



Full wwPDB EM Validation Report ⓘ

Oct 7, 2024 – 05:24 AM EDT

PDB ID : 7M69
EMDB ID : EMD-23691
Title : E1435Q Ycf1 mutant in inward-facing wide conformation
Authors : Khandelwal, N.K.; Millan, C.R.; Thaker, T.M.; Tomasiak, T.M.
Deposited on : 2021-03-25
Resolution : 3.42 Å (reported)
Based on initial model : 6JB1

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.dev113
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4.02b-467
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

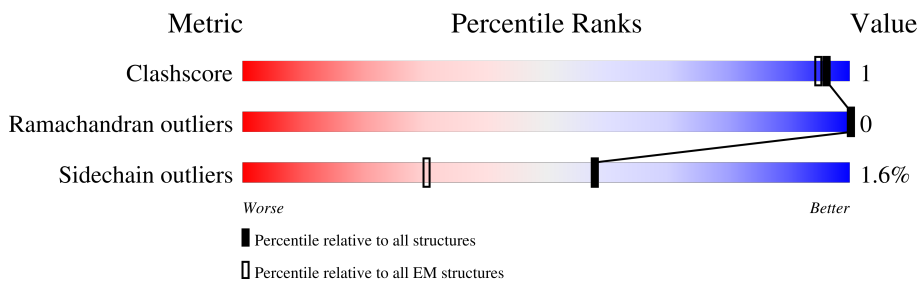
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.42 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	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	1559	

2 Entry composition [i](#)

There is only 1 type of molecule in this entry. The entry contains 21795 atoms, of which 10912 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 Metal resistance protein YCF1.

Mol	Chain	Residues	Atoms							AltConf	Trace
			Total	C	H	N	O	P	S		
1	A	1390	21795	7028	10912	1824	1981	3	47	0	0

There are 45 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-22	ALA	-	expression tag	UNP P39109
A	-21	SER	-	expression tag	UNP P39109
A	-20	ASP	-	expression tag	UNP P39109
A	-19	TYR	-	expression tag	UNP P39109
A	-18	LYS	-	expression tag	UNP P39109
A	-17	ASP	-	expression tag	UNP P39109
A	-16	ASP	-	expression tag	UNP P39109
A	-15	ASP	-	expression tag	UNP P39109
A	-14	ASP	-	expression tag	UNP P39109
A	-13	LYS	-	expression tag	UNP P39109
A	-12	GLY	-	expression tag	UNP P39109
A	-11	ALA	-	expression tag	UNP P39109
A	-10	LEU	-	expression tag	UNP P39109
A	-9	GLU	-	expression tag	UNP P39109
A	-8	VAL	-	expression tag	UNP P39109
A	-7	LEU	-	expression tag	UNP P39109
A	-6	PHE	-	expression tag	UNP P39109
A	-5	GLN	-	expression tag	UNP P39109
A	-4	GLY	-	expression tag	UNP P39109
A	-3	PRO	-	expression tag	UNP P39109
A	-2	SER	-	expression tag	UNP P39109
A	-1	SER	-	expression tag	UNP P39109
A	0	PRO	-	expression tag	UNP P39109
A	1435	GLN	GLU	engineered mutation	UNP P39109
A	1516	GLY	-	expression tag	UNP P39109
A	1517	LEU	-	expression tag	UNP P39109
A	1518	VAL	-	expression tag	UNP P39109
A	1519	PRO	-	expression tag	UNP P39109

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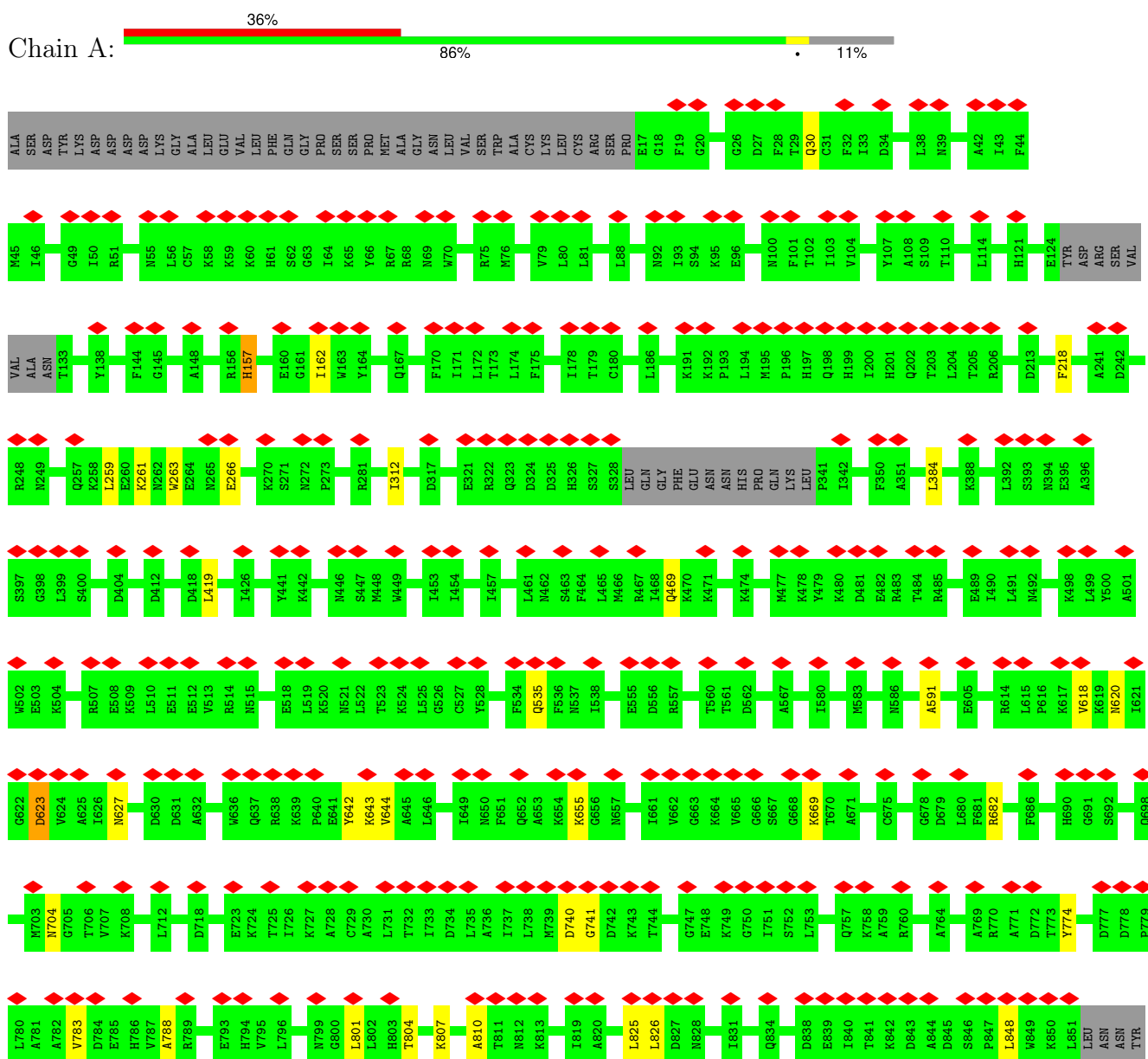
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Chain	Residue	Modelled	Actual	Comment	Reference
A	1520	ARG	-	expression tag	UNP P39109
A	1521	GLY	-	expression tag	UNP P39109
A	1522	SER	-	expression tag	UNP P39109
A	1523	SER	-	expression tag	UNP P39109
A	1524	ALA	-	expression tag	UNP P39109
A	1525	HIS	-	expression tag	UNP P39109
A	1526	HIS	-	expression tag	UNP P39109
A	1527	HIS	-	expression tag	UNP P39109
A	1528	HIS	-	expression tag	UNP P39109
A	1529	HIS	-	expression tag	UNP P39109
A	1530	HIS	-	expression tag	UNP P39109
A	1531	HIS	-	expression tag	UNP P39109
A	1532	HIS	-	expression tag	UNP P39109
A	1533	HIS	-	expression tag	UNP P39109
A	1534	HIS	-	expression tag	UNP P39109
A	1535	GLY	-	expression tag	UNP P39109
A	1536	ALA	-	expression tag	UNP P39109

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: Metal resistance protein YCF1



GLY	D916	A1005	G1190	I1294	V1358	V1426	ASP	ASP	A901	D909	I1083	P1282	I1281	I1340	G1408	I1478	LEU
LYS	F917	T1006	R1198	H1295	F1359	P1427	SER	LYS	I902	D909	F1094	P1283	Y1282	G1341	N1409	V1479	LEU
ASN	G918	L1007	M1208	P1298	E1360	S1428	GLY	ASN	S903	D909	Y1343	E1405	T1404	L1480	L1480	L1480	LEU
GLY	D919	I1008	V1209	M1299	G1361	I1429	GLN	ASN	L904	D909	D1344	G1406	L1403	S1411	D1481	S1411	LEU
LYS	D920	I1011	G1210	K1301	T1362	I1430	LEU	LYS	R905	D909	L1345	G1407	T1404	V1412	N1482	N1482	LEU
ASN	E921	V1012	R1228	V1302	V1363	L1431	SER	ASN	R906	D909	L1346	G1408	L1403	G1413	G1483	G1483	LEU
GLU	R922	F1016	E1232	G1303	R1364	V1432	LEU	ASN	A907	D909	H1347	N1409	L1410	N1482	K1484	K1484	LEU
PHE	I923	K1023	E1241	I1304	E1365	L1433	PHE	ASN	S908	D909	H1348	L1410	L1411	G1483	VAL	VAL	LEU
GLY	A924	L1028	E1248	V1305	I1367	D1434	TYR	ASN	D909	D909	K1349	L1410	L1411	G1483	ALA	ALA	LEU
ASP	R926	K1028	E1251	V1306	I1370	D1441	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
SER	R926	L1028	E1252	G1306	M1371	D1442	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
SER	E927	L1028	E1253	R1307	M1371	D1443	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
GLU	R928	S1032	P1254	R1307	M1371	D1444	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
SER	R929	V1033	P1255	R1307	M1371	D1445	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
VAL	E930	L1034	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
ARG	E931	L1034	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
GLU	Q931	R1035	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
SER	G932	F1041	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
SER	K933	E1042	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
SER	Y934	T1043	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
SER	K935	T1044	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
SER	W936	P1044	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
GLY	W937	P1045	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
GLY	I938	I1046	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
LEU	Y939	G1047	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
GLU	L940	R1048	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
GLN	E941	L1050	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
GLN	Y942	R1051	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
LEU	A943	N1052	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
LYS	R944	F1053	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
LEU	R949	S1054	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
ASN	C952	N1055	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
ASP	L956	Y1058	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
LEU	F957	D1061	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
GLY	I960	A1062	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
ASN	L964	T1083	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
SER	R969	I1085	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
SER	W970	C1086	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
ASP	W971	A1087	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
LEU	Y982	Y1089	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
PHE	R985	F1094	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
GLY	A988	I1095	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
ASN	A989	I1096	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
SER	R990	I1097	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
ASP	A993	Q1107	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
LEU	A997	Q1108	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
LEU	G1001	R1115	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
LEU	L1004	Y1134	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		R1143	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		M1293	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		I1292	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		H1291	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		K1290	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		L1289	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		V1288	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		L1287	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		D1286	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		L1285	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		E1284	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		P1283	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		R1282	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		Y1281	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		R1280	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		T1279	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		S1278	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		Y1277	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		M1276	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		N1275	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		F1274	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		K1273	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		D1272	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		I1271	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		G1269	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		Q1268	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		PRO	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		TRP	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		N1051	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		L1050	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		R1049	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		I1049	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		ARG	E1258	R1307	M1371	D1446	TYR	ASN	D909	D909	H1349	L1410	L1411	G1483	ALA	ALA	LEU
		GLU	E1258	R1307													

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	114963	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	54	Depositor
Minimum defocus (nm)	900	Depositor
Maximum defocus (nm)	2100	Depositor
Magnification	22500	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	16.055	Depositor
Minimum map value	-11.312	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.758	Depositor
Recommended contour level	3.5	Depositor
Map size (Å)	309.30002, 309.30002, 309.30002	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.031, 1.031, 1.031	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: SEP, TPO

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	0.31	0/11066	0.59	0/15008

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	10883	10912	10947	17	0
All	All	10883	10912	10947	17	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 1.

All (17) 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:623:ASP:O	1:A:655:LYS:N	2.38	0.56
1:A:1272:ILE:HD11	1:A:1430:ILE:HD11	1.89	0.55
1:A:259:LEU:HD23	1:A:384:LEU:HD22	1.91	0.52

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Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:704:ASN:N	1:A:1134:GLU:OE2	2.43	0.52
1:A:1269:GLN:HA	1:A:1272:ILE:HD13	1.91	0.52
1:A:642:TYR:HB3	1:A:644:VAL:HG23	1.92	0.51
1:A:669:LYS:HD3	1:A:810:ALA:HB1	1.94	0.49
1:A:620:ASN:HB2	1:A:623:ASP:OD1	2.13	0.47
1:A:1093:ILE:HA	1:A:1096:ILE:HG22	1.96	0.47
1:A:783:VAL:HG23	1:A:788:ALA:HB2	1.98	0.45
1:A:157:HIS:ND1	1:A:162:ILE:O	2.50	0.44
1:A:263:TRP:O	1:A:266:GLU:HB3	2.18	0.44
1:A:312:ILE:HD11	1:A:1210:GLY:CA	2.49	0.43
1:A:1360:GLU:OE1	1:A:1360:GLU:N	2.50	0.42
1:A:740:ASP:OD1	1:A:741:GLY:N	2.53	0.41
1:A:825:LEU:HD22	1:A:848:LEU:HB3	2.02	0.41
1:A:419:LEU:HD22	1:A:591:ALA:HB1	2.02	0.41

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	1377/1559 (88%)	1307 (95%)	70 (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	1167/1364 (86%)	1148 (98%)	19 (2%)	58 75

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	30	GLN
1	A	157	HIS
1	A	218	PHE
1	A	261	LYS
1	A	469	GLN
1	A	535	GLN
1	A	618	VAL
1	A	623	ASP
1	A	627	ASN
1	A	643	LYS
1	A	682	ARG
1	A	774	TYR
1	A	801	LEU
1	A	804	THR
1	A	807	LYS
1	A	826	LEU
1	A	1016	PHE
1	A	1107	GLN
1	A	1282	ARG

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

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

3 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	TPO	A	911	1	8,10,11	1.66	1 (12%)	10,14,16	1.90	1 (10%)
1	SEP	A	914	1	8,9,10	1.62	1 (12%)	7,12,14	1.39	1 (14%)
1	SEP	A	908	1	8,9,10	1.61	1 (12%)	7,12,14	1.37	1 (14%)

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	TPO	A	911	1	-	3/9/11/13	-
1	SEP	A	914	1	-	2/6/8/10	-
1	SEP	A	908	1	-	1/6/8/10	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	911	TPO	P-O1P	3.55	1.61	1.50
1	A	914	SEP	P-O1P	3.54	1.61	1.50
1	A	908	SEP	P-O1P	3.52	1.61	1.50

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	911	TPO	P-OG1-CB	-5.19	109.23	123.33
1	A	914	SEP	OG-CB-CA	3.02	111.08	108.14
1	A	908	SEP	OG-CB-CA	3.00	111.06	108.14

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	908	SEP	N-CA-CB-OG
1	A	911	TPO	N-CA-CB-OG1
1	A	911	TPO	C-CA-CB-CG2
1	A	911	TPO	N-CA-CB-CG2
1	A	914	SEP	CA-CB-OG-P
1	A	914	SEP	N-CA-CB-OG

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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.

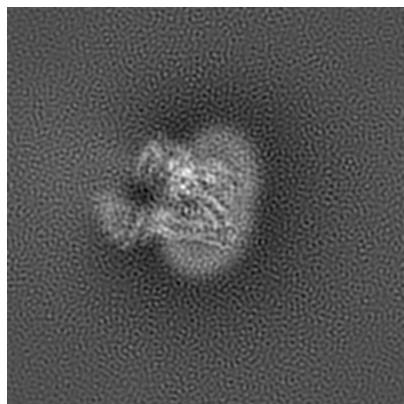
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-23691. These allow visual inspection of the internal detail of the map and identification of artifacts.

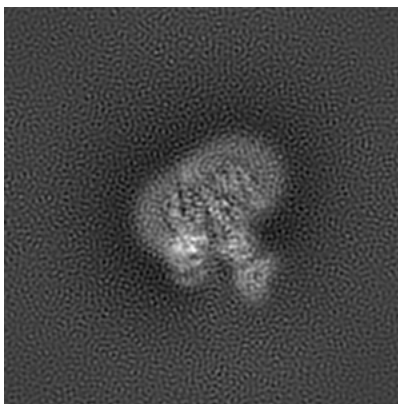
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

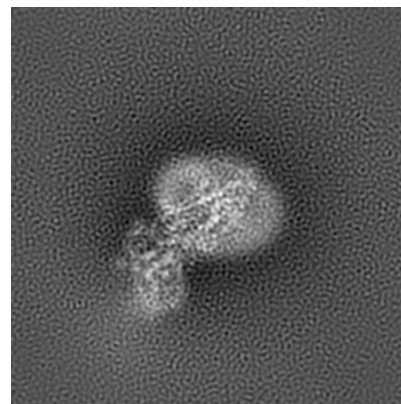
6.1.1 Primary map



X

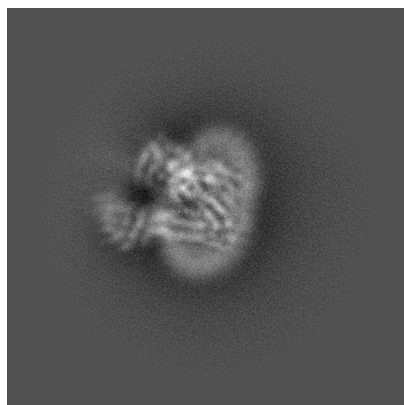


Y

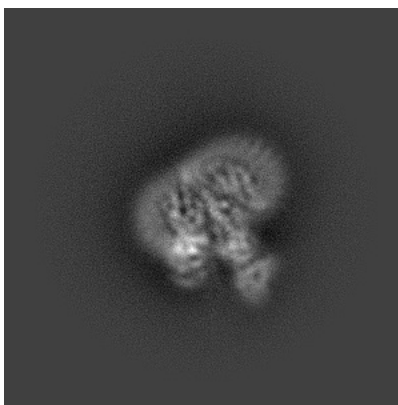


Z

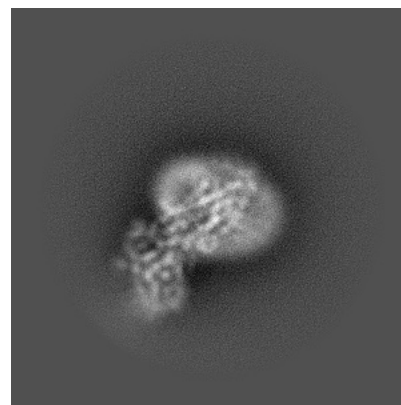
6.1.2 Raw map



X



Y

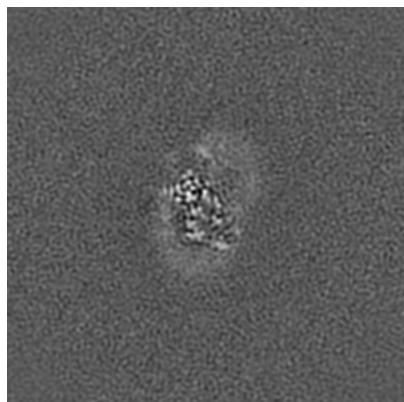


Z

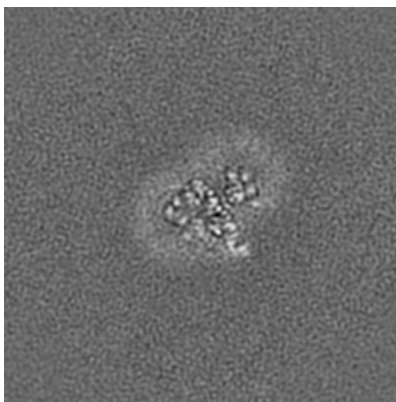
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

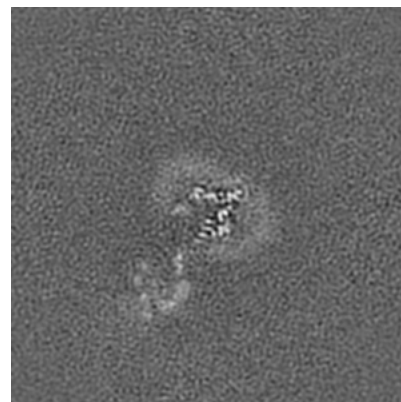
6.2.1 Primary map



X Index: 150

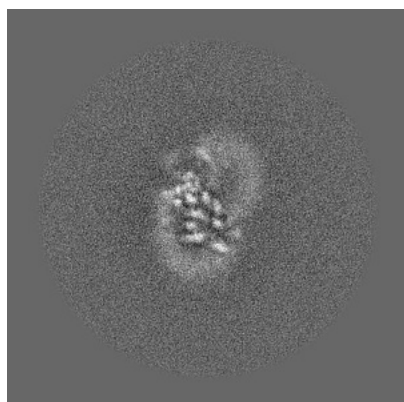


Y Index: 150

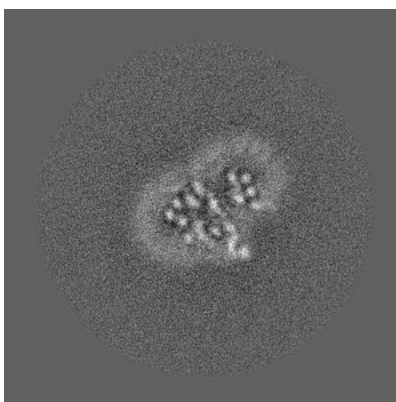


Z Index: 150

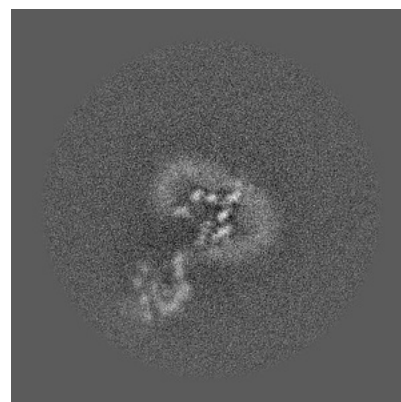
6.2.2 Raw map



X Index: 150



Y Index: 150

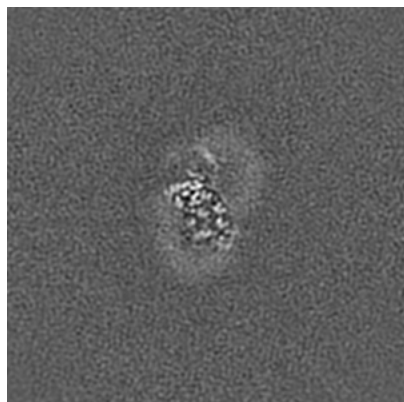


Z Index: 150

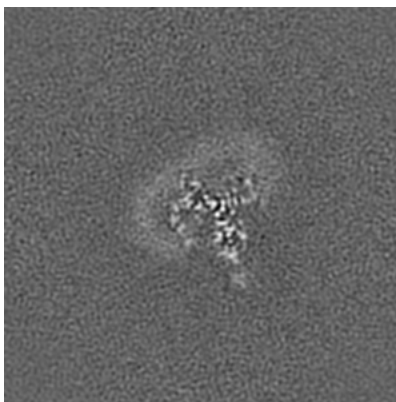
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

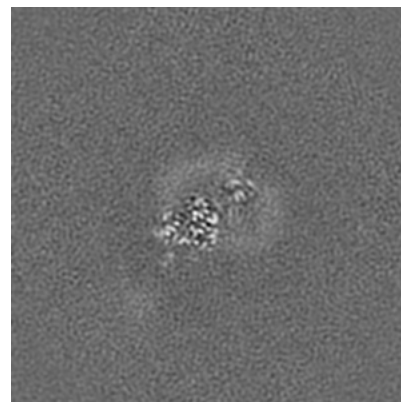
6.3.1 Primary map



X Index: 152

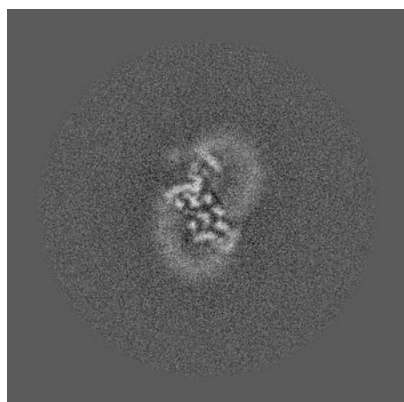


Y Index: 140

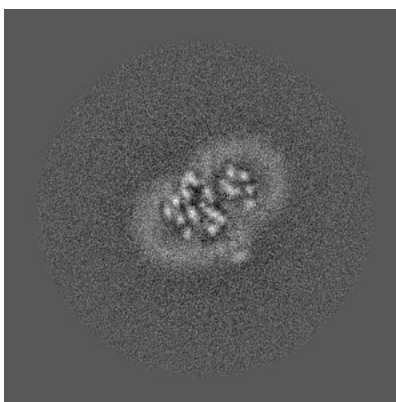


Z Index: 164

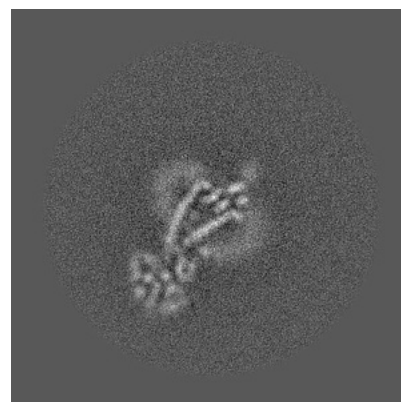
6.3.2 Raw map



X Index: 153



Y Index: 155

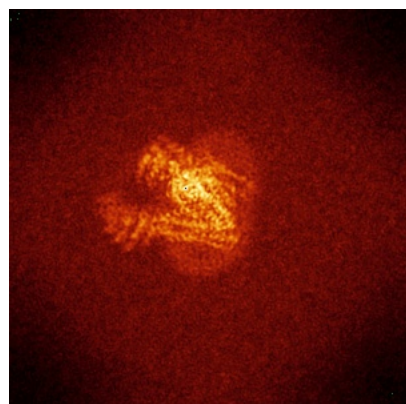


Z Index: 138

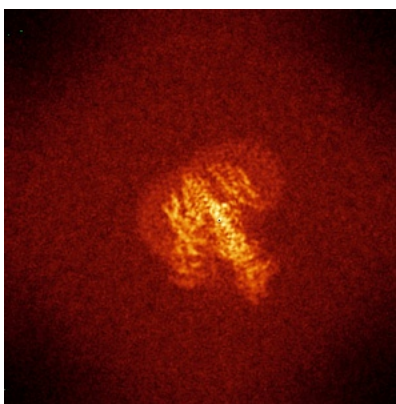
The images above show the largest variance slices of the map in three orthogonal directions.

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

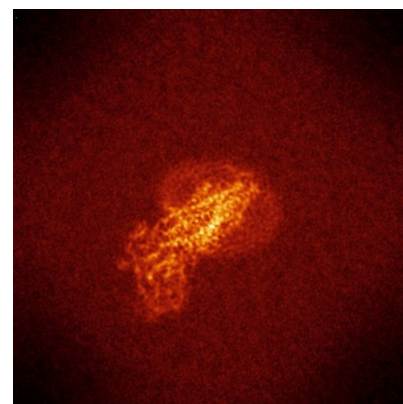
6.4.1 Primary map



X

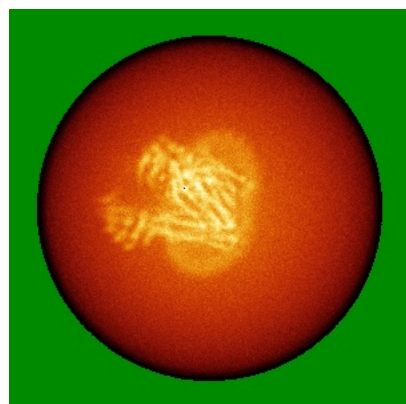


Y

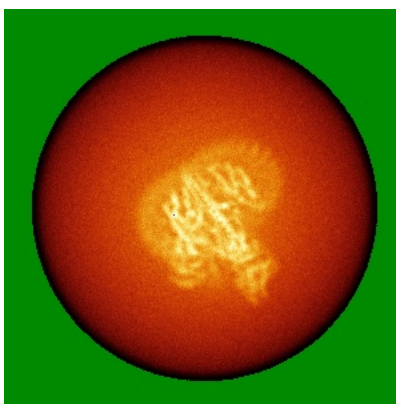


Z

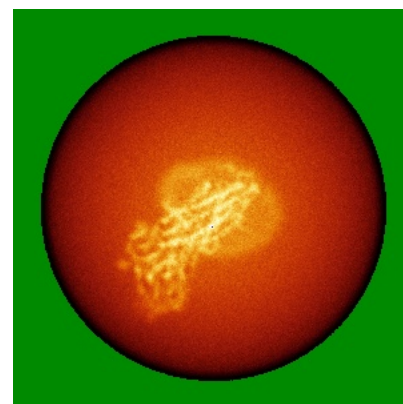
6.4.2 Raw map



X



Y

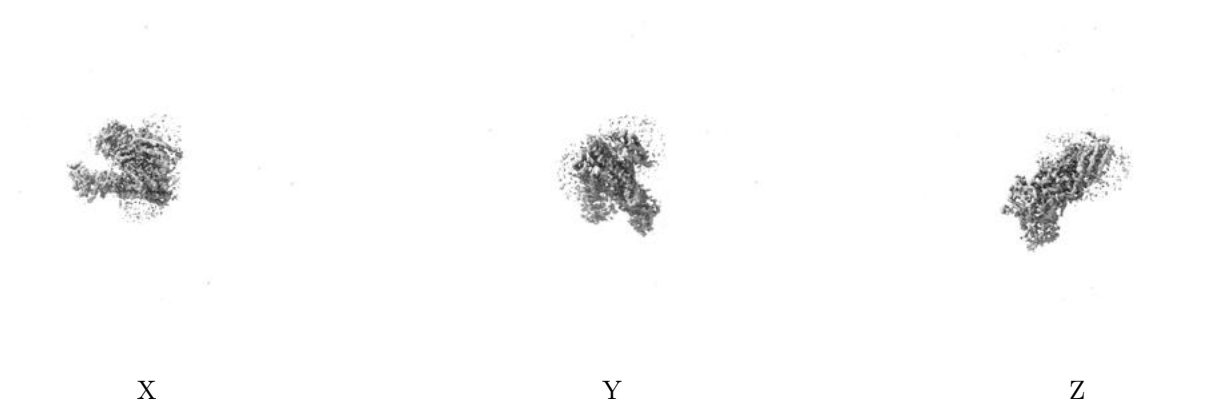


Z

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.

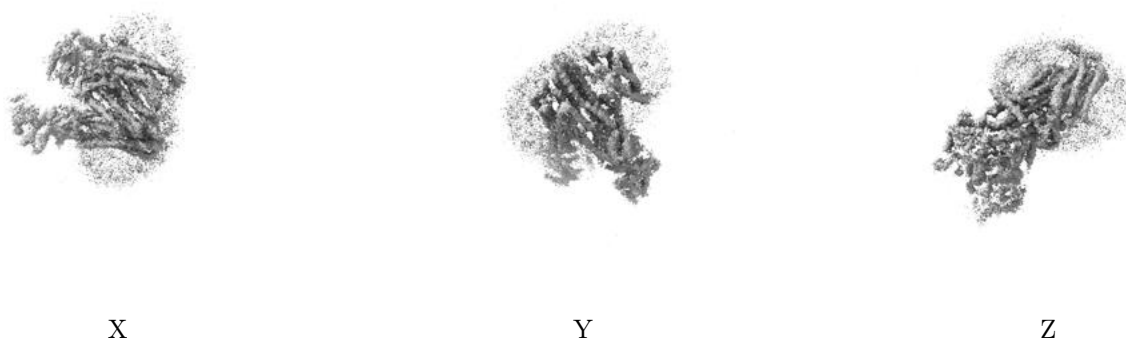
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 3.5. 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.

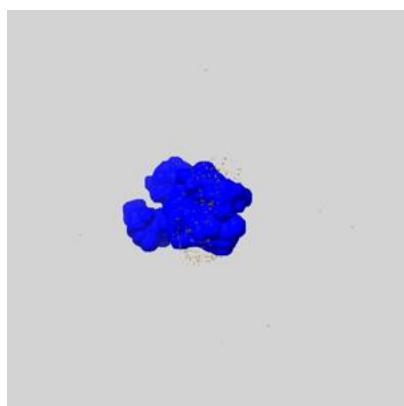
6.6 Mask visualisation [i](#)

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

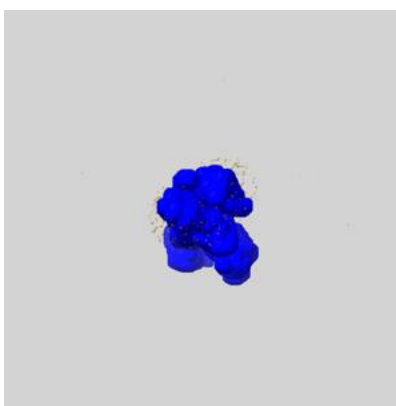
A mask typically either:

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

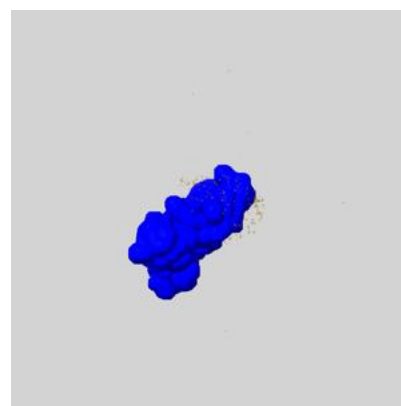
6.6.1 emd_23691_msk_1.map [i](#)



X



Y

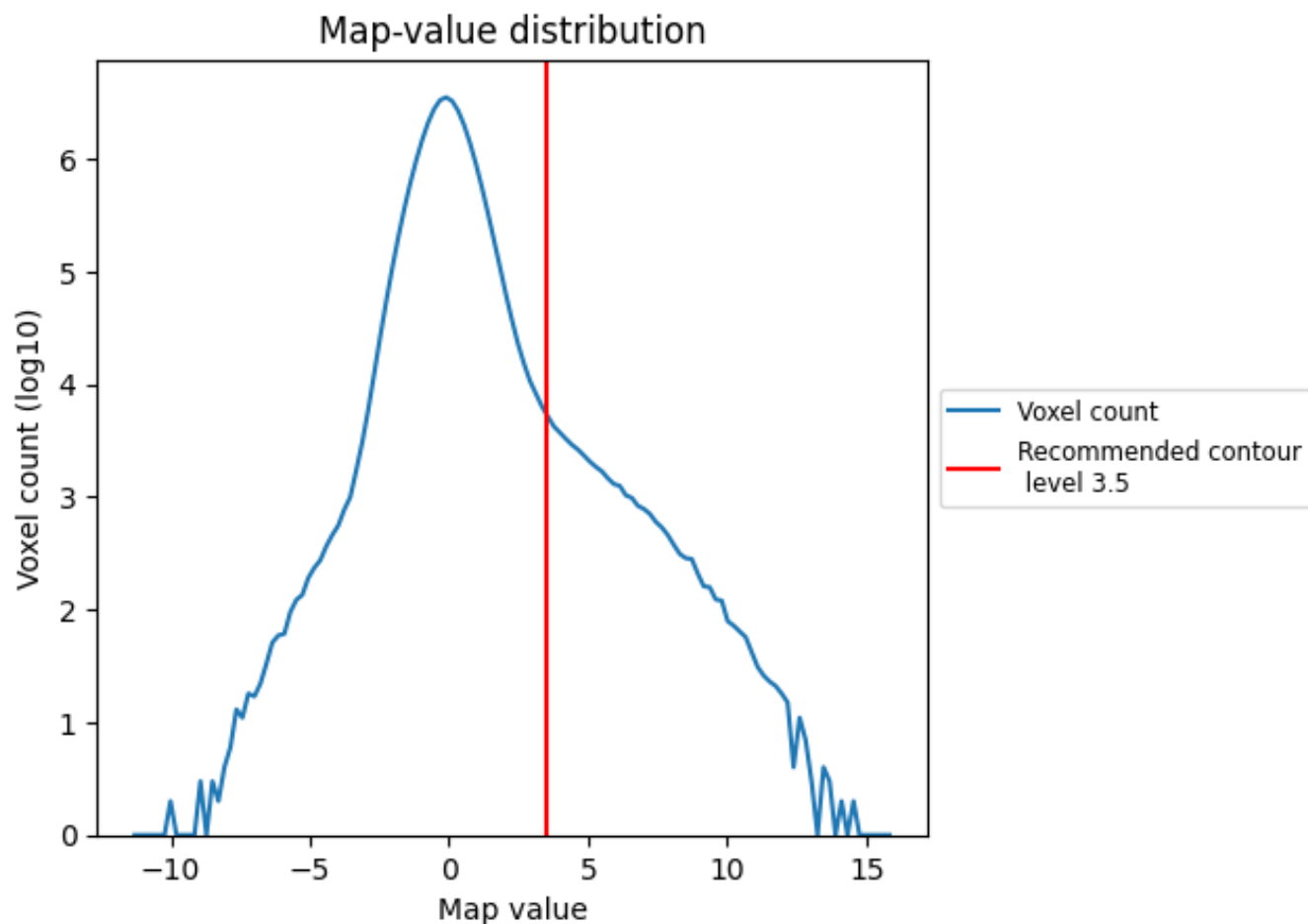


Z

7 Map analysis [i](#)

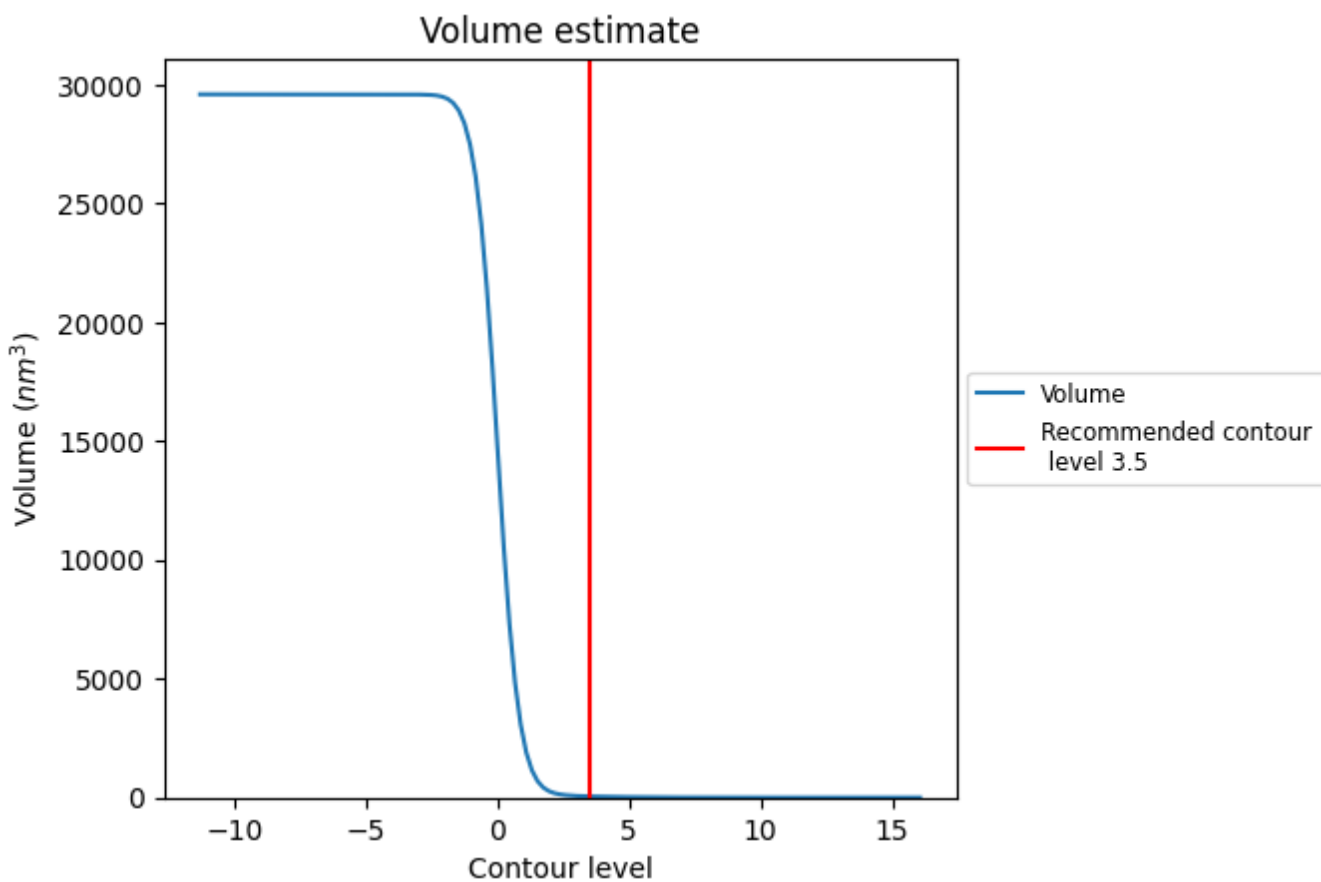
This section contains the results of statistical analysis of the map.

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.

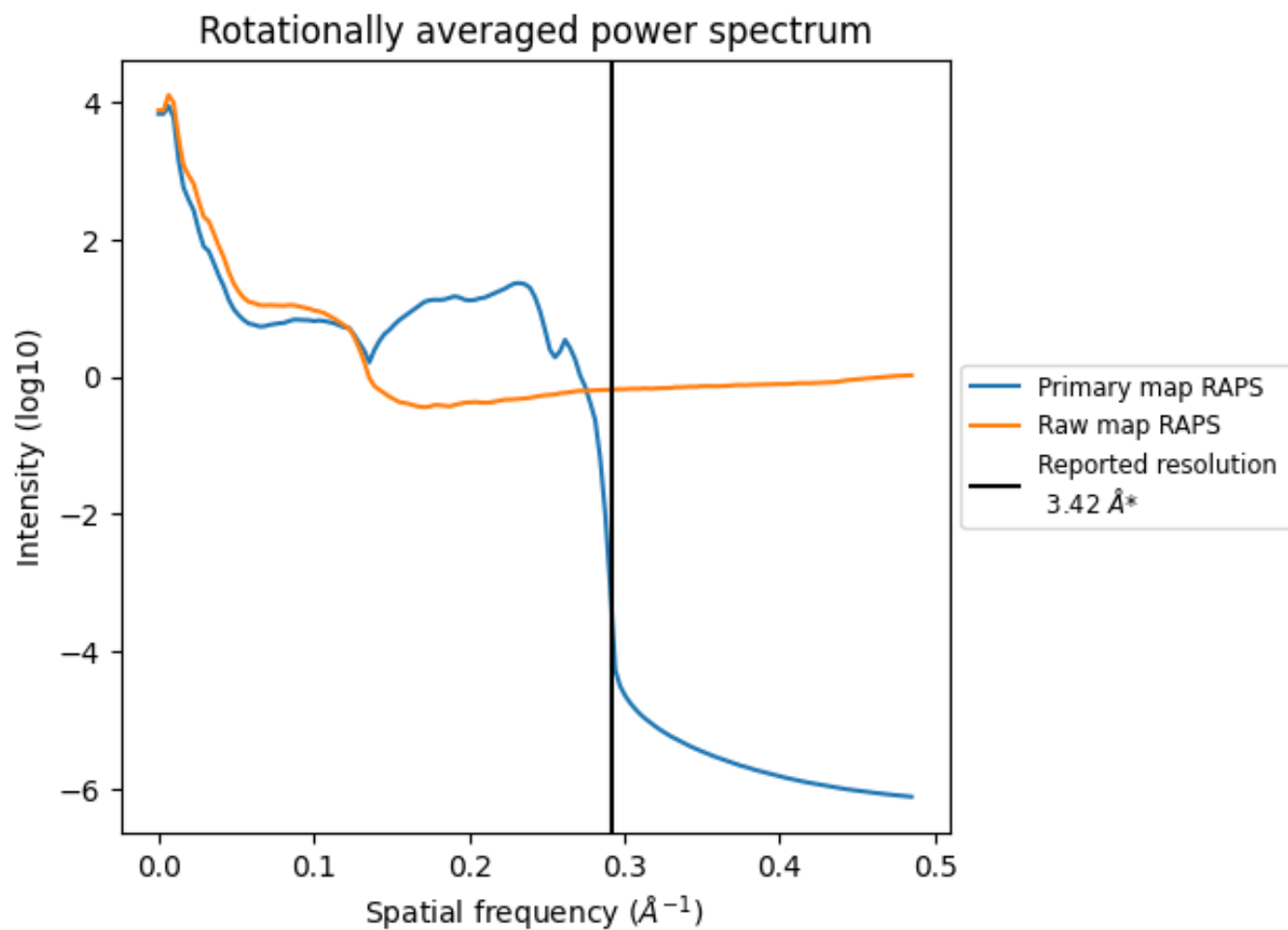
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 48 nm³; this corresponds to an approximate mass of 43 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](#)

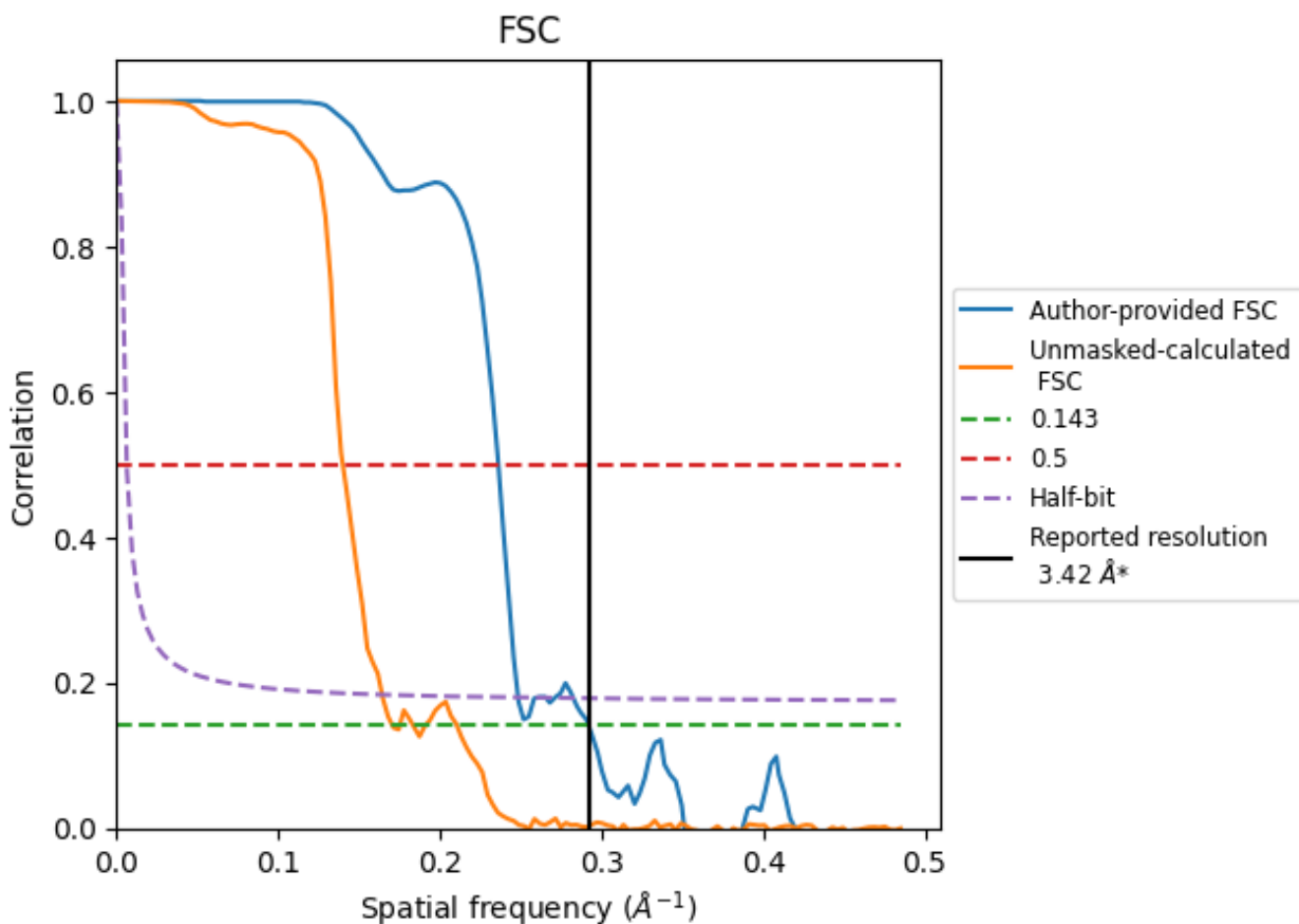


*Reported resolution corresponds to spatial frequency of 0.292 Å⁻¹

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 0.292 \AA^{-1}

8.2 Resolution estimates [i](#)

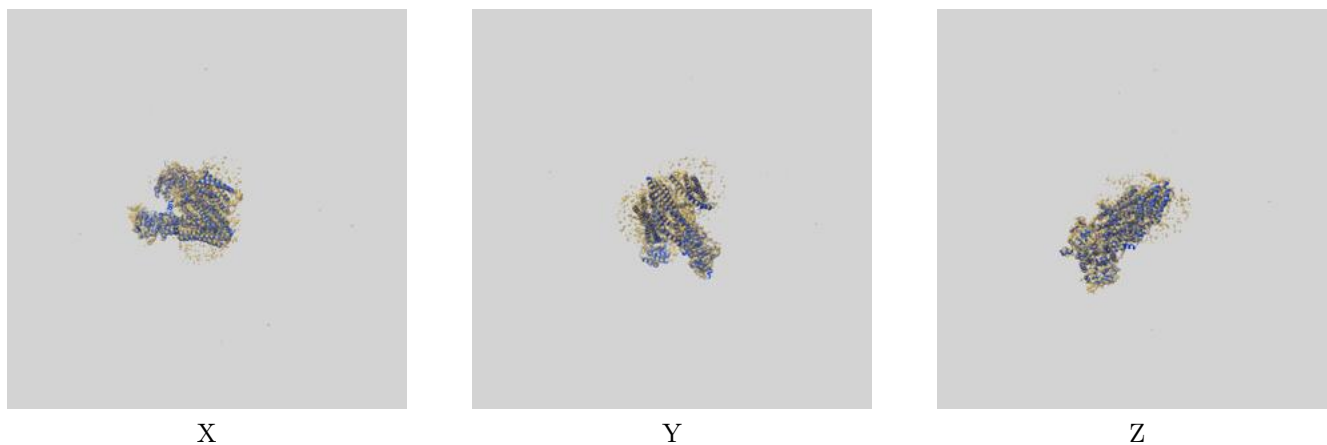
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.42	-	-
Author-provided FSC curve	3.43	4.23	4.02
Unmasked-calculated*	5.88	7.14	6.09

*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 5.88 differs from the reported value 3.42 by more than 10 %

9 Map-model fit [i](#)

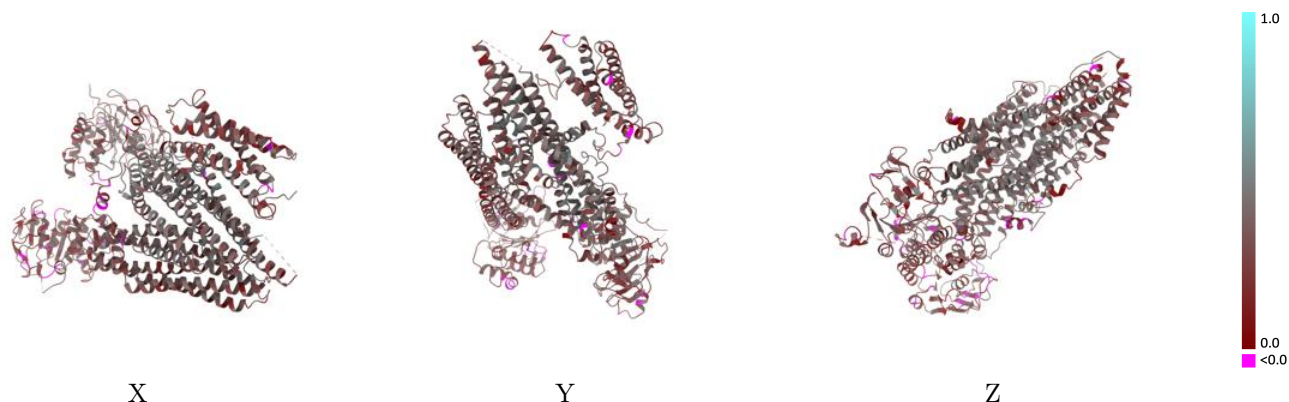
This section contains information regarding the fit between EMDB map EMD-23691 and PDB model 7M69. Per-residue inclusion information can be found in section [3](#) on page [5](#).

9.1 Map-model overlay [i](#)



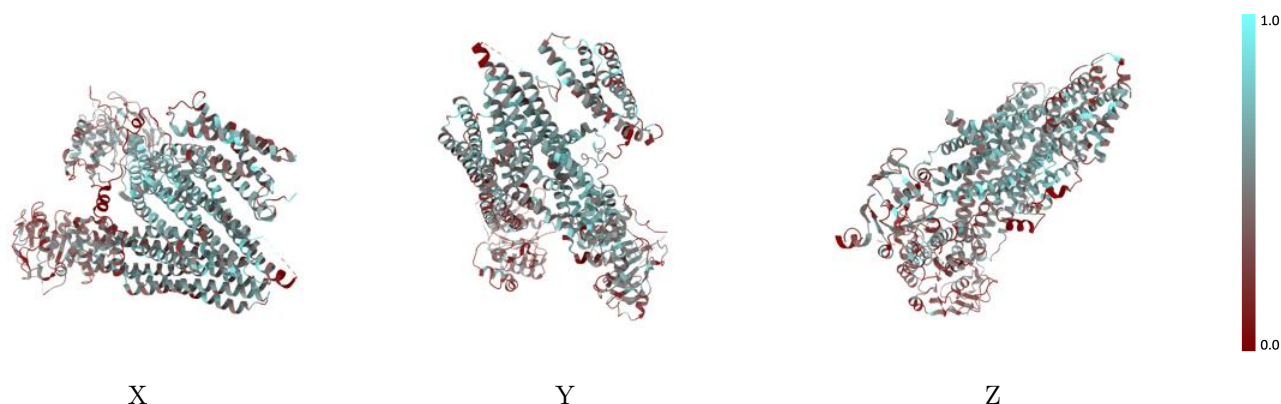
The images above show the 3D surface view of the map at the recommended contour level 3.5 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



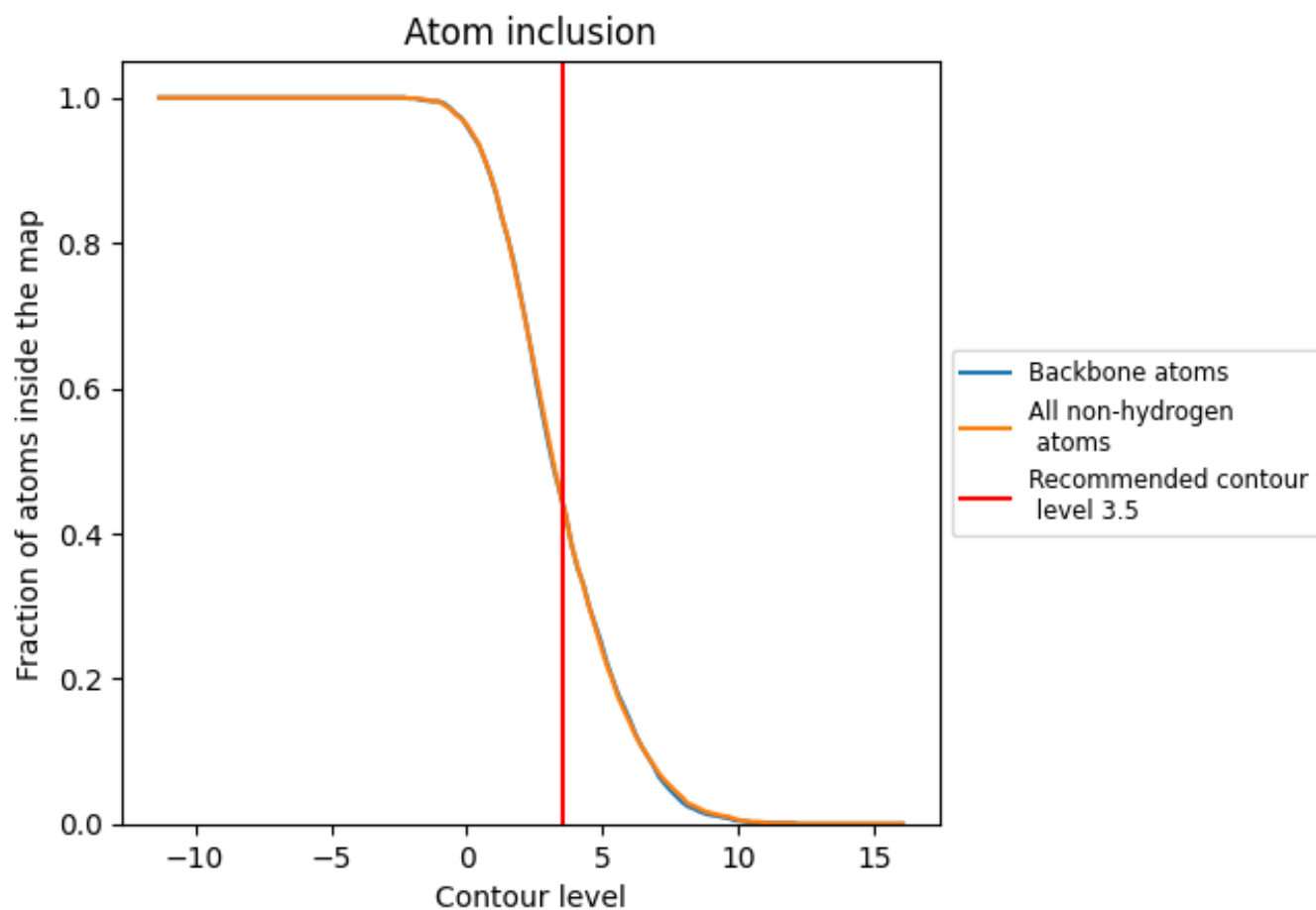
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (3.5).





9.4 Atom inclusion [i](#)



At the recommended contour level, 45% of all backbone atoms, 45% 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 (3.5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.4460	 0.3180
A	 0.4570	 0.3180

