



Full wwPDB EM Validation Report ⓘ

Jul 5, 2025 – 07:43 am BST

PDB ID : 9HPC / pdb_00009hpc
EMDB ID : EMD-52325
Title : The TMD and the LBD region of the AMPAR complex GluA3- TARP gamma2
in the apo state.
Authors : Pokharna, A.; Krieger, J.; Greger, I.
Deposited on : 2024-12-12
Resolution : 2.59 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.dev118
MolProbity : 4-5-2 with Phenix2.0rc1
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.44

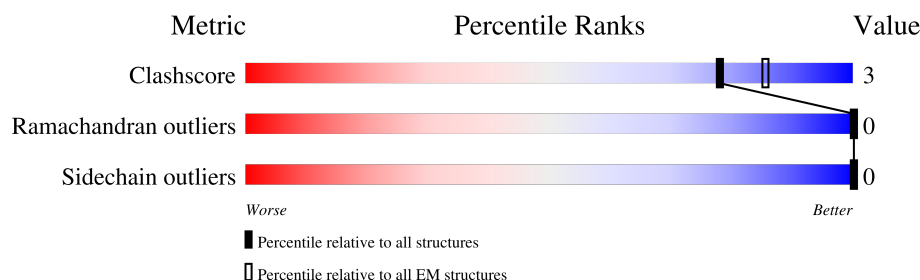
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY





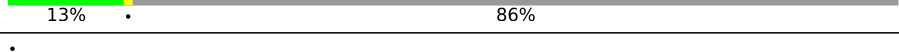
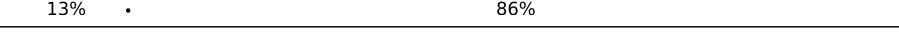

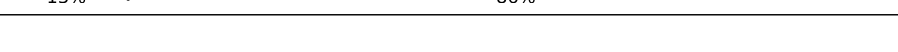
The reported resolution of this entry is 2.59 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	1179	 32% 65%
1	B	1179	 32% 65%
1	C	1179	 33% 65%
1	D	1179	 32% 65%
1	W	1179	 13% 86%
1	X	1179	 13% 86%
1	Y	1179	 13% 86%
1	Z	1179	 13% 86%

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 35941 atoms, of which 17989 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 Isoform Flip of Glutamate receptor 3, Voltage-dependent calcium channel gamma-2 subunit.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	A	410	Total	C	H	N	O	S	0	0
			6430	2084	3226	517	584	19		
1	B	410	Total	C	H	N	O	S	0	0
			6407	2078	3213	518	579	19		
1	C	409	Total	C	H	N	O	S	0	0
			6332	2061	3168	515	569	19		
1	D	409	Total	C	H	N	O	S	0	0
			6369	2068	3191	515	576	19		
1	W	168	Total	C	H	N	O	S	0	0
			2618	865	1307	216	220	10		
1	X	167	Total	C	H	N	O	S	0	0
			2595	860	1293	215	217	10		
1	Y	167	Total	C	H	N	O	S	0	0
			2609	862	1303	215	219	10		
1	Z	167	Total	C	H	N	O	S	0	0
			2581	852	1288	215	217	9		

There are 128 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	GLY	-	expression tag	UNP P19492
A	-6	ASP	-	expression tag	UNP P19492
A	-5	TYR	-	expression tag	UNP P19492
A	-4	LYS	-	expression tag	UNP P19492
A	-3	ASP	-	expression tag	UNP P19492
A	-2	ASP	-	expression tag	UNP P19492
A	-1	ASP	-	expression tag	UNP P19492
A	0	ASP	-	expression tag	UNP P19492
A	1	LYS	-	expression tag	UNP P19492
A	439	GLY	ARG	engineered mutation	UNP P19492
A	844	GLY	-	linker	UNP P19492
A	845	GLY	-	linker	UNP P19492
A	846	SER	-	linker	UNP P19492

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Chain	Residue	Modelled	Actual	Comment	Reference
A	847	GLY	-	linker	UNP P19492
A	848	SER	-	linker	UNP P19492
A	849	GLY	-	linker	UNP P19492
B	-7	GLY	-	expression tag	UNP P19492
B	-6	ASP	-	expression tag	UNP P19492
B	-5	TYR	-	expression tag	UNP P19492
B	-4	LYS	-	expression tag	UNP P19492
B	-3	ASP	-	expression tag	UNP P19492
B	-2	ASP	-	expression tag	UNP P19492
B	-1	ASP	-	expression tag	UNP P19492
B	0	ASP	-	expression tag	UNP P19492
B	1	LYS	-	expression tag	UNP P19492
B	439	GLY	ARG	engineered mutation	UNP P19492
B	844	GLY	-	linker	UNP P19492
B	845	GLY	-	linker	UNP P19492
B	846	SER	-	linker	UNP P19492
B	847	GLY	-	linker	UNP P19492
B	848	SER	-	linker	UNP P19492
B	849	GLY	-	linker	UNP P19492
C	-7	GLY	-	expression tag	UNP P19492
C	-6	ASP	-	expression tag	UNP P19492
C	-5	TYR	-	expression tag	UNP P19492
C	-4	LYS	-	expression tag	UNP P19492
C	-3	ASP	-	expression tag	UNP P19492
C	-2	ASP	-	expression tag	UNP P19492
C	-1	ASP	-	expression tag	UNP P19492
C	0	ASP	-	expression tag	UNP P19492
C	1	LYS	-	expression tag	UNP P19492
C	439	GLY	ARG	engineered mutation	UNP P19492
C	844	GLY	-	linker	UNP P19492
C	845	GLY	-	linker	UNP P19492
C	846	SER	-	linker	UNP P19492
C	847	GLY	-	linker	UNP P19492
C	848	SER	-	linker	UNP P19492
C	849	GLY	-	linker	UNP P19492
D	-7	GLY	-	expression tag	UNP P19492
D	-6	ASP	-	expression tag	UNP P19492
D	-5	TYR	-	expression tag	UNP P19492
D	-4	LYS	-	expression tag	UNP P19492
D	-3	ASP	-	expression tag	UNP P19492
D	-2	ASP	-	expression tag	UNP P19492
D	-1	ASP	-	expression tag	UNP P19492

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Chain	Residue	Modelled	Actual	Comment	Reference
D	0	ASP	-	expression tag	UNP P19492
D	1	LYS	-	expression tag	UNP P19492
D	439	GLY	ARG	engineered mutation	UNP P19492
D	844	GLY	-	linker	UNP P19492
D	845	GLY	-	linker	UNP P19492
D	846	SER	-	linker	UNP P19492
D	847	GLY	-	linker	UNP P19492
D	848	SER	-	linker	UNP P19492
D	849	GLY	-	linker	UNP P19492
W	-855	GLY	-	expression tag	UNP P19492
W	-854	ASP	-	expression tag	UNP P19492
W	-853	TYR	-	expression tag	UNP P19492
W	-852	LYS	-	expression tag	UNP P19492
W	-851	ASP	-	expression tag	UNP P19492
W	-850	ASP	-	expression tag	UNP P19492
W	-849	ASP	-	expression tag	UNP P19492
W	-848	ASP	-	expression tag	UNP P19492
W	-847	LYS	-	expression tag	UNP P19492
W	-409	GLY	ARG	engineered mutation	UNP P19492
W	-4	GLY	-	linker	UNP P19492
W	-3	GLY	-	linker	UNP P19492
W	-2	SER	-	linker	UNP P19492
W	-1	GLY	-	linker	UNP P19492
W	0	SER	-	linker	UNP P19492
W	1	GLY	-	linker	UNP P19492
X	-855	GLY	-	expression tag	UNP P19492
X	-854	ASP	-	expression tag	UNP P19492
X	-853	TYR	-	expression tag	UNP P19492
X	-852	LYS	-	expression tag	UNP P19492
X	-851	ASP	-	expression tag	UNP P19492
X	-850	ASP	-	expression tag	UNP P19492
X	-849	ASP	-	expression tag	UNP P19492
X	-848	ASP	-	expression tag	UNP P19492
X	-847	LYS	-	expression tag	UNP P19492
X	-409	GLY	ARG	engineered mutation	UNP P19492
X	-4	GLY	-	linker	UNP P19492
X	-3	GLY	-	linker	UNP P19492
X	-2	SER	-	linker	UNP P19492
X	-1	GLY	-	linker	UNP P19492
X	0	SER	-	linker	UNP P19492
X	1	GLY	-	linker	UNP P19492
Y	-855	GLY	-	expression tag	UNP P19492

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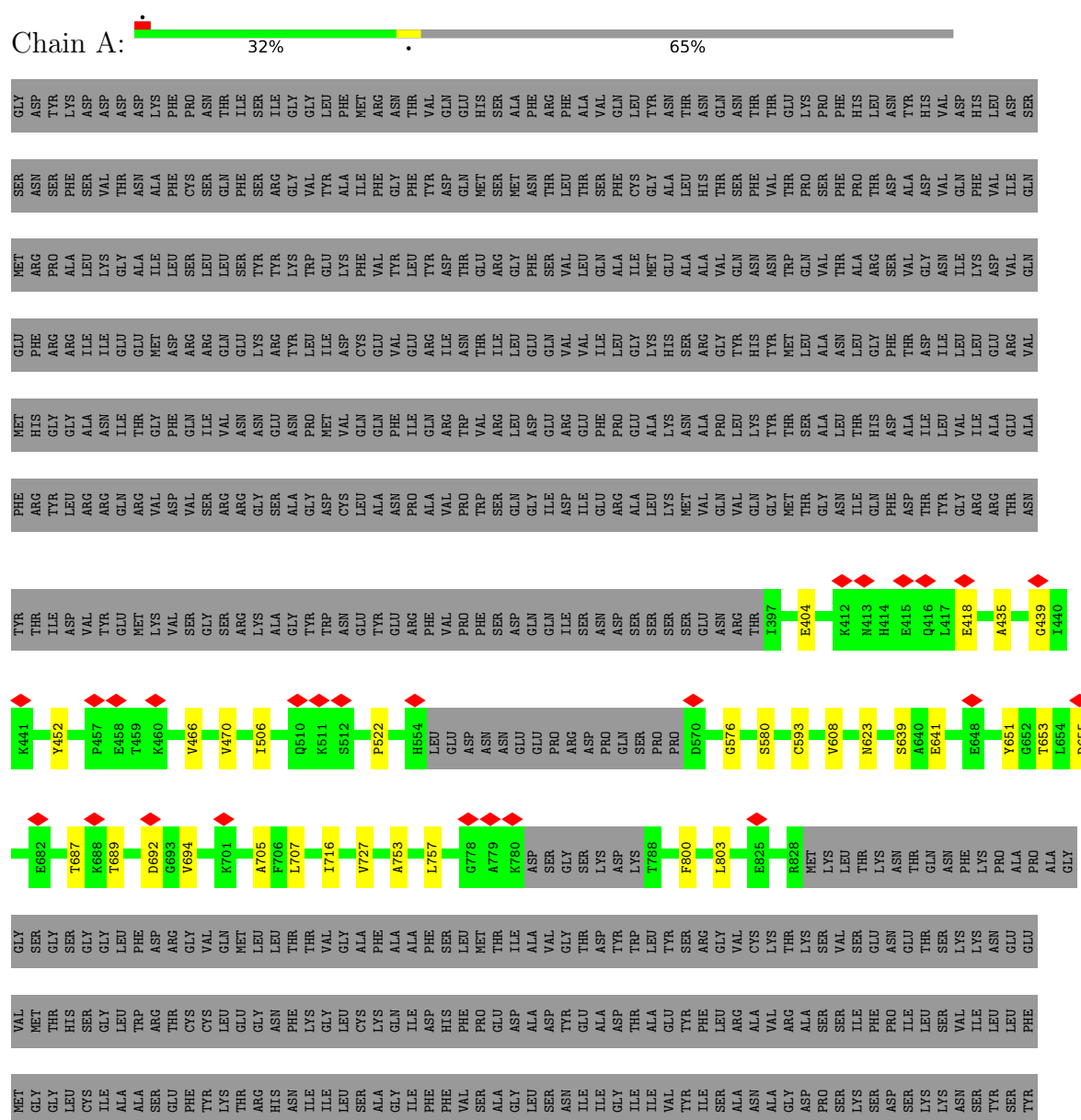
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Chain	Residue	Modelled	Actual	Comment	Reference
Y	-854	ASP	-	expression tag	UNP P19492
Y	-853	TYR	-	expression tag	UNP P19492
Y	-852	LYS	-	expression tag	UNP P19492
Y	-851	ASP	-	expression tag	UNP P19492
Y	-850	ASP	-	expression tag	UNP P19492
Y	-849	ASP	-	expression tag	UNP P19492
Y	-848	ASP	-	expression tag	UNP P19492
Y	-847	LYS	-	expression tag	UNP P19492
Y	-409	GLY	ARG	engineered mutation	UNP P19492
Y	-4	GLY	-	linker	UNP P19492
Y	-3	GLY	-	linker	UNP P19492
Y	-2	SER	-	linker	UNP P19492
Y	-1	GLY	-	linker	UNP P19492
Y	0	SER	-	linker	UNP P19492
Y	1	GLY	-	linker	UNP P19492
Z	-855	GLY	-	expression tag	UNP P19492
Z	-854	ASP	-	expression tag	UNP P19492
Z	-853	TYR	-	expression tag	UNP P19492
Z	-852	LYS	-	expression tag	UNP P19492
Z	-851	ASP	-	expression tag	UNP P19492
Z	-850	ASP	-	expression tag	UNP P19492
Z	-849	ASP	-	expression tag	UNP P19492
Z	-848	ASP	-	expression tag	UNP P19492
Z	-847	LYS	-	expression tag	UNP P19492
Z	-409	GLY	ARG	engineered mutation	UNP P19492
Z	-4	GLY	-	linker	UNP P19492
Z	-3	GLY	-	linker	UNP P19492
Z	-2	SER	-	linker	UNP P19492
Z	-1	GLY	-	linker	UNP P19492
Z	0	SER	-	linker	UNP P19492
Z	1	GLY	-	linker	UNP P19492

3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Isoform Flip of Glutamate receptor 3, Voltage-dependent calcium channel gamma-2 subunit



LEU
GLN
VAL
HIS
ASN
CYS
ILE
GLN
LYS
ASP
SER
LYS
ASP
SER
LEU
HIS
ALA
ASN
THR
ALA
ASN
ARG
ARG
THR
THR
PRO
VAL

- Molecule 1: Isoform Flip of Glutamate receptor 3, Voltage-dependent calcium channel gamma-2 subunit



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

Residue	Position	Frequency	Conservation	Structure
TVR	1397	0.00	0.00	
THR	1401	0.00	0.00	
ILE	1402	0.00	0.00	
ASP	1408	0.00	0.00	
VAL	1412	0.00	0.00	
TVR	1413	0.00	0.00	
GLU	1414	0.00	0.00	
MET	1415	0.00	0.00	
LYS	1421	0.00	0.00	
VAL	1422	0.00	0.00	
SER	1423	0.00	0.00	
GLY	1424	0.00	0.00	
SER	1425	0.00	0.00	
ARG	1426	0.00	0.00	
LYS	1427	0.00	0.00	
ALA	1428	0.00	0.00	
GLY	1429	0.00	0.00	
TVR	1430	0.00	0.00	
TRP	1431	0.00	0.00	
ASN	1432	0.00	0.00	
GLU	1433	0.00	0.00	
TVR	1434	0.00	0.00	
GLU	1435	0.00	0.00	
ARG	1436	0.00	0.00	
PHE	1437	0.00	0.00	
VAL	1438	0.00	0.00	
PRO	1439	0.00	0.00	
PHE	1440	0.00	0.00	
SER	1441	0.00	0.00	
SER	1442	0.00	0.00	
ASP	1443	0.00	0.00	
GLN	1444	0.00	0.00	
ILE	1445	0.00	0.00	
SER	1446	0.00	0.00	
ASN	1447	0.00	0.00	
ASP	1448	0.00	0.00	
SER	1449	0.00	0.00	
SER	1450	0.00	0.00	
SER	1451	0.00	0.00	
GLU	1452	0.00	0.00	
ASN	1453	0.00	0.00	
ARG	1454	0.00	0.00	
THR	1455	0.00	0.00	

Category	Value	Color
ASP	5684	Red
SER	6688	Red
GLY	7689	Yellow
SER	6692	Red
LYS	6699	Green
ASP	7277	Yellow
LYS	7739	Yellow
LYS	7748	Yellow
ASP	7749	Yellow
LYS	7750	Yellow
ASP	7780	Red
SER	8237	Red
GLY	8238	Red
LYS	8239	Red
LYS	8240	Red
LYS	8241	Red
LYS	8242	Red
LYS	8243	Red
LYS	8244	Red
LYS	8245	Red
LYS	8246	Red
LYS	8247	Red
LYS	8248	Red
LYS	8249	Red
LYS	8250	Red
LYS	8251	Red
LYS	8252	Red
LYS	8253	Red
LYS	8254	Red
LYS	8255	Red
LYS	8256	Red
LYS	8257	Red
LYS	8258	Red
LYS	8259	Red
LYS	8260	Red
LYS	8261	Red
LYS	8262	Red
LYS	8263	Red
LYS	8264	Red
LYS	8265	Red
LYS	8266	Red
LYS	8267	Red
LYS	8268	Red
LYS	8269	Red
LYS	8270	Red
LYS	8271	Red
LYS	8272	Red
LYS	8273	Red
LYS	8274	Red
LYS	8275	Red
LYS	8276	Red
LYS	8277	Red
LYS	8278	Red
LYS	8279	Red
LYS	8280	Red
LYS	8281	Red
LYS	8282	Red
LYS	8283	Red
LYS	8284	Red
LYS	8285	Red
LYS	8286	Red
LYS	8287	Red
LYS	8288	Red
LYS	8289	Red
LYS	8290	Red
LYS	8291	Red
LYS	8292	Red
LYS	8293	Red
LYS	8294	Red
LYS	8295	Red
LYS	8296	Red
LYS	8297	Red
LYS	8298	Red
LYS	8299	Red
LYS	8300	Red
LYS	8301	Red
LYS	8302	Red
LYS	8303	Red
LYS	8304	Red
LYS	8305	Red
LYS	8306	Red
LYS	8307	Red
LYS	8308	Red
LYS	8309	Red
LYS	8310	Red
LYS	8311	Red
LYS	8312	Red
LYS	8313	Red
LYS	8314	Red
LYS	8315	Red
LYS	8316	Red
LYS	8317	Red
LYS	8318	Red
LYS	8319	Red
LYS	8320	Red
LYS	8321	Red
LYS	8322	Red
LYS	8323	Red
LYS	8324	Red
LYS	8325	Red
LYS	8326	Red
LYS	8327	Red
LYS	8328	Red
LYS	8329	Red
LYS	8330	Red
LYS	8331	Red
LYS	8332	Red
LYS	8333	Red
LYS	8334	Red
LYS	8335	Red
LYS	8336	Red
LYS	8337	Red
LYS	8338	Red
LYS	8339	Red
LYS	8340	Red
LYS	8341	Red
LYS	8342	Red
LYS	8343	Red
LYS	8344	Red
LYS	8345	Red
LYS	8346	Red
LYS	8347	Red
LYS	8348	Red
LYS	8349	Red
LYS	8350	Red
LYS	8351	Red
LYS	8352	Red

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

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





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	1774241	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 ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	65.736	Depositor
Minimum map value	-46.676	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	1.000	Depositor
Recommended contour level	10	Depositor
Map size (Å)	422.912, 422.912, 422.912	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.826, 0.826, 0.826	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	0.16	0/3279	0.26	0/4431
1	B	0.17	0/3269	0.26	0/4419
1	C	0.16	0/3239	0.25	0/4382
1	D	0.16	0/3252	0.25	0/4397
1	W	0.15	0/1341	0.22	0/1808
1	X	0.17	0/1332	0.25	0/1796
1	Y	0.17	0/1336	0.23	0/1801
1	Z	0.16	0/1322	0.23	0/1784
All	All	0.16	0/18370	0.25	0/24818

There are no bond length outliers.

There are no bond angle outliers.

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	3204	3226	3223	18	0
1	B	3194	3213	3209	19	0
1	C	3164	3168	3166	18	0
1	D	3178	3191	3188	20	0
1	W	1311	1307	1318	8	0
1	X	1302	1293	1309	7	0
1	Y	1306	1303	1313	8	0
1	Z	1293	1288	1298	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	17952	17989	18024	96	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 (96) 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:D:404:GLU:OE1	1:D:452:TYR:OH	1.96	0.83
1:B:689:THR:OG1	1:B:692:ASP:OD2	2.01	0.78
1:C:401:THR:HG21	1:C:408:VAL:HG21	1.72	0.71
1:D:401:THR:HG21	1:D:408:VAL:HG21	1.70	0.71
1:Y:10:MET:SD	1:Y:200:MET:HE1	2.32	0.70
1:Z:82:HIS:O	1:Z:99:ARG:NH2	2.26	0.69
1:Y:10:MET:O	1:Y:14:THR:HG23	1.97	0.65
1:Z:31:ASP:OD2	1:Z:65:ARG:NH2	2.30	0.65
1:A:418:GLU:N	1:A:418:GLU:OE1	2.30	0.64
1:X:30:THR:OG1	1:X:179:SER:OG	2.09	0.62
1:D:655:ASP:OD1	1:D:656:SER:N	2.34	0.60
1:C:456:ASP:OD2	1:C:459:THR:HG22	2.02	0.59
1:D:498:MET:HE3	1:D:711:THR:HG21	1.84	0.59
1:B:466:VAL:O	1:B:470:VAL:HG23	2.01	0.59
1:B:655:ASP:OD1	1:B:656:SER:N	2.35	0.59
1:A:404:GLU:OE1	1:A:452:TYR:OH	2.21	0.58
1:X:14:THR:HG22	1:X:122:ILE:HG21	1.86	0.57
1:D:653:THR:HG23	1:D:678:MET:HE1	1.86	0.57
1:C:401:THR:HG22	1:C:402:ILE:H	1.70	0.56
1:C:522:PRO:O	1:C:623:ASN:ND2	2.35	0.56
1:C:456:ASP:O	1:C:460:LYS:N	2.39	0.56
1:D:653:THR:HG22	1:D:707:LEU:HB2	1.87	0.55
1:W:30:THR:OG1	1:W:179:SER:OG	2.15	0.55
1:Z:72:ASN:OD1	1:Z:73:PHE:N	2.38	0.55
1:B:522:PRO:O	1:B:623:ASN:ND2	2.35	0.55
1:A:576:GLY:O	1:A:580:SER:OG	2.18	0.53
1:B:457:PRO:O	1:B:460:LYS:NZ	2.40	0.53
1:A:522:PRO:O	1:A:623:ASN:ND2	2.41	0.53
1:B:401:THR:HG21	1:B:408:VAL:HG21	1.90	0.53
1:Y:14:THR:HG22	1:Y:122:ILE:HG21	1.89	0.52
1:C:806:GLY:HA3	1:D:608:VAL:HG11	1.92	0.52
1:Y:13:THR:HG22	1:Y:122:ILE:CD1	2.40	0.52
1:Y:30:THR:OG1	1:Y:179:SER:OG	2.19	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:608:VAL:HG11	1:D:806:GLY:HA3	1.91	0.51
1:D:401:THR:CG2	1:D:408:VAL:HG21	2.37	0.51
1:D:522:PRO:O	1:D:623:ASN:ND2	2.40	0.50
1:D:640:ALA:HB1	1:D:674:MET:HE1	1.93	0.50
1:C:574:GLU:O	1:C:579:ASN:ND2	2.44	0.50
1:B:435:ALA:O	1:B:439:GLY:N	2.45	0.49
1:C:485:LEU:HD22	1:D:756:LYS:HG2	1.95	0.49
1:D:401:THR:HG22	1:D:402:ILE:N	2.28	0.48
1:W:30:THR:HG21	1:W:178:TRP:CH2	2.47	0.48
1:A:593:CYS:SG	1:B:593:CYS:O	2.71	0.48
1:D:401:THR:HG21	1:D:408:VAL:CG2	2.40	0.48
1:X:37:ARG:NH2	1:X:56:GLU:O	2.47	0.47
1:A:653:THR:HG22	1:A:707:LEU:HB2	1.96	0.47
1:W:26:ILE:O	1:W:30:THR:HG23	2.15	0.47
1:B:401:THR:HG22	1:B:402:ILE:H	1.80	0.47
1:A:689:THR:HG23	1:A:692:ASP:H	1.80	0.47
1:W:132:HIS:CD2	1:W:208:LEU:HD11	2.50	0.47
1:A:655:ASP:N	1:A:687:THR:O	2.49	0.46
1:B:401:THR:HG22	1:B:402:ILE:N	2.31	0.46
1:C:604:ILE:O	1:C:608:VAL:HG23	2.16	0.46
1:C:505:MET:HE1	1:C:694:VAL:HG22	1.98	0.46
1:Y:13:THR:HG22	1:Y:122:ILE:HD11	1.96	0.46
1:A:694:VAL:HG21	1:A:716:ILE:HD13	1.98	0.45
1:C:647:THR:O	1:C:647:THR:HG22	2.15	0.45
1:B:476:ILE:HD12	1:B:750:VAL:HG21	1.97	0.45
1:A:435:ALA:O	1:A:439:GLY:N	2.43	0.45
1:A:466:VAL:O	1:A:470:VAL:HG23	2.16	0.45
1:C:429:ASP:OD2	1:C:770:TRP:NE1	2.42	0.45
1:A:639:SER:OG	1:A:641:GLU:OE1	2.25	0.45
1:A:753:ALA:O	1:A:757:LEU:HD13	2.17	0.45
1:D:403:LEU:HD23	1:D:446:ILE:HG21	1.98	0.45
1:C:401:THR:CG2	1:C:408:VAL:HG21	2.43	0.45
1:D:718:GLN:O	1:D:719:ARG:NH1	2.48	0.45
1:C:401:THR:HG22	1:C:402:ILE:N	2.31	0.44
1:D:825:GLU:OE1	1:D:828:ARG:NH2	2.50	0.44
1:W:132:HIS:NE2	1:W:208:LEU:HD11	2.33	0.43
1:X:57:VAL:HG11	1:X:70:GLU:O	2.19	0.43
1:B:521:ASP:N	1:B:522:PRO:CD	2.81	0.43
1:D:588:PHE:O	1:D:617:ILE:HD11	2.19	0.43
1:Z:204:ARG:O	1:Z:208:LEU:HD13	2.19	0.42
1:C:641:GLU:OE1	1:C:641:GLU:N	2.48	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:401:THR:CG2	1:B:408:VAL:HG21	2.48	0.42
1:C:690:THR:O	1:C:694:VAL:HG23	2.19	0.42
1:A:506:ILE:HD11	1:A:727:VAL:HG11	2.00	0.42
1:D:435:ALA:O	1:D:439:GLY:N	2.50	0.42
1:W:10:MET:SD	1:W:200:MET:HE3	2.60	0.42
1:X:57:VAL:O	1:X:59:THR:HG23	2.20	0.42
1:A:803:LEU:HA	1:B:608:VAL:CG1	2.50	0.42
1:C:576:GLY:O	1:C:580:SER:OG	2.32	0.42
1:B:506:ILE:HD11	1:B:727:VAL:HG11	2.01	0.41
1:B:748:THR:HB	1:B:749:PRO:HD3	2.02	0.41
1:X:30:THR:HG21	1:X:178:TRP:CH2	2.56	0.41
1:C:497:PHE:C	1:C:497:PHE:CD1	2.99	0.41
1:Z:27:ALA:O	1:Z:33:TRP:NE1	2.43	0.41
1:A:651:TYR:HA	1:A:705:ALA:O	2.21	0.41
1:B:491:ILE:HD12	1:B:739:ALA:HB1	2.03	0.41
1:A:800:PHE:HB3	1:W:154:ILE:HD13	2.03	0.40
1:B:804:VAL:HG11	1:X:151:ILE:HD11	2.03	0.40
1:Y:30:THR:HG21	1:Y:178:TRP:CH2	2.56	0.40
1:Y:14:THR:HG22	1:Y:122:ILE:CG2	2.50	0.40
1:D:796:VAL:O	1:D:799:VAL:HG12	2.21	0.40
1:W:57:VAL:O	1:W:59:THR:HG23	2.21	0.40
1:B:604:ILE:O	1:B:608:VAL:HG23	2.22	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	404/1179 (34%)	396 (98%)	8 (2%)	0	100	100
1	B	404/1179 (34%)	399 (99%)	5 (1%)	0	100	100
1	C	403/1179 (34%)	397 (98%)	6 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	403/1179 (34%)	398 (99%)	5 (1%)	0	100	100
1	W	160/1179 (14%)	158 (99%)	2 (1%)	0	100	100
1	X	159/1179 (14%)	158 (99%)	1 (1%)	0	100	100
1	Y	159/1179 (14%)	158 (99%)	1 (1%)	0	100	100
1	Z	159/1179 (14%)	158 (99%)	1 (1%)	0	100	100
All	All	2251/9432 (24%)	2222 (99%)	29 (1%)	0	100	100

There are no Ramachandran outliers to report.

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	343/1012 (34%)	343 (100%)	0	100	100
1	B	340/1012 (34%)	340 (100%)	0	100	100
1	C	333/1012 (33%)	333 (100%)	0	100	100
1	D	337/1012 (33%)	337 (100%)	0	100	100
1	W	135/1012 (13%)	135 (100%)	0	100	100
1	X	134/1012 (13%)	134 (100%)	0	100	100
1	Y	135/1012 (13%)	135 (100%)	0	100	100
1	Z	132/1012 (13%)	132 (100%)	0	100	100
All	All	1889/8096 (23%)	1889 (100%)	0	100	100

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

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	414	HIS
1	A	554	HIS
1	W	207	GLN

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Mol	Chain	Res	Type
1	X	199	HIS
1	X	205	HIS
1	Y	9	GLN
1	Z	60	HIS
1	Z	205	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

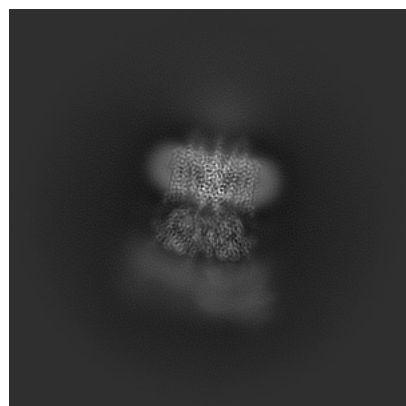
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-52325. These allow visual inspection of the internal detail of the map and identification of artifacts.

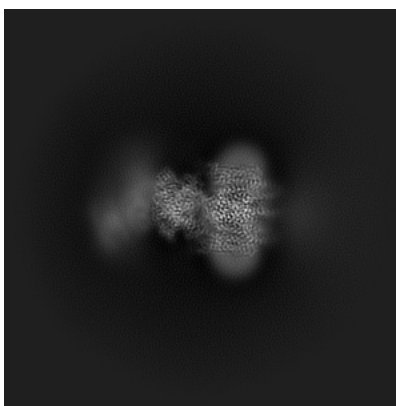
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

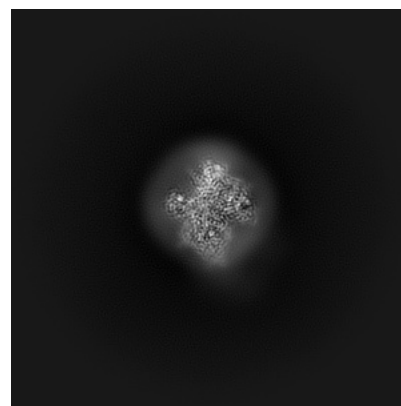
6.1.1 Primary map



X

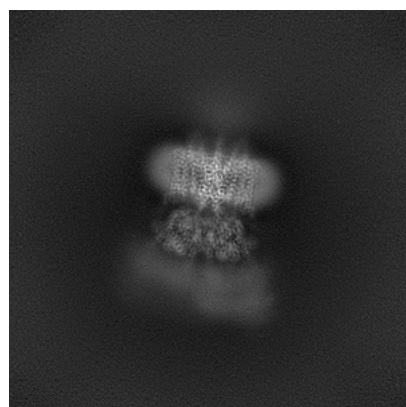


Y

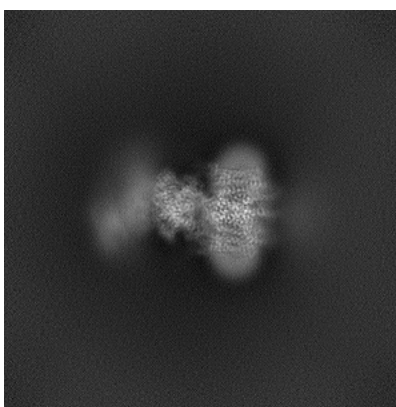


Z

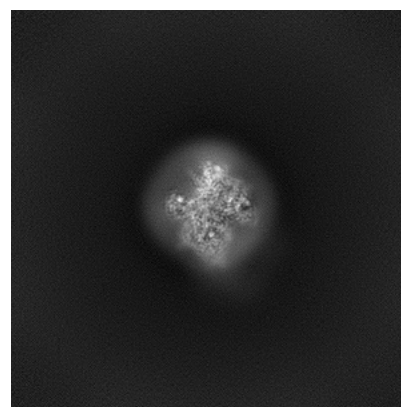
6.1.2 Raw map



X



Y

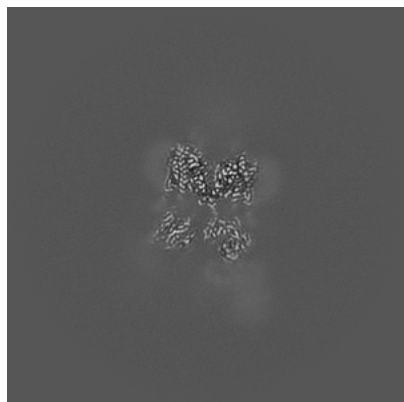


Z

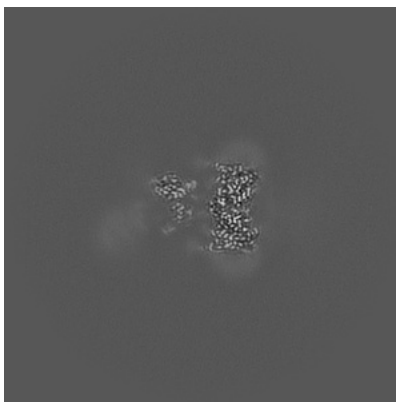
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

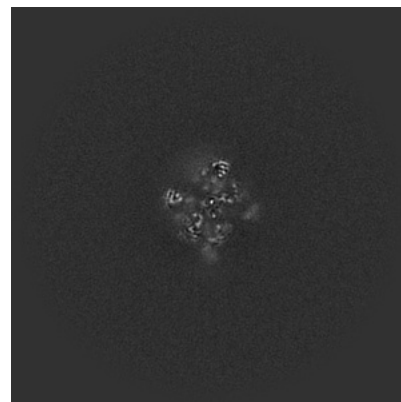
6.2.1 Primary map



X Index: 256

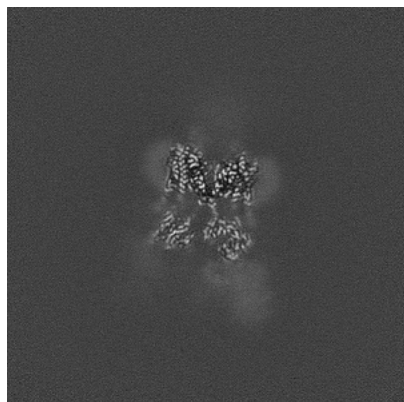


Y Index: 256

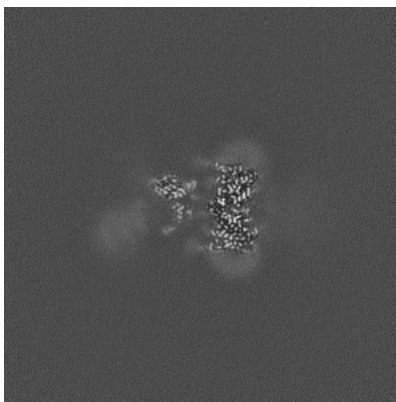


Z Index: 256

6.2.2 Raw map



X Index: 256



Y Index: 256

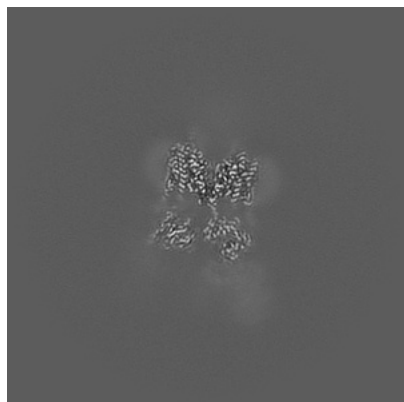


Z Index: 256

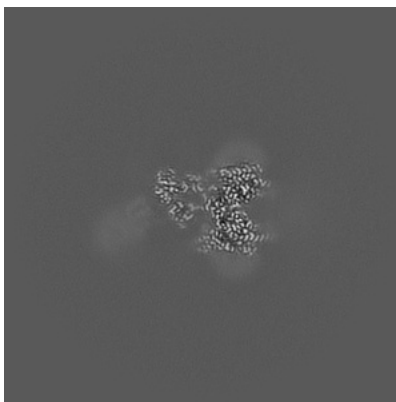
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

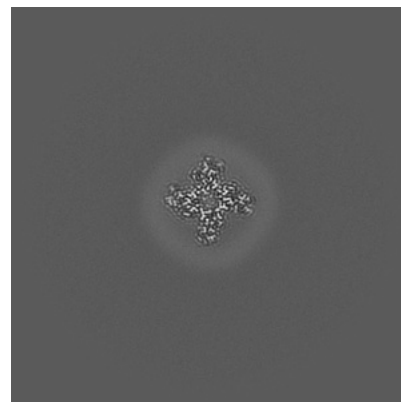
6.3.1 Primary map



X Index: 255

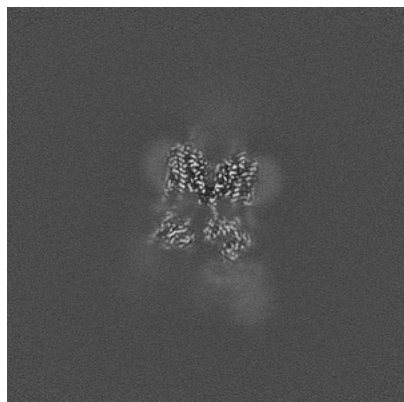


Y Index: 266

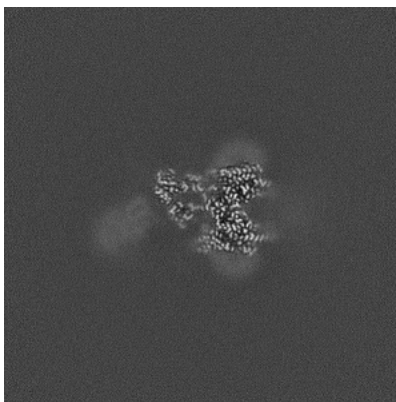


Z Index: 307

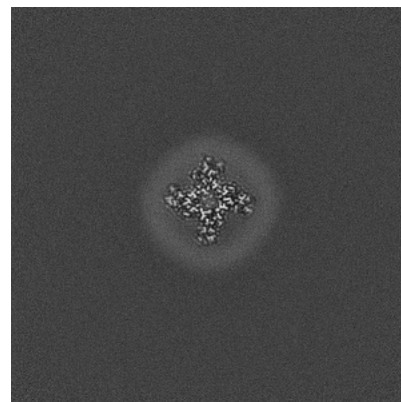
6.3.2 Raw map



X Index: 255



Y Index: 266

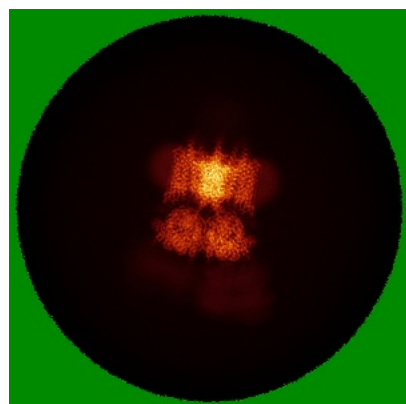


Z Index: 307

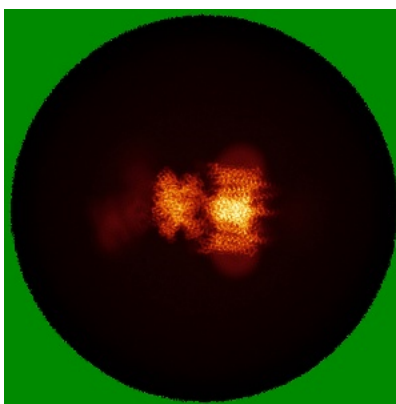
The images above show the largest variance slices of the map in three orthogonal directions.

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

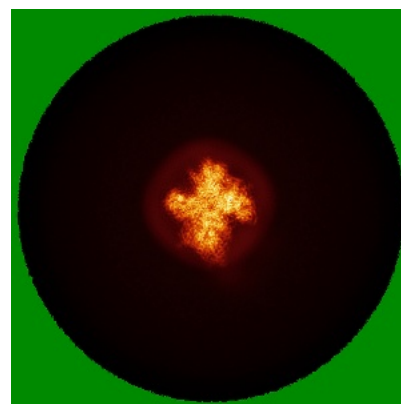
6.4.1 Primary map



X

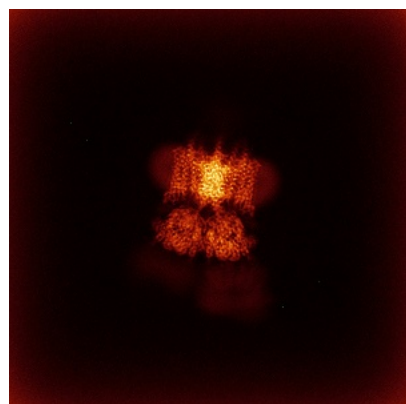


Y

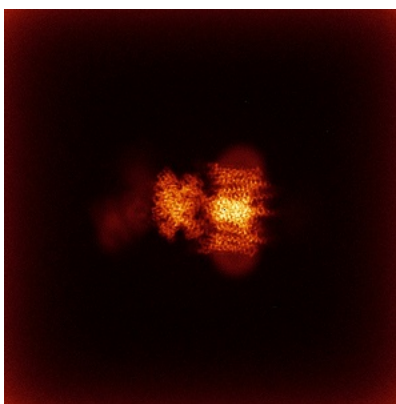


Z

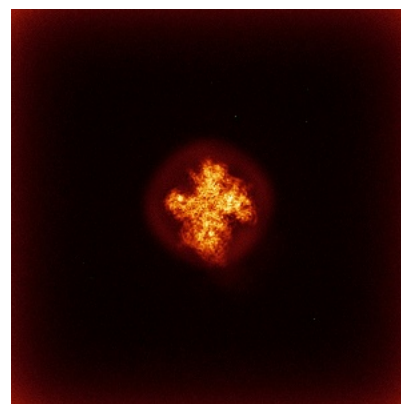
6.4.2 Raw map



X



Y

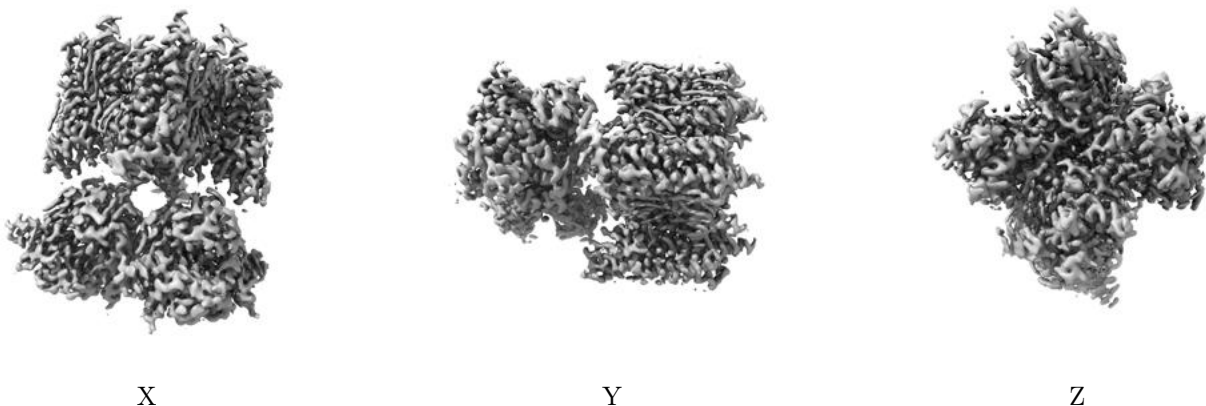


Z

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

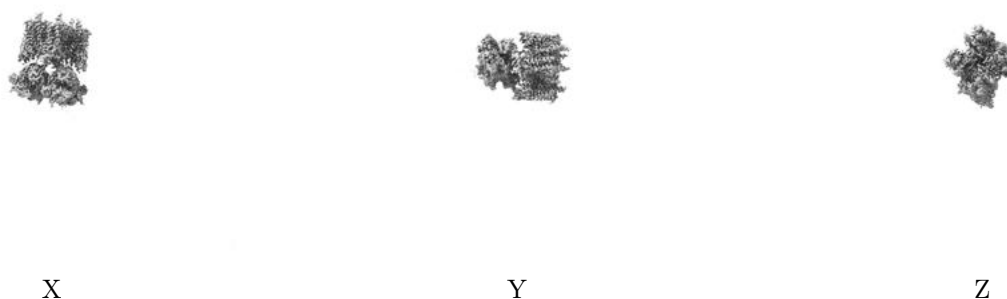
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 10.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



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

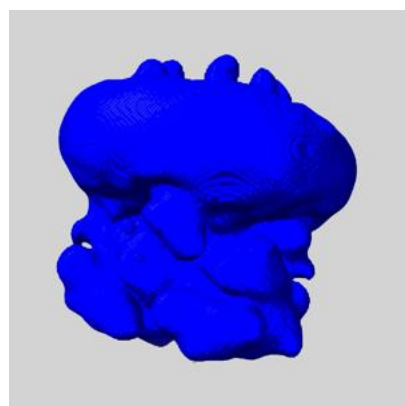
6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

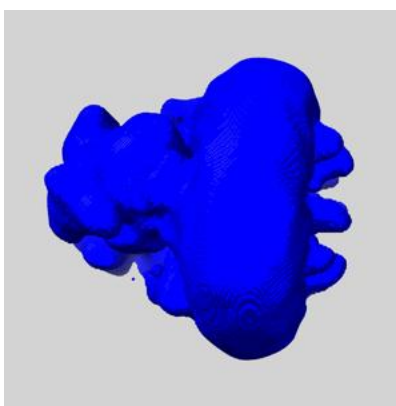
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

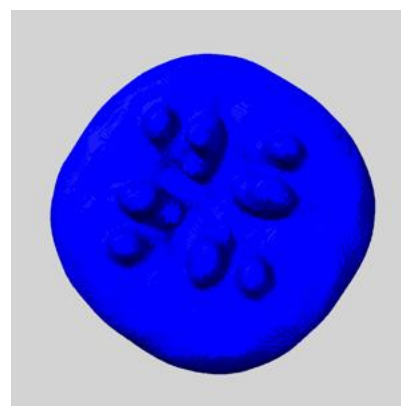
6.6.1 emd_52325_msk_1.map [i](#)



X



Y

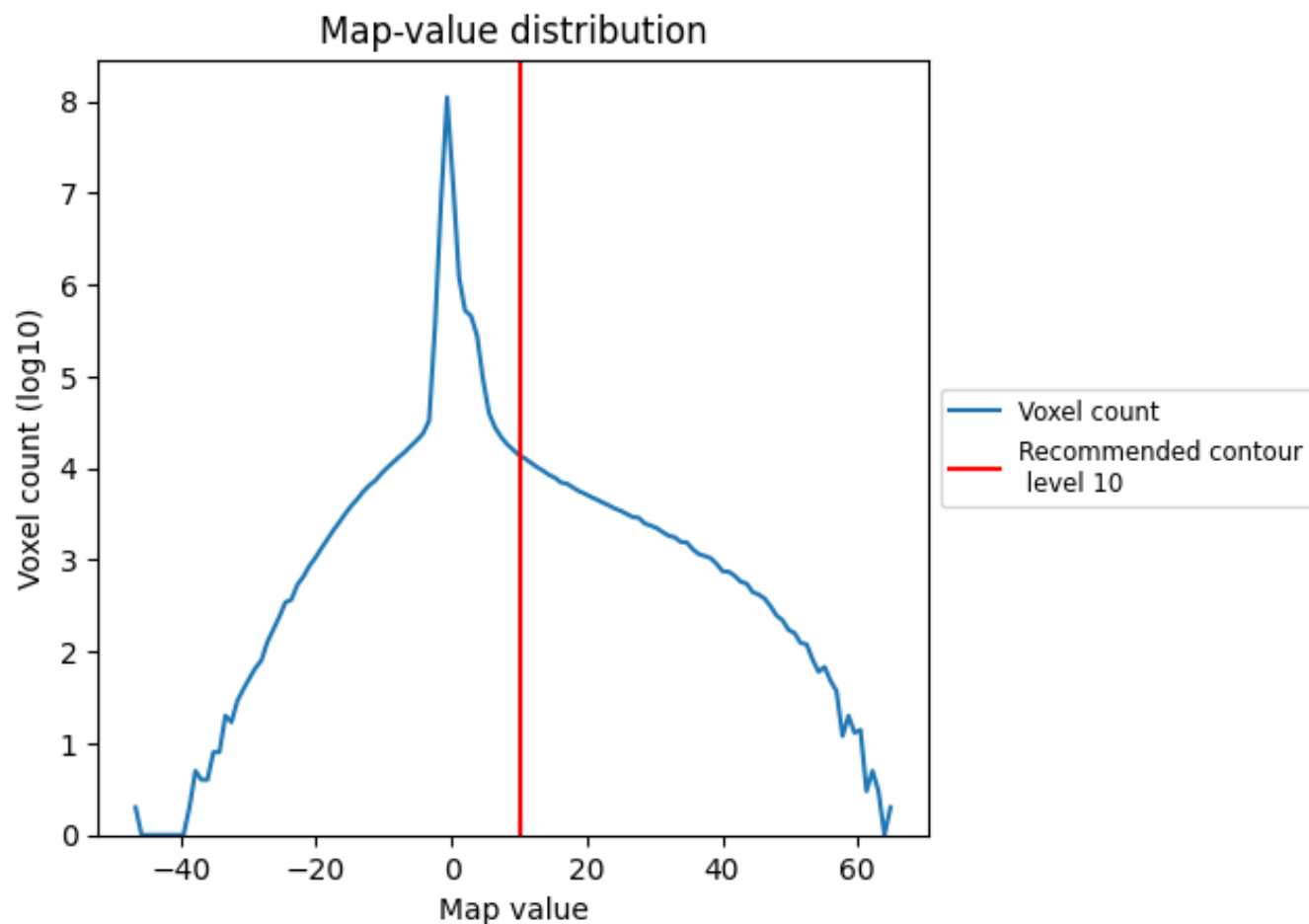


Z

7 Map analysis [i](#)

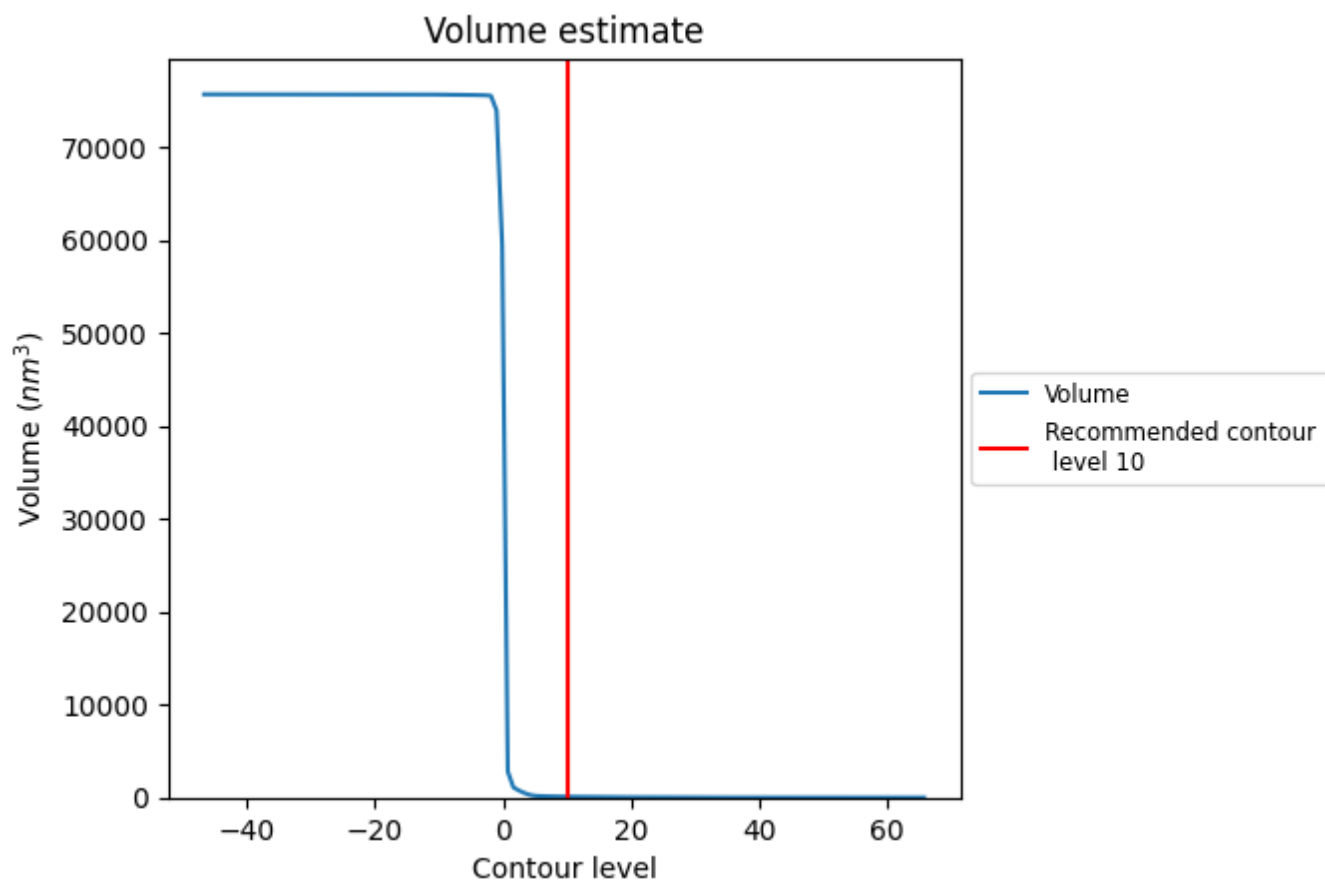
This section contains the results of statistical analysis of the map.

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.

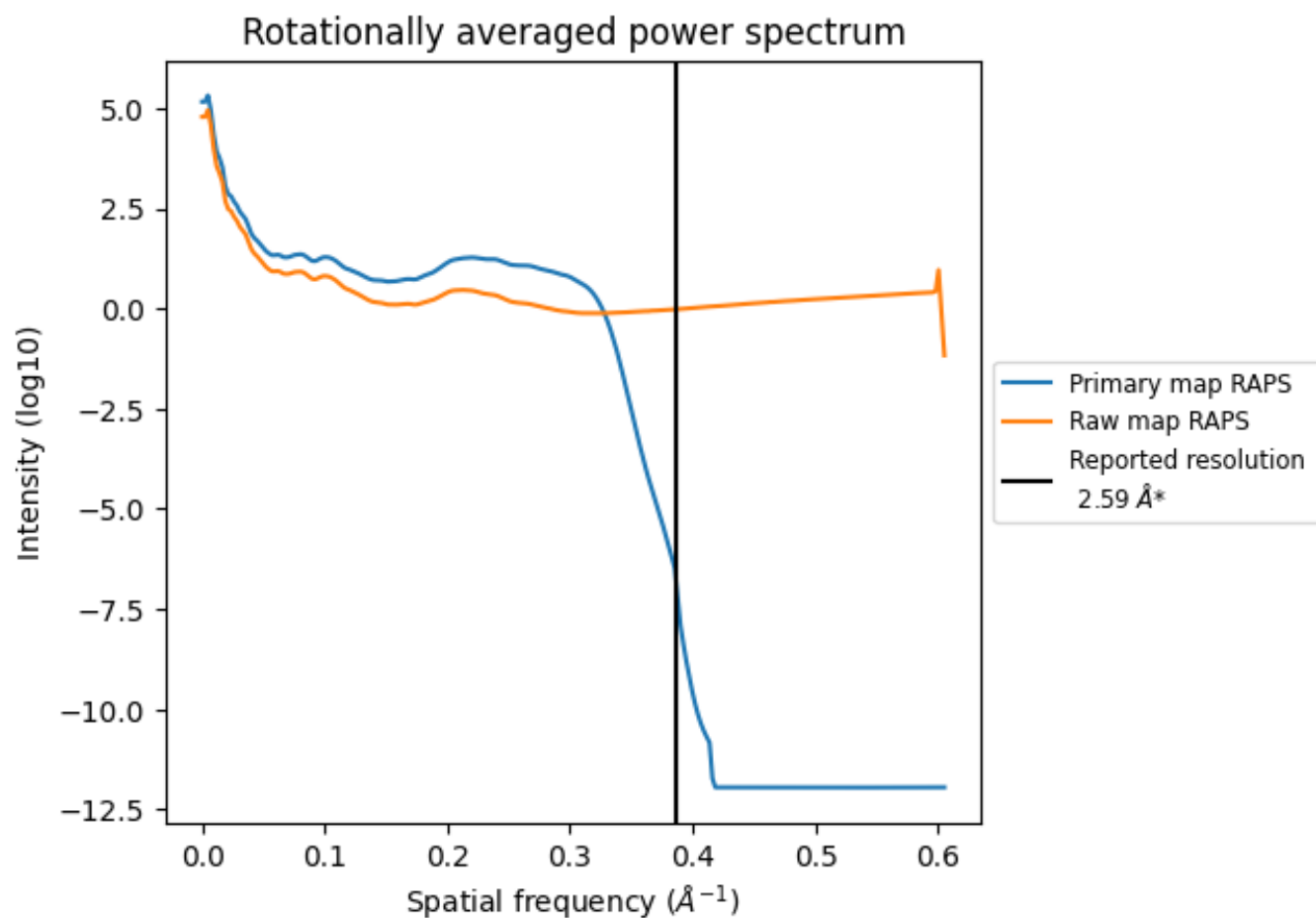
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 93 nm³; this corresponds to an approximate mass of 84 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 ⓘ

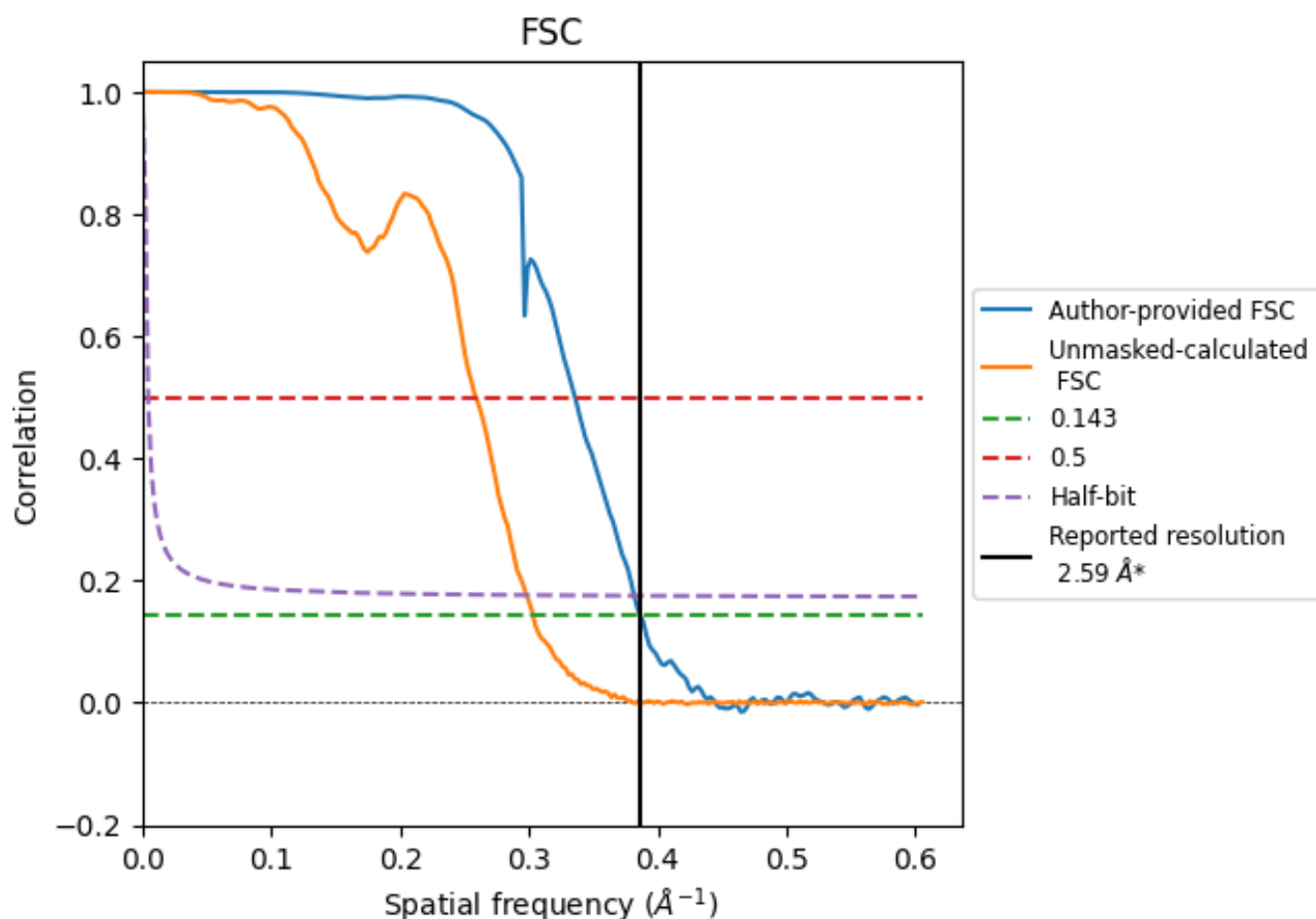


*Reported resolution corresponds to spatial frequency of 0.386 Å⁻¹

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 0.386 \AA^{-1}

8.2 Resolution estimates [i](#)

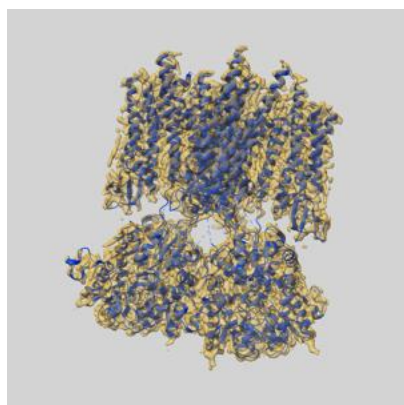
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.59	-	-
Author-provided FSC curve	2.59	2.98	2.62
Unmasked-calculated*	3.30	3.86	3.35

*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 3.30 differs from the reported value 2.59 by more than 10 %

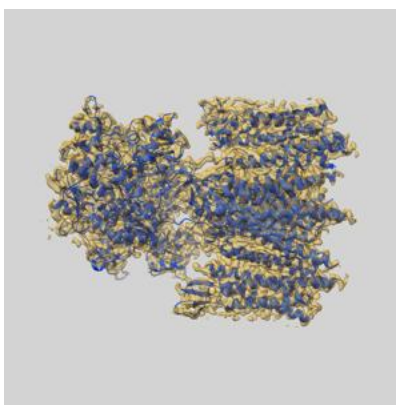
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-52325 and PDB model 9HPC. Per-residue inclusion information can be found in section [3](#) on page [7](#).

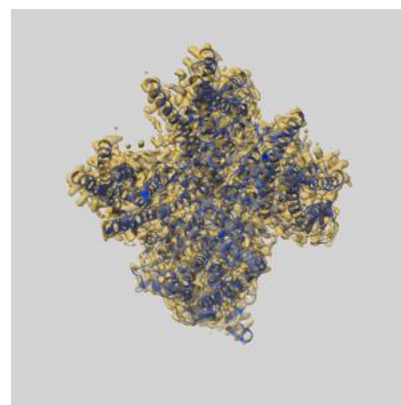
9.1 Map-model overlay [i](#)



X



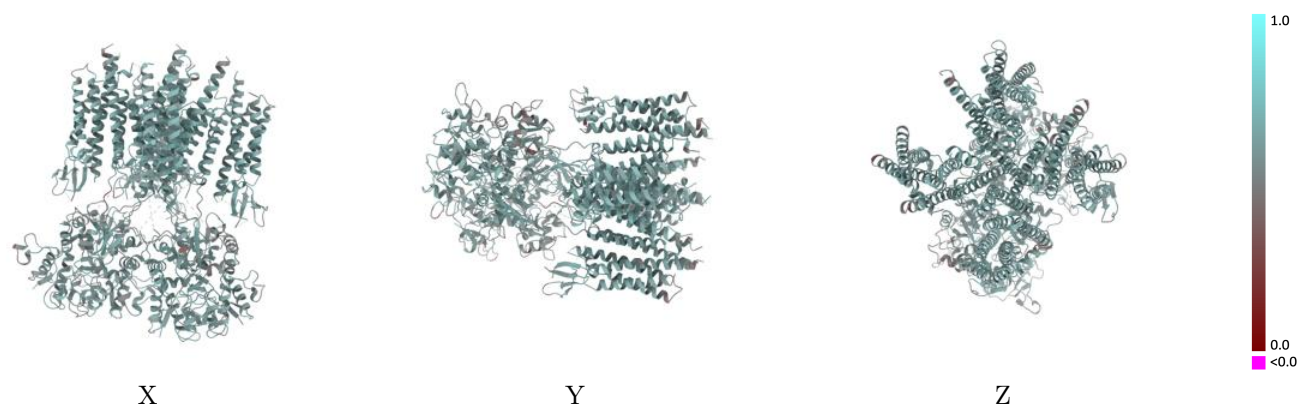
Y



Z

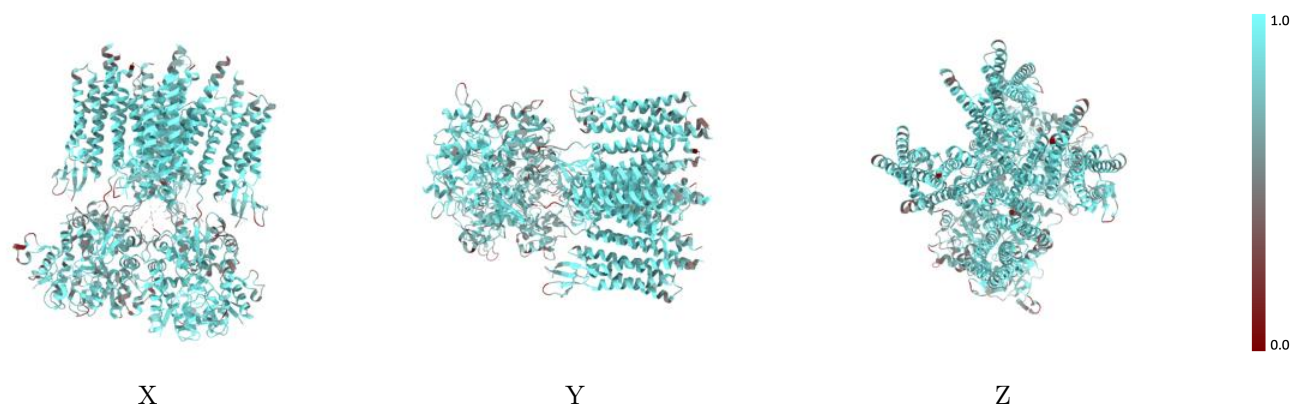
The images above show the 3D surface view of the map at the recommended contour level 10.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



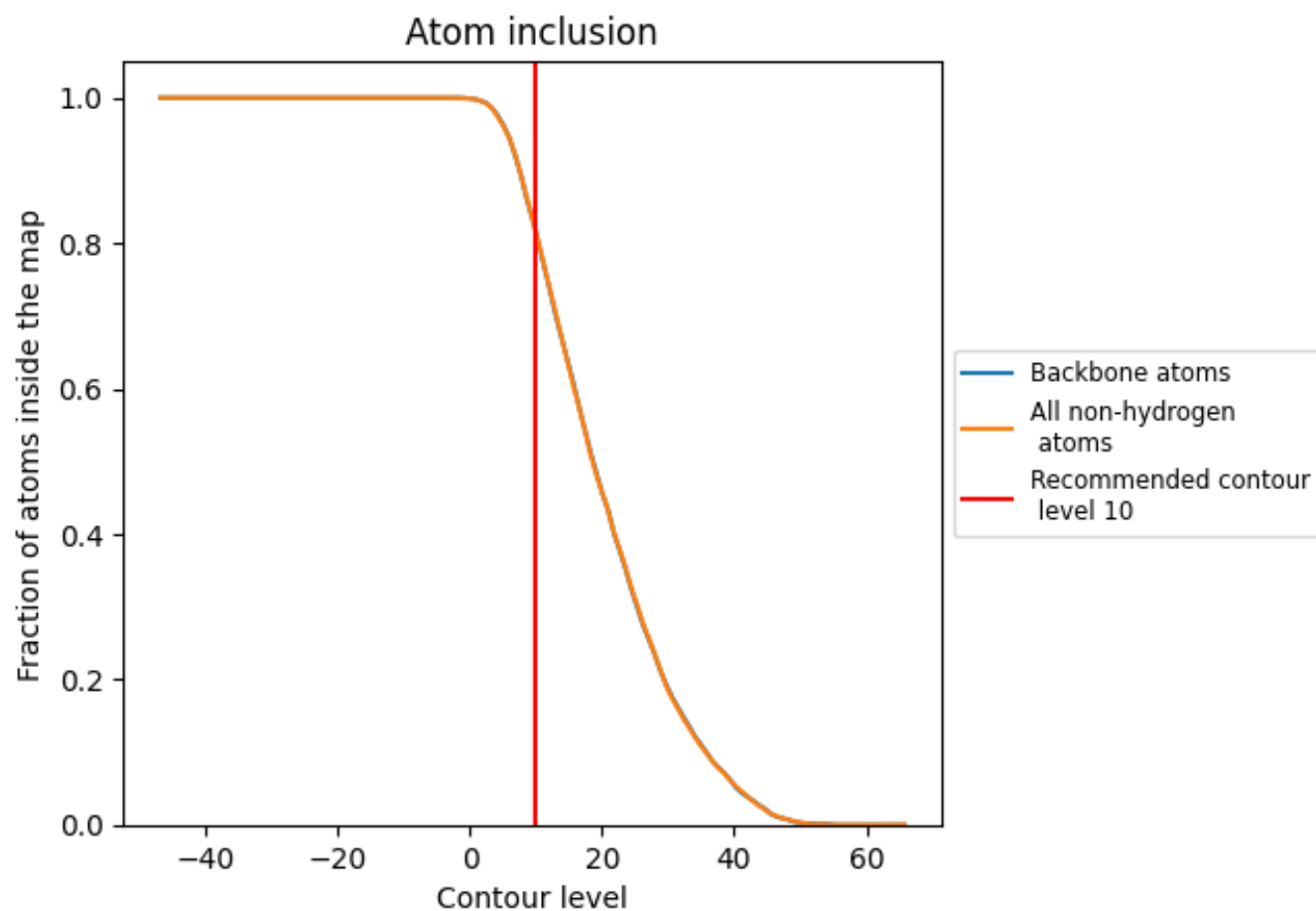
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (10).

9.4 Atom inclusion [i](#)



At the recommended contour level, 82% of all backbone atoms, 82% 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 (10) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div><div></div></div> 0.8170	<div><div></div></div> 0.5870
A	<div><div></div></div> 0.8000	<div><div></div></div> 0.5820
B	<div><div></div></div> 0.7960	<div><div></div></div> 0.5790
C	<div><div></div></div> 0.8470	<div><div></div></div> 0.5930
D	<div><div></div></div> 0.8310	<div><div></div></div> 0.5840
W	<div><div></div></div> 0.8260	<div><div></div></div> 0.5980
X	<div><div></div></div> 0.8340	<div><div></div></div> 0.5890
Y	<div><div></div></div> 0.8400	<div><div></div></div> 0.5970
Z	<div><div></div></div> 0.8390	<div><div></div></div> 0.5900

1.0

0.0

<0.0