



Full wwPDB EM Validation Report ⓘ

Mar 8, 2026 – 09:04 AM UTC

PDB ID : 8WYI / pdb_00008wyi
EMDB ID : EMD-37929
Title : T cell receptor delta 2 gamma 9 with TCRD TM domain chimera of TRAC
Authors : Xin, W.; Huang, B.; Chi, X.; Liu, Y.; Xu, M.; Zhang, Y.; Li, X.; Su, Q.; Zhou, Q.
Deposited on : 2023-10-31
Resolution : 3.90 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
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

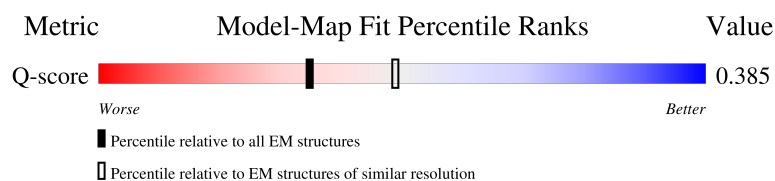
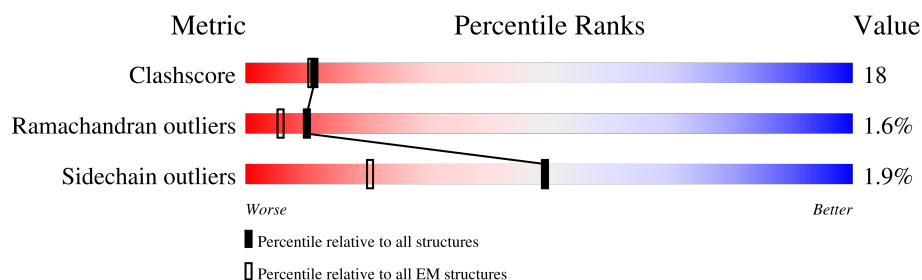
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.90 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	8855 (3.40 - 4.40)

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	195	 10% 6% 85%
1	b	195	 11% 86%
2	d	171	 39% 23% 38%
3	e	207	 6% 42% 17% 42%

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Mol	Chain	Length	Quality of chain
3	f	207	6%36%19%.43%
4	g	182	9%42%19%.37%
5	m	310	7%. .88%
6	n	332	7%.89%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 4659 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 T-cell surface glycoprotein CD3 zeta chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	a	30	Total	C	N	O	S	0	0
			245	172	35	37	1		
1	b	28	Total	C	N	O	S	0	0
			226	157	33	35	1		

There are 62 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
a	165	ALA	-	expression tag	UNP P20963
a	166	ALA	-	expression tag	UNP P20963
a	167	ALA	-	expression tag	UNP P20963
a	168	TRP	-	expression tag	UNP P20963
a	169	SER	-	expression tag	UNP P20963
a	170	HIS	-	expression tag	UNP P20963
a	171	PRO	-	expression tag	UNP P20963
a	172	GLN	-	expression tag	UNP P20963
a	173	PHE	-	expression tag	UNP P20963
a	174	GLU	-	expression tag	UNP P20963
a	175	LYS	-	expression tag	UNP P20963
a	176	GLY	-	expression tag	UNP P20963
a	177	GLY	-	expression tag	UNP P20963
a	178	GLY	-	expression tag	UNP P20963
a	179	SER	-	expression tag	UNP P20963
a	180	GLY	-	expression tag	UNP P20963
a	181	GLY	-	expression tag	UNP P20963
a	182	GLY	-	expression tag	UNP P20963
a	183	SER	-	expression tag	UNP P20963
a	184	GLY	-	expression tag	UNP P20963
a	185	GLY	-	expression tag	UNP P20963
a	186	SER	-	expression tag	UNP P20963
a	187	ALA	-	expression tag	UNP P20963
a	188	TRP	-	expression tag	UNP P20963
a	189	SER	-	expression tag	UNP P20963
a	190	HIS	-	expression tag	UNP P20963

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Chain	Residue	Modelled	Actual	Comment	Reference
a	191	PRO	-	expression tag	UNP P20963
a	192	GLN	-	expression tag	UNP P20963
a	193	PHE	-	expression tag	UNP P20963
a	194	GLU	-	expression tag	UNP P20963
a	195	LYS	-	expression tag	UNP P20963
b	165	ALA	-	expression tag	UNP P20963
b	166	ALA	-	expression tag	UNP P20963
b	167	ALA	-	expression tag	UNP P20963
b	168	TRP	-	expression tag	UNP P20963
b	169	SER	-	expression tag	UNP P20963
b	170	HIS	-	expression tag	UNP P20963
b	171	PRO	-	expression tag	UNP P20963
b	172	GLN	-	expression tag	UNP P20963
b	173	PHE	-	expression tag	UNP P20963
b	174	GLU	-	expression tag	UNP P20963
b	175	LYS	-	expression tag	UNP P20963
b	176	GLY	-	expression tag	UNP P20963
b	177	GLY	-	expression tag	UNP P20963
b	178	GLY	-	expression tag	UNP P20963
b	179	SER	-	expression tag	UNP P20963
b	180	GLY	-	expression tag	UNP P20963
b	181	GLY	-	expression tag	UNP P20963
b	182	GLY	-	expression tag	UNP P20963
b	183	SER	-	expression tag	UNP P20963
b	184	GLY	-	expression tag	UNP P20963
b	185	GLY	-	expression tag	UNP P20963
b	186	SER	-	expression tag	UNP P20963
b	187	ALA	-	expression tag	UNP P20963
b	188	TRP	-	expression tag	UNP P20963
b	189	SER	-	expression tag	UNP P20963
b	190	HIS	-	expression tag	UNP P20963
b	191	PRO	-	expression tag	UNP P20963
b	192	GLN	-	expression tag	UNP P20963
b	193	PHE	-	expression tag	UNP P20963
b	194	GLU	-	expression tag	UNP P20963
b	195	LYS	-	expression tag	UNP P20963

- Molecule 2 is a protein called T-cell surface glycoprotein CD3 delta chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	d	106	Total	C	N	O	S	0	0
			821	523	136	156	6		

- Molecule 3 is a protein called T-cell surface glycoprotein CD3 epsilon chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	e	121	Total	C	N	O	S	0	0
			959	609	151	191	8		
3	f	118	Total	C	N	O	S	0	0
			933	594	148	183	8		

- Molecule 4 is a protein called T-cell surface glycoprotein CD3 gamma chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	g	114	Total	C	N	O	S	0	0
			899	578	149	165	7		

- Molecule 5 is a protein called Signal peptide,flag tag,T cell receptor delta variable 2,T cell receptor delta constant,T cell receptor alpha chain constant,T cell receptor delta variable 2,T cell receptor delta constant,T cell receptor alpha chain constant.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	m	37	Total	C	N	O	S	0	0
			292	192	50	47	3		

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
m	116	LEU	-	linker	UNP A0JD36
m	117	GLY	-	linker	UNP A0JD36
m	118	MET	-	linker	UNP A0JD36
m	119	GLY	-	linker	UNP A0JD36
m	120	GLY	-	linker	UNP A0JD36
m	121	GLU	-	linker	UNP A0JD36
m	122	TYR	-	linker	UNP A0JD36
m	123	THR	-	linker	UNP A0JD36
m	124	ASP	-	linker	UNP A0JD36
m	125	LYS	-	linker	UNP A0JD36
m	126	LEU	-	linker	UNP A0JD36
m	127	ILE	-	linker	UNP A0JD36
m	128	PHE	-	linker	UNP A0JD36
m	129	GLY	-	linker	UNP A0JD36
m	130	LYS	-	linker	UNP A0JD36
m	131	GLY	-	linker	UNP A0JD36
m	132	THR	-	linker	UNP A0JD36
m	133	ARG	-	linker	UNP A0JD36
m	134	VAL	-	linker	UNP A0JD36

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Chain	Residue	Modelled	Actual	Comment	Reference
m	135	THR	-	linker	UNP A0JD36
m	136	VAL	-	linker	UNP A0JD36
m	137	GLU	-	linker	UNP A0JD36
m	138	PRO	-	linker	UNP A0JD36
m	139	ARG	-	linker	UNP A0JD36

- Molecule 6 is a protein called Signal peptide,flag tag,T cell receptor gamma variable 9,T cell receptor gamma constant 1,T cell receptor gamma variable 9,T cell receptor gamma constant 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	n	35	Total	C	N	O	S	0	0
			284	193	41	47	3		

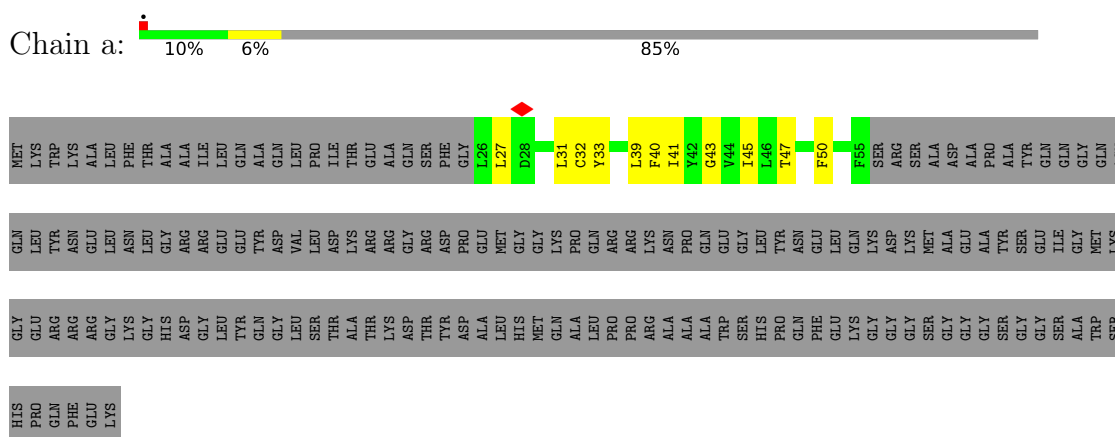
There are 21 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
n	123	ALA	-	linker	UNP Q99603
n	124	GLN	-	linker	UNP Q99603
n	125	GLN	-	linker	UNP Q99603
n	126	GLU	-	linker	UNP Q99603
n	127	LEU	-	linker	UNP Q99603
n	128	GLY	-	linker	UNP Q99603
n	129	LYS	-	linker	UNP Q99603
n	130	LYS	-	linker	UNP Q99603
n	131	ILE	-	linker	UNP Q99603
n	132	LYS	-	linker	UNP Q99603
n	133	VAL	-	linker	UNP Q99603
n	134	PHE	-	linker	UNP Q99603
n	135	GLY	-	linker	UNP Q99603
n	136	PRO	-	linker	UNP Q99603
n	137	GLY	-	linker	UNP Q99603
n	138	THR	-	linker	UNP Q99603
n	139	LYS	-	linker	UNP Q99603
n	140	LEU	-	linker	UNP Q99603
n	141	ILE	-	linker	UNP Q99603
n	142	ILE	-	linker	UNP Q99603
n	143	THR	-	linker	UNP Q99603

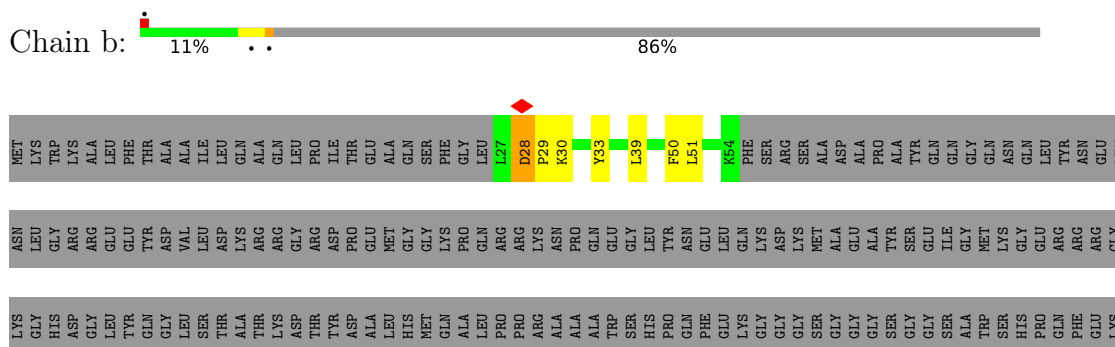
3 Residue-property plots [i](#)

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.

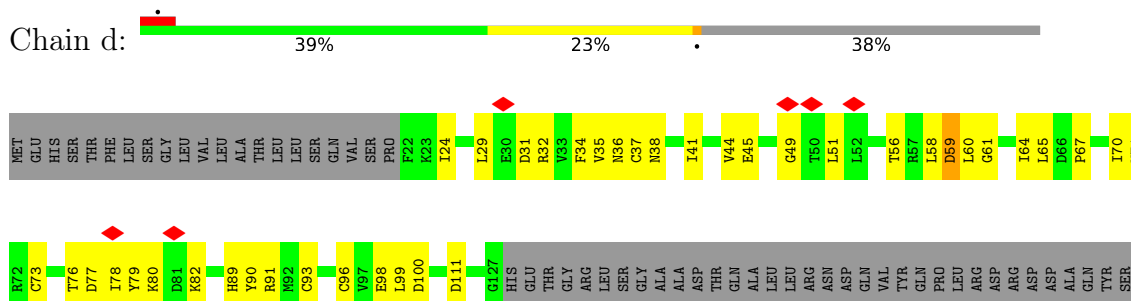
- Molecule 1: T-cell surface glycoprotein CD3 zeta chain



- Molecule 1: T-cell surface glycoprotein CD3 zeta chain

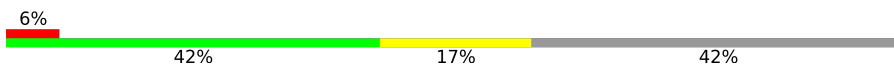


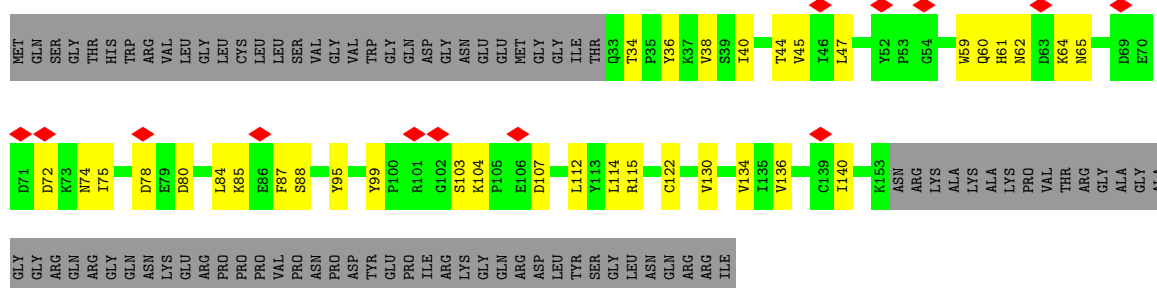
- Molecule 2: T-cell surface glycoprotein CD3 delta chain



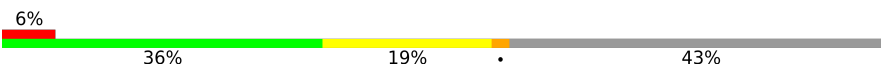
HIS
LEU
GLY
GLY
ASN
TRP
ALA
ARG
ASN
LYS

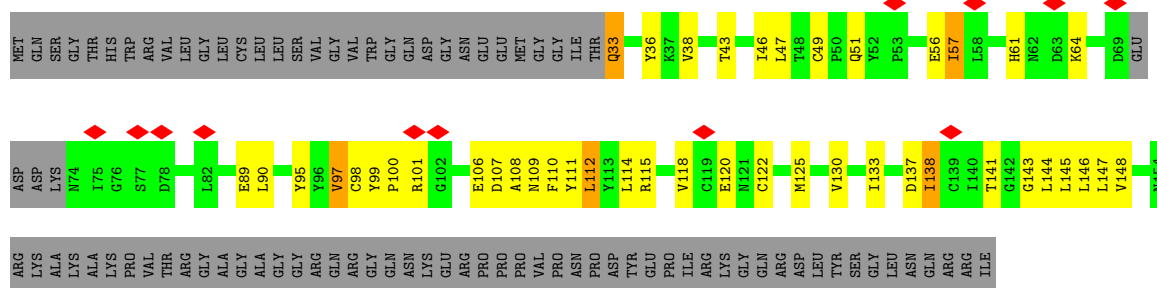
• Molecule 3: T-cell surface glycoprotein CD3 epsilon chain

Chain e: 

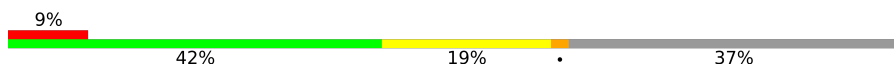


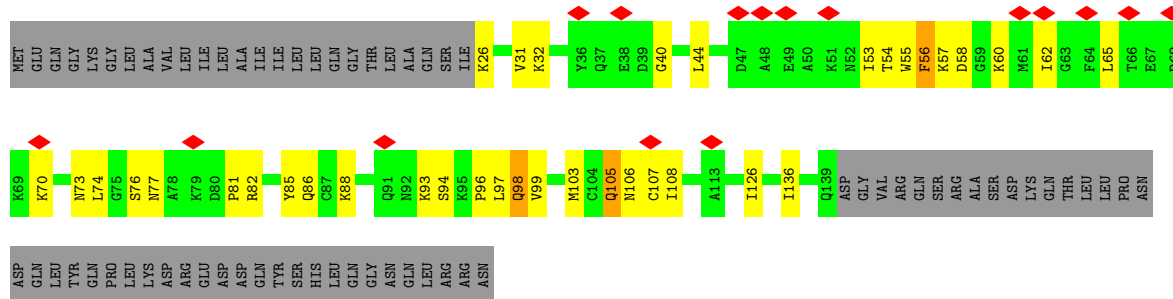
• Molecule 3: T-cell surface glycoprotein CD3 epsilon chain

Chain f: 



• Molecule 4: T-cell surface glycoprotein CD3 gamma chain

Chain g: 



• Molecule 5: Signal peptide,flag tag,T cell receptor delta variable 2,T cell receptor delta constant,T cell receptor alpha chain constant,T cell receptor delta variable 2,T cell receptor delta constant,T cell receptor alpha chain constant

Chain m: 

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	275838	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.165	Depositor
Minimum map value	-0.115	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.02	Depositor
Map size ($\text{\AA}$)	215.45999, 215.45999, 215.45999	wwPDB
Map dimensions	200, 200, 200	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.0773, 1.0773, 1.0773	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.19	0/250	0.46	0/338
1	b	0.17	0/230	0.45	0/311
2	d	0.24	0/833	0.70	0/1132
3	e	0.20	0/980	0.53	0/1331
3	f	0.19	0/953	0.59	1/1294 (0.1%)
4	g	0.22	0/917	0.71	0/1233
5	m	0.21	0/295	0.55	0/397
6	n	0.17	0/288	0.45	0/392
All	All	0.21	0/4746	0.60	1/6428 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	f	51	GLN	N-CA-C	-5.20	108.19	114.75

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	a	245	0	270	11	0
1	b	226	0	250	9	0
2	d	821	0	831	38	0
3	e	959	0	919	36	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	f	933	0	899	34	0
4	g	899	0	893	41	0
5	m	292	0	326	19	0
6	n	284	0	312	15	0
All	All	4659	0	4700	168	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 18.

All (168) 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:33:GLN:HE21	3:f:33:GLN:N	1.32	1.24
4:g:136:ILE:HD12	5:m:289:LEU:HD12	1.33	1.09
5:m:289:LEU:O	5:m:290:TRP:CE3	2.07	1.07
3:f:33:GLN:N	3:f:33:GLN:NE2	2.16	0.94
5:m:289:LEU:O	5:m:290:TRP:CD2	2.21	0.93
4:g:136:ILE:CD1	5:m:289:LEU:HD12	1.98	0.93
3:e:60:GLN:HG2	3:e:65:ASN:HA	1.60	0.83
2:d:38:ASN:ND2	2:d:76:THR:OG1	2.22	0.72
3:e:36:TYR:HD2	3:e:112:LEU:HD12	1.53	0.72
5:m:290:TRP:CE3	5:m:290:TRP:HA	2.26	0.70
5:m:290:TRP:HA	5:m:290:TRP:HE3	1.57	0.70
5:m:291:SER:OG	5:m:292:SER:N	2.19	0.69
2:d:44:VAL:HG13	2:d:45:GLU:HG2	1.76	0.68
1:b:30:LYS:NZ	6:n:277:THR:OG1	2.27	0.67
3:f:137:ASP:O	3:f:141:THR:HG22	1.96	0.65
2:d:41:ILE:HD11	2:d:58:LEU:HD13	1.79	0.65
3:f:36:TYR:CZ	3:f:49:CYS:HB3	2.32	0.64
4:g:103:MET:N	4:g:103:MET:SD	2.70	0.64
3:e:36:TYR:CD2	3:e:112:LEU:HD12	2.32	0.63
3:f:36:TYR:OH	3:f:98:CYS:SG	2.52	0.63
1:b:51:LEU:HB3	5:m:287:LEU:HD11	1.81	0.62
4:g:44:LEU:HD11	4:g:85:TYR:HD2	1.64	0.62
2:d:78:ILE:O	2:d:80:LYS:NZ	2.33	0.62
3:f:112:LEU:HA	4:g:98:GLN:HB3	1.81	0.62
3:f:138:ILE:HG12	6:n:290:LEU:HD11	1.81	0.62
4:g:136:ILE:HD12	5:m:289:LEU:CD1	2.21	0.61
4:g:55:TRP:HE1	4:g:65:LEU:HB2	1.66	0.60
3:f:57:ILE:HA	3:f:100:PRO:HA	1.83	0.60
3:f:125:MET:O	4:g:106:ASN:ND2	2.35	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:b:28:ASP:OD1	1:b:29:PRO:HD2	2.03	0.58
4:g:105:GLN:HG2	4:g:106:ASN:OD1	2.04	0.58
4:g:86:GLN:HE22	4:g:96:PRO:N	2.02	0.58
1:a:32:CYS:HB2	1:b:33:TYR:HE1	1.69	0.57
5:m:288:ARG:C	5:m:288:ARG:HD3	2.29	0.57
2:d:80:LYS:O	2:d:82:LYS:NZ	2.27	0.57
4:g:107:CYS:O	6:n:276:LEU:HD13	2.04	0.57
2:d:100:ASP:H	5:m:263:MET:HE2	1.70	0.57
4:g:86:GLN:NE2	4:g:94:SER:O	2.35	0.56
3:e:47:LEU:HG	3:e:59:TRP:HZ3	1.70	0.56
2:d:77:ASP:N	2:d:77:ASP:OD1	2.37	0.56
4:g:54:THR:OG1	4:g:88:LYS:NZ	2.33	0.56
2:d:35:VAL:HG11	2:d:41:ILE:HD13	1.89	0.55
1:a:39:LEU:HD22	1:b:39:LEU:HG	1.89	0.55
4:g:55:TRP:CZ2	4:g:65:LEU:HD12	2.42	0.55
4:g:56:PHE:HB2	4:g:86:GLN:HB2	1.88	0.55
3:e:60:GLN:NE2	3:e:99:TYR:HE1	2.04	0.55
4:g:57:LYS:HG2	4:g:58:ASP:OD1	2.07	0.55
1:a:41:ILE:O	1:a:45:ILE:HG22	2.08	0.53
3:f:125:MET:SD	4:g:108:ILE:HD11	2.47	0.53
2:d:37:CYS:SG	2:d:38:ASN:N	2.80	0.53
3:e:60:GLN:HE22	3:e:99:TYR:HE1	1.56	0.53
3:f:111:TYR:HB2	4:g:97:LEU:HD12	1.90	0.53
2:d:70:ILE:C	2:d:71:TYR:HD1	2.17	0.52
4:g:88:LYS:N	4:g:88:LYS:HD3	2.24	0.52
3:f:109:ASN:C	3:f:110:PHE:HD1	2.16	0.52
3:e:112:LEU:HD22	3:e:114:LEU:HB3	1.92	0.52
3:e:115:ARG:HH11	3:e:115:ARG:HG2	1.76	0.51
3:f:107:ASP:OD1	3:f:107:ASP:N	2.34	0.51
1:a:50:PHE:HD2	1:b:50:PHE:HA	1.76	0.51
2:d:29:LEU:HG	2:d:34:PHE:CE1	2.46	0.51
5:m:264:MET:HB3	6:n:278:ASN:HD22	1.75	0.51
4:g:60:LYS:HD2	4:g:60:LYS:C	2.37	0.50
3:f:38:VAL:HG22	3:f:47:LEU:HB3	1.93	0.50
4:g:86:GLN:OE1	4:g:96:PRO:HG3	2.11	0.50
3:e:74:ASN:OD1	3:e:75:ILE:N	2.45	0.49
4:g:105:GLN:HG2	4:g:106:ASN:N	2.27	0.49
3:e:61:HIS:ND1	3:e:62:ASN:OD1	2.39	0.49
3:e:134:VAL:HG21	5:m:269:LEU:HD11	1.95	0.49
4:g:74:LEU:HD11	4:g:85:TYR:HE2	1.77	0.49
1:a:27:LEU:HD13	1:a:31:LEU:HD22	1.95	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:f:144:LEU:O	3:f:148:VAL:HG12	2.13	0.49
3:f:56:GLU:HB2	3:f:101:ARG:HB2	1.95	0.49
3:e:60:GLN:HB3	3:e:64:LYS:O	2.13	0.48
3:f:115:ARG:HG2	4:g:103:MET:HE1	1.94	0.48
3:f:97:VAL:HB	3:f:111:TYR:CE2	2.49	0.48
4:g:31:VAL:C	4:g:32:LYS:HD2	2.38	0.48
2:d:67:PRO:HD2	2:d:90:TYR:HB2	1.95	0.48
3:e:59:TRP:CD1	3:e:59:TRP:N	2.82	0.48
3:f:112:LEU:HD12	3:f:114:LEU:HB2	1.95	0.48
3:e:34:THR:O	3:e:34:THR:OG1	2.25	0.47
3:e:61:HIS:HB2	3:e:95:TYR:O	2.13	0.47
3:f:99:TYR:HB3	3:f:108:ALA:HB2	1.96	0.47
4:g:57:LYS:HD3	4:g:62:ILE:HD12	1.96	0.47
6:n:274:LEU:O	6:n:278:ASN:HB2	2.13	0.47
3:e:40:ILE:HG22	3:e:45:VAL:HG23	1.97	0.47
6:n:295:TYR:O	6:n:299:ILE:HG23	2.15	0.47
1:a:31:LEU:HD21	3:e:130:VAL:HG11	1.96	0.47
3:f:111:TYR:CB	4:g:97:LEU:HD12	2.45	0.47
2:d:32:ARG:NH2	2:d:61:GLY:HA2	2.30	0.46
3:e:44:THR:HG22	3:e:85:LYS:HG2	1.97	0.46
4:g:70:LYS:NZ	4:g:70:LYS:HB3	2.31	0.46
4:g:74:LEU:HD11	4:g:85:TYR:CE2	2.50	0.46
2:d:98:GLU:HA	3:e:122:CYS:HB3	1.97	0.46
2:d:93:CYS:HB2	2:d:96:CYS:HB2	1.54	0.46
3:f:36:TYR:CE1	3:f:112:LEU:HD22	2.51	0.46
2:d:111:ASP:HA	5:m:274:LEU:HD21	1.98	0.45
3:f:43:THR:HA	3:f:118:VAL:HG11	1.98	0.45
1:a:43:GLY:O	1:a:47:THR:HG22	2.17	0.45
2:d:38:ASN:HD22	2:d:77:ASP:H	1.64	0.45
3:e:136:VAL:O	3:e:140:ILE:HG22	2.16	0.45
3:f:106:GLU:HG2	4:g:26:LYS:HA	1.98	0.45
2:d:35:VAL:HG21	2:d:71:TYR:HE2	1.82	0.45
2:d:65:LEU:HD23	2:d:65:LEU:O	2.16	0.45
2:d:59:ASP:O	2:d:60:LEU:HD12	2.16	0.45
2:d:91:ARG:HE	3:e:40:ILE:HD11	1.81	0.45
3:e:104:LYS:HA	3:e:104:LYS:HD3	1.89	0.45
3:f:61:HIS:ND1	3:f:95:TYR:O	2.50	0.45
3:e:60:GLN:NE2	3:e:99:TYR:CE1	2.80	0.45
3:f:143:GLY:O	3:f:147:LEU:HD23	2.17	0.44
5:m:265:SER:N	6:n:278:ASN:HD21	2.15	0.44
5:m:282:ASN:HD21	6:n:296:PHE:N	2.15	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:g:44:LEU:HD11	4:g:85:TYR:CD2	2.49	0.44
2:d:32:ARG:HA	2:d:61:GLY:O	2.18	0.44
2:d:60:LEU:HD21	2:d:71:TYR:OH	2.18	0.44
2:d:98:GLU:HG2	3:e:122:CYS:HB3	1.99	0.44
3:f:46:ILE:C	3:f:46:ILE:HD12	2.43	0.44
4:g:73:ASN:OD1	4:g:74:LEU:N	2.50	0.44
5:m:288:ARG:O	5:m:289:LEU:O	2.35	0.44
3:e:112:LEU:CD2	3:e:114:LEU:HB3	2.48	0.43
2:d:51:LEU:HA	2:d:58:LEU:O	2.18	0.43
2:d:41:ILE:HG22	2:d:73:CYS:HB3	1.99	0.43
2:d:99:LEU:O	2:d:99:LEU:HD12	2.18	0.43
3:e:103:SER:HB2	3:e:107:ASP:OD2	2.18	0.43
4:g:81:PRO:C	4:g:82:ARG:HG2	2.44	0.43
2:d:35:VAL:HG21	2:d:71:TYR:CE2	2.53	0.43
3:e:75:ILE:HD13	3:e:84:LEU:HG	2.00	0.43
3:e:87:PHE:HD1	3:e:88:SER:N	2.17	0.43
3:f:146:LEU:HD23	3:f:146:LEU:HA	1.78	0.43
3:e:74:ASN:OD1	3:e:75:ILE:HG12	2.19	0.43
4:g:60:LYS:NZ	4:g:62:ILE:HG12	2.34	0.43
4:g:126:ILE:HD13	4:g:126:ILE:HA	1.88	0.43
6:n:291:LYS:O	6:n:294:VAL:HG12	2.19	0.43
3:e:78:ASP:OD1	3:e:78:ASP:N	2.44	0.42
1:a:40:PHE:HA	1:b:39:LEU:HD11	2.02	0.42
3:e:60:GLN:CG	3:e:65:ASN:HA	2.39	0.42
1:a:50:PHE:HB2	1:b:50:PHE:HB2	2.01	0.42
2:d:36:ASN:HB2	2:d:56:THR:HG22	2.01	0.42
3:e:80:ASP:OD1	3:e:80:ASP:N	2.52	0.42
2:d:80:LYS:HD3	2:d:80:LYS:N	2.34	0.42
6:n:291:LYS:HE3	6:n:291:LYS:HB2	1.88	0.42
1:a:32:CYS:SG	1:a:33:TYR:N	2.93	0.42
2:d:24:ILE:O	3:e:95:TYR:OH	2.29	0.42
4:g:55:TRP:NE1	4:g:65:LEU:HB2	2.34	0.42
6:n:274:LEU:HD12	6:n:274:LEU:HA	1.91	0.42
2:d:38:ASN:ND2	2:d:77:ASP:H	2.18	0.42
3:f:61:HIS:O	3:f:64:LYS:HB2	2.20	0.42
4:g:108:ILE:HG22	6:n:280:SER:HA	2.00	0.42
3:f:130:VAL:HA	3:f:133:ILE:HG22	2.02	0.42
2:d:91:ARG:HE	3:e:40:ILE:CD1	2.32	0.42
6:n:296:PHE:O	6:n:299:ILE:HG13	2.20	0.42
2:d:49:GLY:O	2:d:51:LEU:HG	2.19	0.41
1:a:40:PHE:N	1:b:39:LEU:HD21	2.35	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:d:89:HIS:O	2:d:89:HIS:ND1	2.53	0.41
4:g:40:GLY:O	4:g:76:SER:OG	2.33	0.41
2:d:77:ASP:CG	2:d:78:ILE:HD12	2.44	0.41
3:f:145:LEU:HA	3:f:148:VAL:HG12	2.03	0.41
3:f:89:GLU:C	3:f:89:GLU:OE1	2.64	0.41
4:g:82:ARG:HA	4:g:99:VAL:O	2.21	0.41
2:d:76:THR:N	2:d:79:TYR:O	2.54	0.41
3:f:145:LEU:HA	3:f:145:LEU:HD23	1.89	0.41
5:m:265:SER:CA	6:n:278:ASN:HD21	2.34	0.41
4:g:53:ILE:HG12	4:g:65:LEU:HD13	2.03	0.41
2:d:89:HIS:CD2	3:e:38:VAL:HB	2.57	0.40
6:n:288:LEU:HD23	6:n:288:LEU:HA	1.81	0.40
3:f:90:LEU:HA	3:f:90:LEU:HD23	1.84	0.40
3:e:72:ASP:C	3:e:74:ASN:H	2.29	0.40
4:g:88:LYS:HD2	4:g:93:LYS:NZ	2.37	0.40
5:m:257:HIS:CE1	5:m:260:LYS:HE2	2.57	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	a	28/195 (14%)	28 (100%)	0	0	100	100
1	b	26/195 (13%)	25 (96%)	0	1 (4%)	2	21
2	d	104/171 (61%)	87 (84%)	16 (15%)	1 (1%)	12	45
3	e	119/207 (58%)	107 (90%)	12 (10%)	0	100	100
3	f	114/207 (55%)	99 (87%)	12 (10%)	3 (3%)	4	28
4	g	112/182 (62%)	87 (78%)	23 (20%)	2 (2%)	6	34
5	m	35/310 (11%)	32 (91%)	1 (3%)	2 (6%)	1	16

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
6	n	33/332 (10%)	33 (100%)	0	0	100	100
All	All	571/1799 (32%)	498 (87%)	64 (11%)	9 (2%)	10	36

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	d	59	ASP
4	g	105	GLN
5	m	289	LEU
3	f	57	ILE
3	f	122	CYS
3	f	120	GLU
5	m	291	SER
4	g	98	GLN
1	b	28	ASP

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	a	27/154 (18%)	27 (100%)	0	100	100
1	b	25/154 (16%)	25 (100%)	0	100	100
2	d	93/147 (63%)	91 (98%)	2 (2%)	45	64
3	e	109/177 (62%)	109 (100%)	0	100	100
3	f	106/177 (60%)	102 (96%)	4 (4%)	29	52
4	g	96/155 (62%)	94 (98%)	2 (2%)	47	65
5	m	34/273 (12%)	32 (94%)	2 (6%)	18	44
6	n	33/298 (11%)	33 (100%)	0	100	100
All	All	523/1535 (34%)	513 (98%)	10 (2%)	49	66

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	d	31	ASP
2	d	64	ILE
3	f	33	GLN
3	f	97	VAL
3	f	112	LEU
3	f	138	ILE
4	g	56	PHE
4	g	77	ASN
5	m	258	THR
5	m	290	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
2	d	38	ASN
3	e	65	ASN
6	n	278	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

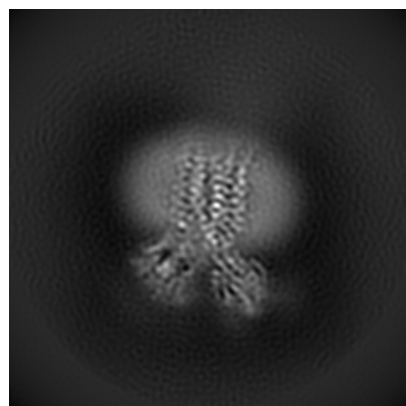
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-37929. These allow visual inspection of the internal detail of the map and identification of artifacts.

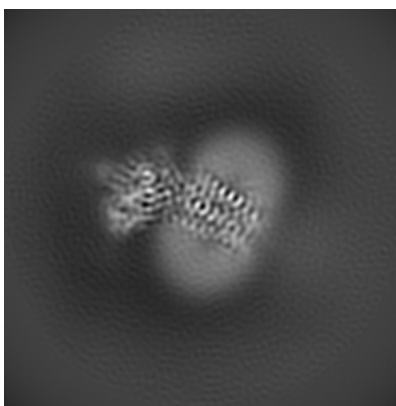
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

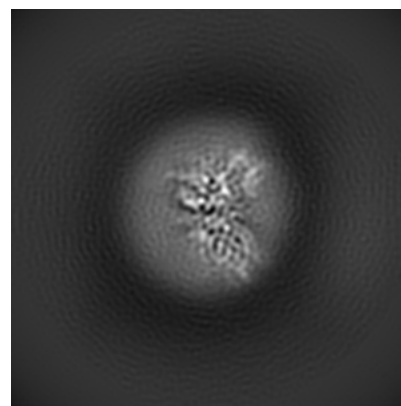
6.1.1 Primary map



X

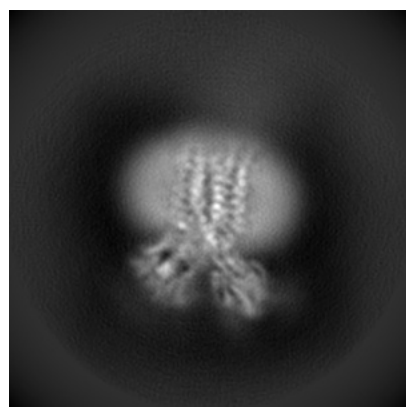


Y

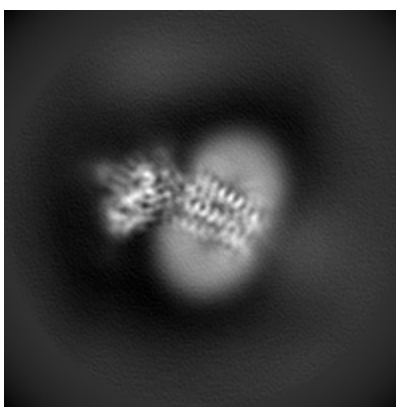


Z

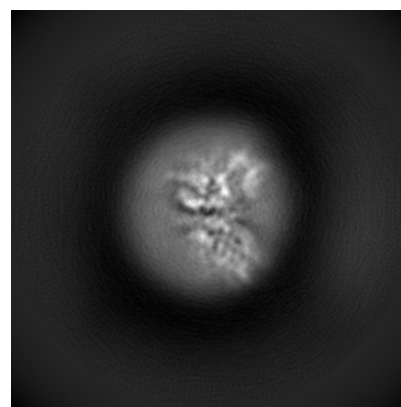
6.1.2 Raw map



X



Y

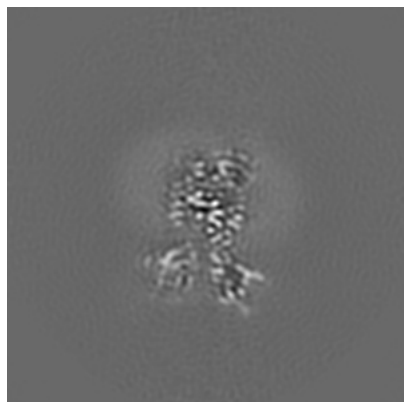


Z

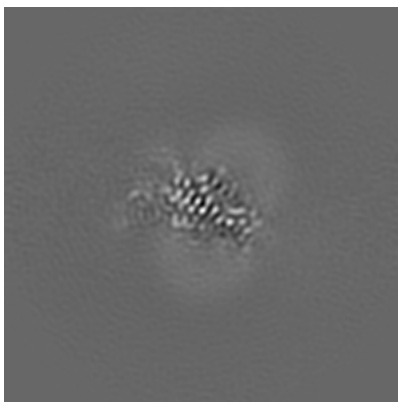
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

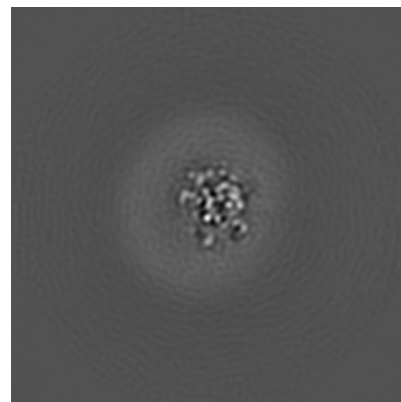
6.2.1 Primary map



X Index: 100

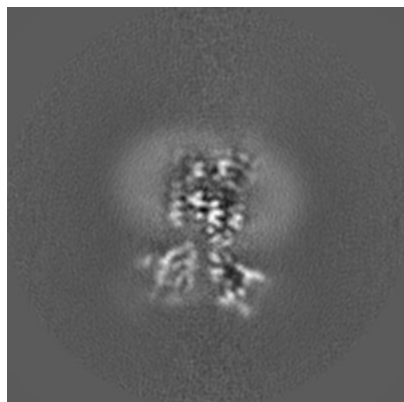


Y Index: 100

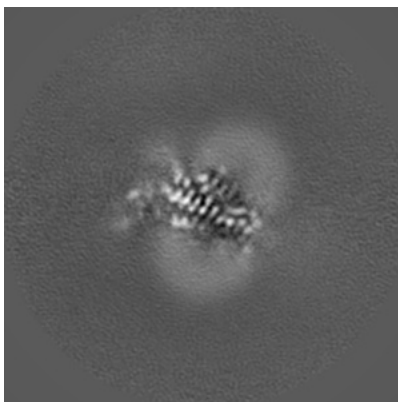


Z Index: 100

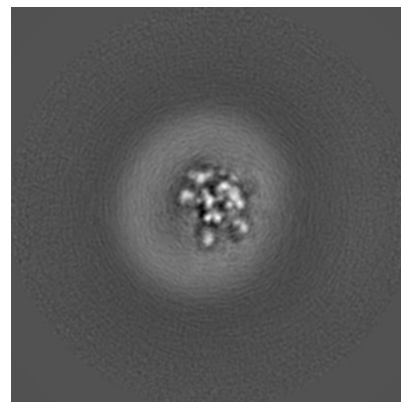
6.2.2 Raw map



X Index: 100



Y Index: 100

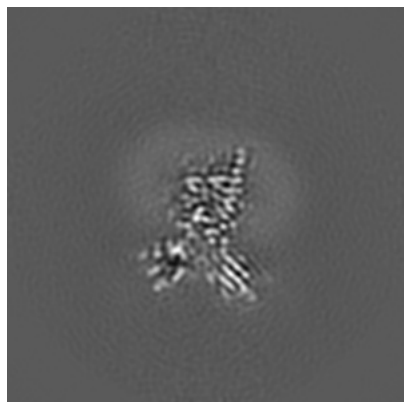


Z Index: 100

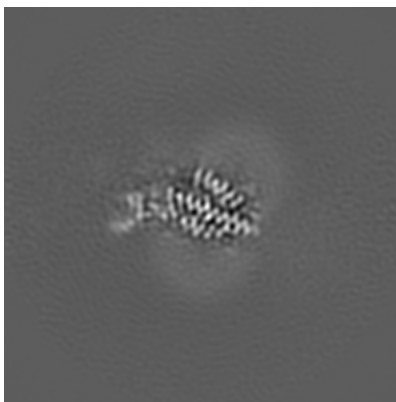
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

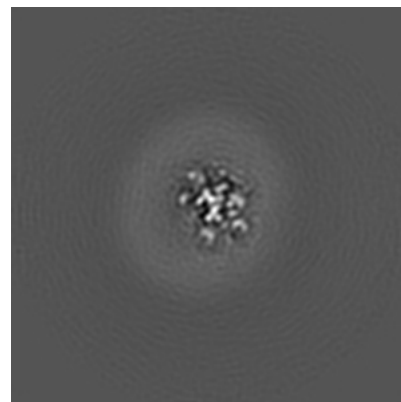
6.3.1 Primary map



X Index: 106

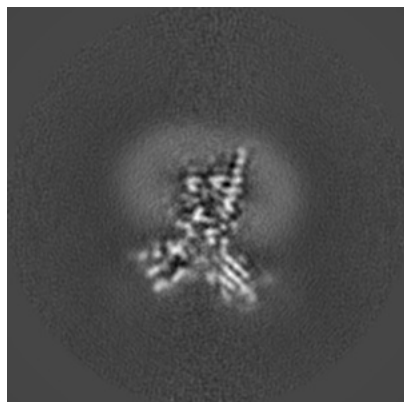


Y Index: 103

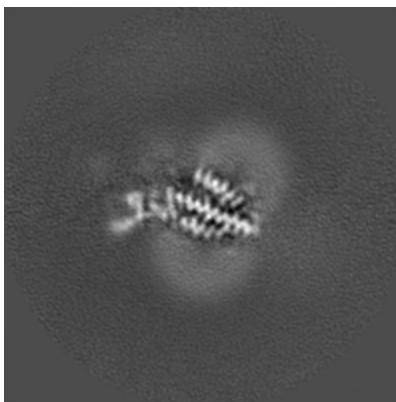


Z Index: 101

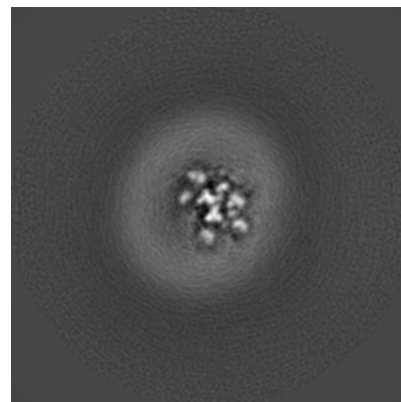
6.3.2 Raw map



X Index: 106



Y Index: 103

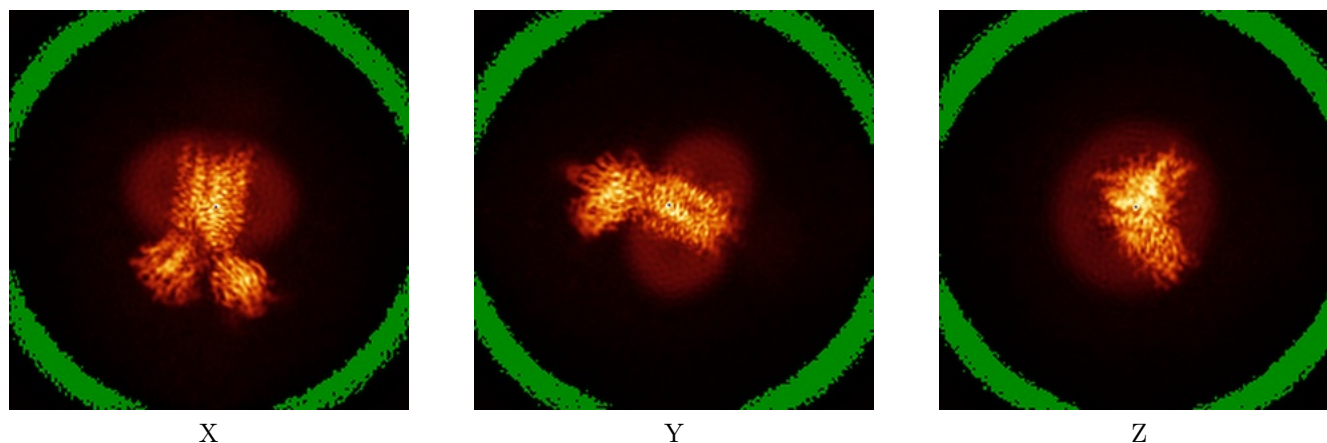


Z Index: 101

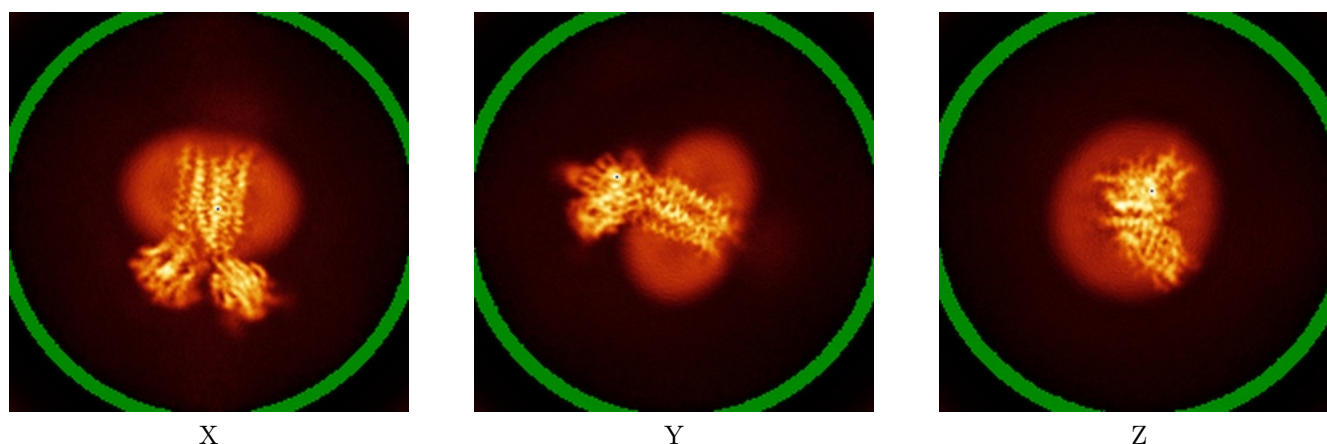
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



6.4.2 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.

6.5 Orthogonal surface views [i](#)

This section was not generated.

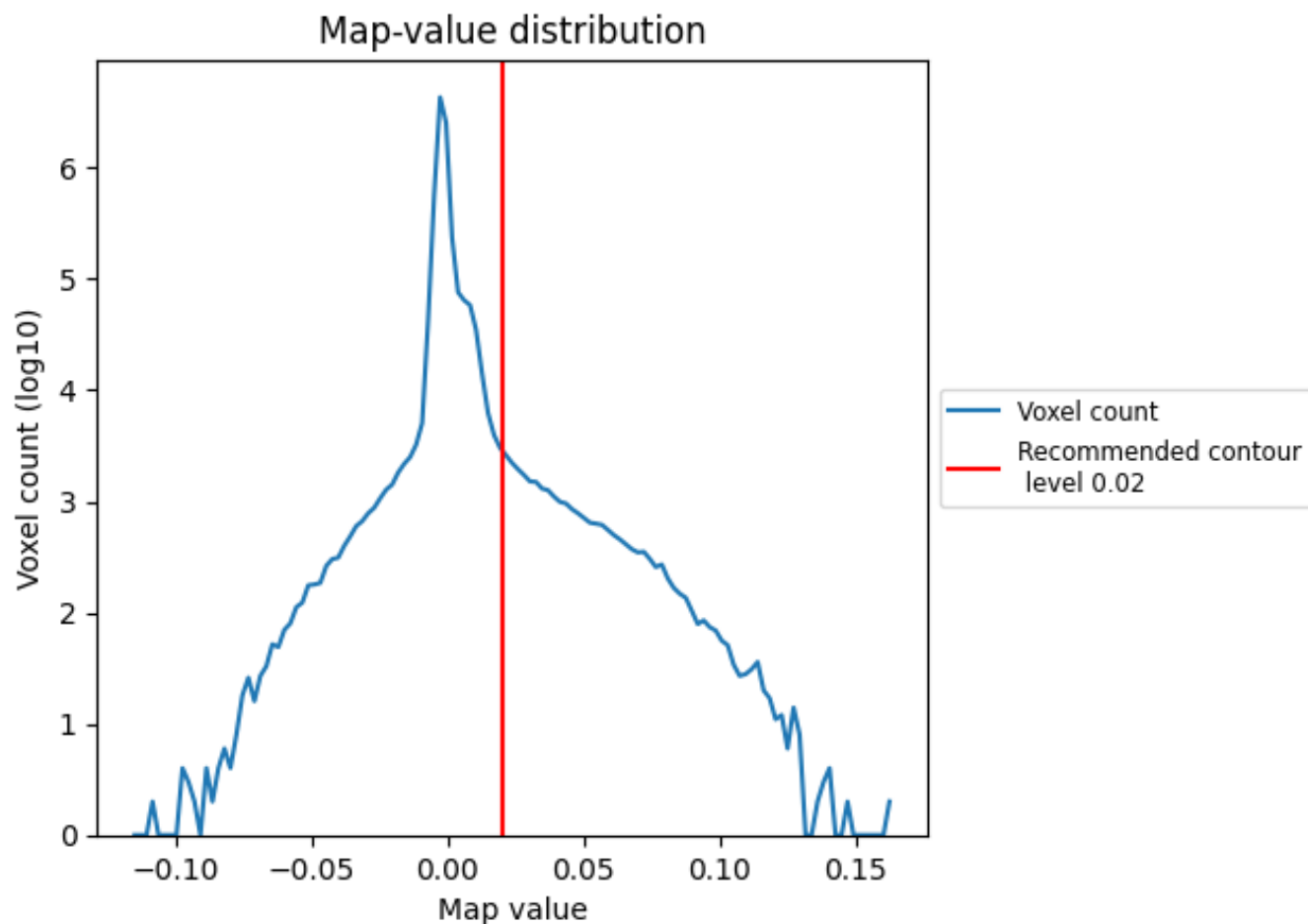
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

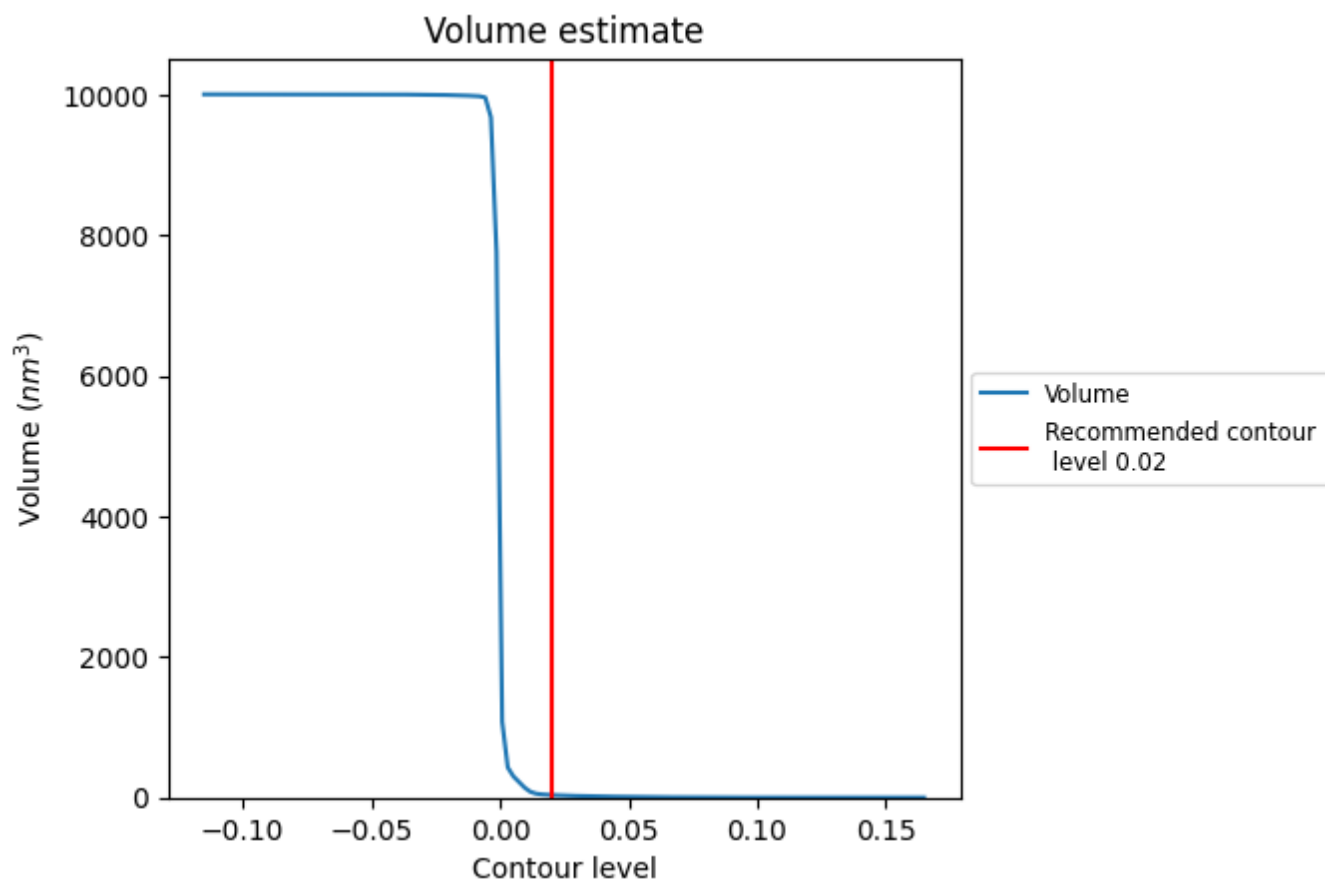
This section contains the results of statistical analysis of the map.

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.

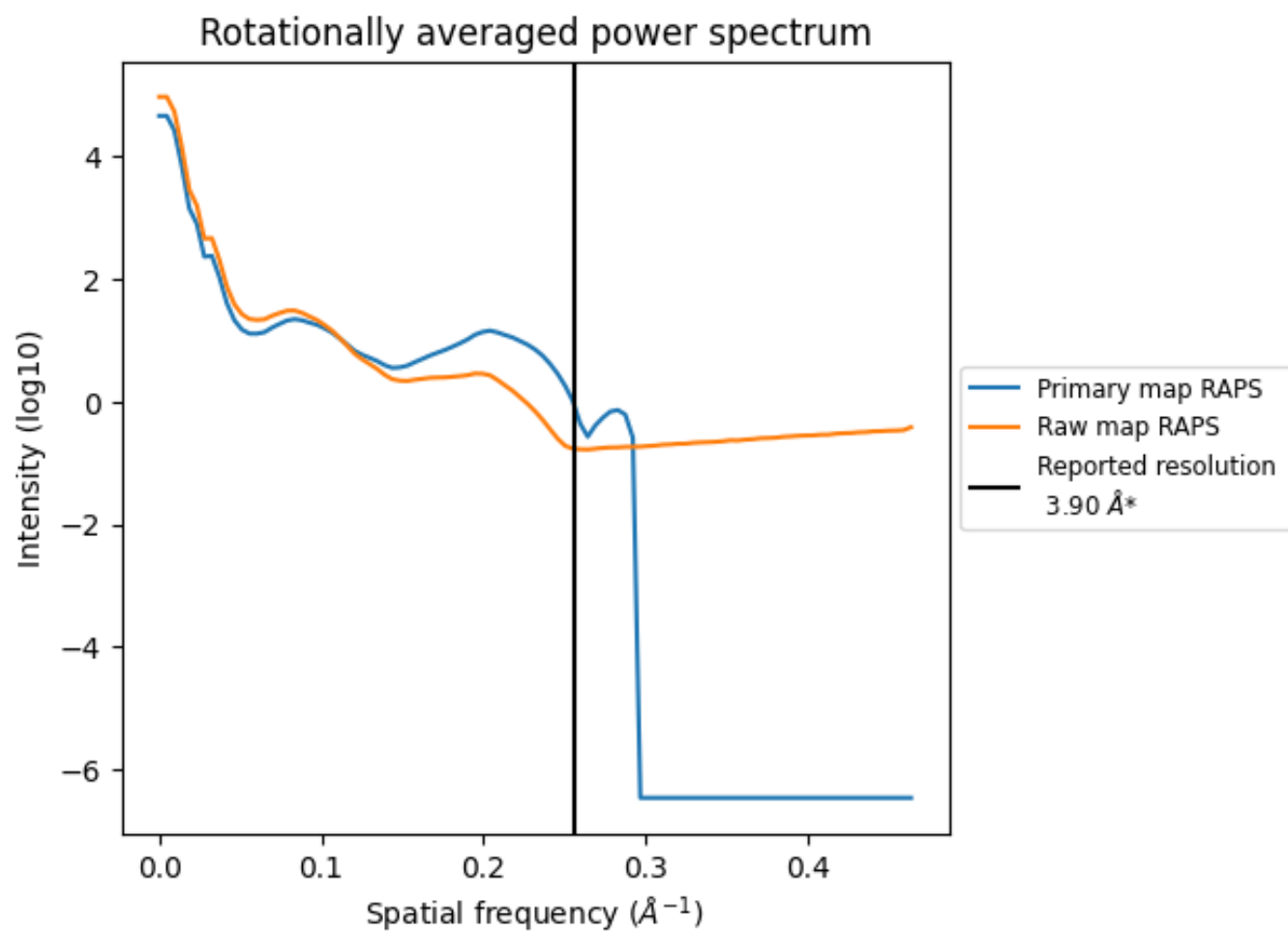
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 36 nm³; this corresponds to an approximate mass of 33 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ

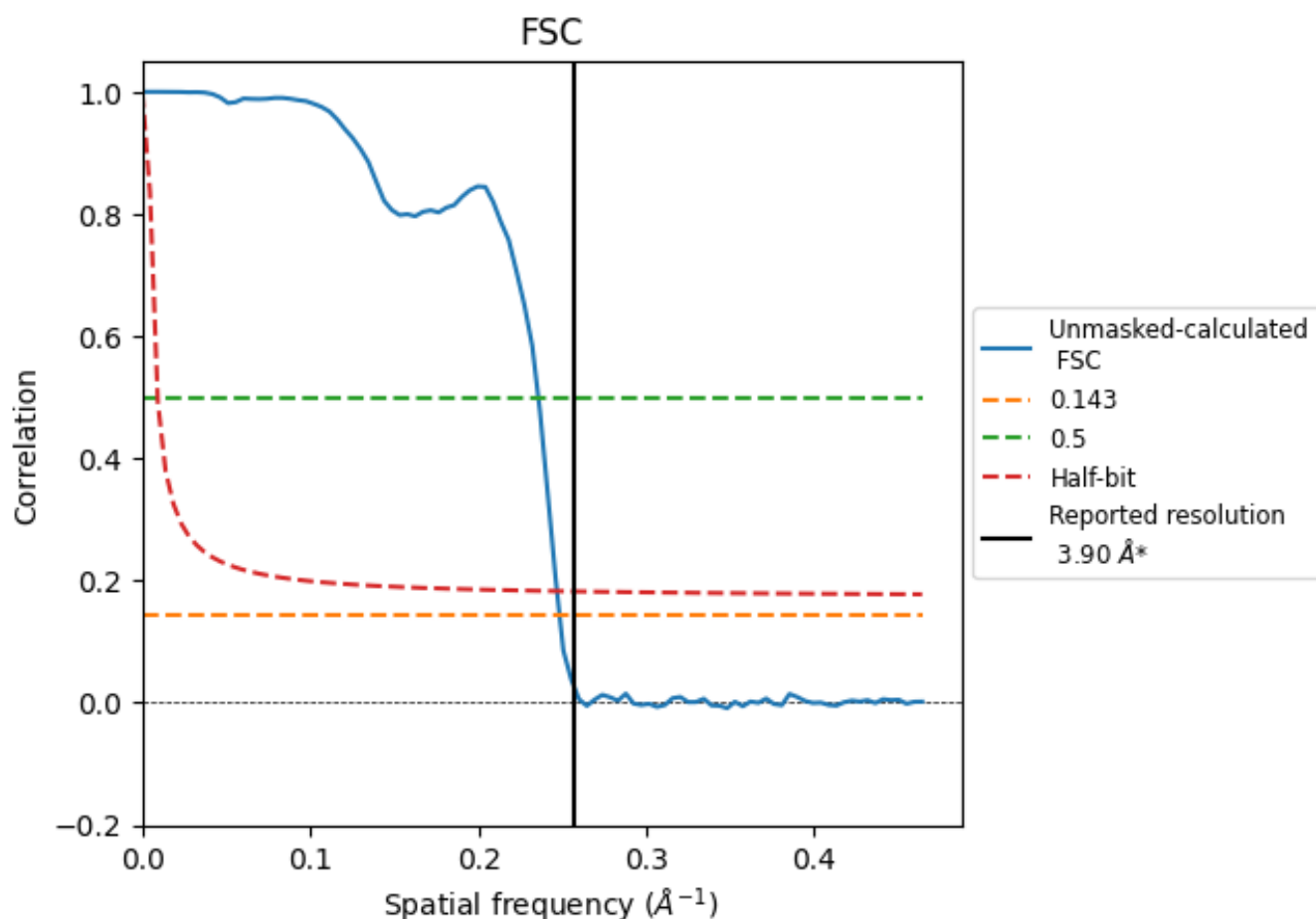


*Reported resolution corresponds to spatial frequency of 0.256 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.256 Å⁻¹

8.2 Resolution estimates [i](#)

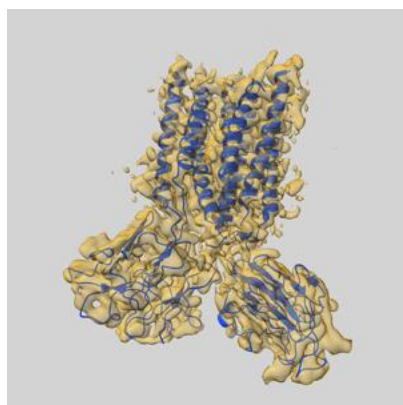
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.90	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.03	4.24	4.05

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

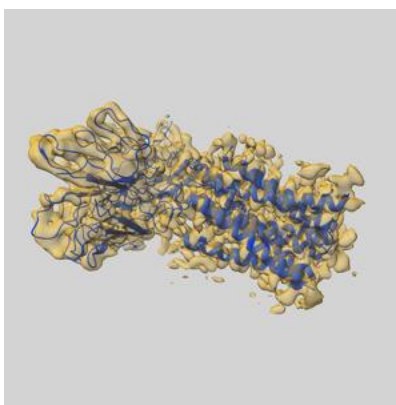
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-37929 and PDB model 8WYI. Per-residue inclusion information can be found in section 3 on page 8.

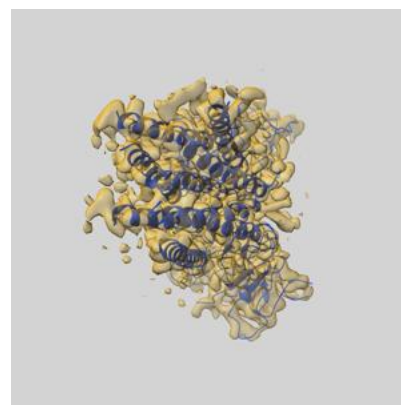
9.1 Map-model overlay [i](#)



X



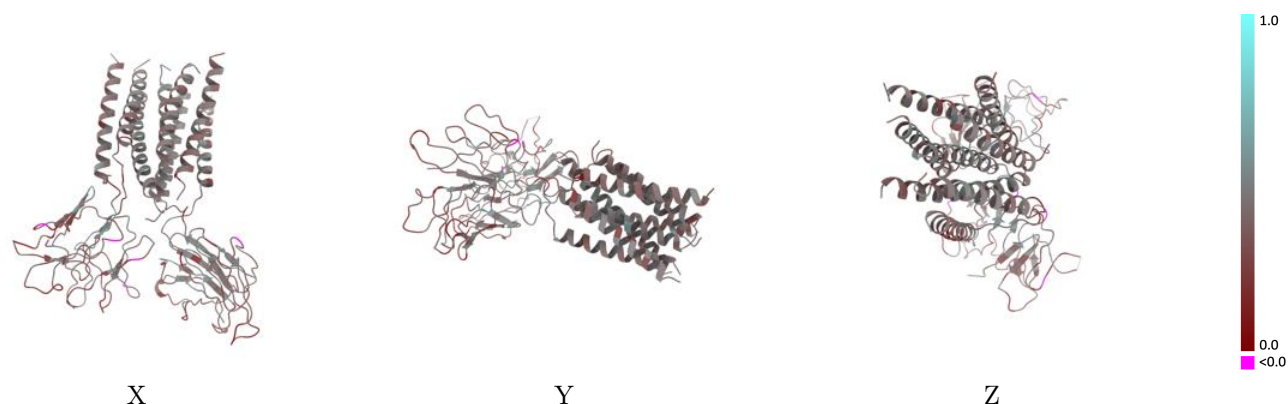
Y



Z

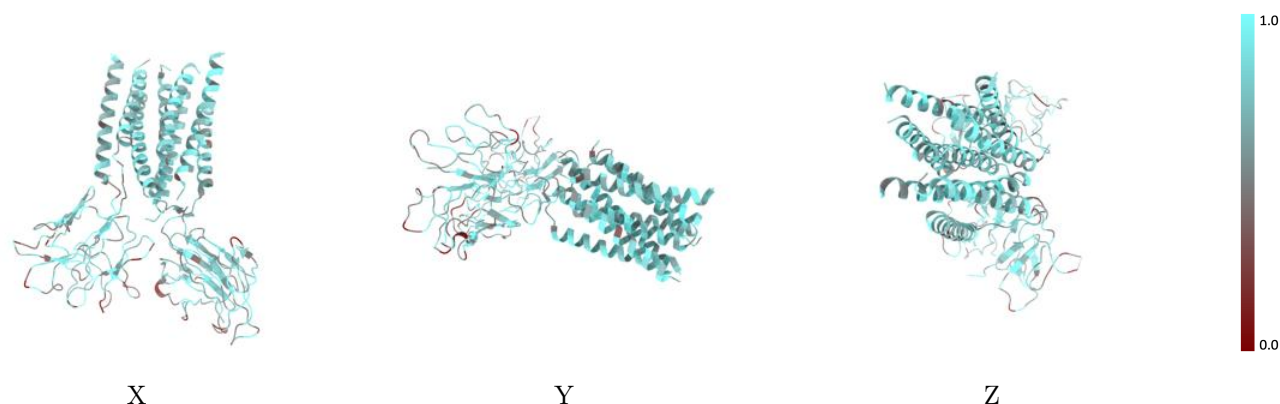
The images above show the 3D surface view of the map at the recommended contour level 0.02 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



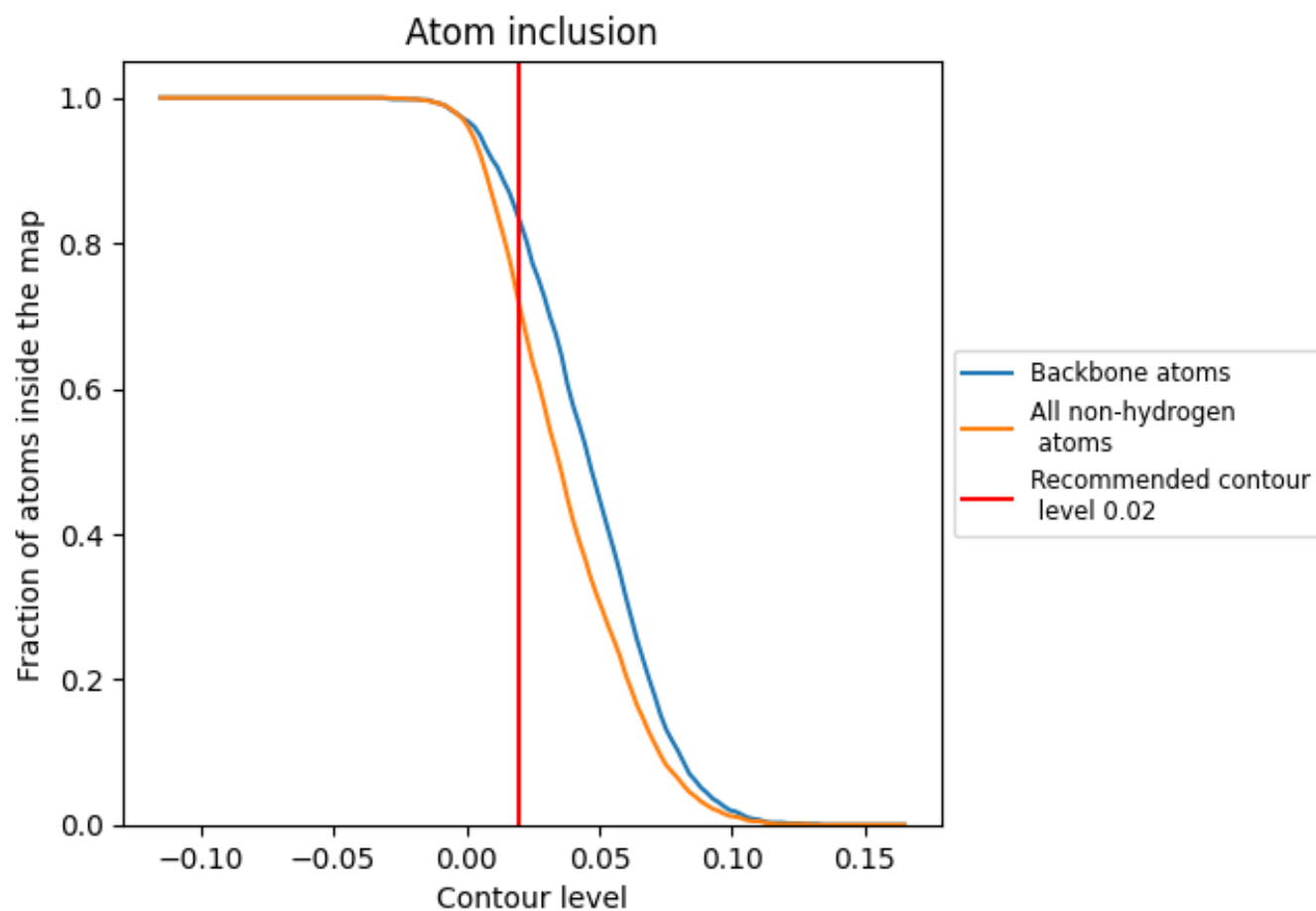
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.02).

9.4 Atom inclusion [i](#)



At the recommended contour level, 83% of all backbone atoms, 71% 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 (0.02) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7130	0.3850
a	0.7390	0.3960
b	0.7970	0.4010
d	0.7070	0.3900
e	0.6960	0.3900
f	0.6860	0.3580
g	0.6780	0.3570
m	0.8010	0.4450
n	0.8170	0.4430

1.0

0.0

<0.0