



Full wwPDB EM Validation Report ⓘ

Apr 5, 2026 – 10:40 PM UTC

PDB ID : 9P1M / pdb_00009p1m
EMDB ID : EMD-71128
Title : Cryo-EM structure of CD73 in complex with antibody Sym024
Authors : Bansia, H.; Armbruster, E.; Des Georges, A.
Deposited on : 2025-06-10
Resolution : 2.90 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:

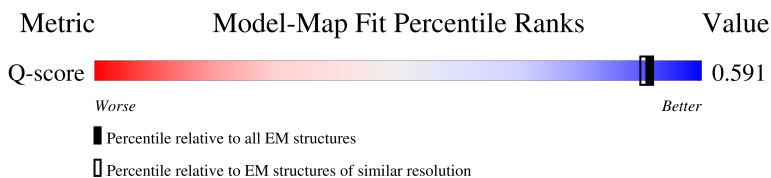
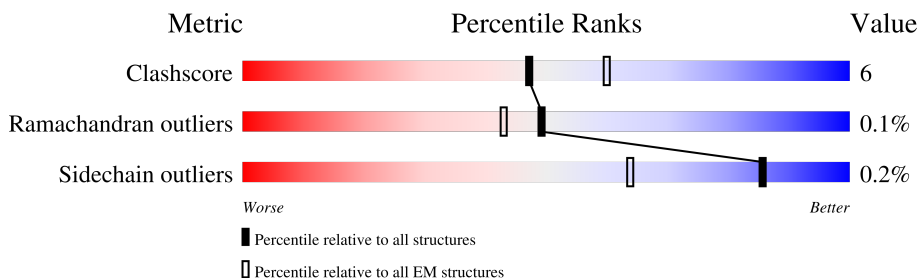
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
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 2.90 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	13054 (2.40 - 3.40)

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	536	
1	B	536	
2	C	214	
2	E	214	

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Mol	Chain	Length	Quality of chain
3	D	453	<p>15% 43% 5% 52%</p>
3	F	453	<p>15% 38% 5% 57%</p>

2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 13874 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 5'-nucleotidase.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	517	Total	C	N	O	S	0	0
			3879	2481	649	732	17		
1	B	523	Total	C	N	O	S	0	0
			3988	2545	672	752	19		

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	550	LEU	-	expression tag	UNP P21589
A	551	GLU	-	expression tag	UNP P21589
A	552	GLY	-	expression tag	UNP P21589
A	553	SER	-	expression tag	UNP P21589
A	554	GLY	-	expression tag	UNP P21589
A	555	SER	-	expression tag	UNP P21589
A	556	HIS	-	expression tag	UNP P21589
A	557	HIS	-	expression tag	UNP P21589
A	558	HIS	-	expression tag	UNP P21589
A	559	HIS	-	expression tag	UNP P21589
A	560	HIS	-	expression tag	UNP P21589
A	561	HIS	-	expression tag	UNP P21589
B	550	LEU	-	expression tag	UNP P21589
B	551	GLU	-	expression tag	UNP P21589
B	552	GLY	-	expression tag	UNP P21589
B	553	SER	-	expression tag	UNP P21589
B	554	GLY	-	expression tag	UNP P21589
B	555	SER	-	expression tag	UNP P21589
B	556	HIS	-	expression tag	UNP P21589
B	557	HIS	-	expression tag	UNP P21589
B	558	HIS	-	expression tag	UNP P21589
B	559	HIS	-	expression tag	UNP P21589
B	560	HIS	-	expression tag	UNP P21589
B	561	HIS	-	expression tag	UNP P21589

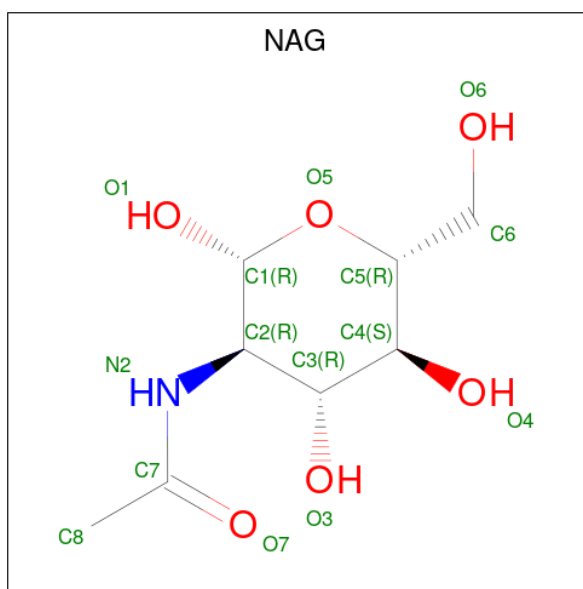
- Molecule 2 is a protein called Antibody Light Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	C	211	Total 1561	C 977	N 264	O 315	S 5	0	0
2	E	181	Total 1357	C 853	N 229	O 270	S 5	0	0

- Molecule 3 is a protein called Antibody Heavy Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	D	218	Total 1609	C 1018	N 270	O 313	S 8	0	0
3	F	193	Total 1448	C 923	N 243	O 274	S 8	0	0

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C₈H₁₅NO₆).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
4	A	1	Total 14	C 8	N 1	O 5	0
4	B	1	Total 14	C 8	N 1	O 5	0

- Molecule 5 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
5	A	2	Total 2	Zn 2	0

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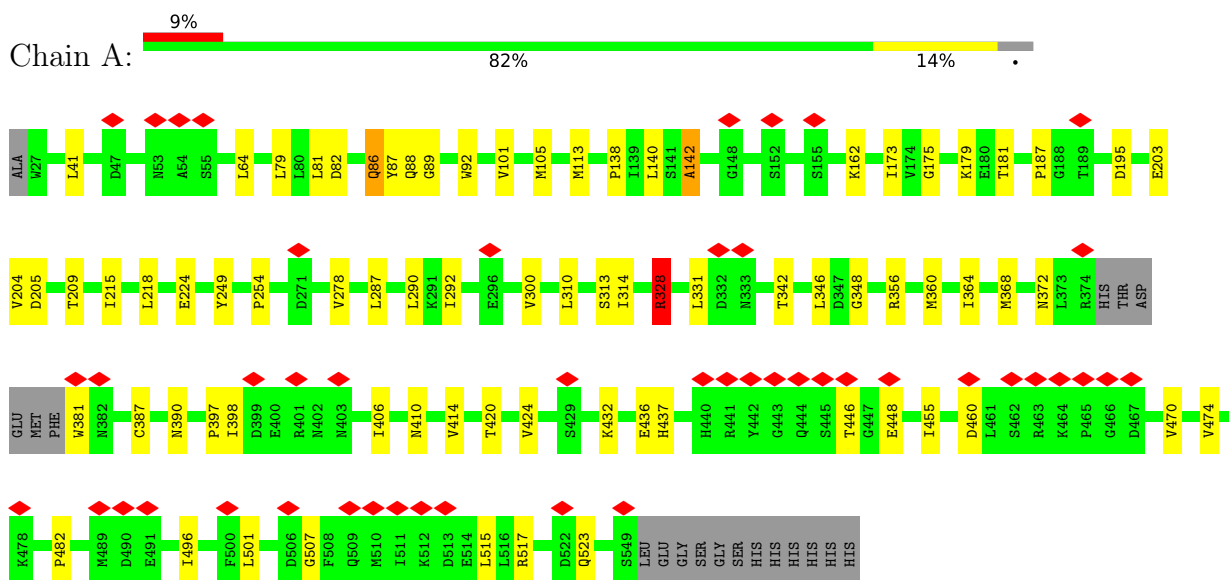
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Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
5	B	2	2	2	0

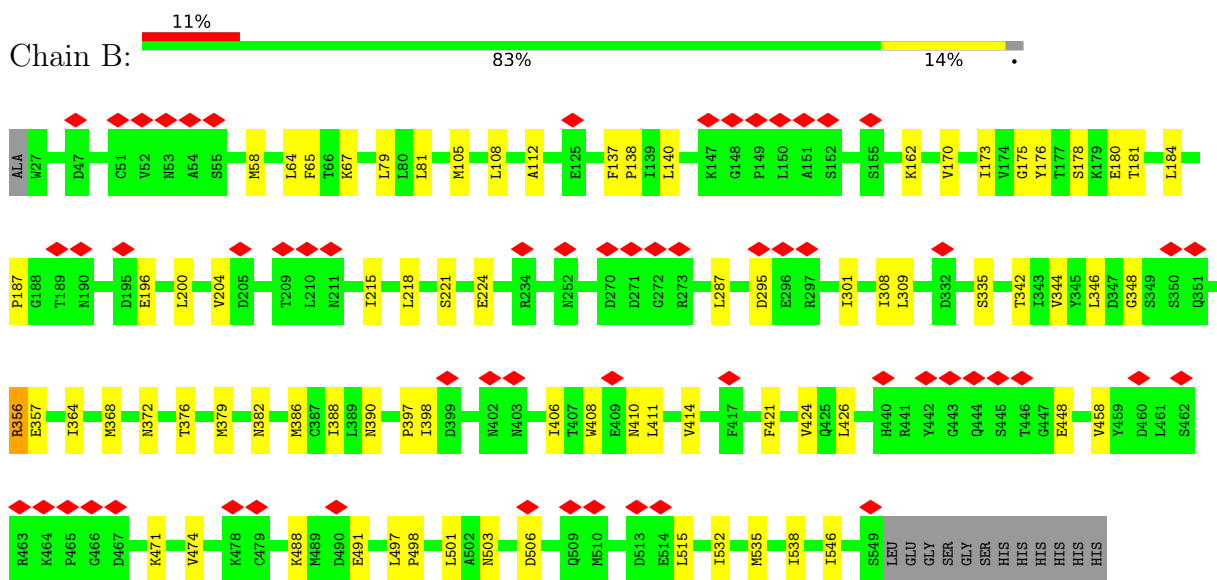
3 Residue-property plots [i](#)

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: 5'-nucleotidase



- Molecule 1: 5'-nucleotidase



- Molecule 2: Antibody Light Chain

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	286779	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS TITAN THEMIS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	4.080	Depositor
Minimum map value	-0.142	Depositor
Average map value	0.024	Depositor
Map value standard deviation	0.079	Depositor
Recommended contour level	0.735	Depositor
Map size (Å)	270.88, 270.88, 270.88	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.84650004, 0.84650004, 0.84650004	Depositor

5 Model quality i

5.1 Standard geometry i

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

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	0.26	0/3962	0.51	7/5395 (0.1%)
1	B	0.18	0/4073	0.41	1/5533 (0.0%)
2	C	0.19	0/1594	0.43	0/2175
2	E	0.19	0/1383	0.50	1/1878 (0.1%)
3	D	0.18	0/1649	0.43	1/2248 (0.0%)
3	F	0.15	0/1483	0.40	0/2017
All	All	0.20	0/14144	0.45	10/19246 (0.1%)

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	1
1	B	0	1
2	C	0	1
All	All	0	3

There are no bond length outliers.

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	142	ALA	CA-C-N	-7.63	110.61	122.37
1	A	142	ALA	C-N-CA	-7.63	110.61	122.37
1	A	89	GLY	CA-C-N	-7.23	107.74	121.54
1	A	89	GLY	C-N-CA	-7.23	107.74	121.54
3	D	223	PRO	N-CA-CB	6.20	110.15	103.33
1	A	87	TYR	CA-CB-CG	5.81	124.36	113.90
1	A	86	GLN	N-CA-C	-5.61	106.27	113.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	503	ASN	N-CA-C	-5.50	106.36	112.57
1	A	87	TYR	CA-C-O	-5.17	114.64	120.43
2	E	32	ARG	N-CA-CB	-5.13	104.28	110.53

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	328	ARG	Sidechain
1	B	356	ARG	Sidechain
2	C	24	ARG	Sidechain

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3879	0	3729	43	0
1	B	3988	0	3899	52	0
2	C	1561	0	1475	23	0
2	E	1357	0	1313	16	0
3	D	1609	0	1528	14	0
3	F	1448	0	1385	22	0
4	A	14	0	13	1	0
4	B	14	0	13	0	0
5	A	2	0	0	0	0
5	B	2	0	0	0	0
All	All	13874	0	13355	162	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 6.

All (162) 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:F:91:THR:HG23	3:F:120:THR:HA	1.31	1.10

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:155:GLN:HE22	2:C:179:LEU:CD1	1.71	1.03
1:A:175:GLY:HA2	1:A:218:LEU:O	1.65	0.95
1:B:170:VAL:HG23	2:E:31:ARG:HH22	1.35	0.89
1:B:372:ASN:O	1:B:376:THR:HG22	1.74	0.88
3:F:91:THR:CG2	3:F:120:THR:HA	2.06	0.85
2:C:155:GLN:NE2	2:C:179:LEU:CD1	2.41	0.83
2:C:155:GLN:HE22	2:C:179:LEU:HD11	1.43	0.83
2:C:155:GLN:HE22	2:C:179:LEU:HD13	1.43	0.82
2:C:155:GLN:NE2	2:C:179:LEU:HD13	1.97	0.80
1:B:424:VAL:HG13	1:B:515:LEU:HD22	1.68	0.74
1:B:170:VAL:HG23	2:E:31:ARG:NH2	2.05	0.72
1:B:372:ASN:O	1:B:376:THR:CG2	2.38	0.72
2:E:46:LEU:HD21	2:E:49:TYR:HB3	1.72	0.72
3:D:91:THR:HG22	3:D:121:VAL:H	1.56	0.70
1:A:82:ASP:OD2	1:A:86:GLN:HG3	1.91	0.69
2:E:195:GLU:HG2	2:E:206:THR:OG1	1.91	0.69
2:C:155:GLN:NE2	2:C:179:LEU:HD11	2.07	0.68
1:B:376:THR:HG21	1:B:382:ASN:HA	1.78	0.66
2:C:46:LEU:HD21	2:C:49:TYR:HB3	1.77	0.65
1:B:138:PRO:HG3	1:B:162:LYS:HG2	1.80	0.63
2:C:32:ARG:HD3	2:C:92:ASN:HA	1.81	0.63
1:A:432:LYS:O	1:A:436:GLU:HG2	1.99	0.63
2:E:31:ARG:HB3	2:E:51:ALA:HB3	1.79	0.62
2:C:150:VAL:HG22	2:C:192:TYR:HA	1.81	0.62
1:B:368:MET:HE2	1:B:421:PHE:CE1	2.36	0.61
1:A:310:LEU:HA	1:A:314:ILE:HD12	1.82	0.61
3:F:40:ALA:HB3	3:F:43:LYS:HB2	1.81	0.60
2:C:151:ASP:H	2:C:191:VAL:HB	1.68	0.59
1:B:390:ASN:HB3	1:B:501:LEU:HD21	1.84	0.58
1:A:79:LEU:HD21	1:A:173:ILE:HD11	1.85	0.58
2:C:142:ARG:HG2	2:C:142:ARG:HH11	1.69	0.58
1:B:424:VAL:HG13	1:B:515:LEU:CD2	2.34	0.58
1:B:335:SER:HA	1:B:408:TRP:HB3	1.84	0.57
1:A:460:ASP:HB2	1:A:470:VAL:HG21	1.86	0.57
1:B:364:ILE:HG22	1:B:368:MET:HE3	1.87	0.57
1:A:181:THR:HG22	1:A:187:PRO:HG3	1.87	0.57
1:B:105:MET:HE2	1:B:137:PHE:CZ	2.40	0.57
2:C:39:LYS:HD3	2:C:84:ALA:HB2	1.87	0.57
3:F:91:THR:HA	3:F:119:VAL:O	2.04	0.57
1:B:295:ASP:HB3	1:B:301:ILE:HD11	1.87	0.57
3:F:16:ARG:HH11	3:F:16:ARG:HG3	1.69	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:398:ILE:HG12	1:A:410:ASN:HB3	1.87	0.56
1:B:488:LYS:HB2	1:B:491:GLU:HB2	1.88	0.56
1:B:342:THR:HB	1:B:406:ILE:HD11	1.89	0.55
1:A:64:LEU:HD11	1:A:287:LEU:HD13	1.89	0.55
1:A:364:ILE:O	1:A:368:MET:HG3	2.07	0.54
1:A:224:GLU:CD	1:A:224:GLU:H	2.16	0.54
1:B:175:GLY:HA2	1:B:218:LEU:O	2.08	0.54
1:B:424:VAL:CG1	1:B:515:LEU:CD2	2.86	0.54
1:A:356:ARG:HB3	1:A:356:ARG:NH1	2.23	0.54
1:B:204:VAL:HG13	1:B:215:ILE:HD13	1.90	0.54
3:F:83:MET:HE1	3:F:119:VAL:HG11	1.90	0.54
1:B:170:VAL:CG2	2:E:31:ARG:NH2	2.71	0.53
1:B:224:GLU:H	1:B:224:GLU:CD	2.16	0.53
3:D:11:LEU:HD13	3:D:120:THR:HB	1.90	0.53
1:A:455:ILE:HG12	1:A:474:VAL:HG12	1.90	0.53
1:A:82:ASP:HB3	1:A:113:MET:HG3	1.90	0.53
1:A:205:ASP:O	1:A:209:THR:HG23	2.09	0.53
1:A:138:PRO:HB2	1:A:140:LEU:HD21	1.90	0.52
2:E:91:ALA:HB1	3:F:107:TYR:HB2	1.91	0.52
1:B:79:LEU:HD21	1:B:173:ILE:HD11	1.91	0.52
2:E:196:VAL:O	2:E:204:PRO:HA	2.10	0.52
1:B:184:LEU:HD22	1:B:376:THR:OG1	2.09	0.52
3:F:91:THR:OG1	3:F:121:VAL:N	2.28	0.52
3:D:83:MET:HE2	3:D:86:LEU:HD21	1.92	0.52
3:D:28:THR:HG22	3:D:30:ASP:OD1	2.10	0.51
3:F:93:LEU:HG	3:F:116:GLY:HA3	1.93	0.51
1:A:346:LEU:HD12	1:A:398:ILE:HB	1.92	0.51
1:A:278:VAL:HG11	1:A:290:LEU:HD22	1.91	0.51
2:C:91:ALA:HB1	3:D:107:TYR:HB2	1.92	0.51
2:E:145:LYS:HB3	2:E:197:THR:HG23	1.93	0.51
1:A:410:ASN:O	1:A:414:VAL:HG23	2.11	0.50
3:D:91:THR:HG22	3:D:121:VAL:N	2.24	0.50
1:A:420:THR:HG22	1:A:523:GLN:HA	1.92	0.50
1:B:64:LEU:HD11	1:B:287:LEU:HD13	1.94	0.50
1:B:424:VAL:CG1	1:B:515:LEU:HD22	2.38	0.50
1:A:360:MET:HE3	1:A:414:VAL:HG21	1.93	0.50
2:C:48:ILE:HG22	2:C:50:ALA:O	2.12	0.50
1:A:460:ASP:HB2	1:A:470:VAL:CG2	2.42	0.49
1:B:348:GLY:H	1:B:397:PRO:HB3	1.77	0.49
1:A:348:GLY:H	1:A:397:PRO:HB3	1.76	0.49
3:D:20:LEU:HD12	3:D:81:LEU:HD23	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:6:GLN:HE21	2:E:21:ILE:HG21	1.77	0.49
3:F:91:THR:HG23	3:F:119:VAL:O	2.13	0.49
1:A:328:ARG:HG2	1:A:331:LEU:HD12	1.94	0.49
1:B:176:TYR:HB3	1:B:200:LEU:HD11	1.95	0.48
2:C:120:PRO:HD3	2:C:132:VAL:HG22	1.95	0.48
1:A:390:ASN:HB3	1:A:501:LEU:HD21	1.96	0.48
3:F:91:THR:HG23	3:F:120:THR:CA	2.23	0.48
3:F:17:SER:HA	3:F:83:MET:O	2.14	0.48
1:A:342:THR:HB	1:A:406:ILE:HD11	1.94	0.48
2:C:37:GLN:HB2	2:C:47:LEU:HD11	1.96	0.48
1:B:65:PHE:HD2	1:B:108:LEU:HD12	1.79	0.47
1:B:458:VAL:HB	1:B:471:LYS:HB3	1.96	0.47
3:D:48:VAL:HG13	3:D:64:VAL:HG11	1.95	0.47
1:B:184:LEU:CD2	1:B:376:THR:OG1	2.63	0.47
1:A:424:VAL:HB	1:A:515:LEU:HD22	1.96	0.47
1:B:368:MET:HG2	1:B:421:PHE:CD2	2.51	0.46
1:B:424:VAL:HB	1:B:497:LEU:HD13	1.97	0.46
1:B:180:GLU:HG3	1:B:379:MET:HG3	1.96	0.46
3:D:166:SER:H	3:D:207:ASN:HD21	1.61	0.46
3:F:87:ARG:NH1	3:F:87:ARG:HB2	2.31	0.46
2:E:4:MET:SD	2:E:90:GLN:HB3	2.55	0.46
1:A:138:PRO:HG3	1:A:162:LYS:HG2	1.96	0.46
3:D:2:VAL:HG11	3:D:112:VAL:HG21	1.98	0.46
2:E:39:LYS:HD3	2:E:84:ALA:HB2	1.97	0.45
1:A:372:ASN:HD22	1:A:496:ILE:HD11	1.81	0.45
1:B:181:THR:HG22	1:B:187:PRO:HG3	1.99	0.45
1:A:437:HIS:CE1	1:A:448:GLU:OE1	2.69	0.45
1:A:41:LEU:HD12	1:A:92:TRP:CE3	2.53	0.45
1:A:179:LYS:HD2	1:A:195:ASP:HA	1.98	0.44
1:B:448:GLU:HG3	1:B:506:ASP:HB3	1.98	0.44
1:A:381:TRP:CH2	1:A:517:ARG:HG2	2.53	0.44
3:F:83:MET:HE2	3:F:86:LEU:HD11	1.99	0.44
1:B:196:GLU:O	1:B:200:LEU:HB2	2.18	0.44
1:B:426:LEU:HD21	1:B:515:LEU:HD23	2.00	0.44
2:C:164:THR:HG23	3:D:176:PHE:CD1	2.54	0.43
1:B:346:LEU:HB2	1:B:398:ILE:HB	2.01	0.43
1:A:204:VAL:HG13	1:A:215:ILE:HD13	2.01	0.43
3:F:11:LEU:HD13	3:F:120:THR:HB	2.01	0.43
1:A:437:HIS:NE2	1:A:507:GLY:HA3	2.34	0.43
3:F:91:THR:HG21	3:F:120:THR:HG23	2.01	0.43
3:D:12:VAL:HG11	3:D:86:LEU:HD12	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:38:GLN:O	2:E:84:ALA:HB1	2.19	0.43
1:A:482:PRO:HG3	1:B:344:VAL:HG11	2.01	0.43
3:F:164:TRP:CH2	3:F:206:CYS:HB2	2.54	0.43
1:B:81:LEU:HD22	1:B:112:ALA:HB3	2.01	0.42
2:C:61:ARG:CZ	2:C:79:GLN:HG3	2.48	0.42
1:B:386:MET:SD	1:B:474:VAL:HB	2.59	0.42
2:E:159:SER:HA	2:E:178:THR:O	2.18	0.42
1:A:79:LEU:HG	1:A:81:LEU:HD21	2.00	0.42
1:B:178:SER:HB3	1:B:221:SER:HA	2.00	0.42
1:A:249:TYR:CZ	1:A:254:PRO:HD3	2.55	0.42
2:C:189:HIS:HB2	2:C:192:TYR:CZ	2.55	0.42
2:E:135:LEU:HD22	3:F:191:VAL:HG11	2.02	0.42
2:C:33:LEU:HD13	2:C:34:ALA:N	2.35	0.42
2:C:91:ALA:HA	2:C:96:LEU:HD22	2.02	0.42
1:A:142:ALA:HB1	1:A:203:GLU:HG3	2.02	0.42
1:A:368:MET:SD	1:A:387:CYS:SG	3.18	0.42
3:D:24:ALA:HB1	3:D:27:PHE:CE1	2.54	0.42
1:A:292:ILE:HG23	1:A:300:VAL:HG13	2.02	0.41
2:C:4:MET:HE1	2:C:29:ILE:HD13	2.01	0.41
1:B:357:GLU:HB2	1:B:546:ILE:HB	2.01	0.41
1:B:388:ILE:O	1:B:498:PRO:HD3	2.20	0.41
3:F:38:ARG:HG3	3:F:92:ALA:HB3	2.02	0.41
1:B:58:MET:SD	1:B:309:LEU:HD11	2.59	0.41
1:B:67:LYS:HE2	1:B:308:ILE:HG21	2.02	0.41
1:B:140:LEU:HD21	1:B:162:LYS:HB2	2.01	0.41
3:F:30:ASP:OD1	3:F:30:ASP:N	2.53	0.41
1:B:184:LEU:HD21	1:B:379:MET:HG2	2.03	0.41
1:B:346:LEU:HD11	1:B:538:ILE:HD11	2.03	0.41
1:B:411:LEU:HD11	1:B:532:ILE:HD12	2.03	0.40
3:F:24:ALA:HB1	3:F:27:PHE:CE1	2.56	0.40
1:A:101:VAL:O	1:A:105:MET:HG3	2.22	0.40
1:B:535:MET:HE3	1:B:535:MET:HB3	1.66	0.40
1:A:313:SER:HB3	4:A:601:NAG:O7	2.22	0.40
2:C:113:PRO:HB3	2:C:139:PHE:HB3	2.03	0.40
3:D:2:VAL:HG13	3:D:27:PHE:CD1	2.57	0.40
2:E:112:ALA:HA	2:E:113:PRO:HD3	1.97	0.40
1:B:410:ASN:O	1:B:414:VAL:HG23	2.22	0.40
3:F:86:LEU:HD23	3:F:86:LEU:HA	1.94	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	513/536 (96%)	498 (97%)	14 (3%)	1 (0%)	43	72
1	B	521/536 (97%)	512 (98%)	9 (2%)	0	100	100
2	C	209/214 (98%)	202 (97%)	7 (3%)	0	100	100
2	E	171/214 (80%)	169 (99%)	2 (1%)	0	100	100
3	D	214/453 (47%)	209 (98%)	5 (2%)	0	100	100
3	F	185/453 (41%)	183 (99%)	2 (1%)	0	100	100
All	All	1813/2406 (75%)	1773 (98%)	39 (2%)	1 (0%)	49	77

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	88	GLN

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	404/461 (88%)	402 (100%)	2 (0%)	81	93
1	B	428/461 (93%)	427 (100%)	1 (0%)	87	96
2	C	169/185 (91%)	169 (100%)	0	100	100
2	E	152/185 (82%)	152 (100%)	0	100	100
3	D	172/396 (43%)	172 (100%)	0	100	100
3	F	155/396 (39%)	155 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	1480/2084 (71%)	1477 (100%)	3 (0%)	85 96

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	328	ARG
1	A	446	THR
1	B	356	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	43	GLN
1	A	372	ASN
1	B	351	GLN
2	C	155	GLN
3	D	202	GLN
3	D	207	ASN
2	E	38	GLN
2	E	92	ASN
3	F	39	GLN
3	F	181	GLN

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](#)

Of 6 ligands modelled in this entry, 4 are monoatomic - leaving 2 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
4	NAG	A	601	1	14,14,15	0.68	0	17,19,21	1.62	1 (5%)
4	NAG	B	601	1	14,14,15	0.71	0	17,19,21	1.04	2 (11%)

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
4	NAG	A	601	1	-	1/6/23/26	0/1/1/1
4	NAG	B	601	1	-	1/6/23/26	0/1/1/1

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	601	NAG	C2-N2-C7	5.23	129.91	122.90
4	B	601	NAG	O5-C1-C2	-2.67	107.16	111.29
4	B	601	NAG	C1-O5-C5	2.06	114.95	112.19

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	601	NAG	C3-C2-N2-C7
4	B	601	NAG	C1-C2-N2-C7

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	601	NAG	1	0

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.

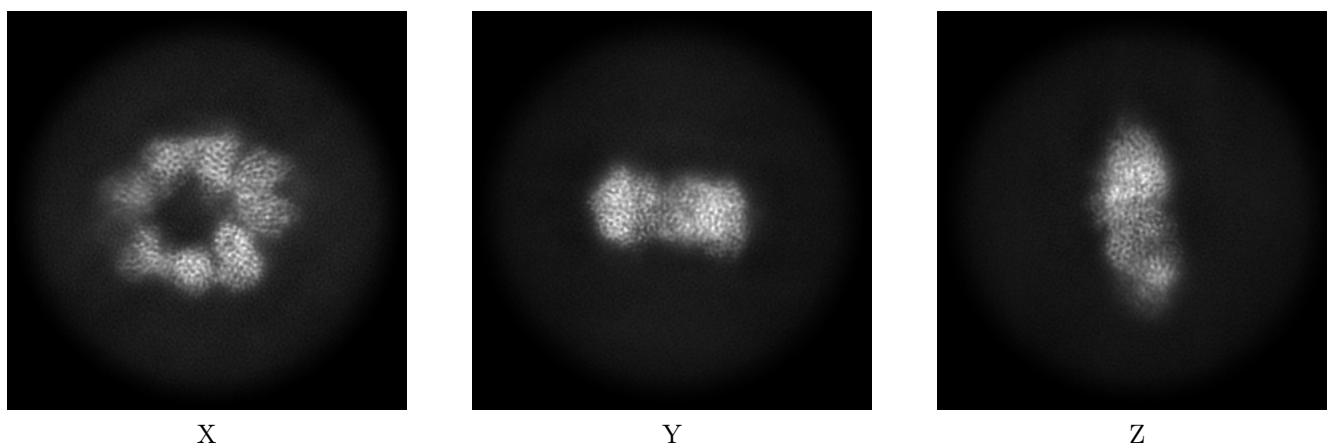
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-71128. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

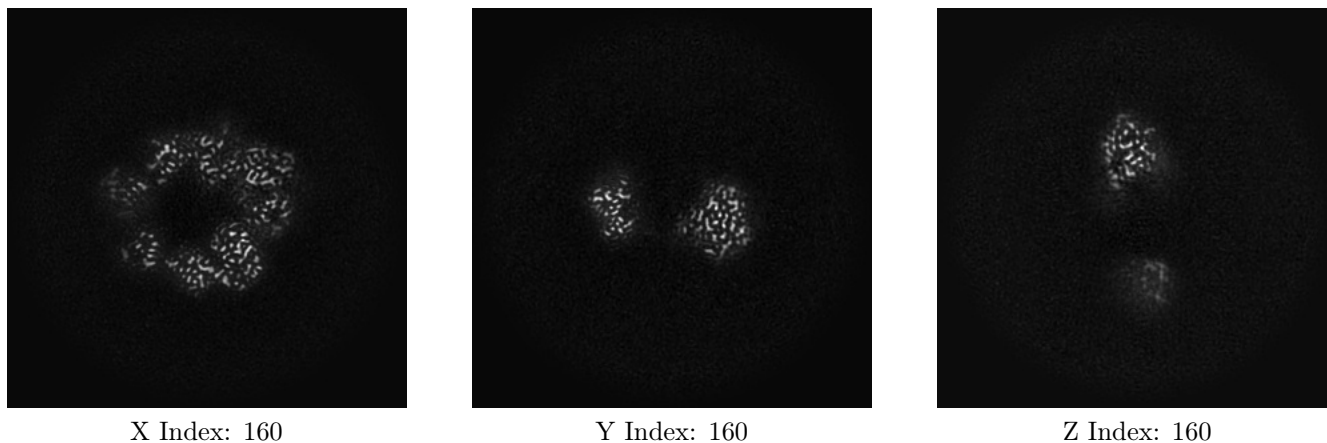
6.1.1 Primary map



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

6.2 Central slices [i](#)

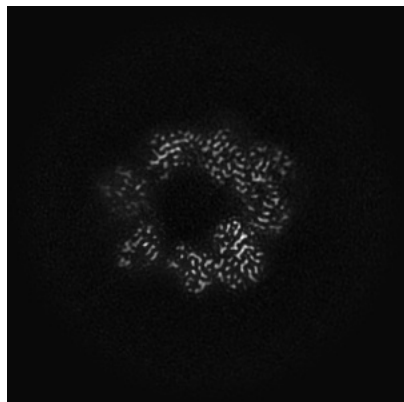
6.2.1 Primary map



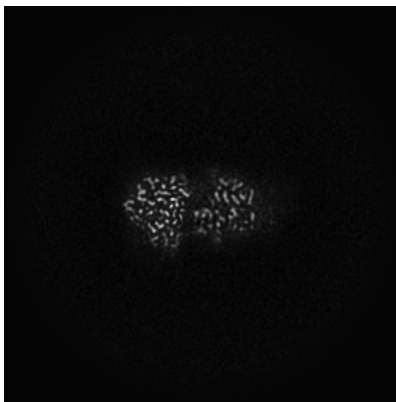
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

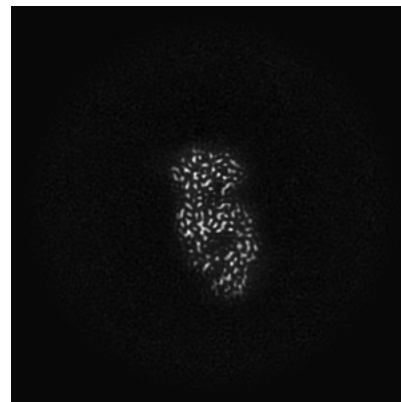
6.3.1 Primary map



X Index: 165



Y Index: 188

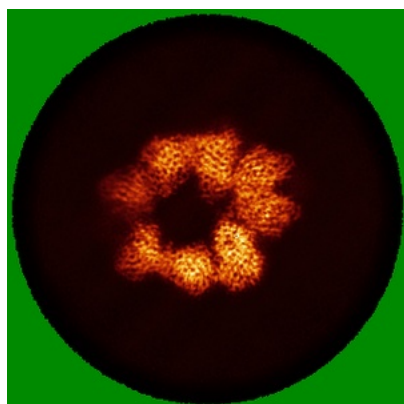


Z Index: 119

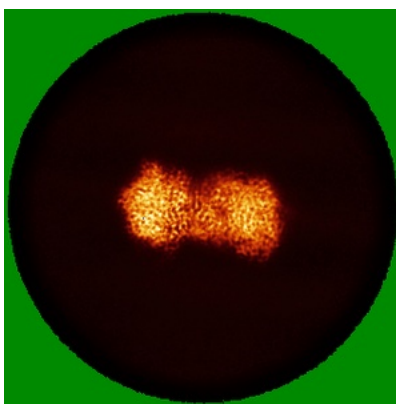
The images above show the largest variance slices of the map in three orthogonal directions.

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

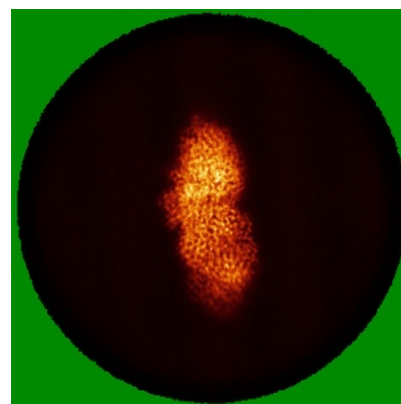
6.4.1 Primary map



X



Y

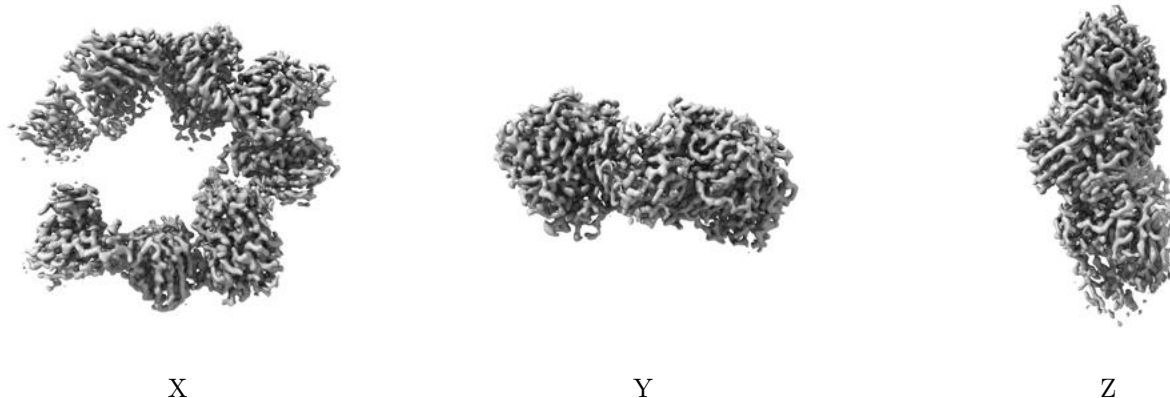


Z

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 0.735. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

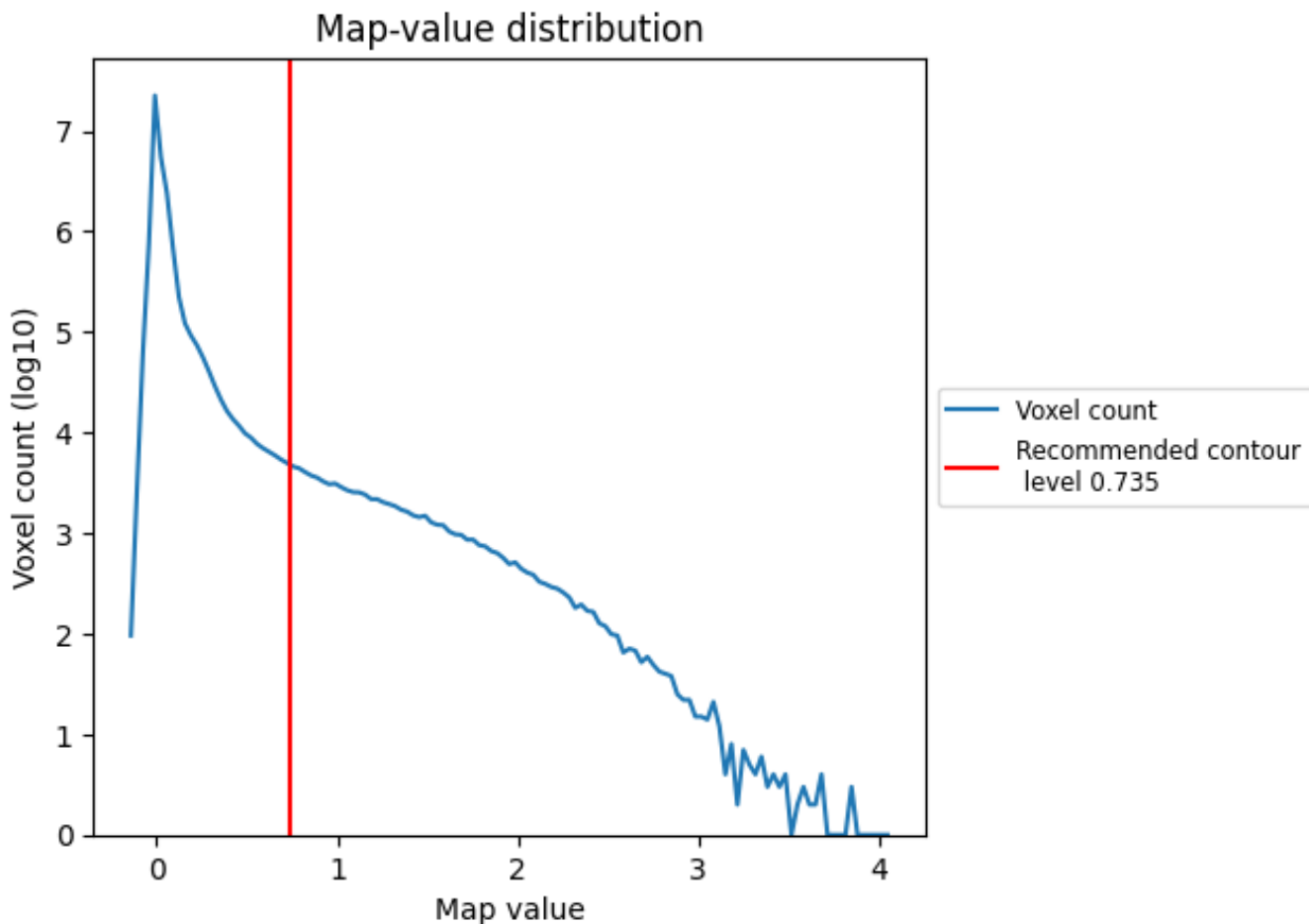
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

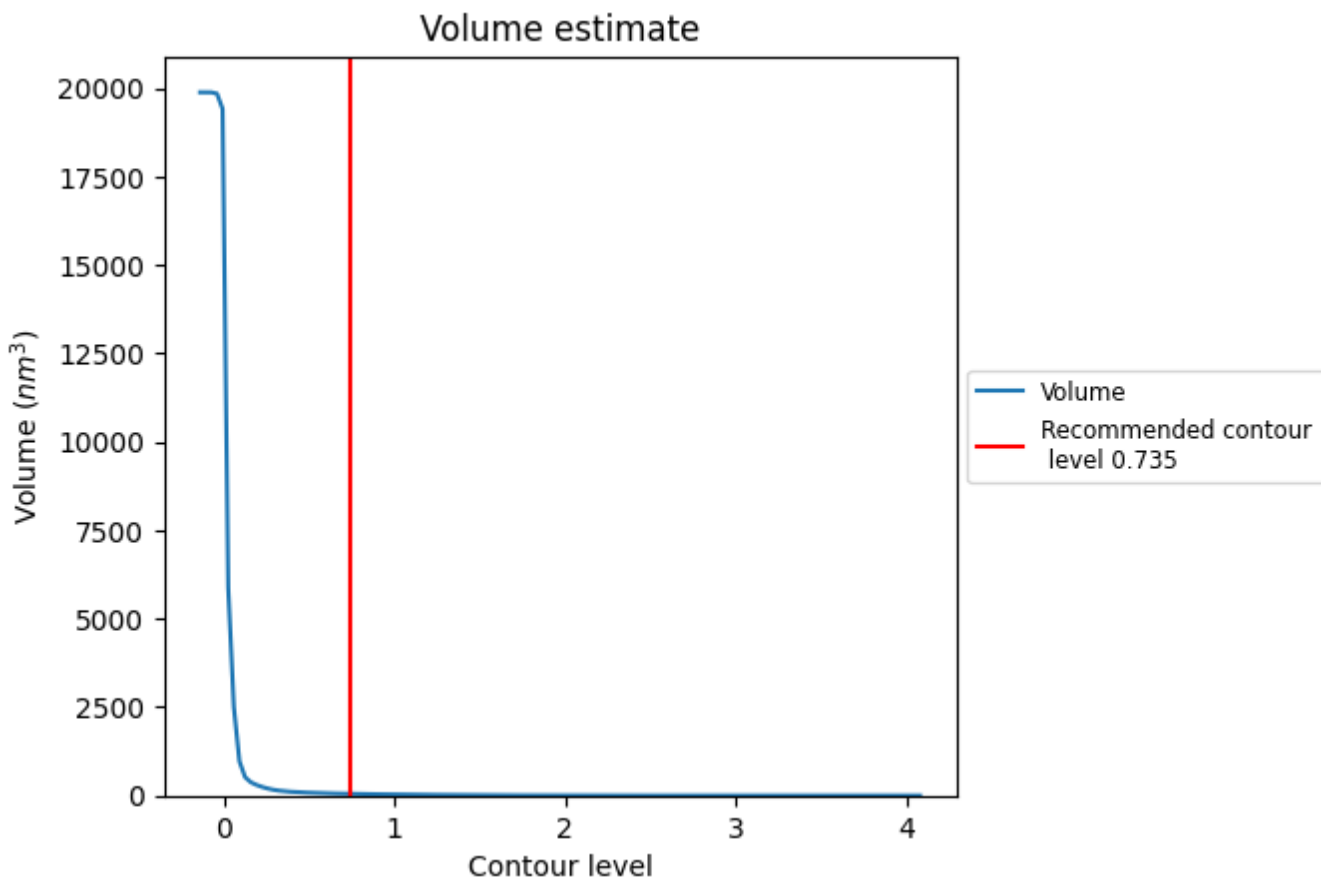
This section contains the results of statistical analysis of the map.

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.

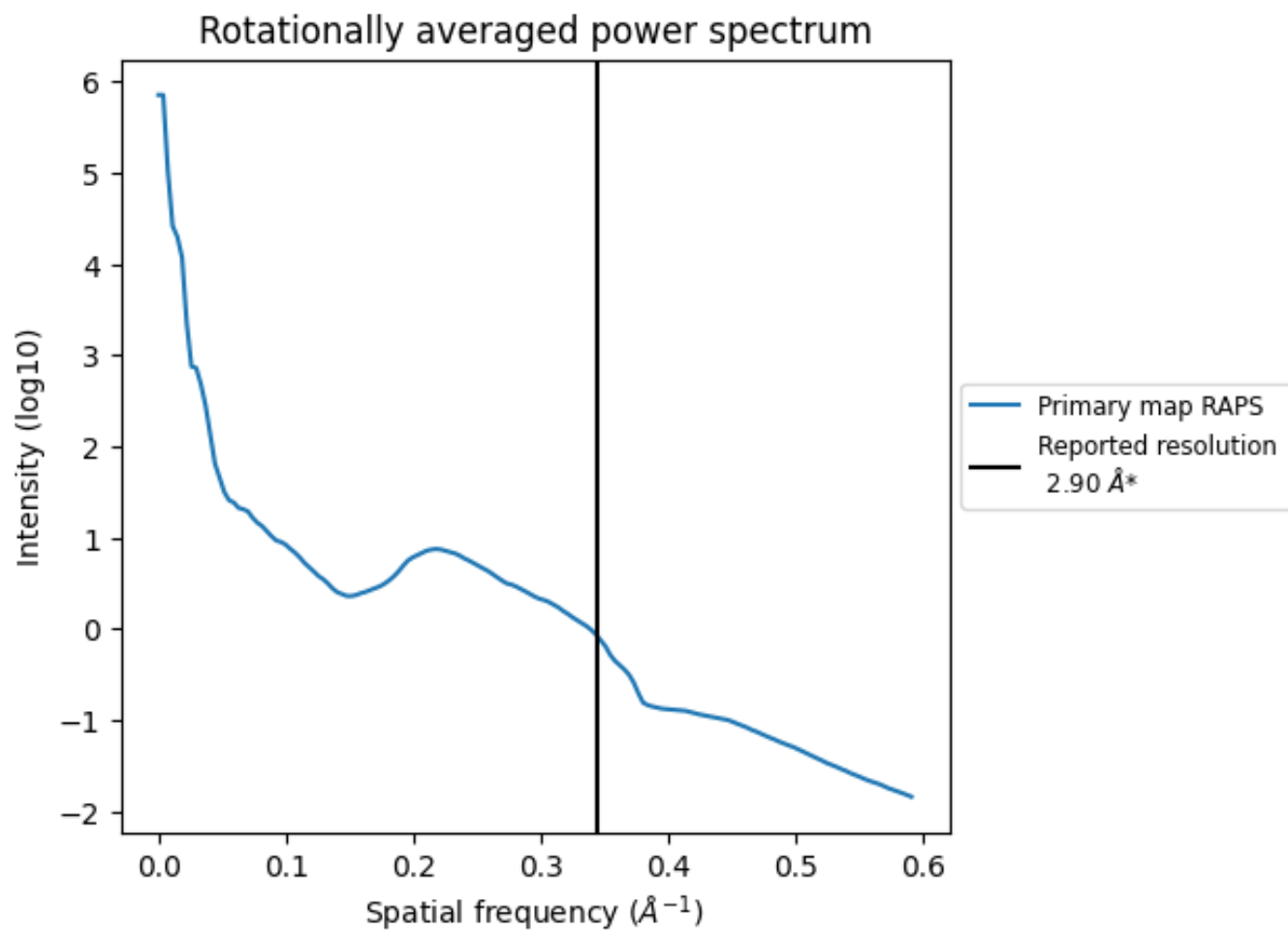
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 49 nm³; this corresponds to an approximate mass of 45 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 0.345 Å⁻¹

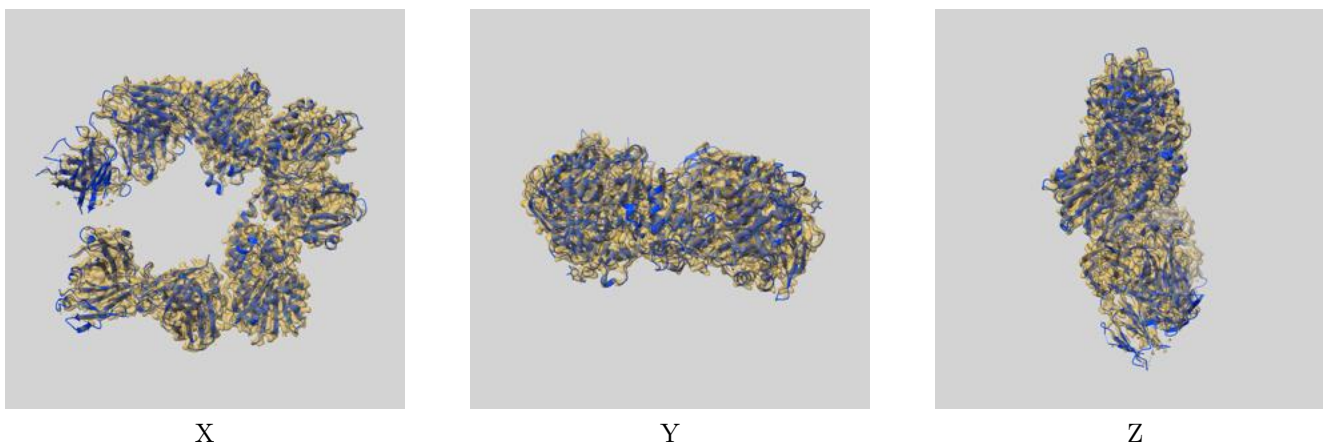
8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-71128 and PDB model 9P1M. Per-residue inclusion information can be found in section 3 on page 7.

9.1 Map-model overlay [i](#)



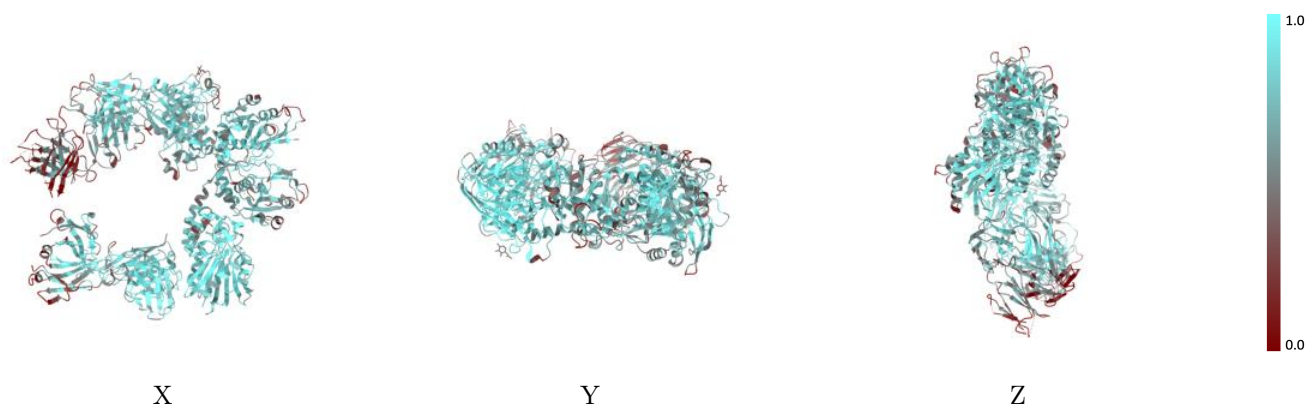
The images above show the 3D surface view of the map at the recommended contour level 0.735 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



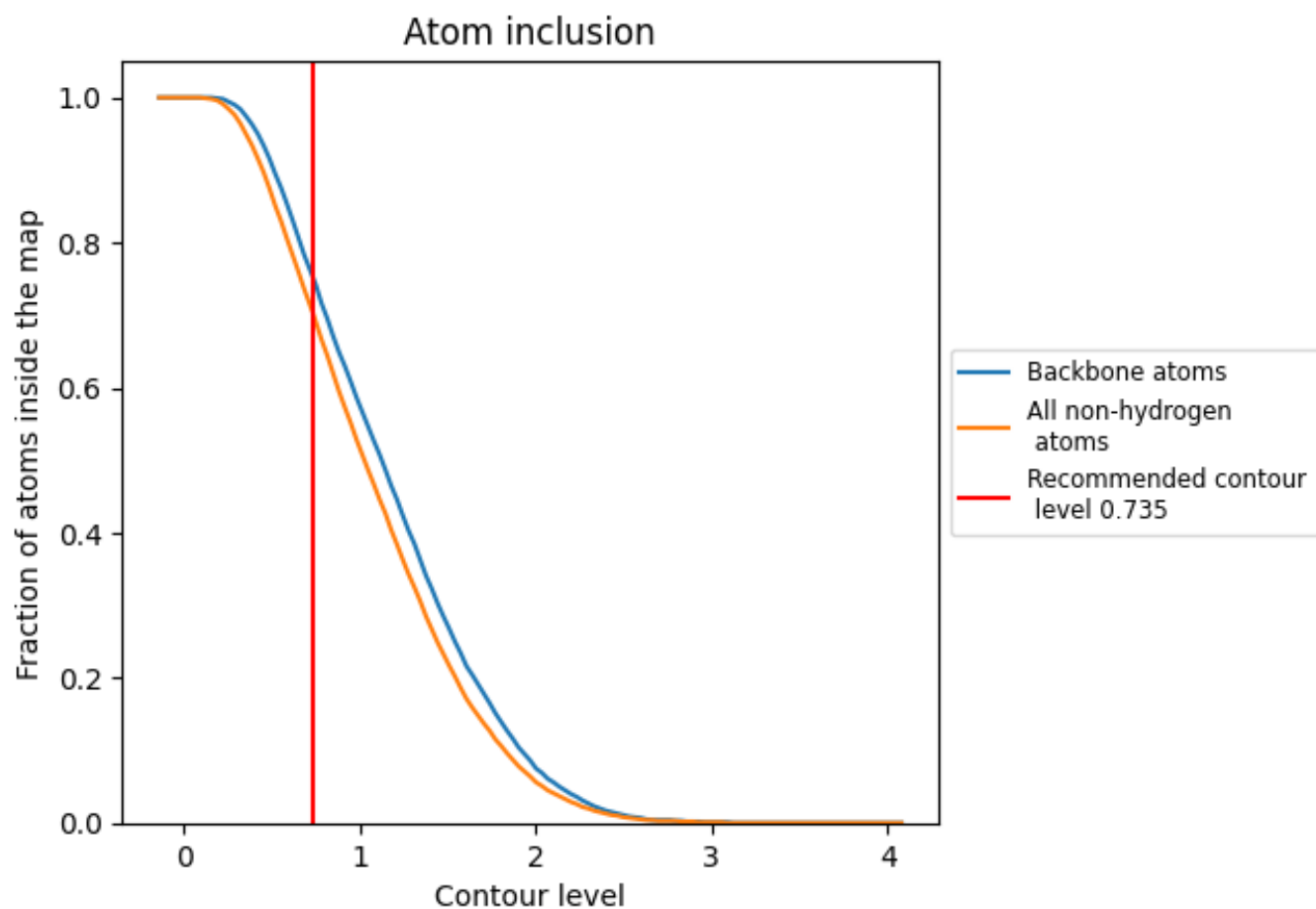
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.735).















9.4 Atom inclusion [i](#)



At the recommended contour level, 75% of all backbone atoms, 70% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.735) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7010	 0.5910
A	 0.7750	 0.6070
B	 0.7260	 0.5970
C	 0.6730	 0.5880
D	 0.7800	 0.6180
E	 0.5170	 0.5400
F	 0.5450	 0.5570

