



Full wwPDB EM Validation Report ⓘ

Mar 9, 2026 – 08:07 PM UTC

PDB ID : 9DW8 / pdb_00009dw8
EMDB ID : EMD-47238
Title : Dephosphorylated (E1371Q)CFTR in complex with PKA-C
Authors : Fiedorczuk, K.; Chen, J.; Csanady, L.
Deposited on : 2024-10-08
Resolution : 3.50 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.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

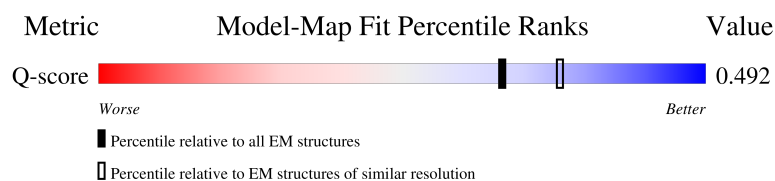
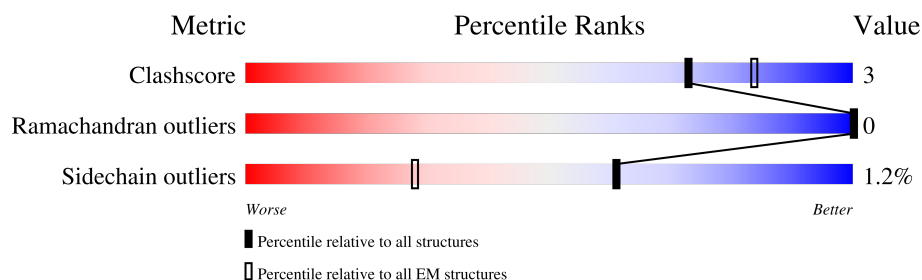
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.50 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.



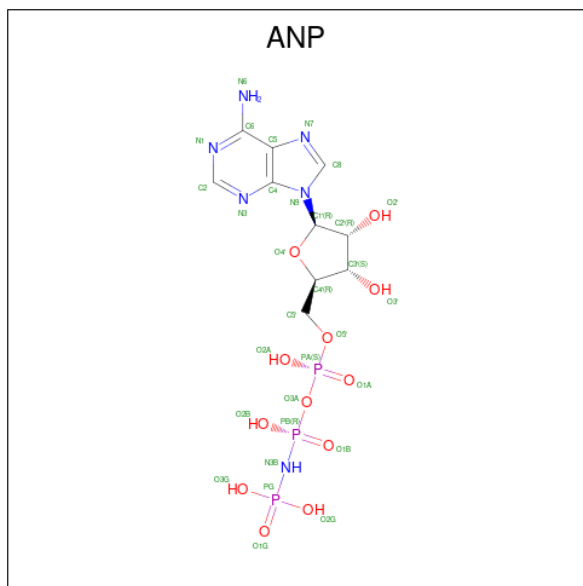
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	13950 (3.00 - 4.00)

Mol	Chain	Residues	Atoms					AltConf
3	A	1	Total	C	N	O	P	0
			39	18	5	13	3	
3	A	1	Total	C	N	O	P	0
			39	18	5	13	3	

- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
4	A	2	Total	Mg	0
			2	2	
4	G	2	Total	Mg	0
			2	2	

- Molecule 5 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (CCD ID: ANP) (formula: C₁₀H₁₇N₆O₁₂P₃).



3 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	38413	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 ($e^-/\text{\AA}^2$)	68.6	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.277	Depositor
Minimum map value	-0.725	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.035	Depositor
Recommended contour level	0.27	Depositor
Map size (Å)	297.44, 297.44, 297.44	wwPDB
Map dimensions	440, 440, 440	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.676, 0.676, 0.676	Depositor

4 Model quality [i](#)

4.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: B44, MG, ANP, 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	0.15	0/9648	0.37	0/13042
2	G	0.15	0/2512	0.36	0/3395
All	All	0.15	0/12160	0.37	0/16437

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

4.2 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	9452	0	9722	65	0
2	G	2461	0	2386	14	0
3	A	78	0	40	0	0
4	A	2	0	0	0	0
4	G	2	0	0	0	0
5	G	31	0	13	0	0
All	All	12026	0	12161	79	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 3.

All (79) 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:1356:LEU:HD21	1:A:1387:THR:HG21	1.72	0.70
1:A:1289:ILE:HD12	1:A:1369:LEU:HG	1.79	0.64
1:A:1401:GLU:O	1:A:1407:MET:CE	2.48	0.61
2:G:95:ILE:O	2:G:99:VAL:HG23	2.00	0.61
1:A:1105:MET:O	1:A:1109:ILE:HG23	2.02	0.59
1:A:1401:GLU:O	1:A:1407:MET:HE3	2.03	0.59
1:A:111:PRO:HA	1:A:117:ARG:HH22	1.67	0.58
1:A:1050:PRO:HA	1:A:1053:THR:HG22	1.84	0.58
2:G:101:PHE:HB3	2:G:104:LEU:HD13	1.85	0.56
1:A:160:ILE:HD11	1:A:371:ILE:HG12	1.88	0.55
1:A:1212:VAL:HG12	1:A:1267:ILE:HG12	1.89	0.55
1:A:101:LEU:HD22	1:A:123:LEU:HD12	1.87	0.55
1:A:824:ILE:HG23	1:A:828:ASP:HB2	1.88	0.54
2:G:302:ASP:OD1	2:G:302:ASP:N	2.41	0.54
1:A:1022:VAL:HB	1:A:1140:MET:HE3	1.89	0.54
1:A:1215:LEU:HD23	1:A:1230:ILE:HD11	1.93	0.51
1:A:293:LEU:HA	1:A:296:THR:HG22	1.93	0.51
1:A:274:ALA:HB1	1:A:1288:VAL:HG21	1.91	0.51
1:A:1376:LEU:HD11	1:A:1384:ILE:HD12	1.92	0.51
1:A:96:ALA:HB1	1:A:211:LEU:HD11	1.93	0.50
2:G:50:LEU:HD11	2:G:60:LEU:HB2	1.91	0.50
1:A:147:HIS:CD2	1:A:151:GLN:HE21	2.29	0.50
1:A:1293:VAL:HG11	1:A:1351:LYS:HB3	1.94	0.50
1:A:102:LEU:O	1:A:106:ILE:HD12	2.11	0.50
1:A:108:SER:O	1:A:117:ARG:HD3	2.13	0.48
1:A:1113:ALA:O	1:A:1117:ILE:HG22	2.14	0.48
1:A:1206:SER:OG	1:A:1207:GLY:N	2.46	0.47
1:A:1217:ALA:HB1	1:A:1261:LEU:HD11	1.96	0.47
1:A:513:ASP:OD2	1:A:515:TYR:N	2.48	0.47
1:A:333:LEU:HD12	1:A:336:ILE:HD12	1.97	0.47
1:A:610:LEU:HG	1:A:616:ILE:HD12	1.97	0.47
1:A:1259:ARG:HG2	1:A:1274:TRP:CZ3	2.49	0.47
1:A:401:TRP:CD1	1:A:440:VAL:HG21	2.50	0.47
1:A:929:MET:HG2	1:A:933:ARG:NH2	2.31	0.46
1:A:468:LEU:HD22	1:A:570:LEU:HD22	1.96	0.46
1:A:172:LEU:HD11	1:A:1062:LEU:HD23	1.96	0.46
1:A:1300:PHE:CE1	1:A:1354:MET:HE1	2.51	0.46
1:A:929:MET:HG2	1:A:933:ARG:HH21	1.80	0.46
1:A:1044:GLU:HG3	1:A:1089:TRP:HE3	1.81	0.45
1:A:1367:LEU:HB2	1:A:1397:VAL:HG12	1.98	0.45
1:A:1034:LEU:O	1:A:1038:GLN:HG3	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1300:PHE:HE1	1:A:1354:MET:HE1	1.81	0.45
2:G:52:THR:HA	2:G:57:ARG:HA	1.99	0.44
2:G:242:ASP:OD2	2:G:243:GLN:NE2	2.46	0.44
1:A:441:LEU:HD22	1:A:444:ILE:HG13	2.01	0.43
2:G:139:PHE:HB3	2:G:143:HIS:HB3	2.00	0.43
1:A:1388:LEU:HA	1:A:1392:PHE:CE2	2.53	0.43
2:G:104:LEU:HD11	2:G:154:THR:HG23	2.00	0.43
1:A:1030:ARG:HG3	1:A:1151:ILE:HD11	2.01	0.42
2:G:78:GLN:H	2:G:78:GLN:CD	2.26	0.42
1:A:192:ASP:OD1	1:A:192:ASP:N	2.53	0.42
1:A:60:GLU:OE1	1:A:64:LYS:HG3	2.19	0.42
1:A:131:PHE:HB3	1:A:1108:VAL:HG22	2.01	0.42
2:G:303:TRP:HA	2:G:306:ILE:HG22	2.02	0.42
1:A:211:LEU:HD23	1:A:346:LEU:HB2	2.02	0.42
1:A:1239:ARG:HG3	1:A:1397:VAL:HG22	2.02	0.42
1:A:1267:ILE:HD12	1:A:1274:TRP:CZ3	2.54	0.42
1:A:1372:PRO:HD2	1:A:1401:GLU:HG3	2.01	0.42
1:A:847:ASN:OD1	1:A:847:ASN:C	2.63	0.41
1:A:997:LEU:HD13	1:A:997:LEU:HA	1.88	0.41
1:A:1055:LEU:HD12	1:A:1055:LEU:HA	1.89	0.41
1:A:21:ARG:N	1:A:22:PRO:HD2	2.34	0.41
2:G:22:LYS:O	2:G:22:LYS:HD3	2.20	0.41
1:A:177:ILE:HD13	1:A:1059:LEU:HD12	2.01	0.41
2:G:96:LEU:HD23	2:G:107:LEU:HD12	2.02	0.41
2:G:130:PHE:O	2:G:134:ARG:HG2	2.19	0.41
1:A:80:ARG:HE	1:A:148:ILE:HD11	1.84	0.41
1:A:319:PHE:CD2	1:A:319:PHE:C	2.99	0.41
1:A:1208:GLY:HA2	1:A:1366:ILE:HD11	2.02	0.41
1:A:604:THR:HG21	1:A:609:HIS:HB2	2.04	0.40
2:G:45:GLU:HG3	2:G:64:MET:HE1	2.03	0.40
1:A:595:MET:HE2	1:A:600:ARG:HD2	2.03	0.40
1:A:1376:LEU:H	1:A:1376:LEU:HD23	1.86	0.40
1:A:212:MET:HE3	1:A:227:LEU:HD13	2.03	0.40
1:A:319:PHE:CZ	1:A:323:LEU:HD22	2.56	0.40
1:A:214:LEU:O	1:A:217:GLU:HB3	2.22	0.40
1:A:1012:GLN:N	1:A:1012:GLN:OE1	2.54	0.40
1:A:1133:LEU:HD23	1:A:1133:LEU:HA	1.92	0.40
1:A:1232:PHE:CE2	1:A:1234:ILE:HD11	2.56	0.40

There are no symmetry-related clashes.

4.3 Torsion angles

4.3.1 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	
2	G	31/351 (9%)	31 (100%)	0	0	100	100

There are no Ramachandran outliers to report.

4.3.2 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	1031/800 (129%)	1020 (99%)	11 (1%)	65	74
2	G	246/305 (81%)	242 (98%)	4 (2%)	55	70
All	All	1277/1105 (116%)	1262 (99%)	15 (1%)	61	73

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	125	ILE
1	A	174	LYS
1	A	192	ASP
1	A	195	LEU
1	A	214	LEU
1	A	396	ASN
1	A	586	ILE
1	A	600	ARG
1	A	828	ASP
1	A	1270	ASP
1	A	1376	LEU

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Mol	Chain	Res	Type
2	G	78	GLN
2	G	80	VAL
2	G	210	ILE
2	G	282	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	98	GLN
1	A	151	GLN
1	A	268	ASN
1	A	856	HIS
1	A	1229	ASN
1	A	1281	GLN
1	A	1291	GLN
1	A	1348	HIS
1	A	1375	HIS
2	G	69	HIS
2	G	78	GLN
2	G	172	ASN
2	G	246	GLN

4.3.3 RNA ⓘ

There are no RNA molecules in this entry.

4.4 Non-standard residues in protein, DNA, RNA chains ⓘ

1 non-standard protein/DNA/RNA residue is modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
2	TPO	G	198	2	8,10,11	2.58	1 (12%)	10,14,16	1.32	1 (10%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	TPO	G	198	2	-	2/9/11/13	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	198	TPO	P-OG1	7.12	1.72	1.59

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	198	TPO	OG1-P-O1P	-2.38	100.86	109.33

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	G	198	TPO	CB-OG1-P-O3P
2	G	198	TPO	O-C-CA-CB

There are no ring outliers.

No monomer is involved in short contacts.

4.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

4.6 Ligand geometry [i](#)

Of 7 ligands modelled in this entry, 4 are monoatomic - leaving 3 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the

expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
5	ANP	G	403	4	33,33,33	2.79	13 (39%)	45,52,52	2.67	12 (26%)
3	B44	A	1502	4	41,42,42	3.42	19 (46%)	59,63,63	2.22	13 (22%)
3	B44	A	1501	4	41,42,42	3.43	19 (46%)	59,63,63	2.24	11 (18%)

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
5	ANP	G	403	4	-	3/18/38/38	0/3/3/3
3	B44	A	1502	4	-	8/28/44/44	0/4/4/4
3	B44	A	1501	4	-	5/28/44/44	0/4/4/4

All (51) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1502	B44	C17-C18	8.33	1.53	1.38
3	A	1501	B44	C17-C18	8.33	1.53	1.38
3	A	1501	B44	C14-C12	7.43	1.53	1.38
3	A	1502	B44	C14-C12	7.43	1.53	1.38
3	A	1501	B44	C8-N7	7.25	1.52	1.39
3	A	1502	B44	C8-N7	7.12	1.52	1.39
5	G	403	ANP	C5-N7	6.98	1.51	1.39
3	A	1501	B44	C9-N6	6.98	1.45	1.34
3	A	1502	B44	C9-N6	6.92	1.45	1.34
3	A	1501	B44	C15-C16	6.78	1.53	1.38
3	A	1502	B44	C15-C16	6.65	1.52	1.38
5	G	403	ANP	PA-O3A	5.66	1.65	1.59
3	A	1501	B44	C13-N9	-5.62	1.28	1.37
3	A	1502	B44	C13-N9	-5.59	1.28	1.37
5	G	403	ANP	C8-N9	-5.22	1.28	1.37
3	A	1502	B44	P1-O11	4.91	1.64	1.59
3	A	1501	B44	P1-O11	4.77	1.64	1.59
3	A	1501	B44	P2-O12	4.69	1.64	1.59
3	A	1502	B44	P2-O11	4.69	1.64	1.59
5	G	403	ANP	PB-O3A	4.56	1.64	1.59
3	A	1501	B44	P2-O11	4.55	1.64	1.59

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1502	B44	P2-O12	4.51	1.64	1.59
5	G	403	ANP	C6-N6	4.31	1.45	1.34
3	A	1501	B44	C7-N9	-4.24	1.28	1.37
3	A	1502	B44	C7-N9	-4.12	1.29	1.37
5	G	403	ANP	PB-O2B	-4.11	1.45	1.56
3	A	1502	B44	C15-C14	-4.08	1.31	1.38
5	G	403	ANP	C4-N9	-4.07	1.29	1.37
3	A	1501	B44	C15-C14	-4.02	1.32	1.38
5	G	403	ANP	PG-O2G	-3.86	1.46	1.56
5	G	403	ANP	PG-O3G	-3.84	1.46	1.56
3	A	1502	B44	C18-C12	-3.71	1.31	1.38
3	A	1501	B44	C18-C12	-3.69	1.31	1.38
5	G	403	ANP	PB-N3B	2.84	1.70	1.63
5	G	403	ANP	PG-N3B	2.79	1.70	1.63
3	A	1502	B44	C16-C17	-2.75	1.32	1.38
3	A	1501	B44	C16-C17	-2.73	1.32	1.38
3	A	1502	B44	P3-O13	-2.36	1.46	1.54
3	A	1501	B44	P3-O13	-2.36	1.46	1.54
3	A	1502	B44	C8-C7	2.32	1.43	1.39
3	A	1501	B44	C7-N3	-2.29	1.30	1.34
3	A	1501	B44	P3-O7	-2.28	1.46	1.54
3	A	1502	B44	C7-N3	-2.28	1.30	1.34
3	A	1501	B44	C8-C7	2.27	1.43	1.39
3	A	1502	B44	P3-O7	-2.27	1.46	1.54
3	A	1502	B44	P2-O6	-2.08	1.45	1.55
5	G	403	ANP	C5-C4	2.04	1.42	1.39
5	G	403	ANP	PA-O2A	-2.03	1.45	1.55
3	A	1501	B44	C3-C4	-2.01	1.47	1.53
3	A	1501	B44	P2-O6	-2.01	1.46	1.55
3	A	1502	B44	P1-O8	-2.01	1.46	1.55

All (36) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	G	403	ANP	C4-N9-C8	13.05	119.44	105.74
3	A	1501	B44	C7-N9-C13	12.54	118.90	105.74
3	A	1502	B44	C7-N9-C13	12.46	118.83	105.74
5	G	403	ANP	O2B-PB-O1B	-4.23	100.79	109.87
5	G	403	ANP	C5-C4-N9	-4.20	101.23	105.81
3	A	1502	B44	C8-C7-N9	-4.19	101.25	105.81
3	A	1501	B44	C8-C7-N9	-4.04	101.40	105.81
3	A	1502	B44	N3-C7-N9	3.71	133.48	127.17

Continued on next page...

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	G	403	ANP	N3-C4-N9	3.65	133.38	127.17
5	G	403	ANP	O2G-PG-O1G	-3.58	104.47	113.45
5	G	403	ANP	O3G-PG-O1G	-3.57	104.51	113.45
3	A	1501	B44	N3-C7-N9	3.54	133.19	127.17
5	G	403	ANP	C1'-N9-C8	-3.05	120.33	127.09
3	A	1501	B44	C7-N9-C5	-3.04	119.51	126.63
3	A	1501	B44	C9-C8-N7	2.96	135.66	132.43
3	A	1502	B44	C5-N9-C13	-2.95	120.54	127.09
3	A	1501	B44	O7-P3-O12	2.94	114.51	104.64
3	A	1502	B44	O7-P3-O12	2.92	114.43	104.64
5	G	403	ANP	N9-C8-N7	-2.78	109.98	113.94
5	G	403	ANP	C3'-C2'-C1'	2.76	106.69	101.46
5	G	403	ANP	C4-N9-C1'	-2.74	120.23	126.63
3	A	1502	B44	O13-P3-O12	2.61	113.40	104.64
3	A	1502	B44	C9-C8-N7	2.57	135.23	132.43
3	A	1502	B44	O6-P2-O9	-2.57	100.51	112.44
3	A	1502	B44	C7-N9-C5	-2.57	120.63	126.63
3	A	1501	B44	O13-P3-O12	2.54	113.16	104.64
3	A	1501	B44	C5-N9-C13	-2.48	121.59	127.09
3	A	1502	B44	O8-P1-O5	-2.47	100.96	112.44
3	A	1501	B44	O8-P1-O5	-2.44	101.07	112.44
3	A	1501	B44	O6-P2-O9	-2.43	101.14	112.44
5	G	403	ANP	O2A-PA-O1A	-2.35	101.53	112.44
3	A	1502	B44	C3-C4-C5	2.26	105.73	101.46
3	A	1501	B44	C7-C8-N7	-2.26	108.00	110.58
5	G	403	ANP	O2B-PB-O3A	2.20	111.99	104.64
3	A	1502	B44	C4-C3-C2	2.17	106.80	102.61
3	A	1502	B44	C7-C8-N7	-2.10	108.18	110.58

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1502	B44	C1-O1-P1-O11
3	A	1502	B44	C1-O1-P1-O8
5	G	403	ANP	PG-N3B-PB-O1B
5	G	403	ANP	PG-N3B-PB-O3A
3	A	1501	B44	C8-C9-N6-C10
3	A	1501	B44	N1-C9-N6-C10
3	A	1502	B44	C10-C11-C12-C18
5	G	403	ANP	PB-O3A-PA-O1A
3	A	1502	B44	C10-C11-C12-C14

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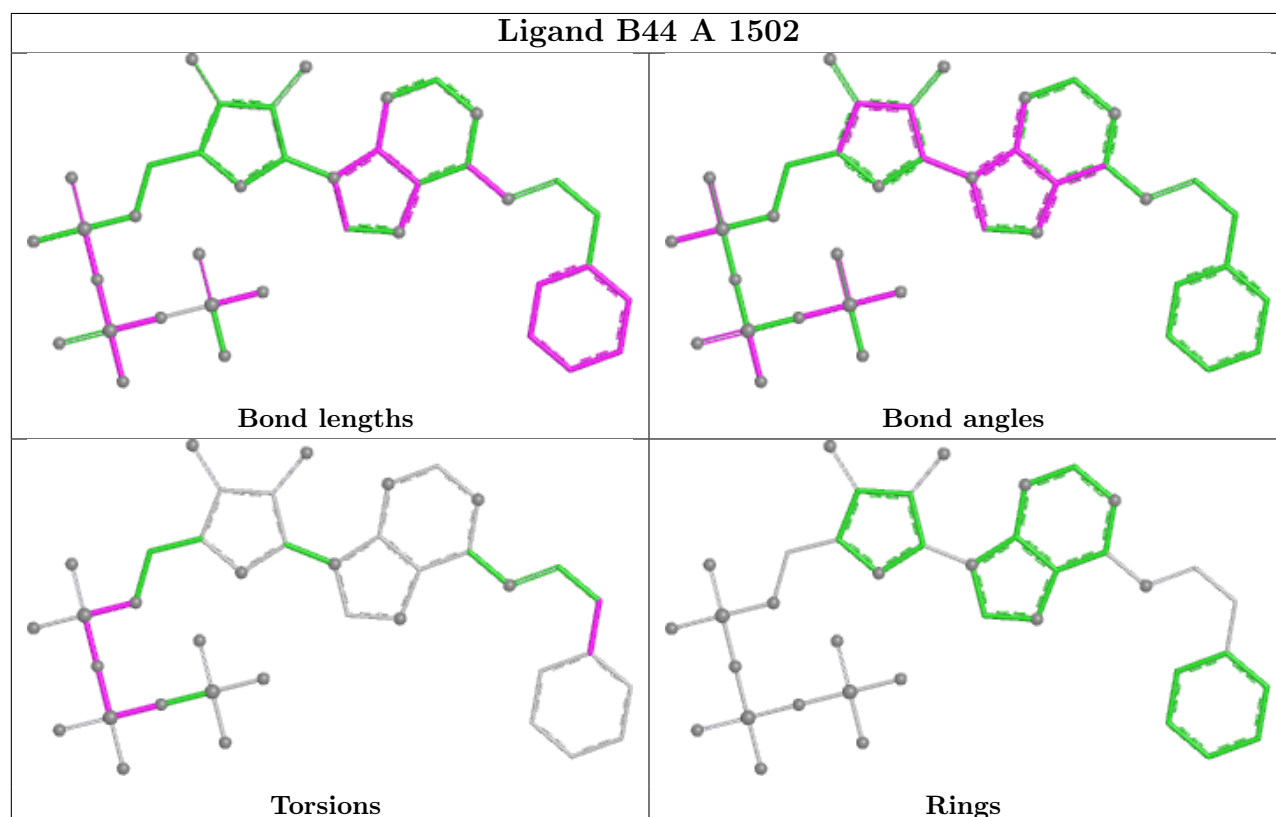
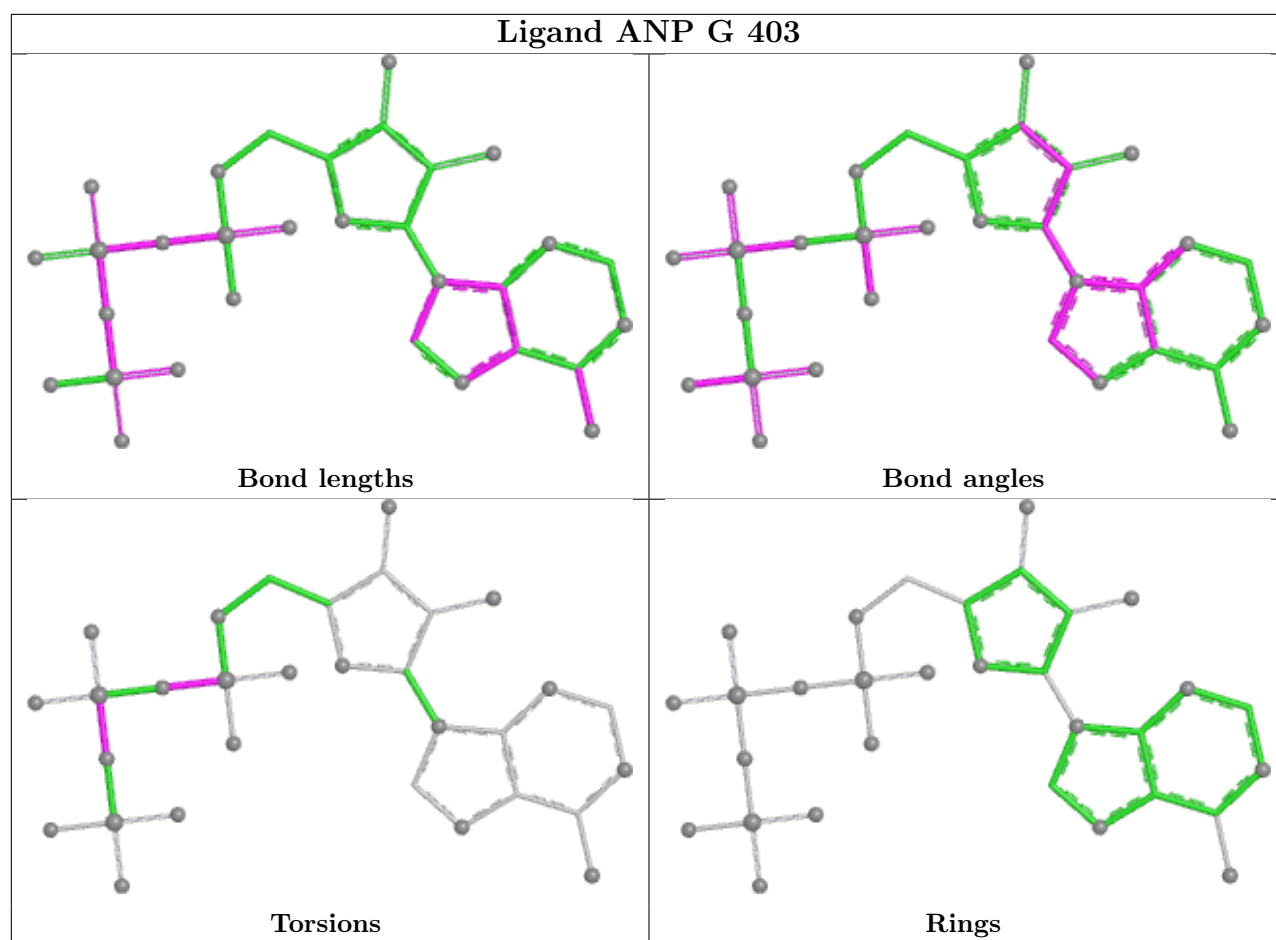
Continued from previous page...

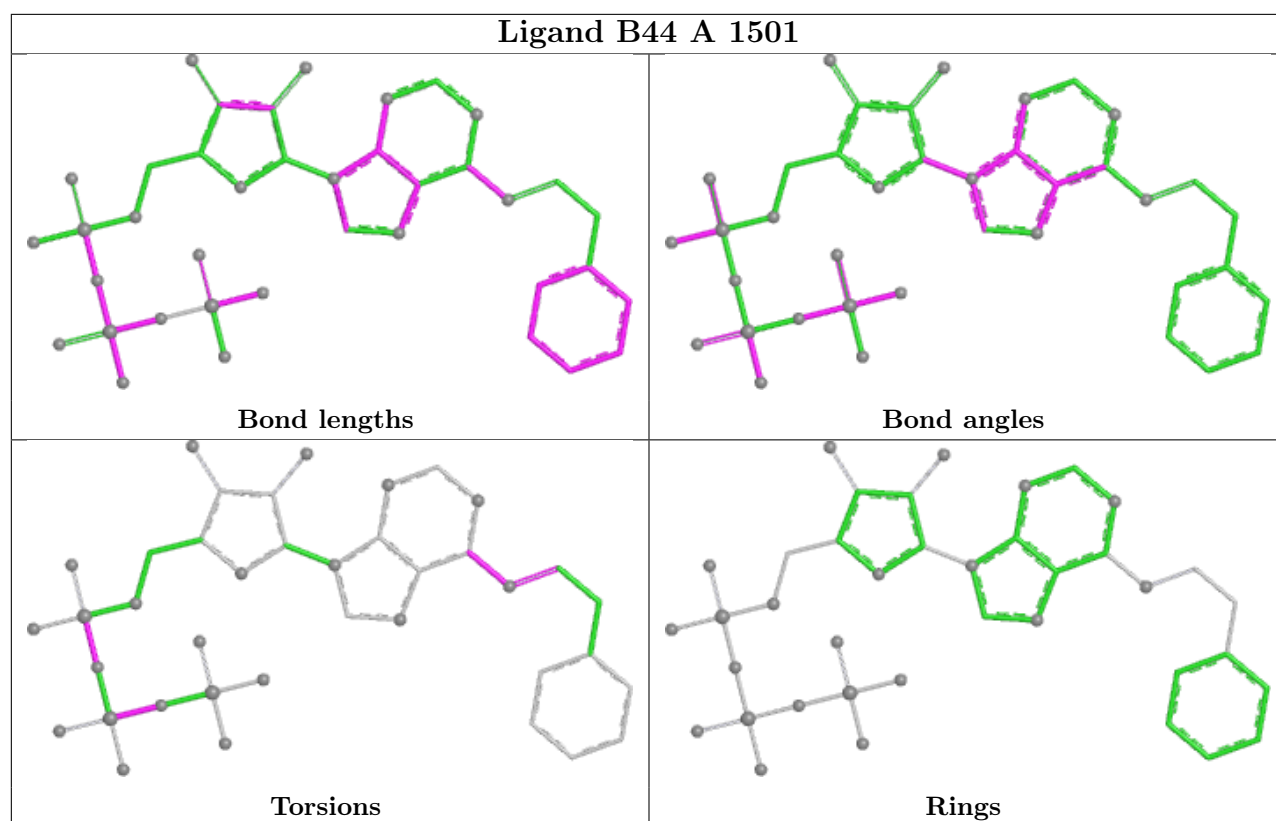
Mol	Chain	Res	Type	Atoms
3	A	1502	B44	P3-O12-P2-O9
3	A	1502	B44	C1-O1-P1-O5
3	A	1502	B44	P2-O11-P1-O5
3	A	1501	B44	C11-C10-N6-C9
3	A	1501	B44	P3-O12-P2-O6
3	A	1501	B44	P2-O11-P1-O8
3	A	1502	B44	P1-O11-P2-O6

There are no ring outliers.

No monomer is involved in short contacts.

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





4.7 Other polymers [i](#)

There are no such residues in this entry.

4.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

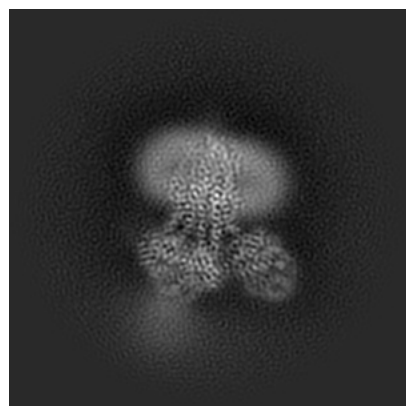
5 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-47238. These allow visual inspection of the internal detail of the map and identification of artifacts.

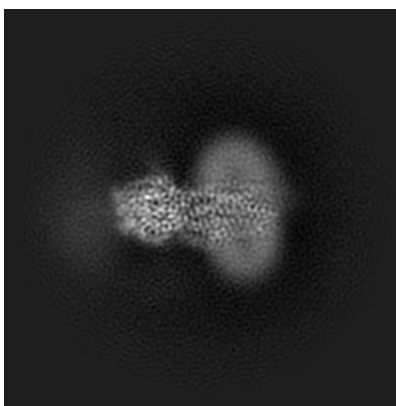
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

5.1 Orthogonal projections [i](#)

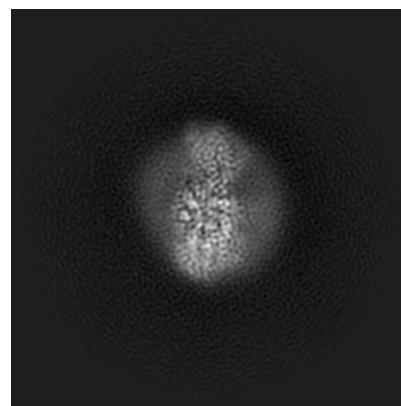
5.1.1 Primary map



X

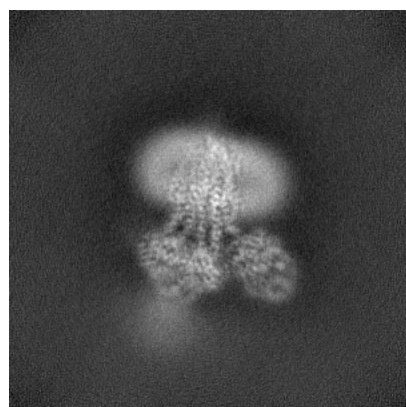


Y

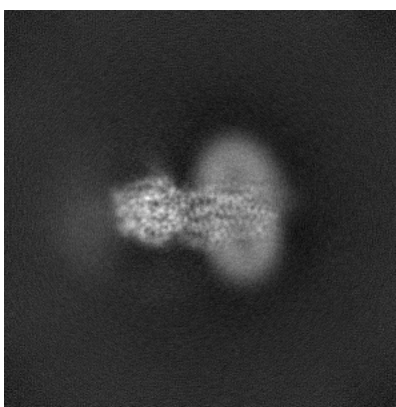


Z

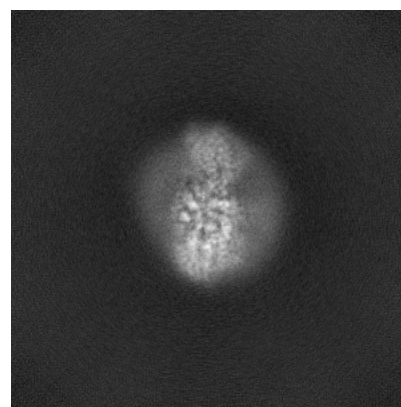
5.1.2 Raw map



X



Y

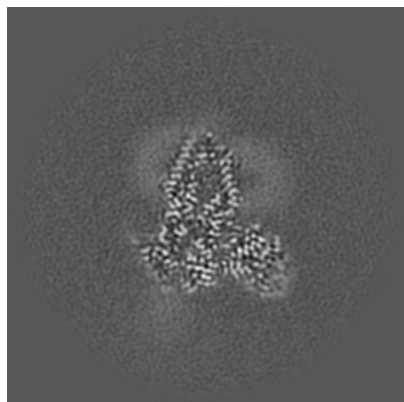


Z

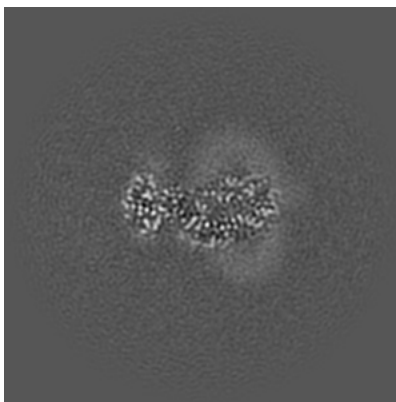
The images above show the map projected in three orthogonal directions.

5.2 Central slices [i](#)

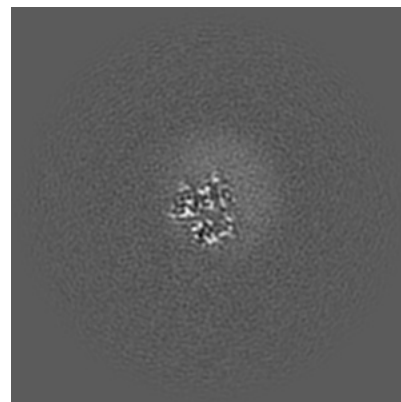
5.2.1 Primary map



X Index: 220

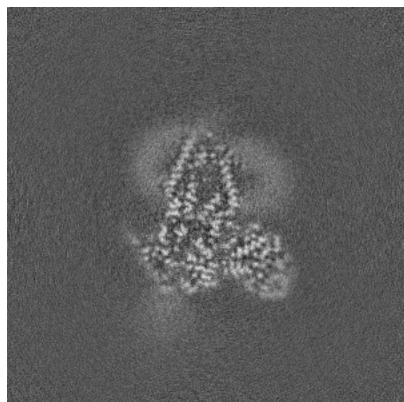


Y Index: 220

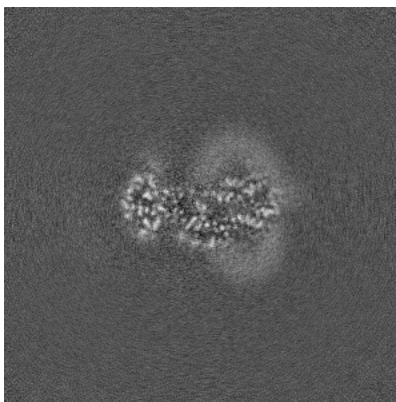


Z Index: 220

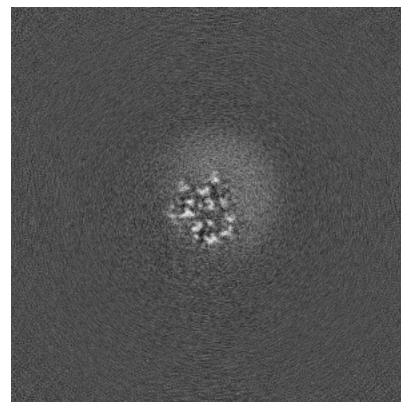
5.2.2 Raw map



X Index: 220



Y Index: 220

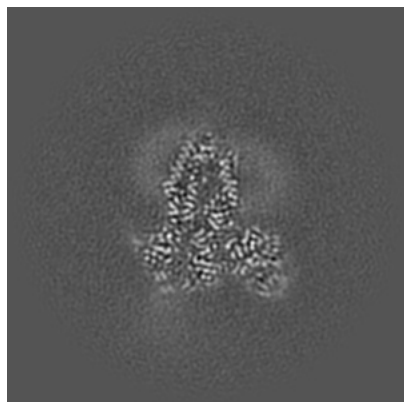


Z Index: 220

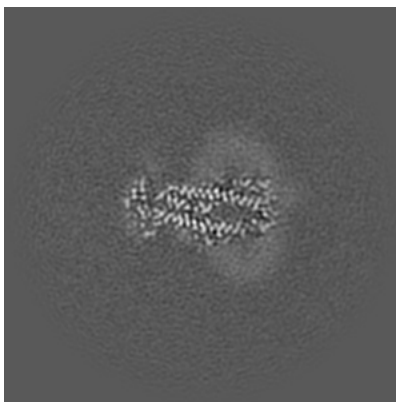
The images above show central slices of the map in three orthogonal directions.

5.3 Largest variance slices [i](#)

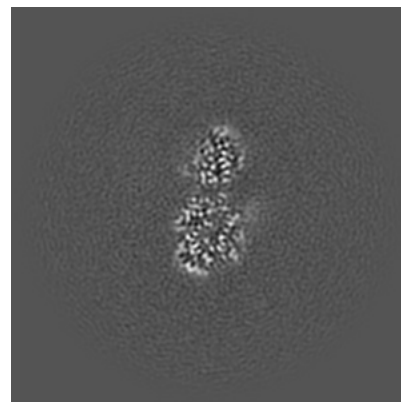
5.3.1 Primary map



X Index: 218

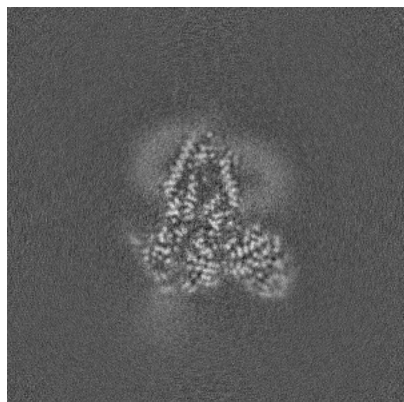


Y Index: 226

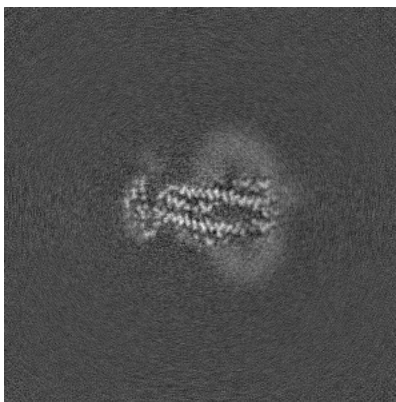


Z Index: 168

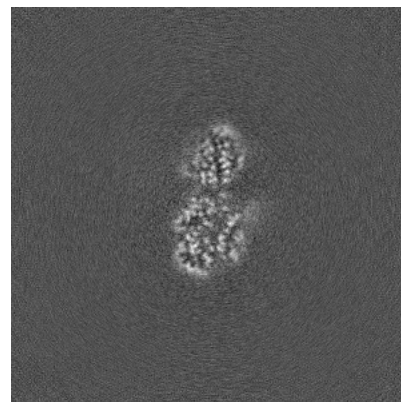
5.3.2 Raw map



X Index: 219



Y Index: 226

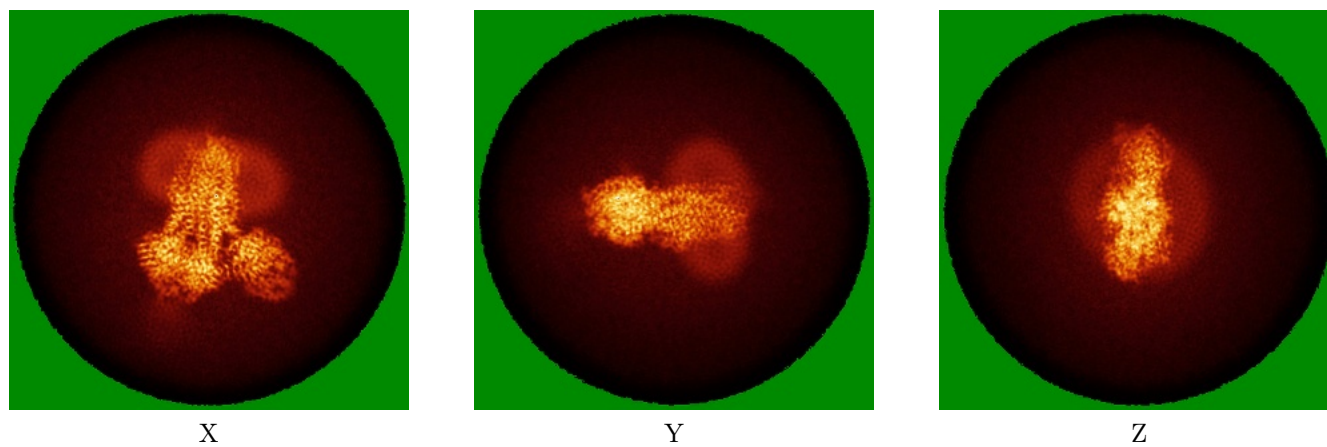


Z Index: 168

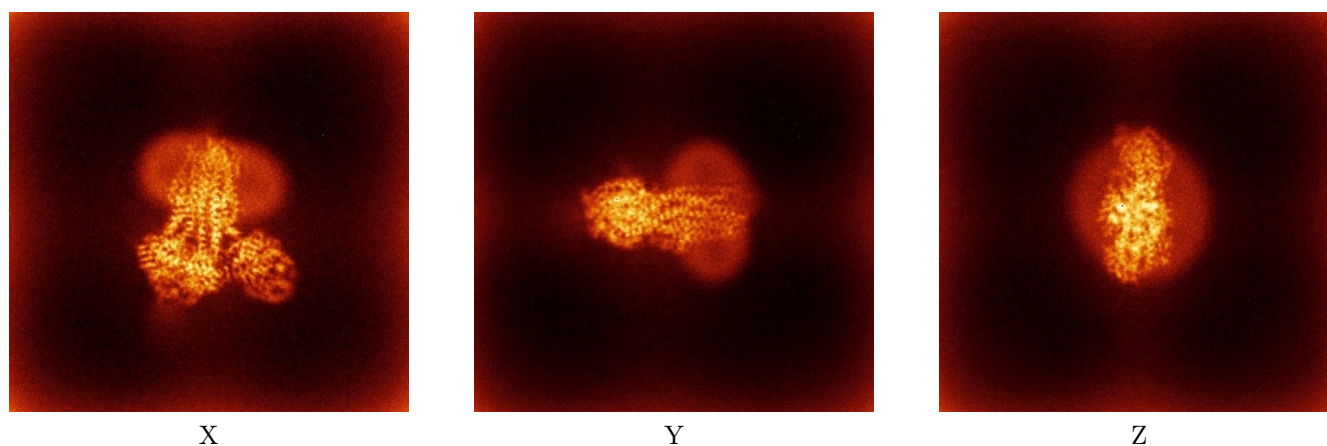
The images above show the largest variance slices of the map in three orthogonal directions.

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

5.4.1 Primary map



5.4.2 Raw map



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

5.5 Orthogonal surface views [i](#)

This section was not generated.

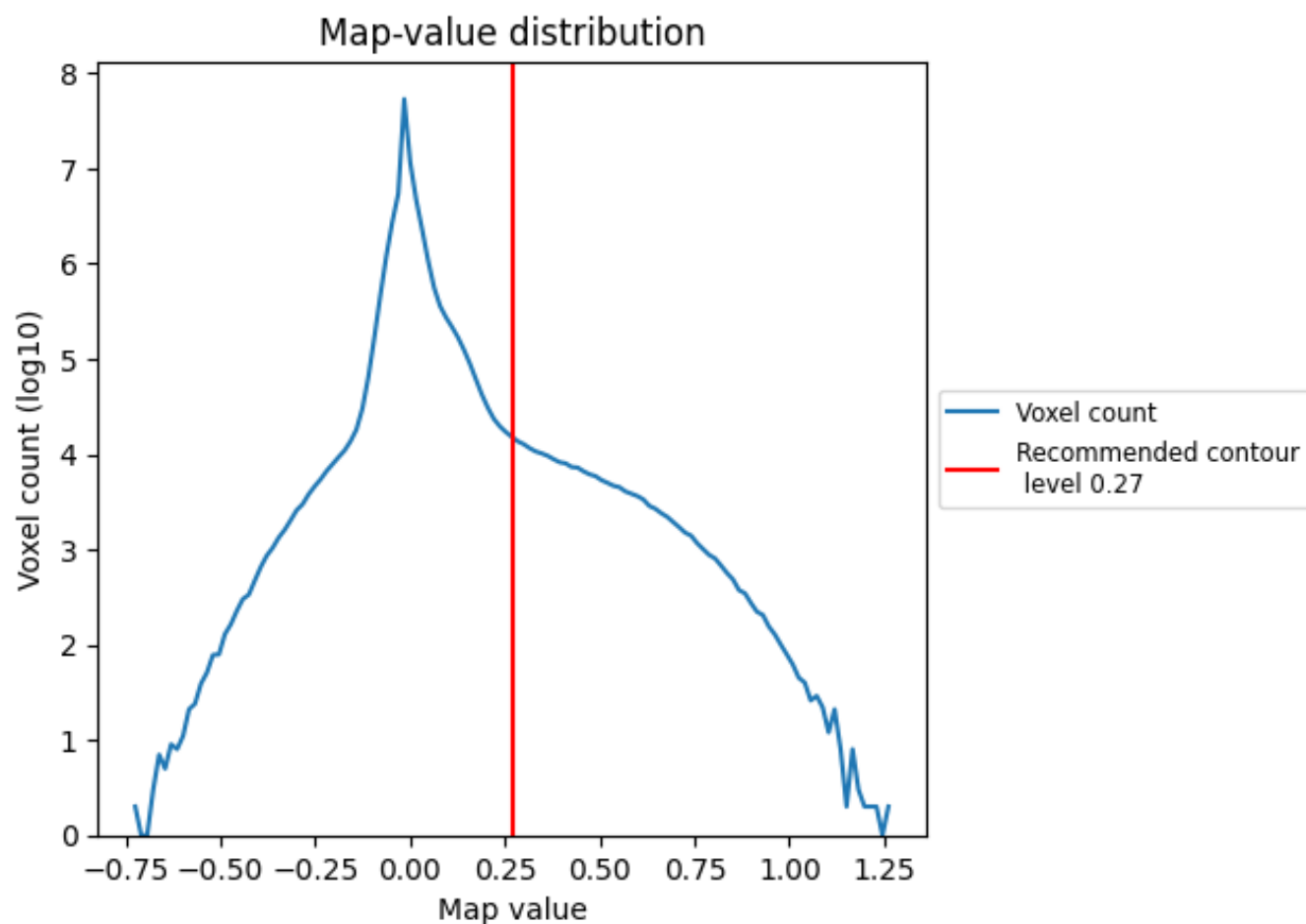
5.6 Mask visualisation [i](#)

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

6 Map analysis [i](#)

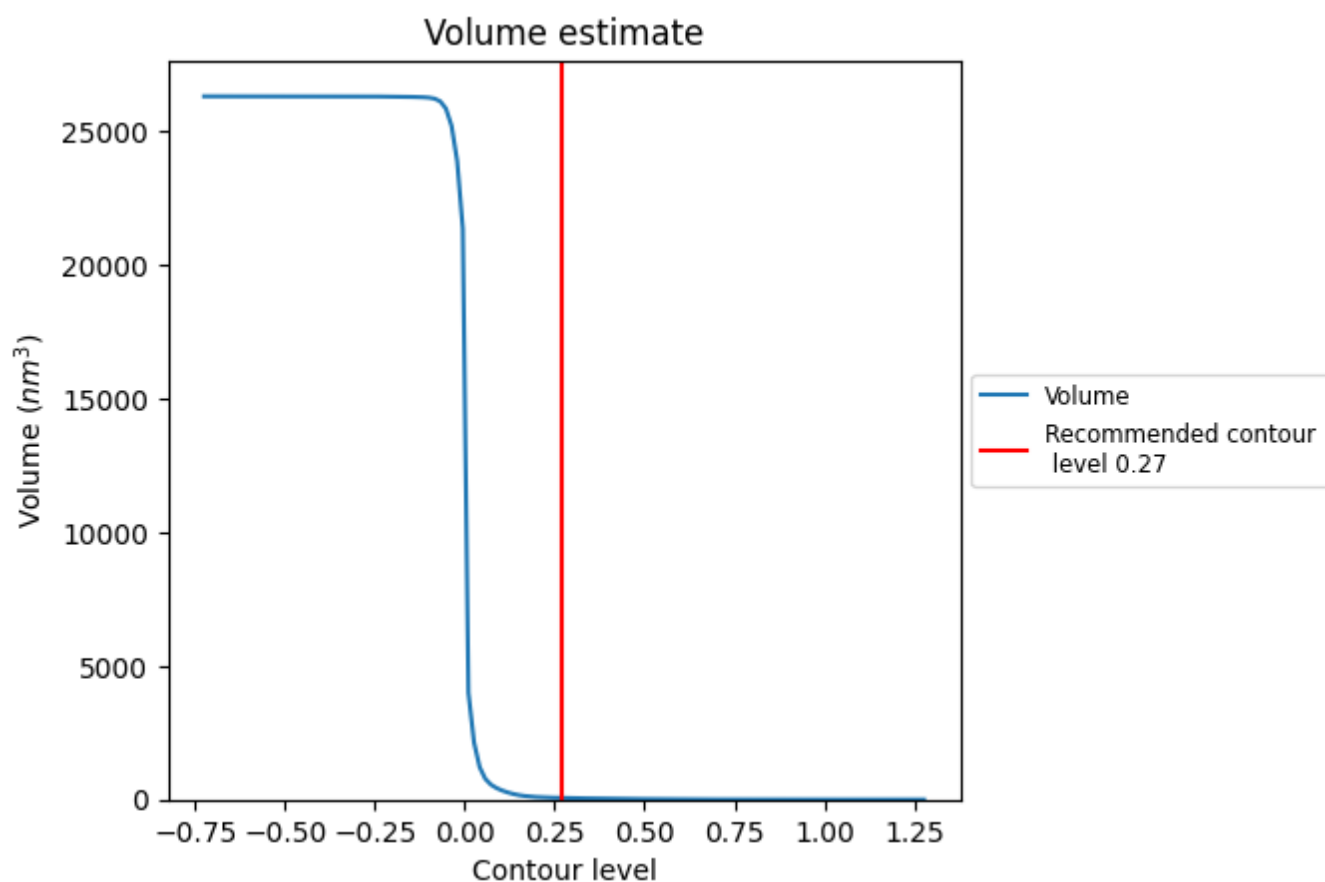
This section contains the results of statistical analysis of the map.

6.1 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.

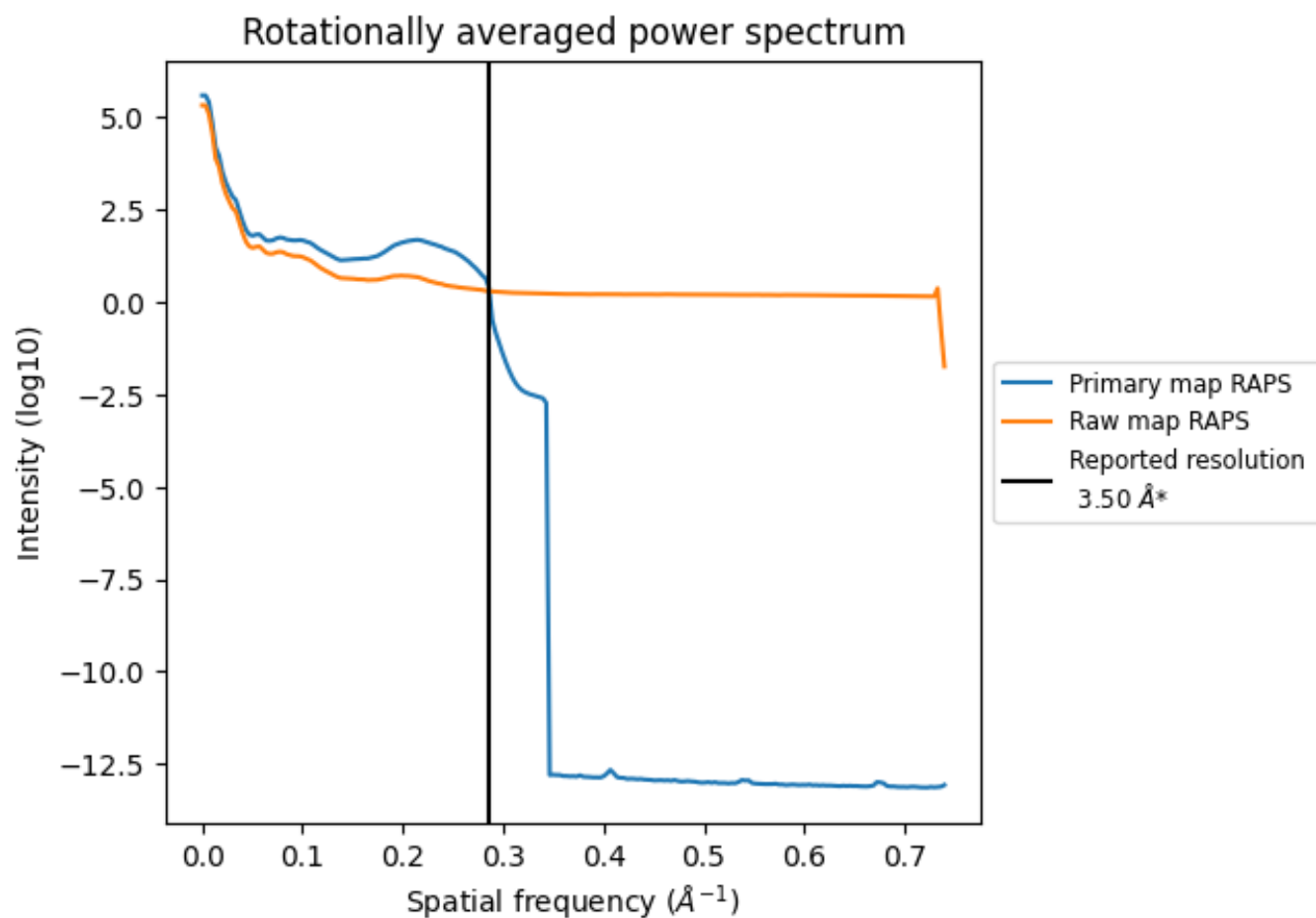
6.2 Volume estimate [i](#)



The volume at the recommended contour level is 62 nm³; this corresponds to an approximate mass of 56 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.

6.3 Rotationally averaged power spectrum ⓘ

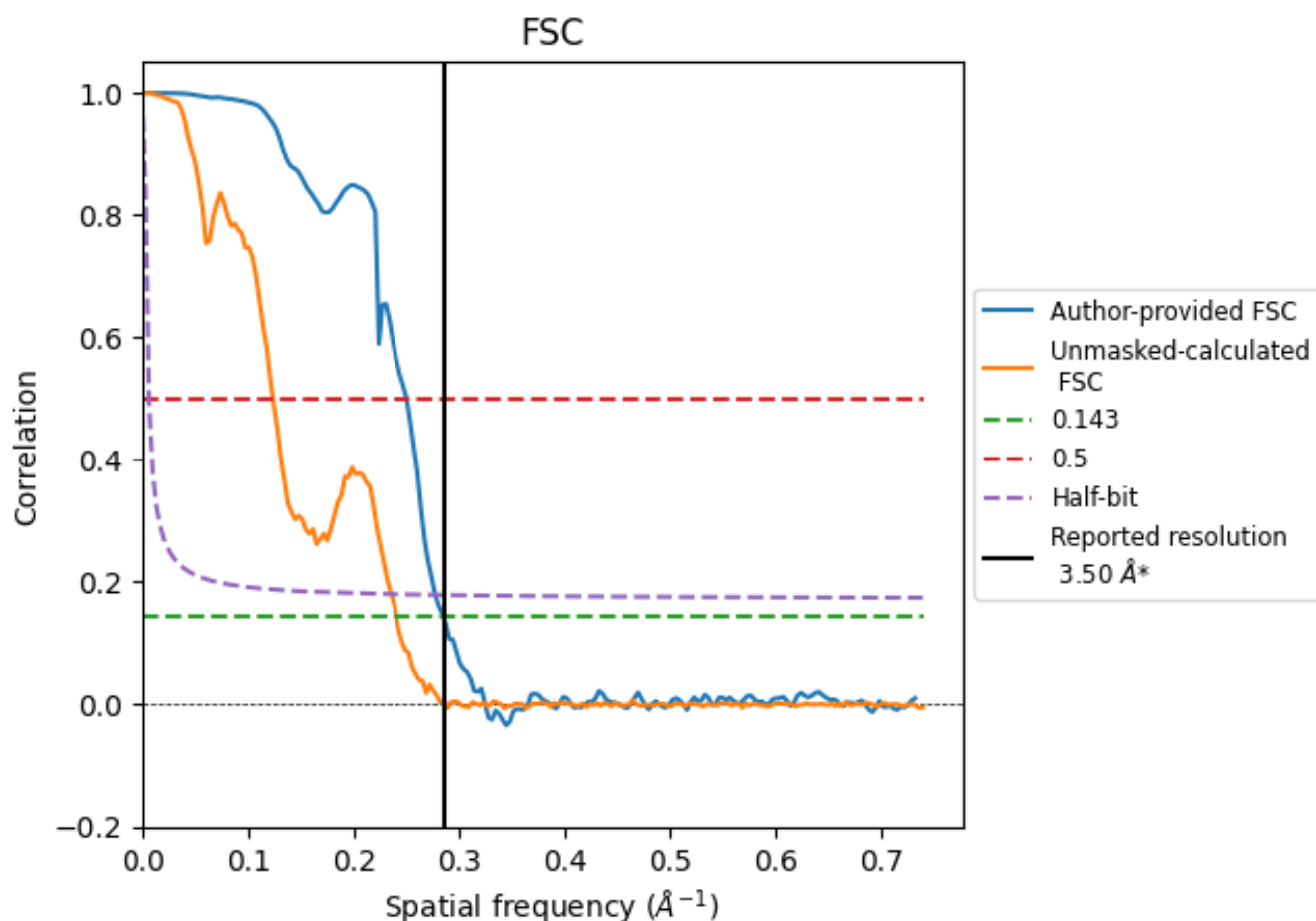


*Reported resolution corresponds to spatial frequency of 0.286 Å⁻¹

7 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.

7.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.286 $\text{\AA}^{-1}$

7.2 Resolution estimates [i](#)

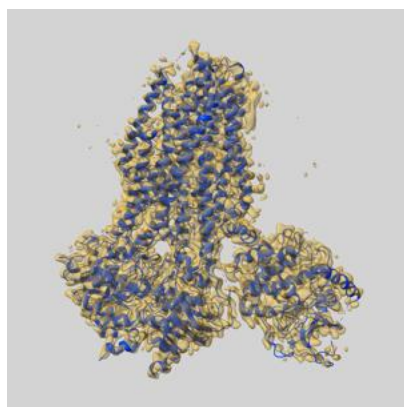
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.50	-	-
Author-provided FSC curve	3.51	3.99	3.60
Unmasked-calculated*	4.16	8.09	4.25

*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 3.5 by more than 10 %

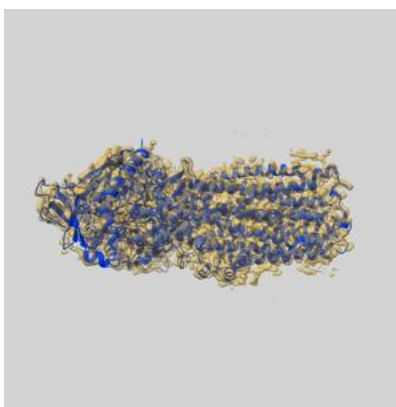
8 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-47238 and PDB model 9DW8. Per-residue inclusion information can be found in section ?? on page ??.

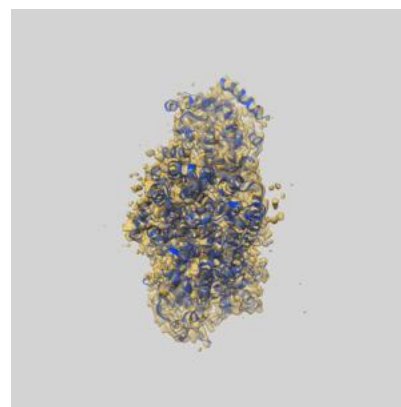
8.1 Map-model overlay [i](#)



X



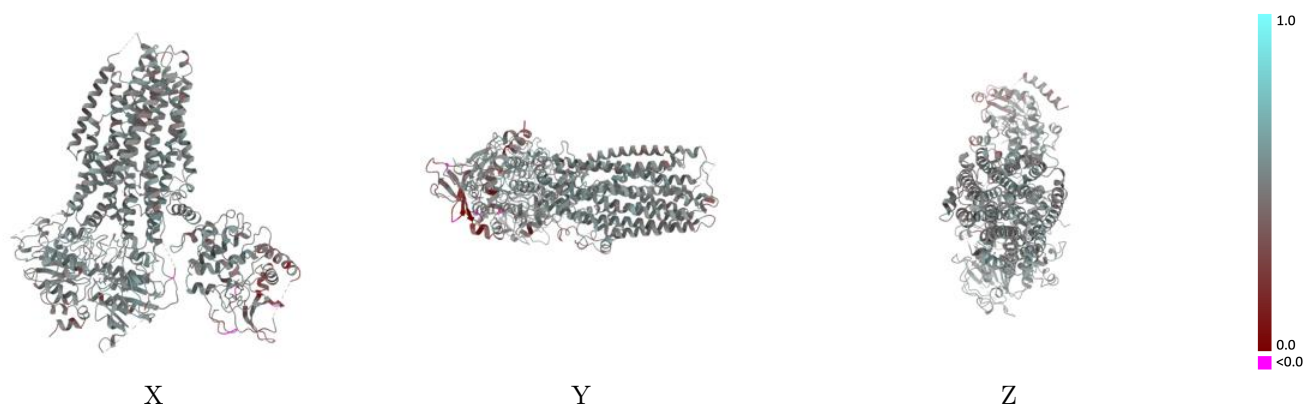
Y



Z

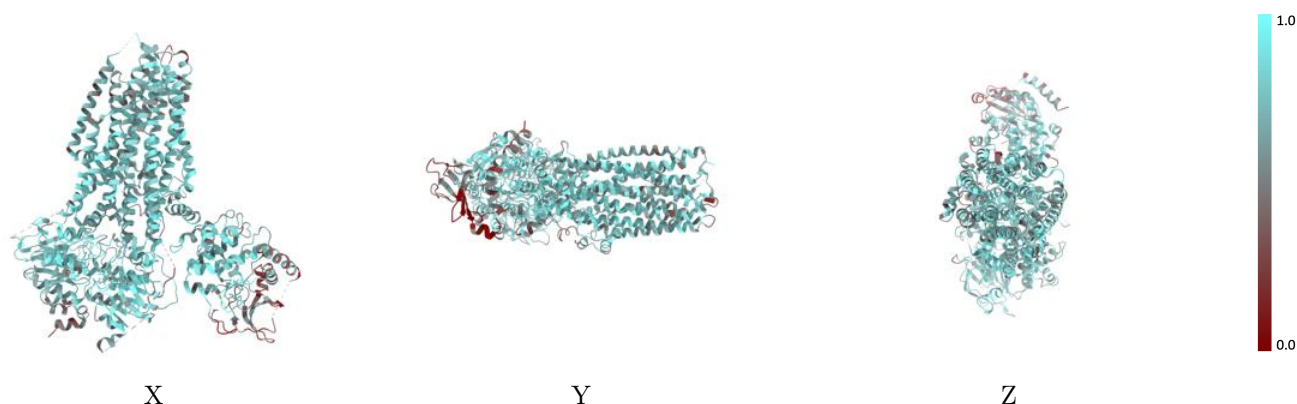
The images above show the 3D surface view of the map at the recommended contour level 0.27 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



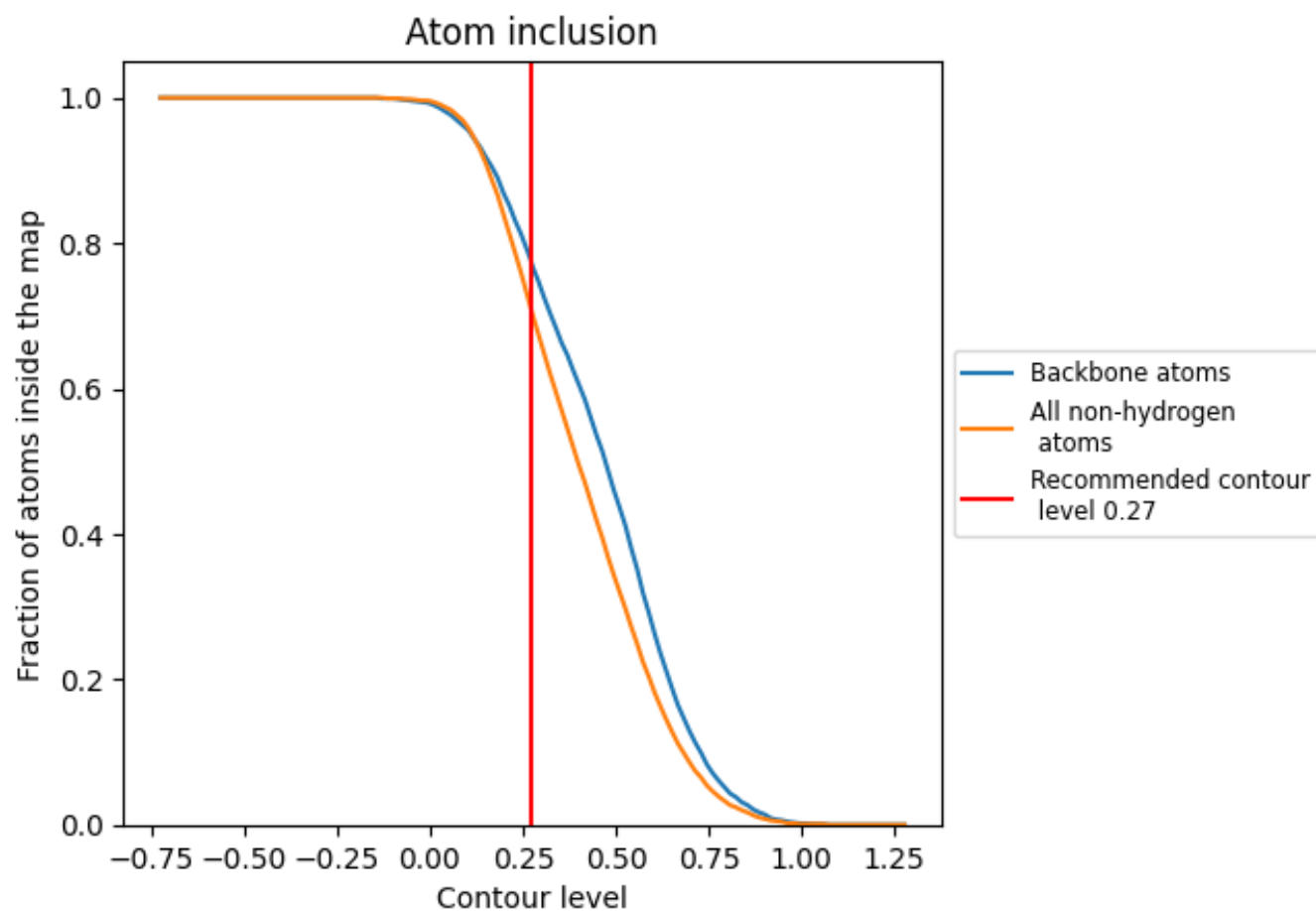
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

8.3 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 (0.27).

8.4 Atom inclusion [i](#)



At the recommended contour level, 78% of all backbone atoms, 71% of all non-hydrogen atoms, are inside the map.

8.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.27) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7140	0.4920
A	0.7370	0.5030
G	0.6270	0.4510

