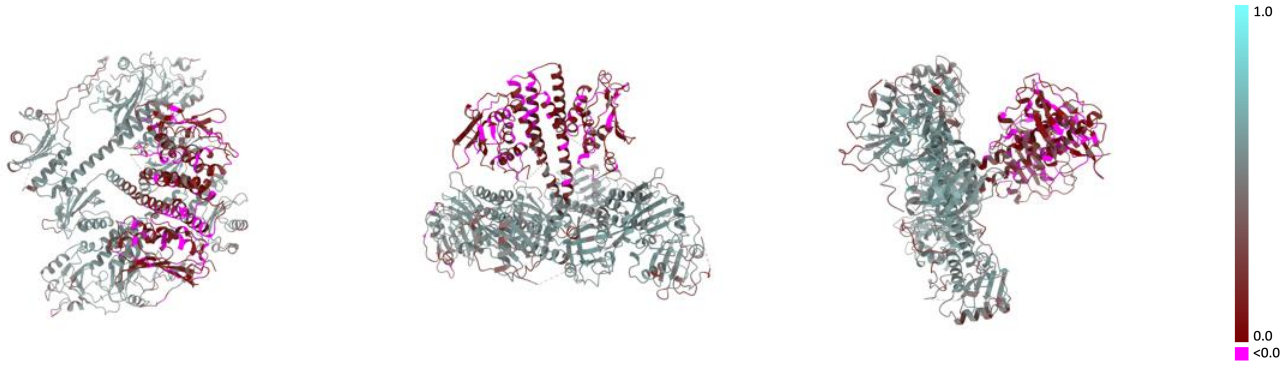
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.3 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

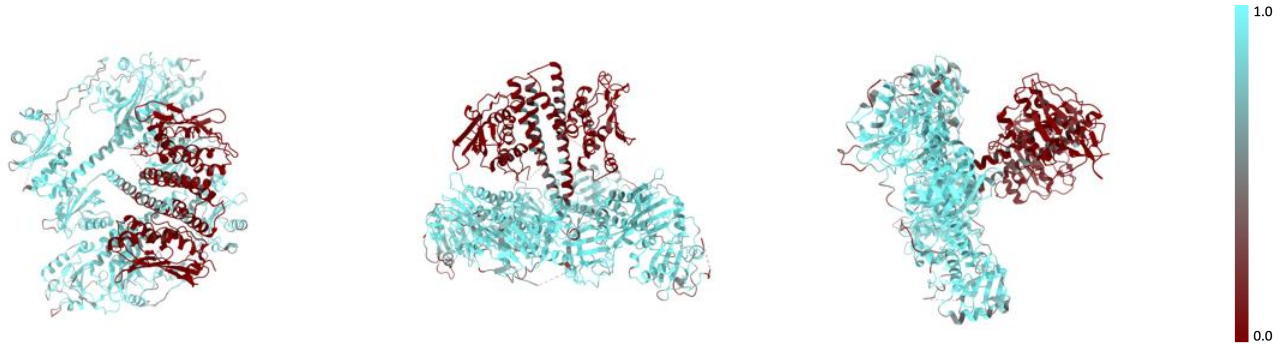
9.2 Q-score mapped to coordinate model (i)



X Y Z

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

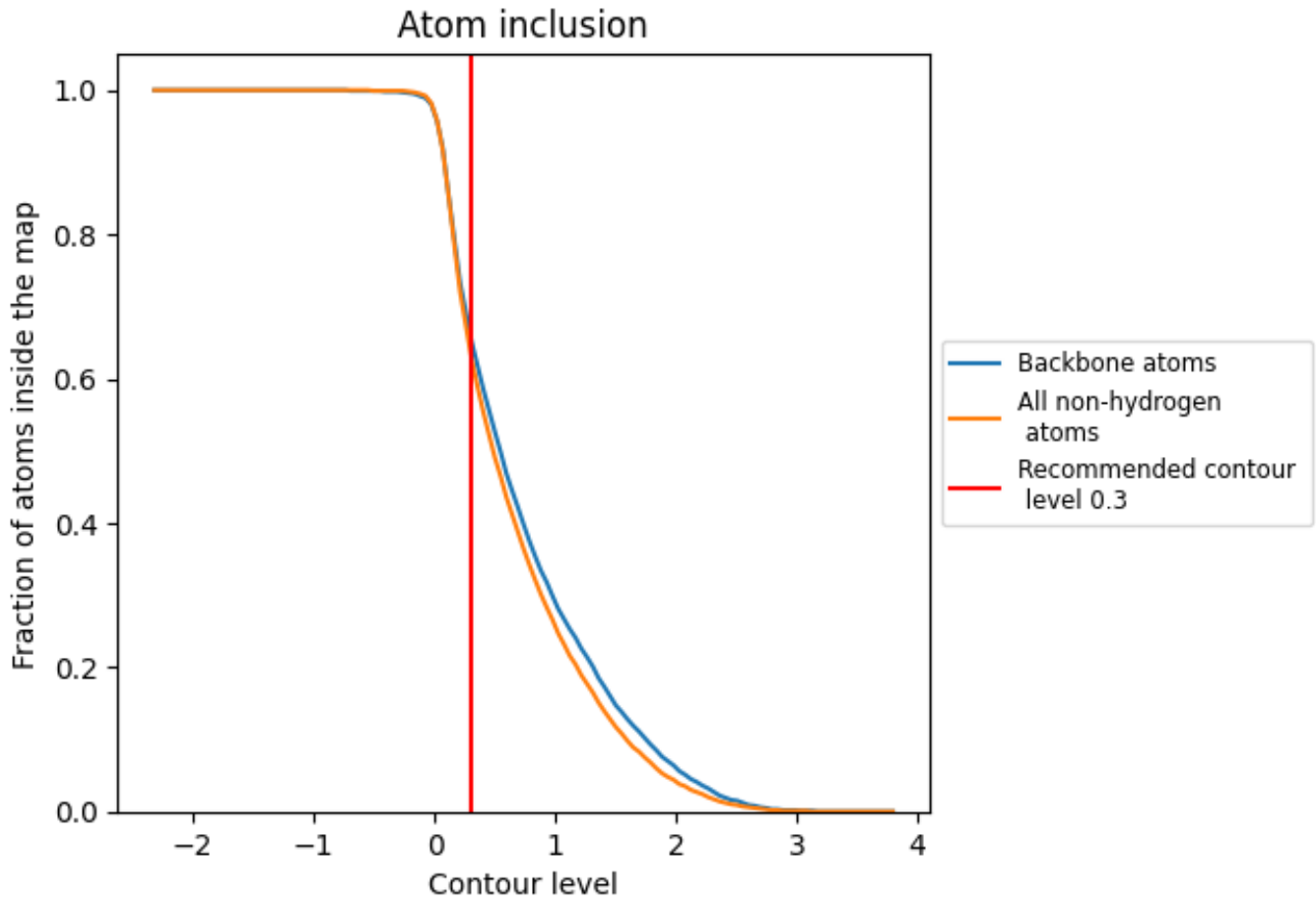
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.3).

9.4 Atom inclusion (i)



At the recommended contour level, 66% of all backbone atoms, 63% 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 (0.3) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6330	0.4050
A	0.6400	0.4110
B	0.6250	0.3990