Full wwPDB EM Validation Report

Jul 30, 2025 – 06:13 PM JST

PDB ID	:	9KEN / pdb_00009ken
EMDB ID	:	EMD-62292
Title	:	cryo-EM structure of TRIP12 in complex with K29/48 branched-triUb
Authors	:	Ai, H.S.; Wu, X.W.; Liu, L.
Deposited on	:	2024-11-05
Resolution	:	3.63 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:

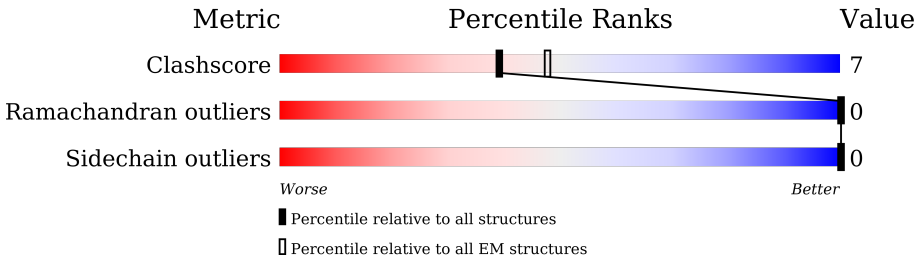
EMDB validation analysis	:	0.0.1.dev126
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.45.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.63 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 <=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	C	76	71% 29%
2	D	76	71% 26%
3	A	1609	57% 12% 30%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 10083 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 Ubiquitin.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	C	76	Total	C	N	O	S	0	0
			597	376	105	115	1		

- Molecule 2 is a protein called Ubiquitin K29C.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	D	74	Total	C	N	O	S	0	0
			581	366	99	115	1		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	29	CYS	LYS	engineered mutation	UNP P62979

- Molecule 3 is a protein called E3 ubiquitin-protein ligase TRIP12.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	A	1124	Total	C	N	O	S	0	0
			8905	5696	1504	1644	61		

There are 10 discrepancies between the modelled and reference sequences:

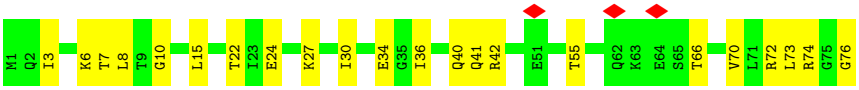
Chain	Residue	Modelled	Actual	Comment	Reference
A	384	ASP	-	expression tag	UNP Q14669
A	385	TYR	-	expression tag	UNP Q14669
A	386	LYS	-	expression tag	UNP Q14669
A	387	ASP	-	expression tag	UNP Q14669
A	388	ASP	-	expression tag	UNP Q14669
A	389	ASP	-	expression tag	UNP Q14669
A	390	ASP	-	expression tag	UNP Q14669
A	391	LYS	-	expression tag	UNP Q14669
A	392	GLY	-	expression tag	UNP Q14669
A	393	THR	-	expression tag	UNP Q14669

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.

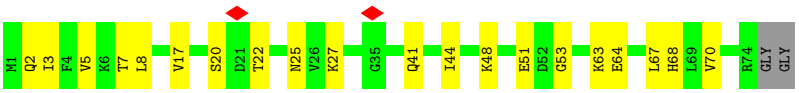
• Molecule 1: Ubiquitin

Chain C:



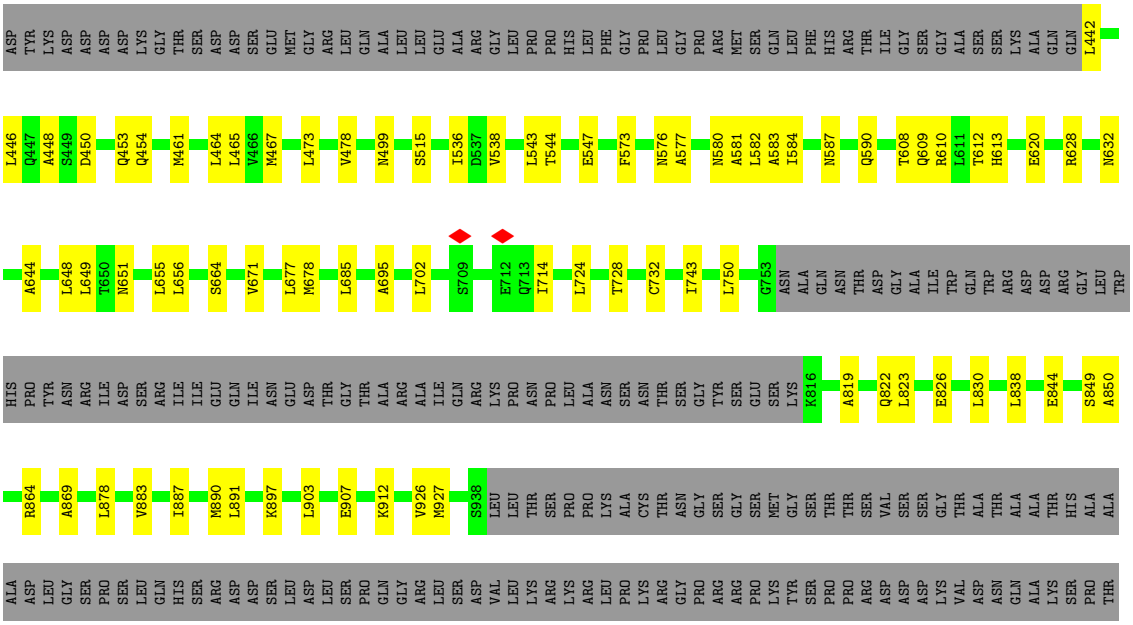
• Molecule 2: Ubiquitin K29C

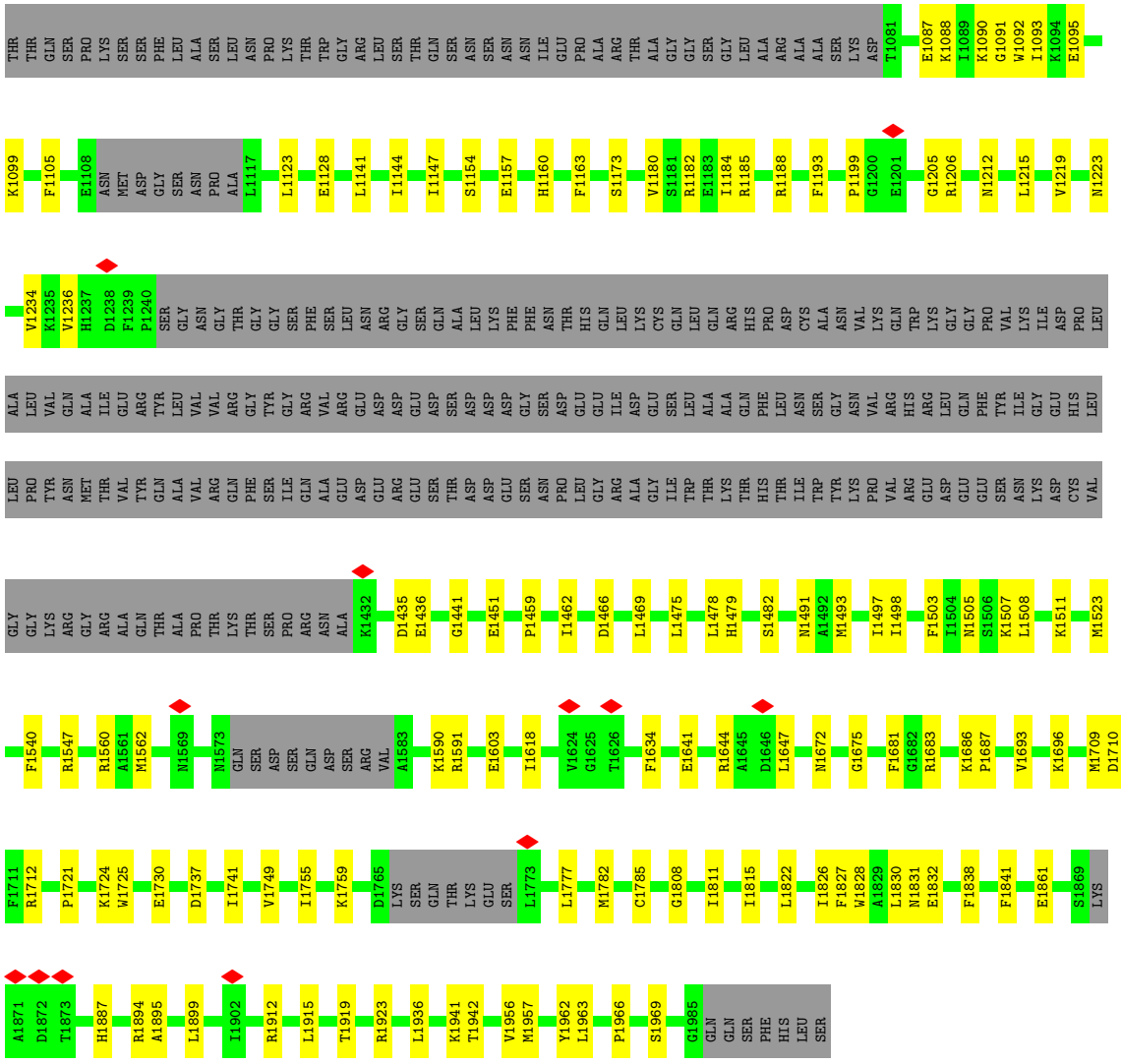
Chain D:



• Molecule 3: E3 ubiquitin-protein ligase TRIP12

Chain A:




THR THR GLN SER PRO LYS SER SER PHE LEU ALA SER LEU ASN PRO LYS THR TRP GLY ARG LEU SER THR GLN SER ASN SER ASN ASN ILE GLU PRO ALA ARG THR ALA GLY GLY SER GLY LEU ALA ARG ALA ALA SER LYS ASP T1081 E1087 K1088 I1089 K1090 G1091 W1092 I1093 K1094 E1095
K1099 F1105 E1108 ASN MET ASP GLY SER ASN PRO ALA L1117 L1123 E1128 L1141 I1144 I1147 S1154 E1157 H1160 F1163 S1173 V1180 S1181 R1182 E1183 I1184 R1185 R1188 F1193 P1199 G1200 E1201 G1205 R1206 N1212 L1215 V1219 N1223
V1234 K1235 V1236 H1237 D1238 F1239 P1240 SER GLY ASN GLY THR GLY GLY SER PHE SER LEU ASN ARG GLY SER GLN ALA LEU LYS PHE PHE ASN THR HIS GLN LEU LYS CYS GLN LEU GLN ARG HIS PRO ASP CYS ALA ASN VAL LYS GLN TRP LYS GLY GLY PRO VAL LYS ILE ASP PRO LEU
ALA LEU VAL GLN ALA ILE GLU ARG TYR LEU VAL VAL ARG GLY TYR GLY ARG VAL ARG GLU ASP ASP GLU ASP SER ASP ASP ASP GLY SER ASP GLU GLU ILE ASP GLU SER LEU ALA ALA GLN PHE LEU ASN SER GLY ASN VAL ARG HIS ARG LEU GLN GLU GLY PHE TYR ILE GLY GLU HIS LEU
LEU PRO TYR ASN MET THR VAL TYR GLN ALA VAL ARG GLN PHE SER ILE GLN ALA GLU ASP GLU ARG GLU SER THR ASP ASP SER GLU ASN PRO LEU GLY ARG ALA GLY ILE TRP THR LYS THR HIS THR ILE TRP TYR LYS PRO VAL ARG GLU ASP GLU LYS ASP CYS VAL
GLY GLY LYS ARG GLY ARG ALA GLN THR ALA PRO THR LYS THR SER PRO ARG ASN ALA K1432 D1435 E1436 G1441 E1451 P1459 I1462 D1466 L1469 L1475 L1478 H1479 S1482 N1491 A1492 M1493 I1497 I1498 F1503 I1504 N1505 S1506 K1507 L1508 K1511 M1523
F1540 R1547 R1560 A1561 M1562 N1569 N1573 GLN SER ASP SER GLN ASP SER ARG VAL A1583 K1590 R1591 E1603 I1618 V1624 G1625 T1626 F1634 E1641 R1644 A1645 D1646 L1647 N1672 G1675 F1681 G1682 R1683 K1686 P1687 V1693 K1696 M1709 D1710
F1711 R1712 P1721 K1724 W1725 E1730 D1737 I1741 V1749 I1755 K1759 D1765 LYS SER GLN THR LYS GLU SER L1773 L1777 M1782 C1785 G1808 I1811 I1815 L1822 I1826 F1827 W1828 A1829 L1830 N1831 E1832 F1838 F1841 E1861 S1869 LYS
A1871 D1872 T1873 H1887 R1894 A1895 L1899 I1902 R1912 L1915 T1919 R1923 L1936 K1941 T1942 V1956 M1957 Y1962 L1963 P1966 S1969 G1985 GLN GLN SER PHE HIS LEU SER

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	259711	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	0.051	Depositor
Minimum map value	-0.033	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.005	Depositor
Map size (Å)	206.848, 206.848, 206.848	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.808, 0.808, 0.808	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	C	0.28	0/603	0.63	0/811
2	D	0.37	0/587	0.59	0/793
3	A	0.40	0/9082	0.57	0/12289
All	All	0.39	0/10272	0.57	0/13893

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
3	A	0	2

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	A	1128	GLU	Peptide
3	A	1160	HIS	Peptide

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	C	597	0	625	15	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	581	0	597	14	0
3	A	8905	0	8955	122	0
All	All	10083	0	10177	141	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 7.

All (141) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:1497:ILE:HG22	3:A:1498:ILE:HG13	1.72	0.71
3:A:1618:ILE:HG21	3:A:1634:PHE:HB2	1.80	0.62
3:A:1466:ASP:HB3	3:A:1469:LEU:HB2	1.82	0.61
3:A:1560:ARG:NH1	3:A:1709:MET:O	2.35	0.60
3:A:1725:TRP:HZ2	3:A:1831:ASN:HA	1.66	0.60
3:A:1505:ASN:HB3	3:A:1508:LEU:HB2	1.84	0.60
1:C:76:GLY:O	2:D:48:LYS:NZ	2.35	0.59
3:A:1205:GLY:O	3:A:1491:ASN:ND2	2.35	0.59
2:D:25:ASN:ND2	3:A:1957:MET:SD	2.76	0.59
3:A:590:GLN:O	3:A:632:ASN:ND2	2.37	0.57
2:D:63:LYS:HG2	2:D:64:GLU:HG2	1.87	0.57
3:A:1173:SER:HB3	3:A:1185:ARG:HH22	1.70	0.57
3:A:1547:ARG:NH2	3:A:1861:GLU:OE1	2.37	0.57
3:A:1182:ARG:NH2	3:A:1451:GLU:OE1	2.38	0.56
1:C:22:THR:HG22	1:C:55:THR:HG22	1.88	0.56
3:A:1206:ARG:HH11	3:A:1493:MET:HE2	1.70	0.56
3:A:448:ALA:O	3:A:454:GLN:NE2	2.39	0.56
3:A:1435:ASP:OD2	3:A:1683:ARG:NH2	2.39	0.55
3:A:644:ALA:HA	3:A:648:LEU:HD23	1.89	0.55
3:A:1505:ASN:HD22	3:A:1508:LEU:HD12	1.72	0.55
3:A:1603:GLU:OE2	3:A:1696:LYS:NZ	2.40	0.55
3:A:1710:ASP:O	3:A:1712:ARG:NH1	2.40	0.55
2:D:44:ILE:HB	2:D:68:HIS:HB2	1.89	0.55
1:C:3:ILE:HD11	1:C:15:LEU:HD12	1.88	0.55
2:D:17:VAL:HG12	3:A:1957:MET:HE1	1.88	0.55
3:A:1193:PHE:HB3	3:A:1215:LEU:HB2	1.88	0.54
3:A:750:LEU:HD22	3:A:897:LYS:HG2	1.89	0.54
1:C:73:LEU:HD23	1:C:74:ARG:HG2	1.89	0.54
3:A:581:ALA:HA	3:A:584:ILE:HD12	1.89	0.54
3:A:1212:ASN:ND2	3:A:1497:ILE:O	2.40	0.53
3:A:547:GLU:HG3	3:A:580:ASN:HA	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:544:THR:OG1	3:A:580:ASN:ND2	2.42	0.53
3:A:656:LEU:HD21	3:A:671:VAL:HG11	1.91	0.53
2:D:51:GLU:OE1	3:A:576:ASN:ND2	2.41	0.53
3:A:1475:LEU:O	3:A:1479:HIS:N	2.41	0.53
3:A:869:ALA:O	3:A:912:LYS:NZ	2.40	0.52
3:A:878:LEU:HD22	3:A:883:VAL:HG21	1.92	0.52
3:A:1154:SER:HG	3:A:1157:GLU:H	1.53	0.52
3:A:903:LEU:HD11	3:A:1093:ILE:HG23	1.91	0.52
3:A:1459:PRO:HD2	3:A:1462:ILE:HD12	1.90	0.52
3:A:1173:SER:HB3	3:A:1185:ARG:HH12	1.74	0.52
3:A:1647:LEU:HD22	3:A:1696:LYS:HE3	1.91	0.52
1:C:40:GLN:NE2	1:C:73:LEU:O	2.42	0.52
3:A:1828:TRP:HA	3:A:1832:GLU:HB3	1.93	0.51
3:A:1507:LYS:HE2	3:A:1511:LYS:HD2	1.93	0.51
3:A:1590:LYS:O	3:A:1591:ARG:NH1	2.42	0.51
3:A:620:GLU:OE2	3:A:664:SER:N	2.44	0.51
3:A:1895:ALA:O	3:A:1899:LEU:N	2.43	0.51
3:A:478:VAL:HG11	3:A:515:SER:HB2	1.93	0.51
1:C:6:LYS:HD3	1:C:66:THR:HG23	1.92	0.50
1:C:70:VAL:HG22	3:A:536:ILE:HD13	1.92	0.50
2:D:2:GLN:NE2	2:D:3:ILE:O	2.44	0.50
3:A:1184:ILE:HG23	3:A:1199:PRO:HG2	1.94	0.50
3:A:1436:GLU:O	3:A:1441:GLY:N	2.42	0.50
3:A:849:SER:OG	3:A:850:ALA:N	2.45	0.49
1:C:36:ILE:O	1:C:41:GLN:NE2	2.45	0.49
3:A:732:CYS:O	3:A:864:ARG:NH1	2.45	0.49
3:A:446:LEU:HD11	3:A:461:MET:HG2	1.94	0.49
3:A:1087:GLU:O	3:A:1091:GLY:N	2.41	0.49
1:C:24:GLU:HA	1:C:27:LYS:HG2	1.95	0.49
3:A:1838:PHE:HA	3:A:1841:PHE:HB3	1.94	0.49
1:C:30:ILE:O	1:C:34:GLU:N	2.45	0.49
3:A:649:LEU:HD21	3:A:678:MET:HE1	1.95	0.49
3:A:1826:ILE:HG23	3:A:1830:LEU:HD12	1.96	0.48
3:A:583:ALA:O	3:A:587:ASN:ND2	2.46	0.48
3:A:1144:ILE:HD13	3:A:1163:PHE:HE1	1.79	0.48
3:A:1482:SER:HA	3:A:1497:ILE:HD12	1.96	0.48
3:A:590:GLN:HB2	3:A:628:ARG:HD3	1.95	0.48
3:A:1956:VAL:HG12	3:A:1963:LEU:HA	1.96	0.47
3:A:543:LEU:HD12	3:A:577:ALA:HB1	1.96	0.47
3:A:1808:GLY:HA2	3:A:1811:ILE:HD12	1.97	0.47
2:D:27:LYS:HD2	2:D:41:GLN:HB2	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:609:GLN:O	3:A:612:THR:OG1	2.29	0.47
3:A:1141:LEU:HD23	3:A:1144:ILE:HD12	1.97	0.47
2:D:53:GLY:O	3:A:1887:HIS:NE2	2.44	0.47
3:A:1215:LEU:HD11	3:A:1478:LEU:HD22	1.96	0.47
2:D:22:THR:OG1	3:A:1962:TYR:OH	2.23	0.46
3:A:1219:VAL:O	3:A:1223:ASN:N	2.47	0.46
1:C:8:LEU:HD22	3:A:536:ILE:HD11	1.96	0.46
1:C:36:ILE:HB	1:C:41:GLN:HE21	1.80	0.46
3:A:1234:VAL:HG12	3:A:1236:VAL:HG23	1.97	0.45
3:A:442:LEU:HD12	3:A:464:LEU:HD22	1.99	0.45
3:A:1724:LYS:NZ	3:A:1737:ASP:OD1	2.47	0.45
3:A:608:THR:O	3:A:651:ASN:ND2	2.50	0.45
3:A:714:ILE:HB	3:A:844:GLU:HG3	1.99	0.45
3:A:465:LEU:HD23	3:A:473:LEU:HD13	1.99	0.45
3:A:1523:MET:HG2	3:A:1562:MET:HE3	1.99	0.45
3:A:678:MET:HE3	3:A:685:LEU:HD13	1.99	0.44
3:A:1894:ARG:NH1	3:A:1969:SER:O	2.51	0.44
3:A:927:MET:HE3	3:A:1105:PHE:HB3	1.99	0.44
3:A:1755:ILE:HD11	3:A:1782:MET:HB2	1.99	0.44
3:A:1941:LYS:HD3	3:A:1966:PRO:HG3	1.98	0.44
2:D:70:VAL:HG21	3:A:467:MET:HA	1.98	0.44
3:A:1672:ASN:ND2	3:A:1675:GLY:O	2.47	0.44
3:A:448:ALA:HB3	3:A:454:GLN:HG3	2.00	0.44
3:A:823:LEU:HD11	3:A:830:LEU:HD23	1.99	0.44
3:A:1681:PHE:HZ	3:A:1693:VAL:HG21	1.83	0.44
1:C:7:THR:HG23	1:C:10:GLY:H	1.83	0.43
2:D:5:VAL:HG22	2:D:67:LEU:HD11	1.99	0.43
3:A:822:GLN:O	3:A:826:GLU:N	2.36	0.43
3:A:1755:ILE:O	3:A:1759:LYS:N	2.49	0.43
3:A:1915:LEU:O	3:A:1919:THR:OG1	2.30	0.43
3:A:743:ILE:HG21	3:A:907:GLU:HG2	2.01	0.43
3:A:887:ILE:O	3:A:891:LEU:N	2.48	0.43
3:A:1123:LEU:HD13	3:A:1147:ILE:HG21	2.00	0.43
1:C:42:ARG:HH11	1:C:72:ARG:HD3	1.83	0.43
3:A:1215:LEU:HD23	3:A:1497:ILE:HG21	2.00	0.43
3:A:1912:ARG:HH12	3:A:1923:ARG:HH21	1.67	0.42
3:A:1180:VAL:HG21	3:A:1188:ARG:HH12	1.84	0.42
3:A:1503:PHE:HB3	3:A:1540:PHE:HD2	1.83	0.42
3:A:1641:GLU:OE2	3:A:1644:ARG:NH1	2.46	0.42
3:A:610:ARG:HD3	3:A:613:HIS:CD2	2.54	0.42
3:A:724:LEU:HD23	3:A:724:LEU:HA	1.87	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:887:ILE:HG22	3:A:891:LEU:HG	2.02	0.42
3:A:1777:LEU:HB3	3:A:1815:ILE:HG12	2.01	0.42
3:A:1827:PHE:O	3:A:1832:GLU:N	2.42	0.42
3:A:499:ASN:HA	3:A:538:VAL:HG22	2.01	0.42
3:A:1749:VAL:HG13	3:A:1822:LEU:HD22	2.02	0.42
3:A:702:LEU:HD23	3:A:702:LEU:HA	1.83	0.42
3:A:695:ALA:HA	3:A:838:LEU:HD11	2.02	0.42
3:A:1088:LYS:O	3:A:1092:TRP:N	2.50	0.42
3:A:573:PHE:HB3	3:A:577:ALA:HB3	2.02	0.41
3:A:582:LEU:HD11	3:A:610:ARG:HD2	2.01	0.41
3:A:819:ALA:O	3:A:823:LEU:N	2.52	0.41
1:C:42:ARG:HD3	1:C:72:ARG:HE	1.85	0.41
3:A:450:ASP:OD2	3:A:453:GLN:N	2.53	0.41
3:A:1721:PRO:HB2	3:A:1741:ILE:HD11	2.03	0.41
2:D:7:THR:OG1	2:D:8:LEU:N	2.52	0.41
3:A:651:ASN:O	3:A:655:LEU:N	2.54	0.41
3:A:1936:LEU:HA	3:A:1936:LEU:HD12	1.87	0.41
3:A:1782:MET:N	3:A:1785:CYS:O	2.47	0.41
2:D:20:SER:HB2	3:A:1942:THR:H	1.85	0.41
3:A:728:THR:O	3:A:732:CYS:N	2.48	0.41
3:A:1508:LEU:HD23	3:A:1508:LEU:HA	1.79	0.41
3:A:887:ILE:HA	3:A:890:MET:HE3	2.02	0.41
3:A:1730:GLU:O	3:A:1831:ASN:ND2	2.43	0.40
3:A:677:LEU:HD23	3:A:677:LEU:HA	1.85	0.40
3:A:891:LEU:HD11	3:A:926:VAL:HG13	2.04	0.40
3:A:1087:GLU:HA	3:A:1090:LYS:HB2	2.04	0.40
3:A:1095:GLU:HG2	3:A:1099:LYS:HE3	2.02	0.40
3:A:1686:LYS:HA	3:A:1687:PRO:HD3	1.96	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	C	74/76 (97%)	64 (86%)	10 (14%)	0	100	100
2	D	72/76 (95%)	64 (89%)	8 (11%)	0	100	100
3	A	1108/1609 (69%)	1045 (94%)	63 (6%)	0	100	100
All	All	1254/1761 (71%)	1173 (94%)	81 (6%)	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	C	67/68 (98%)	67 (100%)	0	100	100
2	D	66/68 (97%)	66 (100%)	0	100	100
3	A	993/1412 (70%)	993 (100%)	0	100	100
All	All	1126/1548 (73%)	1126 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
3	A	454	GLN
3	A	580	ASN
3	A	587	ASN
3	A	613	HIS
3	A	651	ASN
3	A	681	ASN
3	A	707	ASN
3	A	856	HIS
3	A	881	HIS
3	A	1220	HIS
3	A	1505	ASN
3	A	1515	GLN
3	A	1643	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
3	A	1689	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

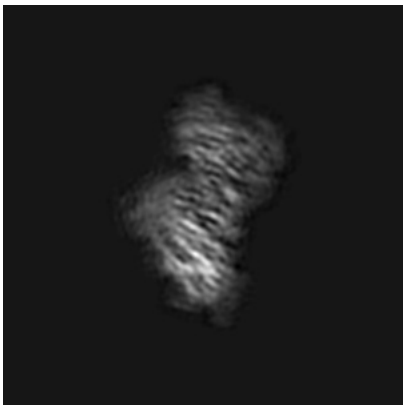
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-62292. These allow visual inspection of the internal detail of the map and identification of artifacts.

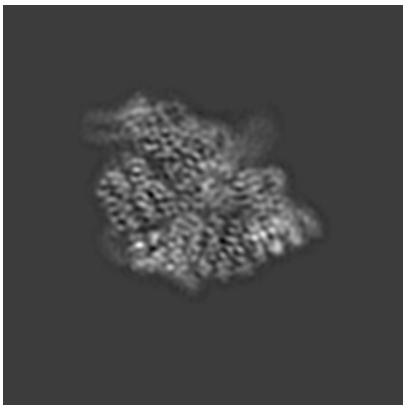
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

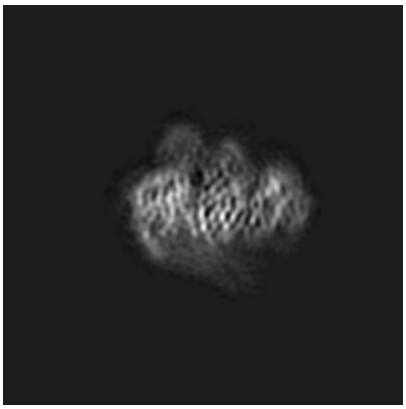
6.1.1 Primary map



X

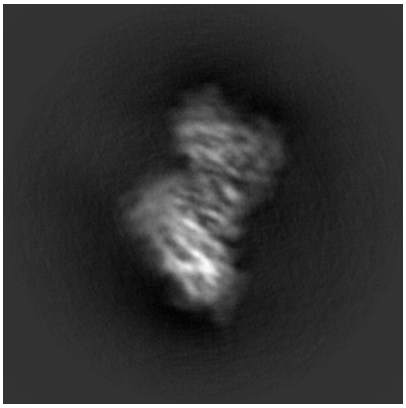


Y

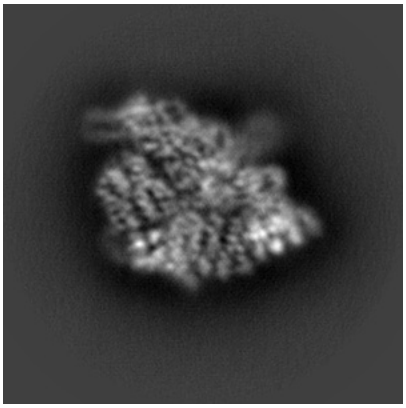


Z

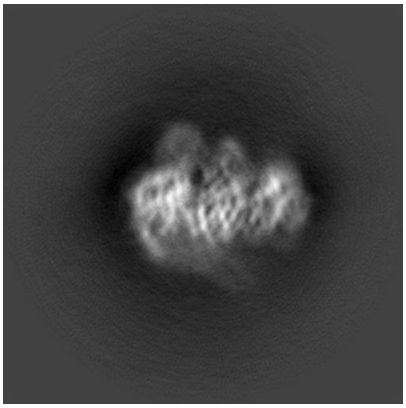
6.1.2 Raw map



X



Y

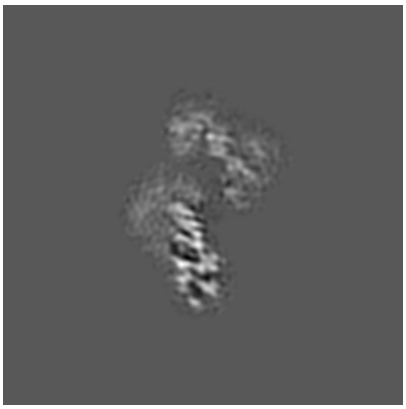


Z

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

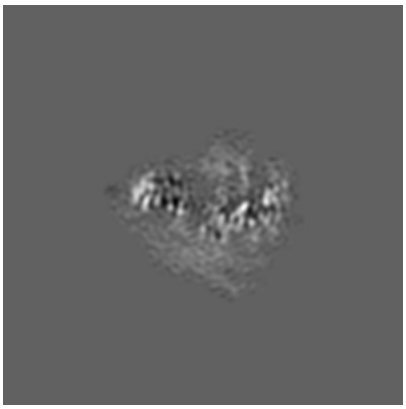
6.2 Central slices (i)

6.2.1 Primary map



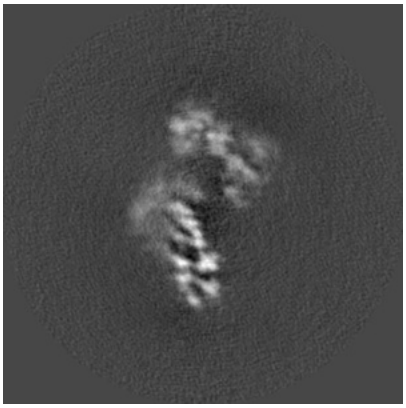
X Index: 128

Y Index: 128

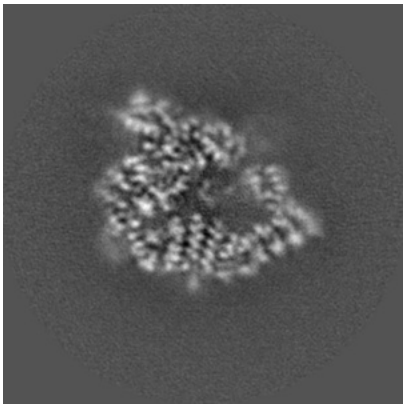


Z Index: 128

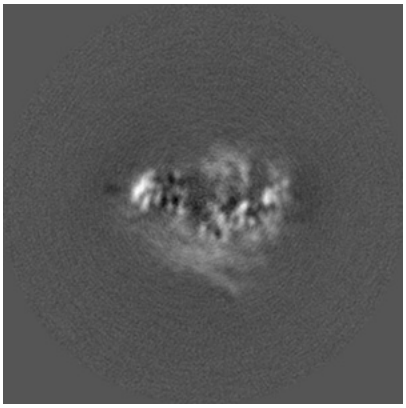
6.2.2 Raw map



X Index: 128



Y Index: 128



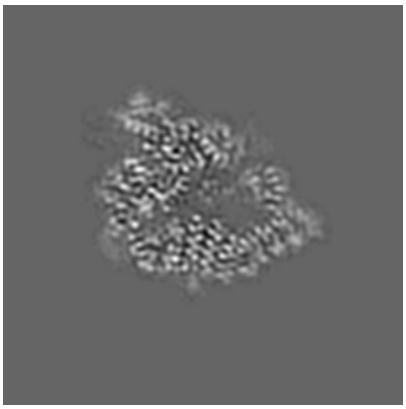
Z Index: 128

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

6.3 Largest variance slices (i)

6.3.1 Primary map

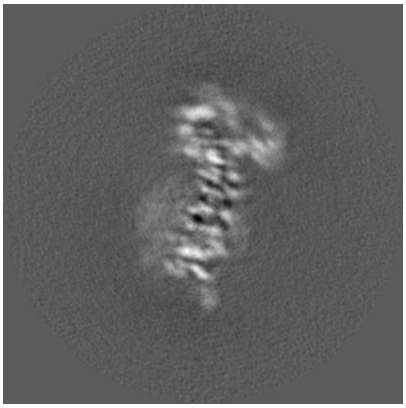
X Index: 106



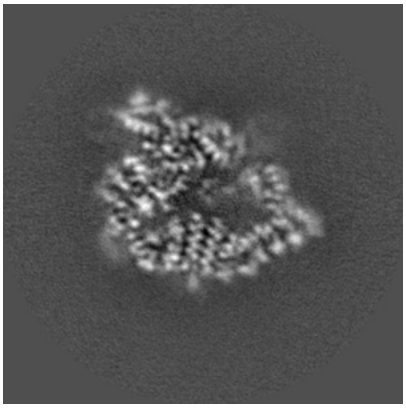
Y Index: 129

Z Index: 88

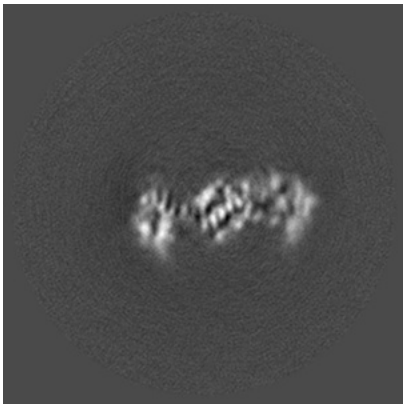
6.3.2 Raw map



X Index: 107



Y Index: 129

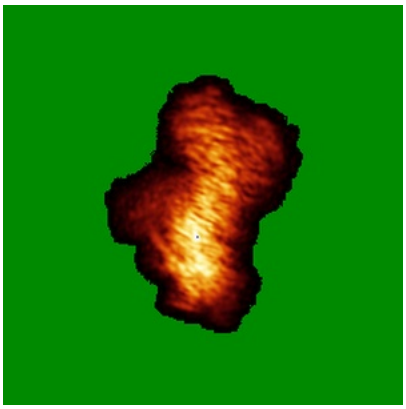


Z Index: 88

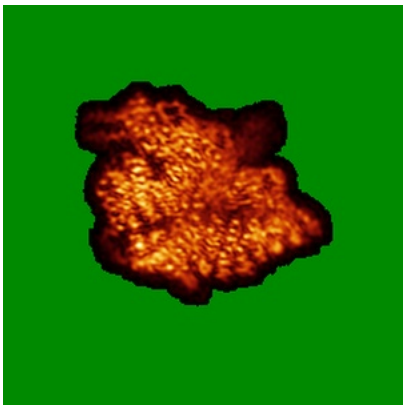
The images above show the largest variance slices of the map in three orthogonal directions.

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

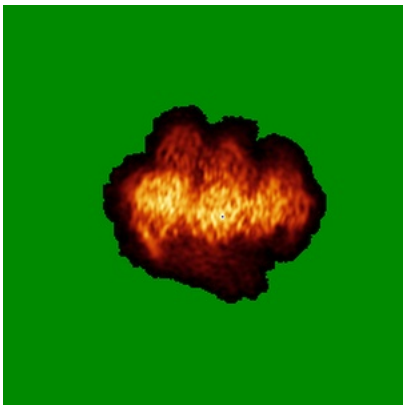
6.4.1 Primary map



X

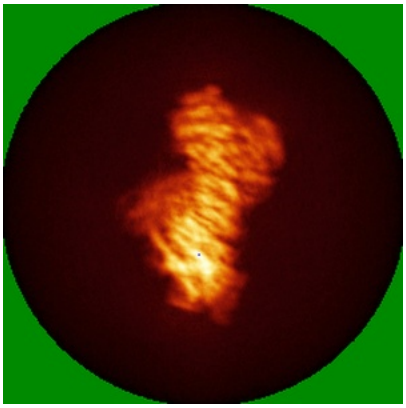


Y

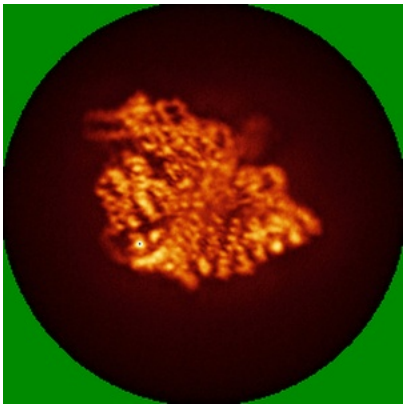


Z

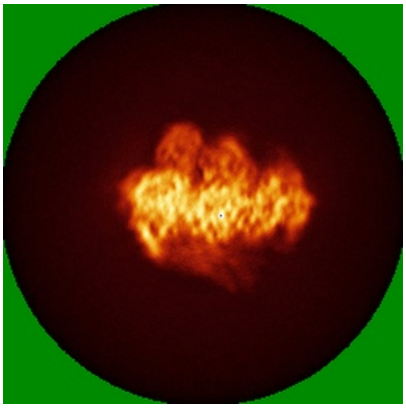
6.4.2 Raw map



X



Y

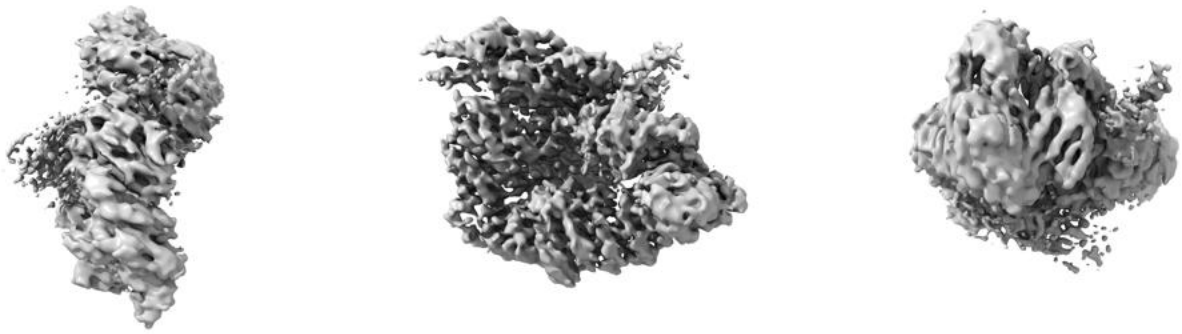


Z

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)

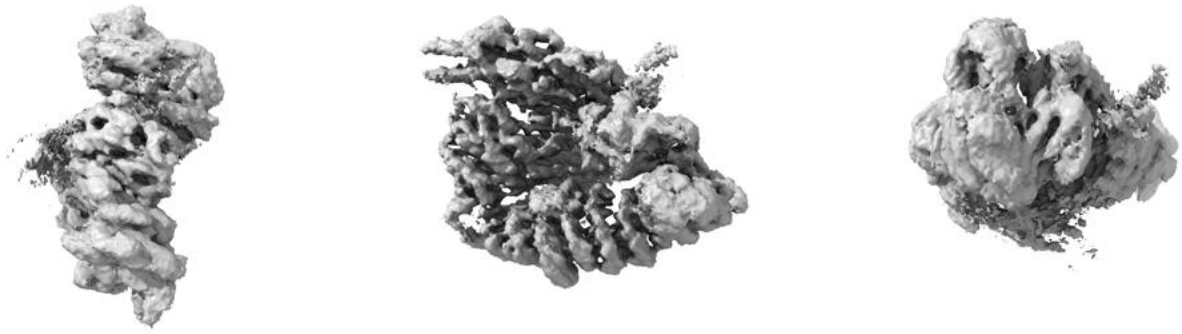
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.005. 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.

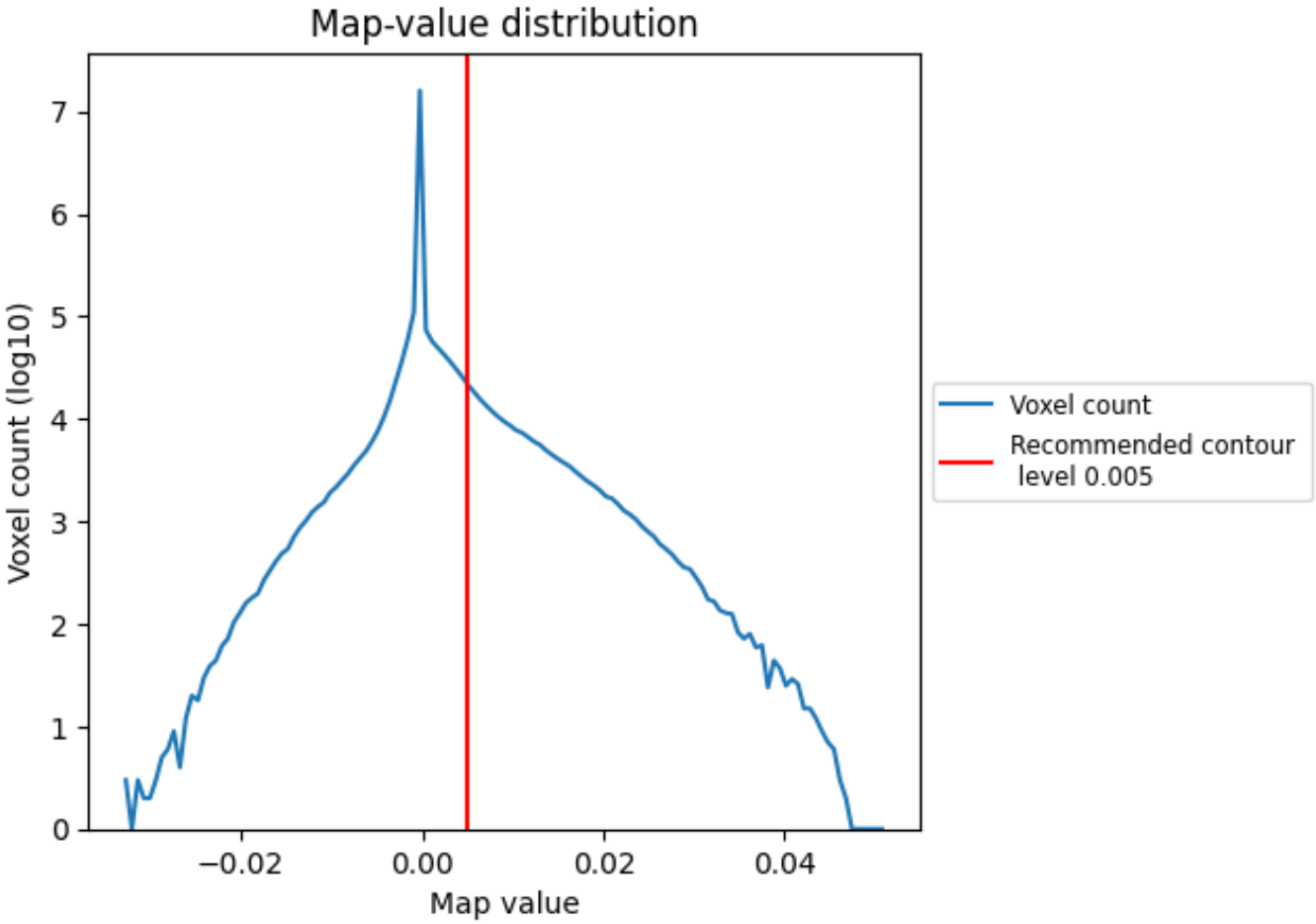
6.6 Mask visualisation (i)

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

7 Map analysis

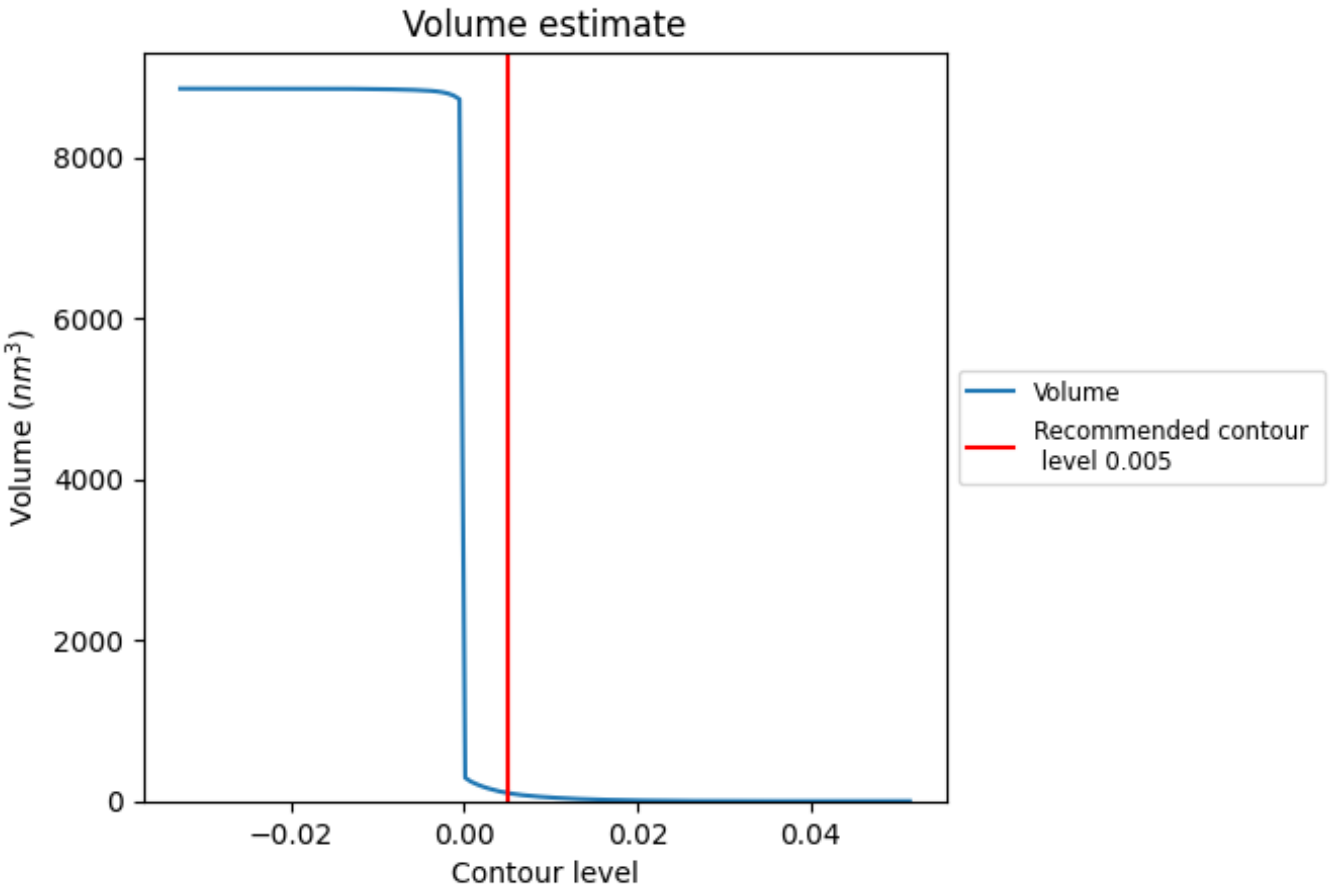
This section contains the results of statistical analysis of the map.

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.

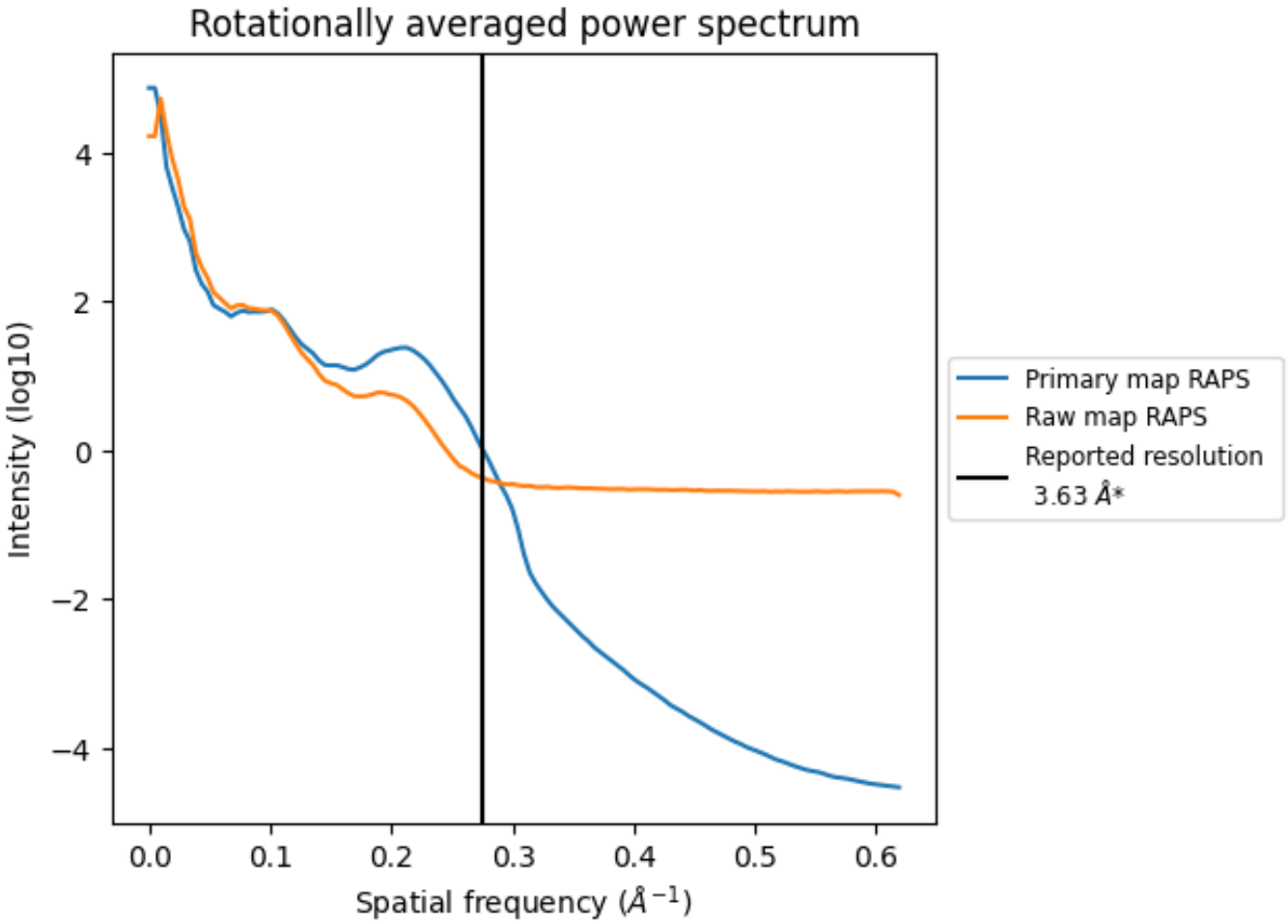
7.2 Volume estimate (i)



The volume at the recommended contour level is 102 nm^3; this corresponds to an approximate mass of 92 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)

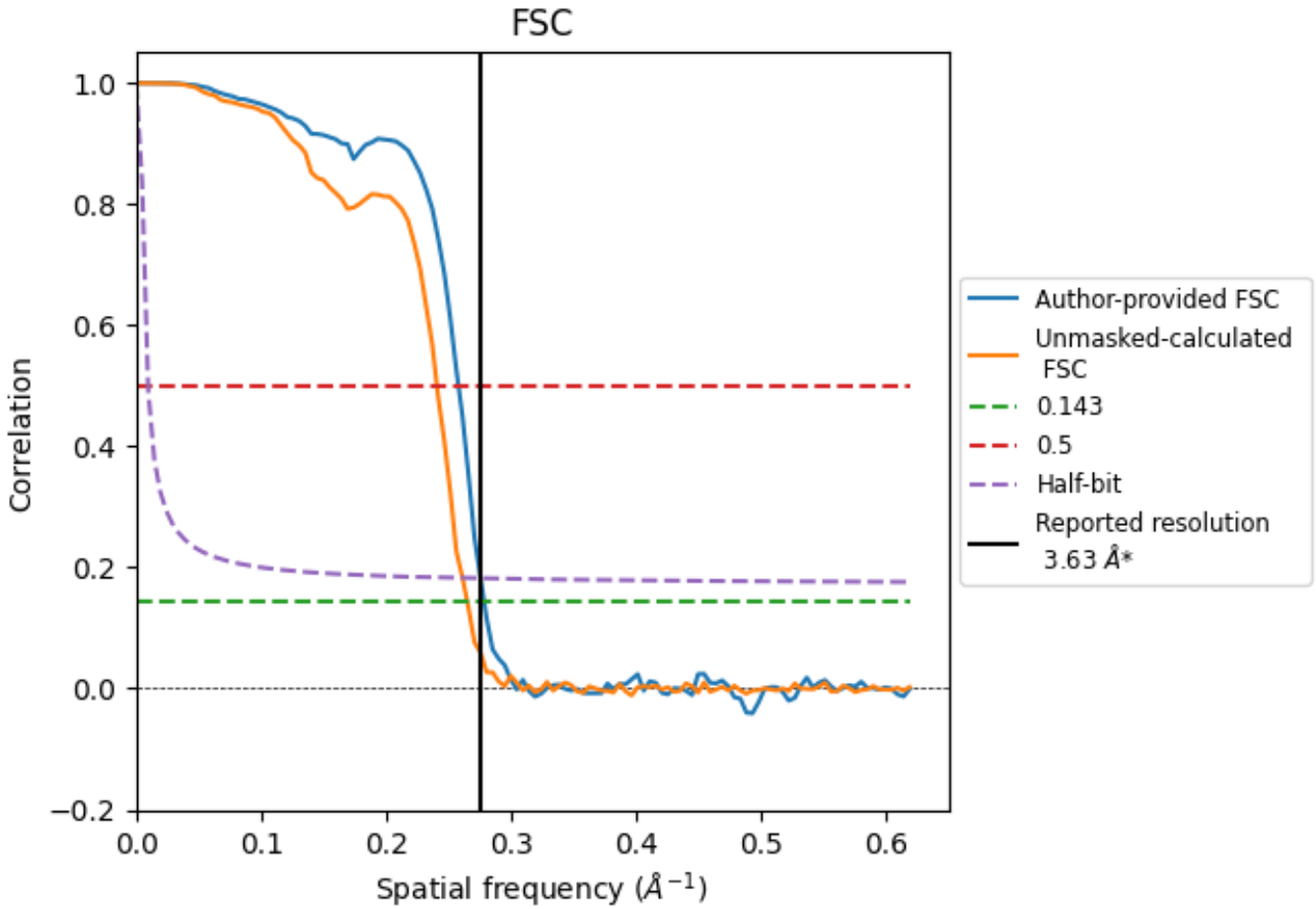


*Reported resolution corresponds to spatial frequency of 0.275 Å^{-1}

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 0.275 Å^{-1}

8.2 Resolution estimates (i)

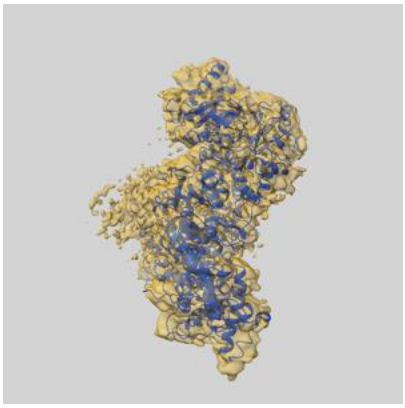
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.63	-	-
Author-provided FSC curve	3.59	3.88	3.63
Unmasked-calculated*	3.77	4.15	3.83

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

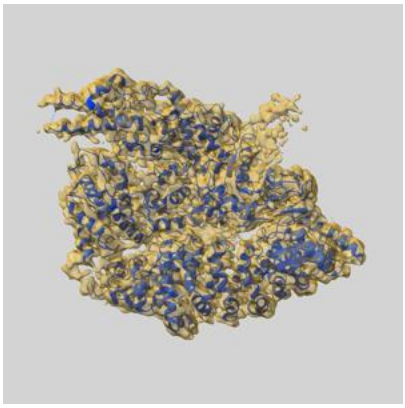
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-62292 and PDB model 9KEN. Per-residue inclusion information can be found in section 3 on page 4.

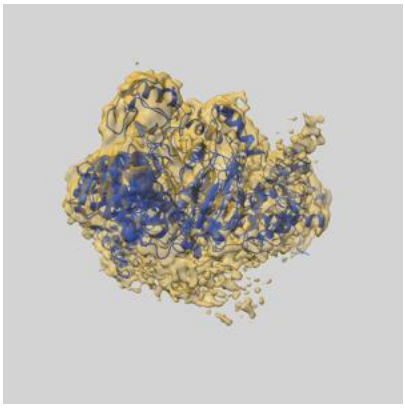
9.1 Map-model overlay



X



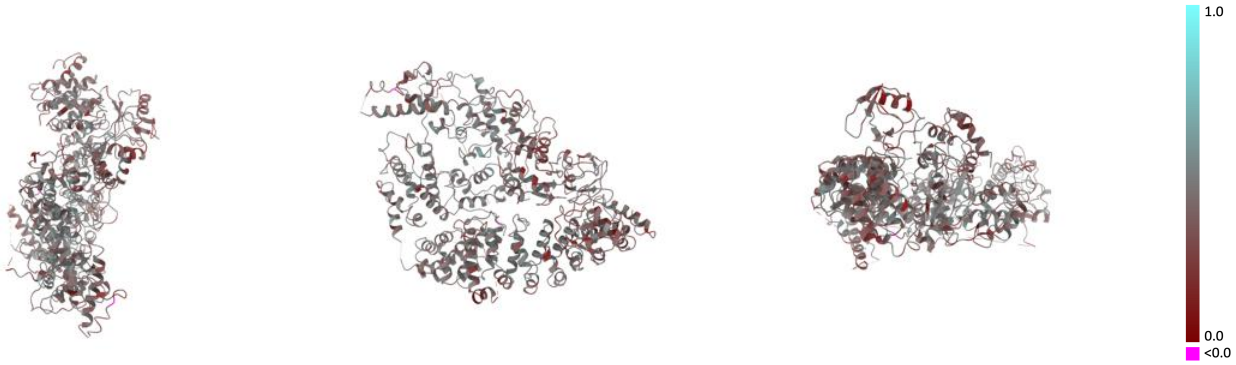
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.005 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.

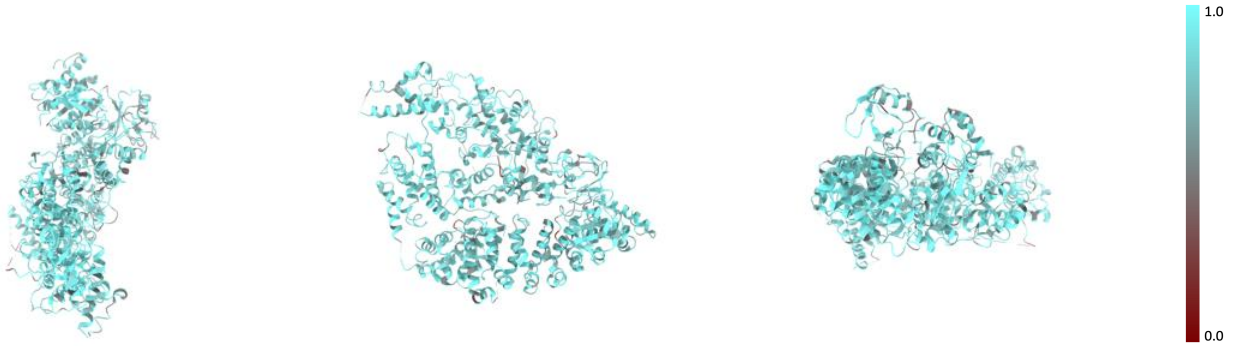
9.2 Q-score mapped to coordinate model (i)



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.

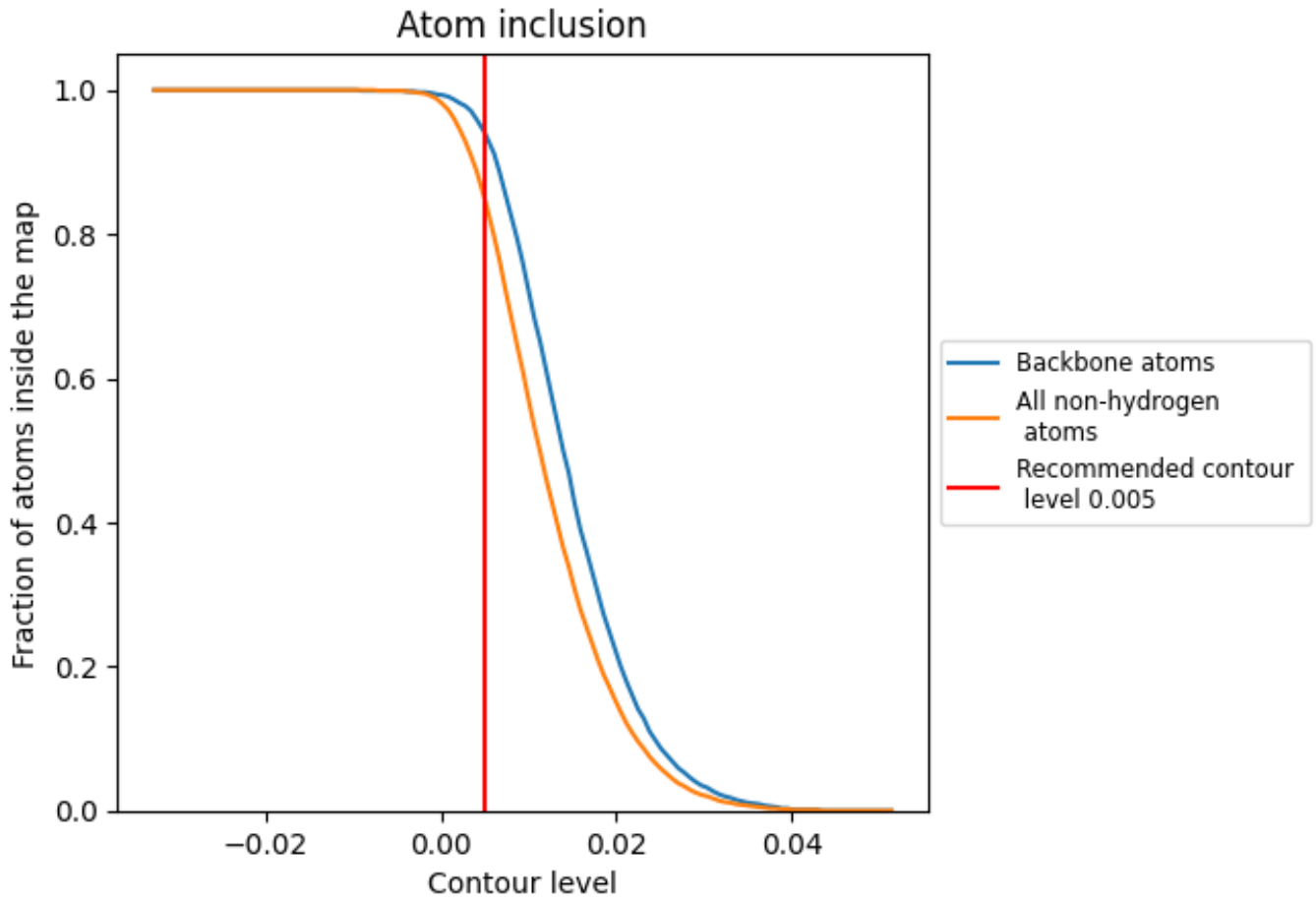
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.005).

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 (0.005) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8490	0.4080
A	0.8550	0.4140
C	0.7600	0.3350
D	0.8430	0.3970