



wwPDB EM Validation Summary Report ⓘ

Jun 3, 2025 – 10:26 AM EDT

PDB ID : 9NWD / pdb_00009nwd
EMDB ID : EMD-46688
Title : Human E3 ligase UBR4-KCMF1-calmodulin complex (N-terminal)
Authors : Yang, Z.; Haakonsen, D.L.; Heider, M.; Witus, S.R.; Zelter, A.; Beschauner, T.; MacCoss, M.J.; Rape, M.
Deposited on : 2025-03-22
Resolution : 3.40 Å(reported)

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

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

A user guide is available at

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

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev118
MolProbity : 4-5-2 with Phenix2.0rc1
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) : 2.43.1

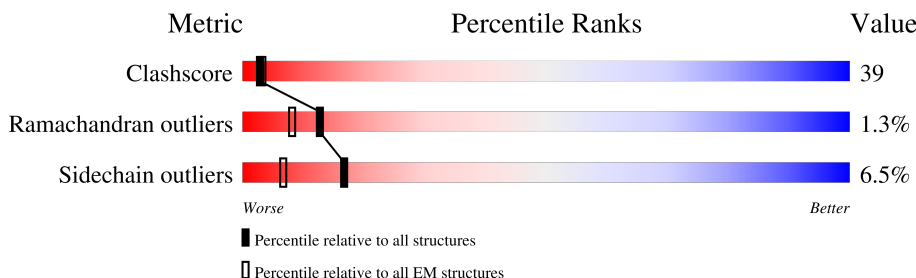
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.40 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
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	5183	
1	B	5183	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 21667 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.

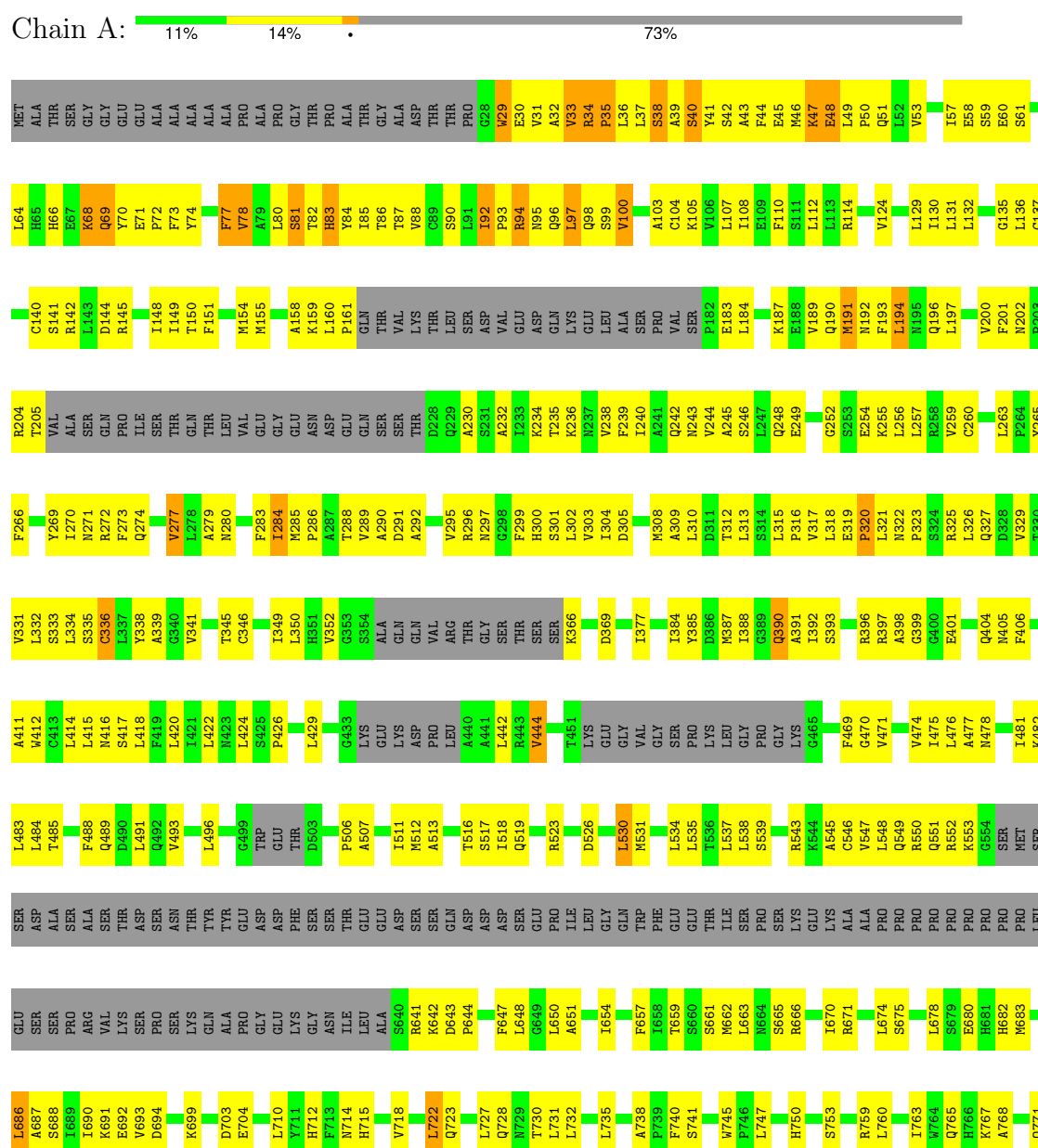
- Molecule 1 is a protein called E3 ubiquitin-protein ligase UBR4.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1396	Total	C	N	O	S	0	0
			10853	6909	1833	2049	62		
1	B	1387	Total	C	N	O	S	0	0
			10814	6883	1831	2038	62		

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: E3 ubiquitin-protein ligase UBR4



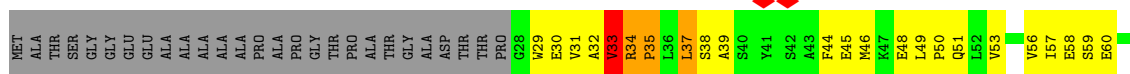
SER	GLY	L1554	Q1490	M1412	S1333	L1270	S1191	L1128	H1057	K986	A846	G772
SER	PRO	Q1555	L1491	A1413	L1334	G1271	K1192	S1129	H1058	E987	Q847	D773
THR	SER	L1556	L1492	A1414	E1335	T1272	K1193	V1131	I1059	K988	M848	P774
MET	HIS	H1557	Q1493	A1415	L1336	L1273	K1194	Q1132	K989	W918	R849	E778
THR	LEU	N1558	L1496	E1416	L1337	C1274	L1195	Q1133	K1060	V991	F850	C779
LYS	SER	A1559	T1497	E1417	L1338	L1278	Q1196	S1134	Q1061	L999	V851	L780
LYS	VAL	A1560	T1497	E1417	L1339	L1278	G1197	L1135	G1062	H921	P852	L780
ALA	ASP	A1561	T1497	E1417	L1339	L1278	F1198	L1135	M1063	F922	L853	K761
VAL	GLY	D1562	V1427	V1427	E1342	P1279	F1199	L1135	A1068	Q1000	W82	V782
GLN	GLY	V1563	L1428	K1428	A1281	L1280	A1200	H1138	A1068	S923	L854	W783
ASP	GLY	L1564	L1428	K1428	E1345	A1281	V1201	F1139	A1068	S924	L855	W783
VAL	ARG	S1565	F1430	F1430	L1346	S1283	A1203	S1140	L1071	D925	A856	F786
ALA	ARG	S1566	F1431	F1431	L1347	L1284	A1203	S1141	L1072	A926	R857	L787
VAL	ILE	C1567	T1432	T1432	A1346	K1285	I2004	M1142	L1072	P928	L858	S788
ILE	GLY	K1568	A1433	A1433	L1346	H1286	G1205	A1143	A1075	H929	L859	S788
CYS	THR	S1569	L1434	L1434	V1350	L1287	S1206	ALA	S1076	W1007	L860	T789
VAL	ASP	Y1570	F1435	F1435	Y1351	L1288	G1206	ALA	S1076	P930	L861	T789
CYS	VAL	V1571	F1435	F1435	Y1351	L1288	S1206	ALA	S1076	R931	L862	K791
VAL	ASP	S1572	T1438	E1439	K1353	L1289	S1207	THR	T1077	Q792	L863	Q792
LYS	THR	Q1573	E1439	E1439	L1354	S1290	C1209	ASP	C1080	L1010	Y864	K793
ARG	VAL	C1511	N1443	N1443	G1357	L1291	K1210	PRO	S1081	L1013	L865	A794
HIS	GLY	V1512	N1443	N1443	G1357	V1292	A1211	HIS	S1082	P1014	L866	A794
ALA	GLY	V1513	P1444	P1444	L1361	L1293	T1213	LYS	V1083	L936	L867	L795
LYS	LEU	L1514	S1445	S1445	L1361	T1294	T1213	S1151	K1084	P1015	Q868	G797
ASP	ALA	L1515	L1446	L1446	H1385	G1296	G1215	S1152	V1087	Y1019	Y869	V798
VAL	VAL	G1516	L1447	L1447	H1385	P1297	P1216	T1154	E1088	I1020	P800	V799
HIS	GLY	K1517	L1447	L1447	H1385	L1298	T1217	T1155	I1089	D943	V874	P800
GLY	GLY	L1518	H1448	H1448	N1369	L1299	L1218	K1156	V1090	D944	Y875	S801
PRO	ILE	L1519	L1449	L1449	S1370	V1300	V1219	K1156	Q1097	Q1022	L876	E802
ALA	ASP	A1582	C1450	C1450	G1371	W1301	Q1220	L1165	I1098	S1024	F877	N807
ASP	TYR	P1520	C1450	C1450	L1372	W1301	Q1220	L1165	F1094	N1025	E878	V808
LYS	ALA	M1521	L1453	L1453	L1372	S1302	N1221	P1160	F1094	N1026	Q881	E809
ALA	GLN	T1522	L1456	L1456	L1376	E1304	L1222	A1161	R1096	S1027	Q881	E809
LYS	GLY	T1523	L1456	L1456	L1376	E1304	L1222	A1161	R1096	N1027	L885	H810
THR	ASP	F1524	V1459	V1459	C1380	M1305	S1224	Q1164	Q1097	P1028	S886	L811
ILE	PHE	M1525	E1460	E1460	Q1382	P1307	V1226	L1166	I1098	M1030	P887	Q812
ASP	ASP	N1528	R1463	R1463	Q1382	P1308	V1226	L1166	F1101	S1031	P888	M813
CYS	GLY	G1529	L1464	L1464	Y1383	Q1309	L1222	P1167	F1101	E1032	F889	L816
ASP	ASP	D1530	L1464	L1464	L1384	V1310	P1223	T1168	I1104	C1033	G890	I817
LYS	GLY	G1531	W1467	W1467	Q1387	I1311	Y1169	D1034	D1105	V961	TRP	F821
LYS	ASN	F1534	L1468	L1468	L1387	T1313	P1242	L1036	K962	Y963	GLY	G825
GLY	LEU	P1535	T1469	T1469	Q1392	L1314	N1243	L1036	Y963	D964	GLY	G825
ASP	LEU	E1536	M1471	M1471	A1393	L1315	G1245	H1037	E965	E965	GLY	G825
LYS	GLY	L1537	M1471	M1471	R1394	P1316	S1246	L1038	L966	L966	GLN	I829
LYS	CYS	M1538	S1474	S1474	L1394	L1317	W1247	L1039	ASP	Y967	ASP	L830
LYS	LEU	V1539	S1474	S1474	M1397	L1318	W1247	W1041	A968	A969	S831	L830
LYS	VAL	V1540	S1474	S1474	M1397	L1319	W1247	S1042	ASN	ASN	ASN	L832
ALA	ALA	A1541	K1477	K1477	E1398	E1320	F1251	S1043	ASN	ASN	ASN	F833
VAL	LEU	A1542	D1478	D1478	E1399	T1323	A1252	R1044	GLY	GLY	GLY	V834
LYS	GLN	T1543	D1479	D1479	F1400	E1324	T1255	L1045	ARG	ARG	ARG	Q835
ARG	LYS	L1544	D1480	D1480	F1401	E1325	T1255	L1046	A975	A975	A903	I836
THR	THR	A1545	Q1481	Q1481	D1403	V1326	T1257	I1047	A976	A976	I837	I837
THR	THR	S1546	Q1481	Q1481	D1403	V1326	T1257	I1047	A976	A976	T904	Q838
VAL	VAL	A1547	V1484	V1484	D1405	E1328	S1258	S1048	L980	L980	T905	E839
VAL	PRO	G1548	I1485	I1485	G1405	E1328	S1258	S1049	D981	D981	P906	V842
GLY	GLY	Q1549	Q1486	Q1486	E1406	I1329	Y1261	V1050	T982	T982	Y908	M843
GLY	GLY	G1550	E1487	E1487	L1407	S1330	Y1261	V1051	V983	V983	H909	M843
ASN	GLY	A1551	N1488	N1488	L1407	S1331	A1268	W1053	R984	R984	G910	D845
GLN	TRP	G1552	N1489	N1489	M1411	N1332	H1269	P1190	R985	R985	F911	D845

WORLDWIDE
PDB
PROTEIN DATA BANK



- Molecule 1: E3 ubiquitin-protein ligase UBR4

Chain B:  12% 12% • 73%











SER	PHE	TYR	ALA	CYS	TYR	ALA	THR	HIS
	TRP	TYR	ASP	ASN	THR	MET	GLN	GLN
	ALA	PHE	THR	GLY	PHE	ALA	VAL	LEU
	VAL	THR	GLY	LEU	THR	MET	LEU	LYS
	ASP	VAL	GLY	LEU	ARG	GLN	GLY	LEU
	LEU	LEU	GLY	VAL	VAL	LYS	THR	ILE
	ALA	ALA	GLY	TRP	ALA	ASP	LEU	LEU
	GLY	ILE	ARG	GLY	GLY	LEU	ASP	LEU
	LEU	HIS	GLU	TRP	ALA	LEU	SER	GLN
	LEU	ILE	GLU	PRO	ASN	GLY	ILE	LYS
SER	MET	LEU	ASN	HIS	GLU	THR	PRO	GLY
	PHE	PRO	ILE	VAL	MET	LEU	ASN	ILE
	LYS	PRO	HIS	PRO	GLU	GLY	LEU	THR
	LYS	GLU	LEU	GLU	ASN	MET	HIS	GLN
	ASP	VAL	ILE	SER	LYS	THR	LYS	ASN
	PRO	PRO	PRO	ALA	PRO	THR	LEU	ALA
	GLU	THR	THR	PHE	ARG	ASN	GLU	LEU
	SER	ALA	ILE	ALA	LYS	GLU	GLN	ASP
	PHE	THR	HIS	THR	GLN	LYS	VAL	TYR
	LEU	ARG	HIS	CYS	GLN	GLY	SER	MET
SER	THR	VAL	THR	LEU	GLY	GLN	SER	LYS
	GLY	GLU	VAL	ALA	TYR	VAL	ASP	LYS
	ASP	ILE	LEU	ARG	SER	VAL	GLY	HIS
	LEU	LEU	THR	HIS	THR	THR	GLY	ILE
	LEU	LEU	TYR	ASN	THR	LYS	THR	PRO
	ASN	ARG	VAL	ASN	VAL	ALA	ALA	ASN
	LEU	VAL	THR	GLN	ILE	LEU	ALA	LYS
	GLU	THR	ARG	GLU	ILE	LYS	GLU	LEU
	TYR	SER	ALA	CYS	VAL	GLN	ASN	ASP
	ILE	GLN	THR	THR	HIS	ALA	LEU	ALA
PRO	HIS	ARG	ASP	GLY	THR	MET	GLN	GLN
	GLN	THR	THR	ASN	THR	ASP	VAL	LEU
	LYS	VAL	GLY	LEU	THR	GLN	GLY	LEU
	ASP	LEU	GLY	PRO	ARG	GLY	ILE	LEU
	LEU	LEU	THR	HIS	THR	VAL	GLY	THR
	LEU	LEU	THR	ASN	THR	GLY	THR	GLY
	ASN	ARG	VAL	GLN	VAL	GLY	GLY	ILE
	ASN	LEU	THR	GLU	ILE	LYS	GLU	LEU
	ASP	THR	ALA	THR	THR	GLY	ASN	ASP
	TYR	MET	VAL	GLN	VAL	GLY	VAL	TYR

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	126259	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.801	Depositor
Minimum map value	-0.495	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.014	Depositor
Recommended contour level	0.068	Depositor
Map size (\AA)	432.64, 432.64, 432.64	wwPDB
Map dimensions	520, 520, 520	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	0.832, 0.832, 0.832	Depositor

5 Model quality

5.1 Standard geometry

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	0.89	21/11051 (0.2%)	1.14	66/15000 (0.4%)
1	B	0.99	22/11008 (0.2%)	1.26	65/14932 (0.4%)
All	All	0.95	43/22059 (0.2%)	1.20	131/29932 (0.4%)

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
1	A	0	4
1	B	0	12
All	All	0	16

The worst 5 of 43 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	878	GLU	CA-C	-8.95	1.41	1.52
1	A	789	THR	CA-C	-8.80	1.41	1.52
1	A	855	LEU	CA-C	-8.66	1.40	1.52
1	A	858	LEU	CA-C	-8.53	1.41	1.52
1	A	782	VAL	CA-C	-8.30	1.42	1.52

The worst 5 of 131 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	855	LEU	N-CA-C	-13.01	96.76	112.89
1	B	1451	GLY	N-CA-C	-12.54	98.98	114.16
1	A	789	THR	N-CA-C	-12.48	97.67	111.28
1	B	1083	VAL	N-CA-C	-12.02	96.91	110.62
1	A	860	LEU	N-CA-C	-11.29	98.99	111.07

There are no chirality outliers.

5 of 16 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1008	ARG	Sidechain
1	A	1174	ARG	Sidechain
1	A	1394	ARG	Sidechain
1	A	849	ARG	Sidechain
1	B	272	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	10853	0	10929	945	0
1	B	10814	0	10915	803	0
All	All	21667	0	21844	1708	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 39.

The worst 5 of 1708 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:B:313:LEU:HD11	1:B:332:LEU:CD2	1.51	1.36
1:B:89:CYS:SG	1:B:239:PHE:HD2	1.54	1.30
1:A:1399:GLU:O	1:A:1403:ASP:OD1	1.56	1.20
1:B:89:CYS:SG	1:B:239:PHE:CD2	2.32	1.20
1:A:73:PHE:CD1	1:A:159:LYS:HA	1.80	1.17

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	1372/5183 (26%)	1288 (94%)	63 (5%)	21 (2%)	8	30
1	B	1359/5183 (26%)	1262 (93%)	82 (6%)	15 (1%)	12	37
All	All	2731/10366 (26%)	2550 (93%)	145 (5%)	36 (1%)	13	33

5 of 36 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	889	PHE
1	A	906	PRO
1	A	907	LEU
1	A	909	HIS
1	A	1031	SER

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	1218/4521 (27%)	1151 (94%)	67 (6%)	18	44
1	B	1217/4521 (27%)	1126 (92%)	91 (8%)	11	35
All	All	2435/9042 (27%)	2277 (94%)	158 (6%)	17	39

5 of 158 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	943	ASP
1	B	1338	LEU
1	B	1033	CYS
1	B	1131	VAL
1	B	1486	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 78 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	979	GLN
1	B	1528	ASN
1	B	1057	HIS
1	B	1249	ASN
1	B	1589	HIS

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 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.

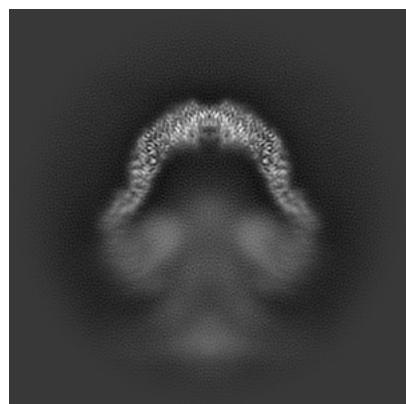
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-46688. These allow visual inspection of the internal detail of the map and identification of artifacts.

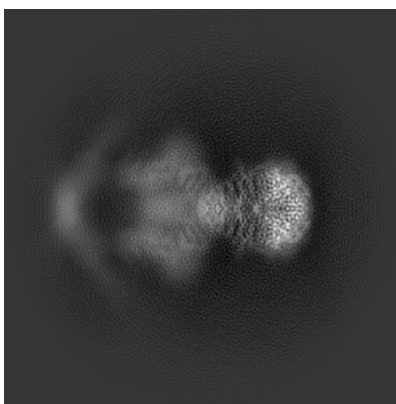
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

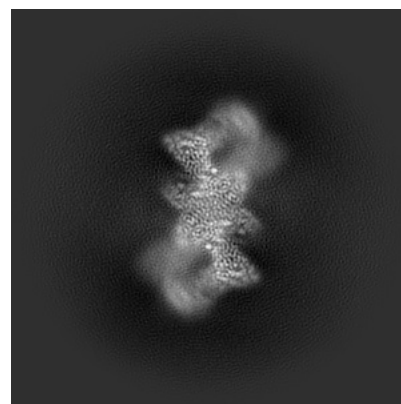
6.1.1 Primary map



X

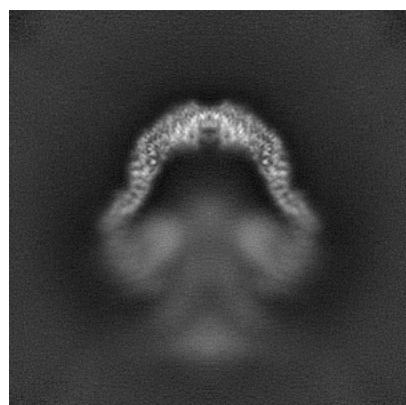


Y

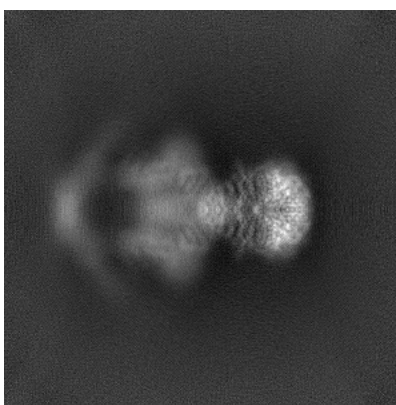


Z

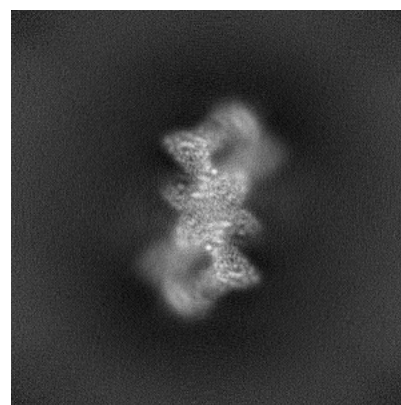
6.1.2 Raw map



X



Y

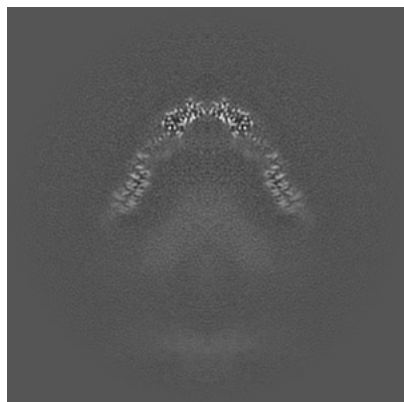


Z

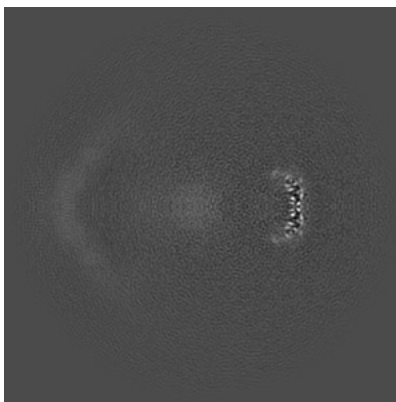
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

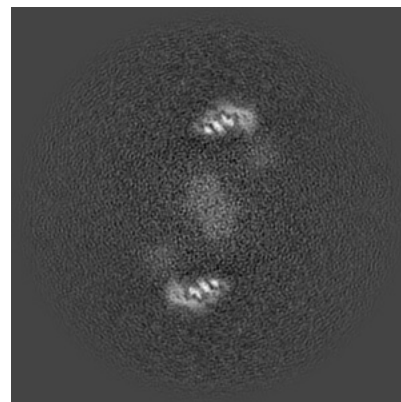
6.2.1 Primary map



X Index: 260

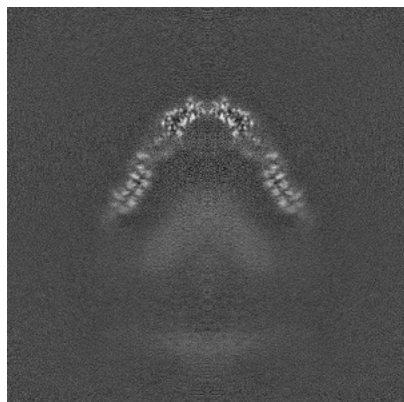


Y Index: 260

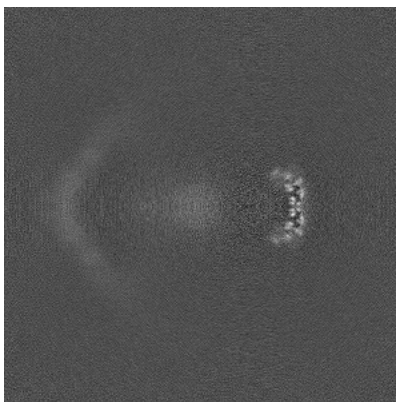


Z Index: 260

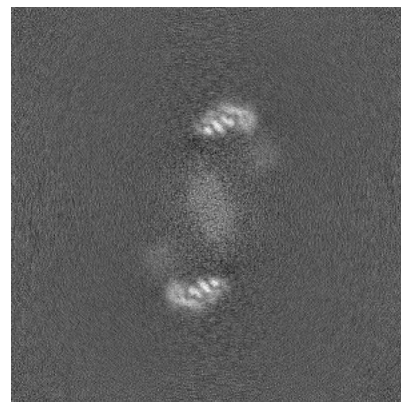
6.2.2 Raw map



X Index: 260



Y Index: 260

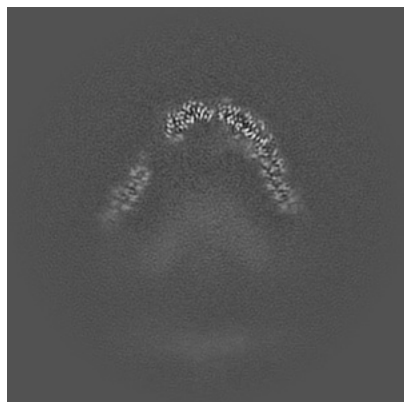


Z Index: 260

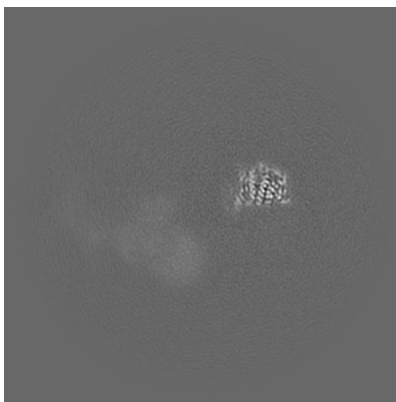
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

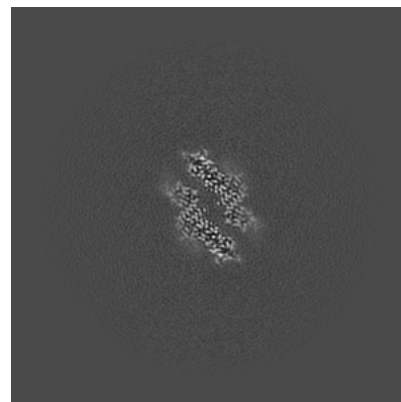
6.3.1 Primary map



X Index: 254

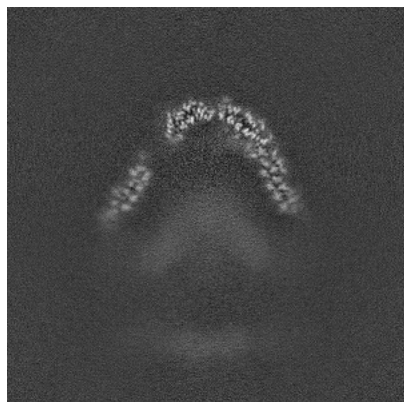


Y Index: 187

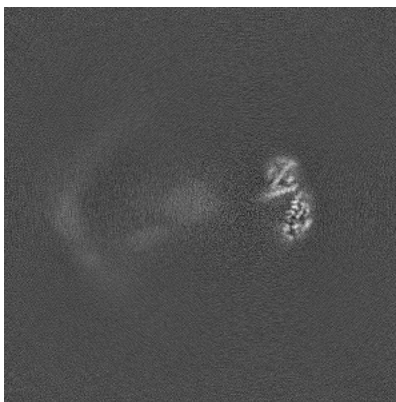


Z Index: 370

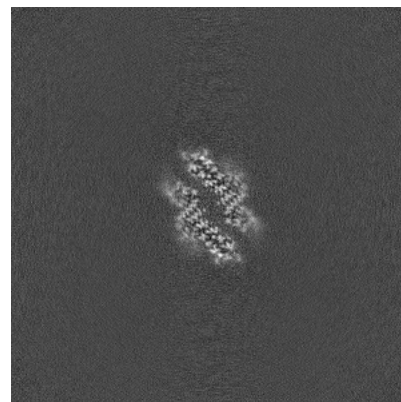
6.3.2 Raw map



X Index: 254



Y Index: 242

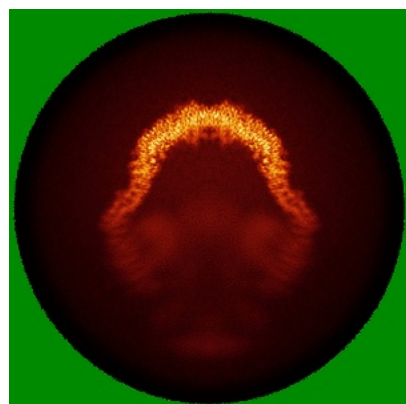


Z Index: 370

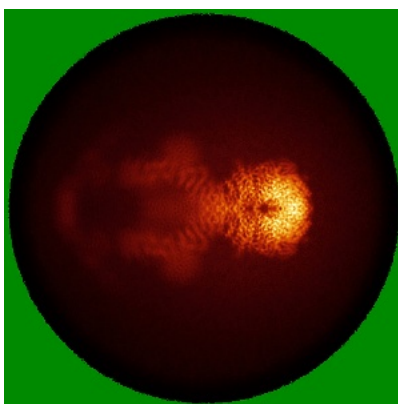
The images above show the largest variance slices of the map in three orthogonal directions.

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

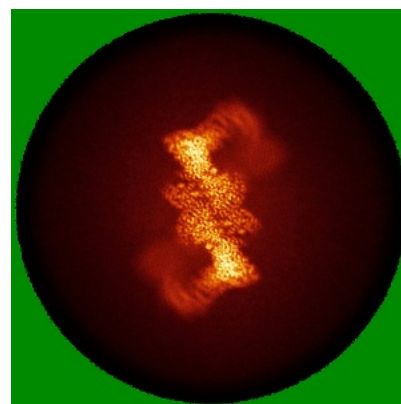
6.4.1 Primary map



X

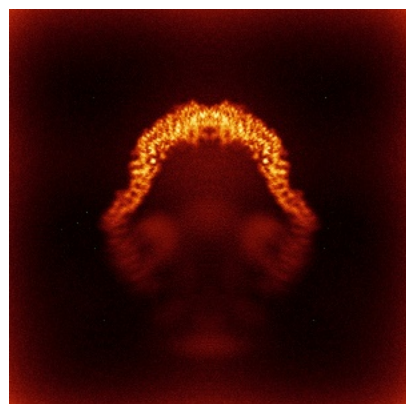


Y

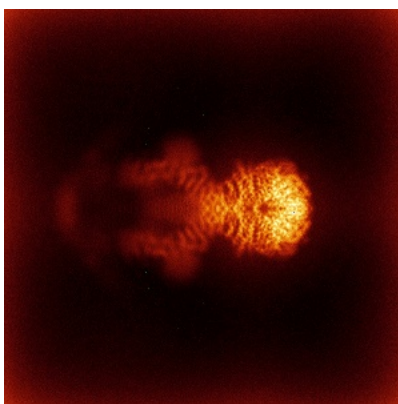


Z

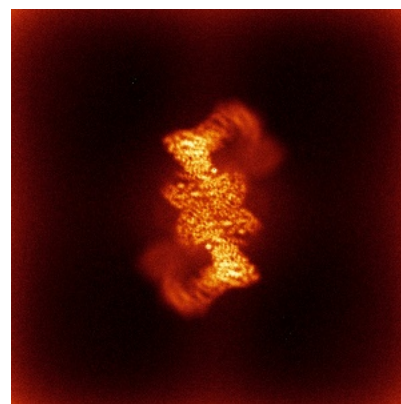
6.4.2 Raw map



X



Y

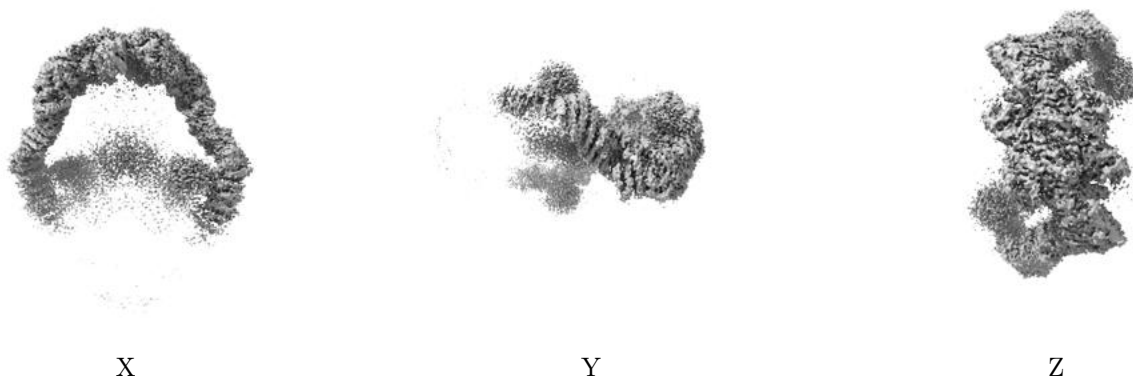


Z

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

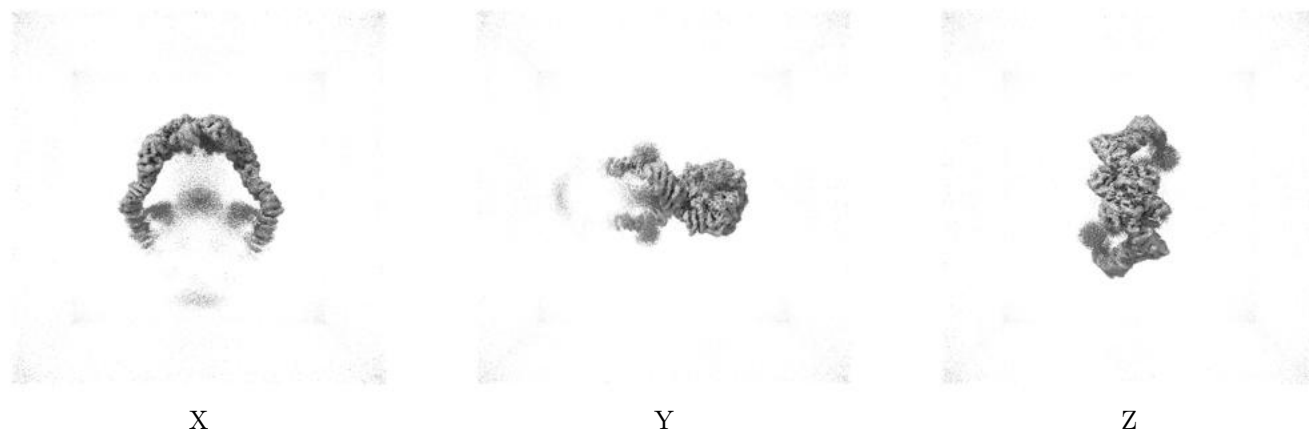
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.068. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



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

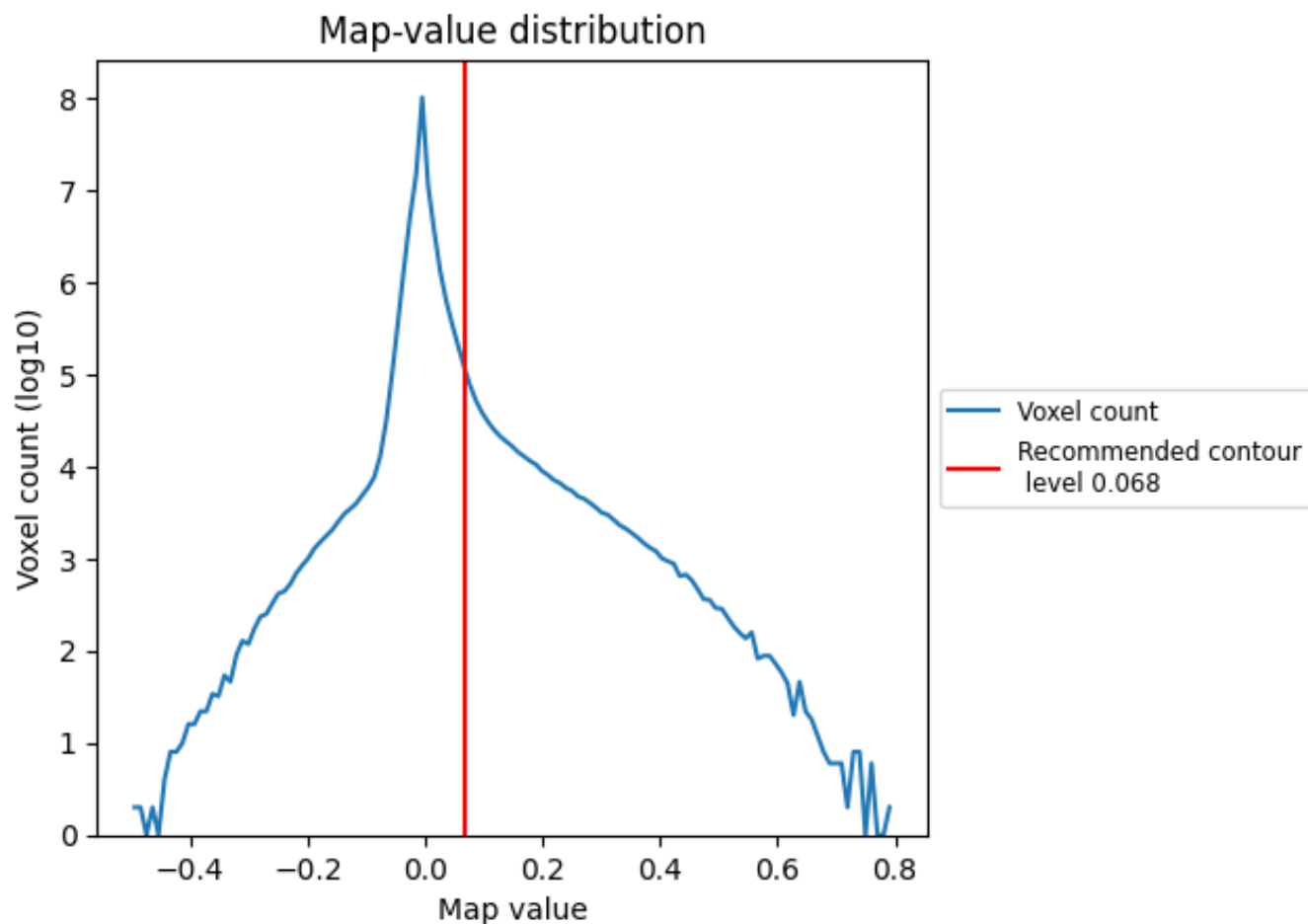
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

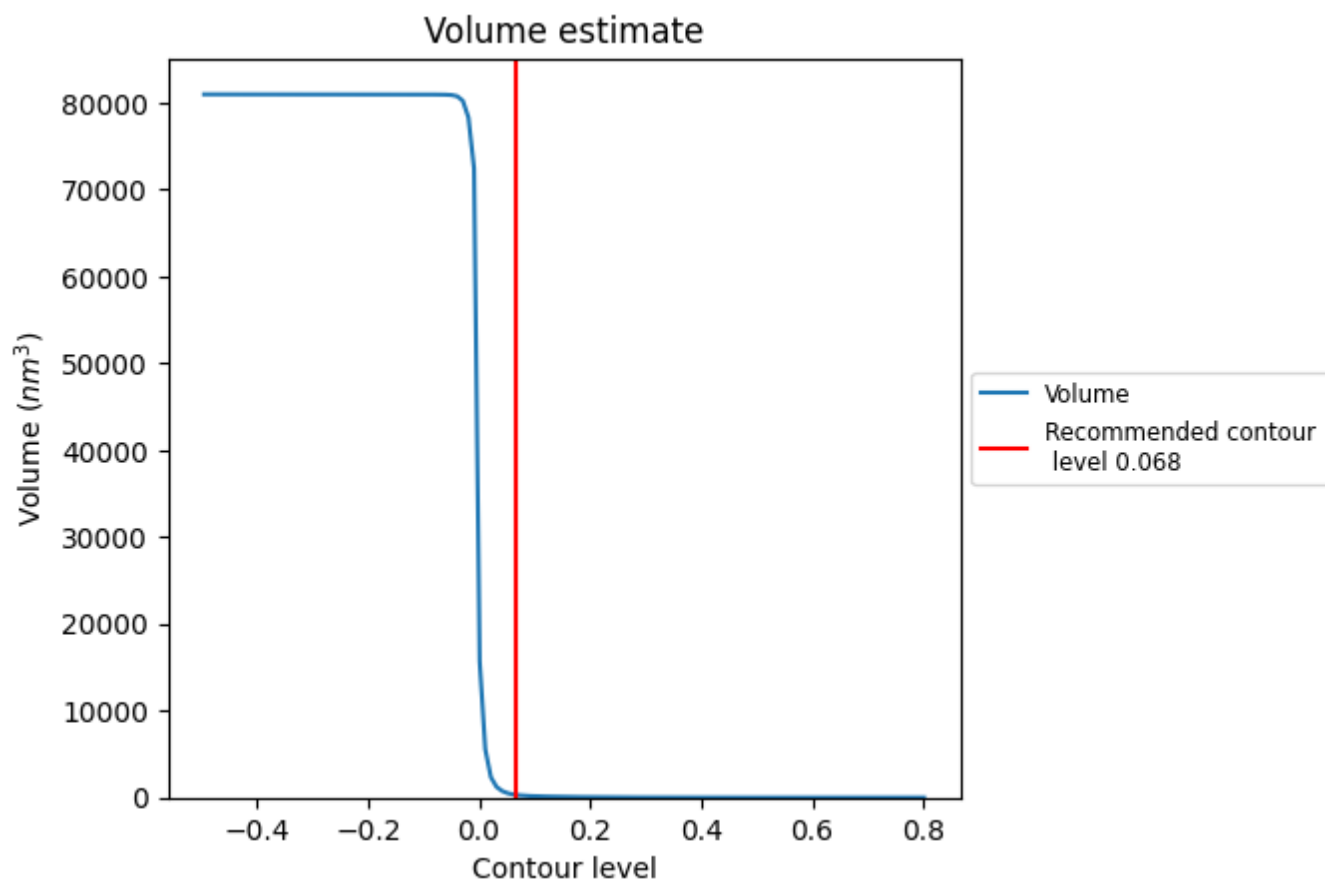
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

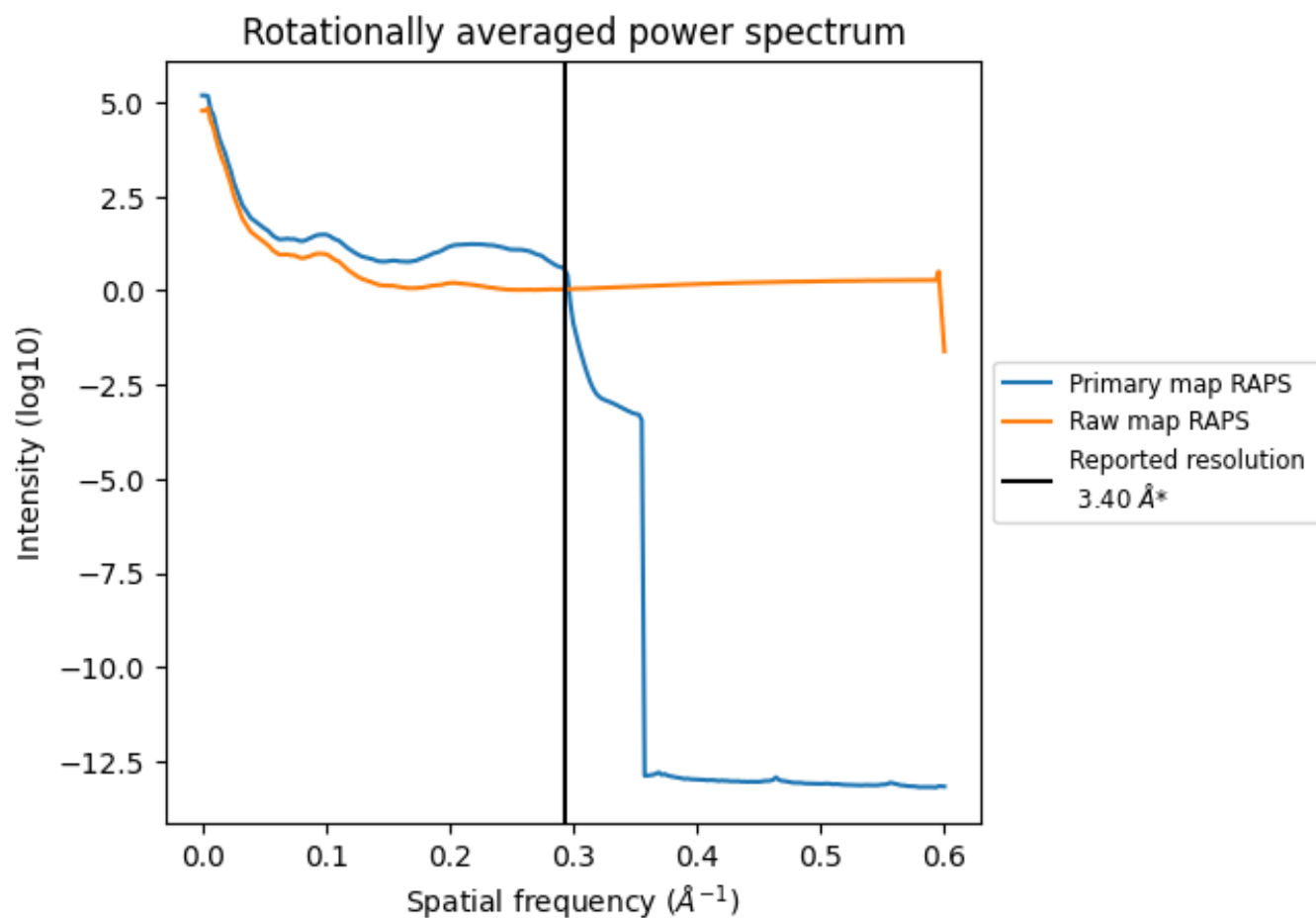
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 300 nm³; this corresponds to an approximate mass of 271 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ

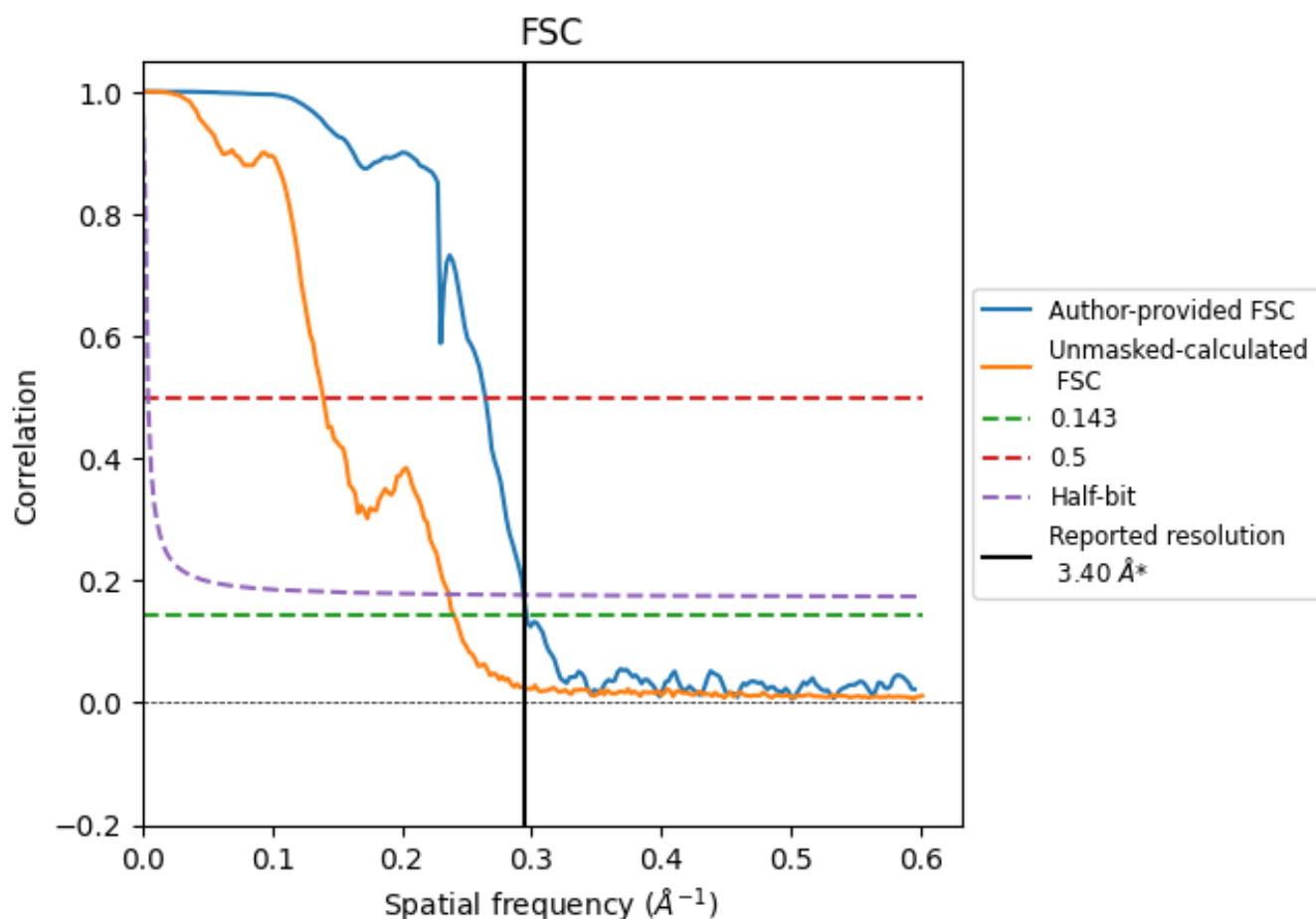


*Reported resolution corresponds to spatial frequency of 0.294 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



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

8.2 Resolution estimates [i](#)

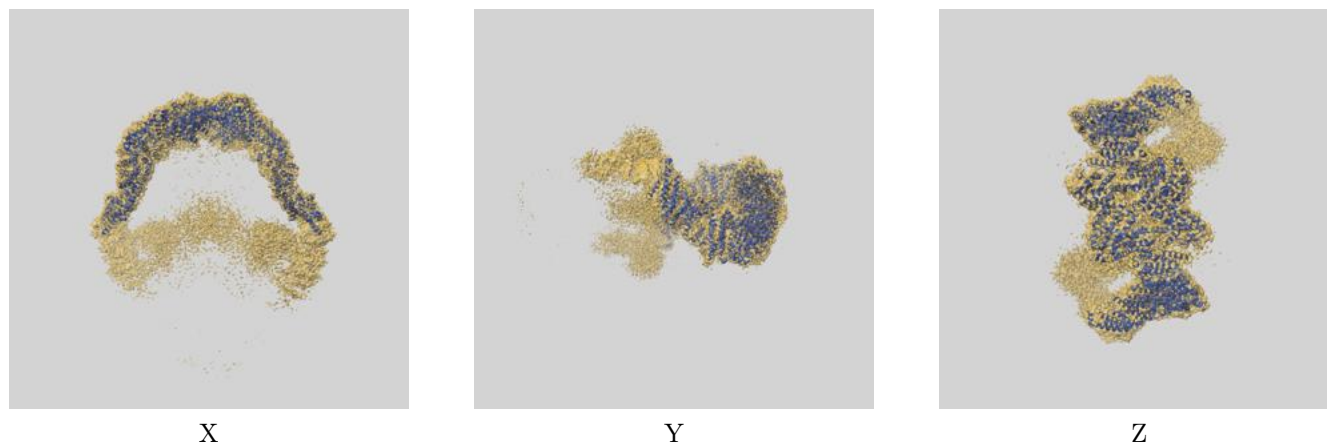
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	3.38	3.78	3.40
Unmasked-calculated*	4.16	7.17	4.24

*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 4.16 differs from the reported value 3.4 by more than 10 %

9 Map-model fit [i](#)

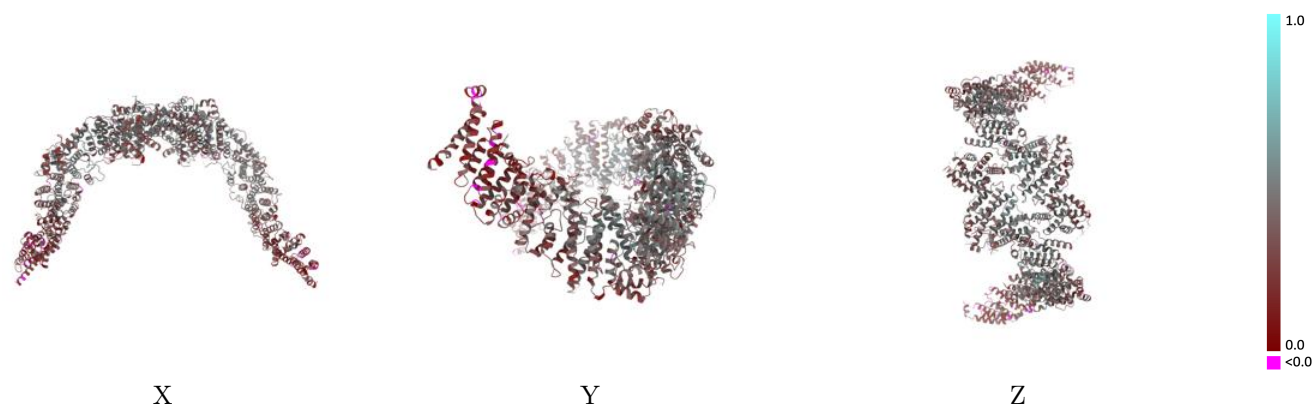
This section contains information regarding the fit between EMDB map EMD-46688 and PDB model 9NWD. Per-residue inclusion information can be found in [section 3](#) on [page 4](#).

9.1 Map-model overlay [i](#)



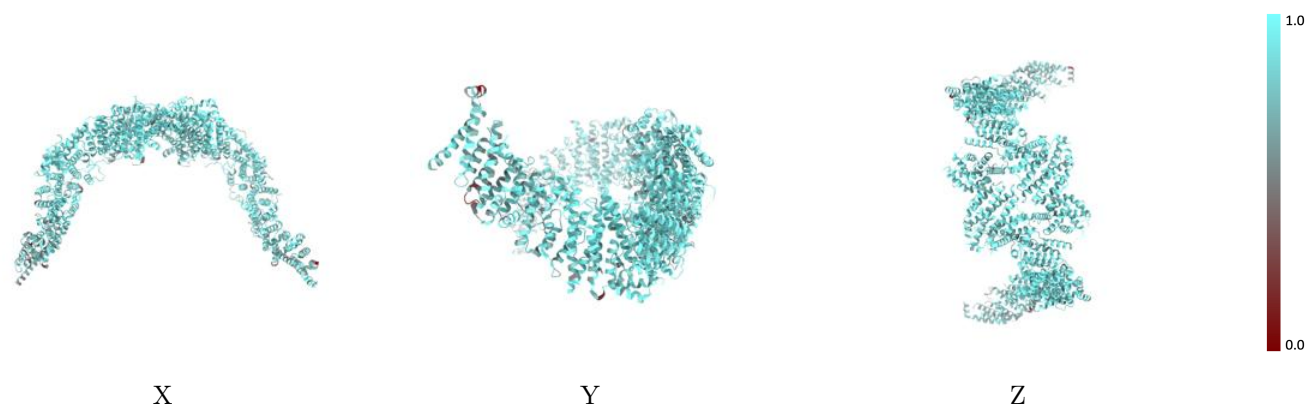
The images above show the 3D surface view of the map at the recommended contour level 0.068 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



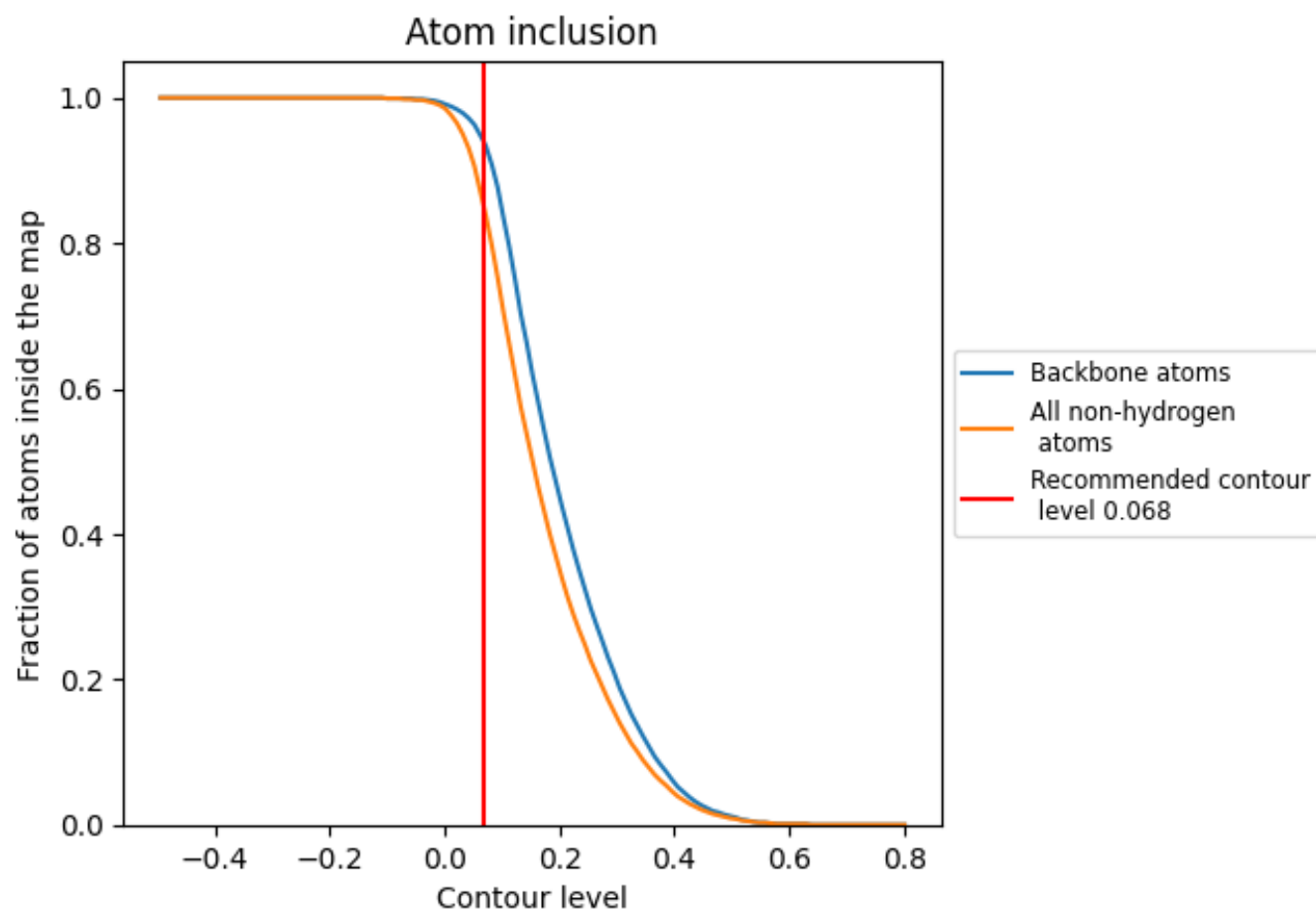
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.068).

9.4 Atom inclusion [i](#)



At the recommended contour level, 94% of all backbone atoms, 85% 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 (0.068) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div></div> 0.8510	<div></div> 0.3640
A	<div></div> 0.8470	<div></div> 0.3600
B	<div></div> 0.8550	<div></div> 0.3680

