



## Full wwPDB EM Validation Report ⓘ

May 13, 2025 – 08:07 AM EDT

PDB ID : 6V00 / pdb\_00006v00  
EMDB ID : EMD-20966  
Title : structure of human KCNQ1-KCNE3-CaM complex  
Authors : Mackinnon, R.; Sun, J.  
Deposited on : 2019-11-16  
Resolution : 3.10 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](mailto: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>.

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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) : 2.43.1

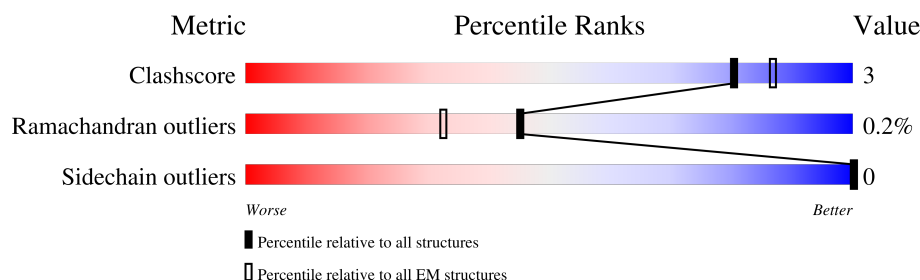
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.10 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  $\geq 3$ , 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	557	
1	D	557	
1	G	557	
1	J	557	
2	B	149	
2	E	149	
2	H	149	
2	K	149	

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Mol	Chain	Length	Quality of chain
3	C	355	<div><div><div>5%</div><div>12%</div><div></div></div><div>87%</div></div>
3	F	355	<div><div><div>5%</div><div>12%</div><div></div></div><div>87%</div></div>
3	I	355	<div><div><div>5%</div><div>13%</div><div></div></div><div>87%</div></div>
3	L	355	<div><div><div>5%</div><div>13%</div><div></div></div><div>87%</div></div>

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 17460 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 Potassium voltage-gated channel subfamily KQT member 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	354	Total	C	N	O	S	0	0
			2864	1879	499	475	11		
1	D	354	Total	C	N	O	S	0	0
			2864	1879	499	475	11		
1	G	354	Total	C	N	O	S	0	0
			2864	1879	499	475	11		
1	J	354	Total	C	N	O	S	0	0
			2864	1879	499	475	11		

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	75	MET	-	expression tag	UNP P51787
A	621	SER	-	expression tag	UNP P51787
A	622	ASN	-	expression tag	UNP P51787
A	623	SER	-	expression tag	UNP P51787
A	624	LEU	-	expression tag	UNP P51787
A	625	GLU	-	expression tag	UNP P51787
A	626	VAL	-	expression tag	UNP P51787
A	627	LEU	-	expression tag	UNP P51787
A	628	PHE	-	expression tag	UNP P51787
A	629	GLN	-	expression tag	UNP P51787
A	630	GLY	-	expression tag	UNP P51787
A	631	PRO	-	expression tag	UNP P51787
D	75	MET	-	expression tag	UNP P51787
D	621	SER	-	expression tag	UNP P51787
D	622	ASN	-	expression tag	UNP P51787
D	623	SER	-	expression tag	UNP P51787
D	624	LEU	-	expression tag	UNP P51787
D	625	GLU	-	expression tag	UNP P51787
D	626	VAL	-	expression tag	UNP P51787
D	627	LEU	-	expression tag	UNP P51787
D	628	PHE	-	expression tag	UNP P51787
D	629	GLN	-	expression tag	UNP P51787

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Chain	Residue	Modelled	Actual	Comment	Reference
D	630	GLY	-	expression tag	UNP P51787
D	631	PRO	-	expression tag	UNP P51787
G	75	MET	-	expression tag	UNP P51787
G	621	SER	-	expression tag	UNP P51787
G	622	ASN	-	expression tag	UNP P51787
G	623	SER	-	expression tag	UNP P51787
G	624	LEU	-	expression tag	UNP P51787
G	625	GLU	-	expression tag	UNP P51787
G	626	VAL	-	expression tag	UNP P51787
G	627	LEU	-	expression tag	UNP P51787
G	628	PHE	-	expression tag	UNP P51787
G	629	GLN	-	expression tag	UNP P51787
G	630	GLY	-	expression tag	UNP P51787
G	631	PRO	-	expression tag	UNP P51787
J	75	MET	-	expression tag	UNP P51787
J	621	SER	-	expression tag	UNP P51787
J	622	ASN	-	expression tag	UNP P51787
J	623	SER	-	expression tag	UNP P51787
J	624	LEU	-	expression tag	UNP P51787
J	625	GLU	-	expression tag	UNP P51787
J	626	VAL	-	expression tag	UNP P51787
J	627	LEU	-	expression tag	UNP P51787
J	628	PHE	-	expression tag	UNP P51787
J	629	GLN	-	expression tag	UNP P51787
J	630	GLY	-	expression tag	UNP P51787
J	631	PRO	-	expression tag	UNP P51787

- Molecule 2 is a protein called Calmodulin-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	144	Total	C	N	O	S	0	0
			1105	681	180	235	9		
2	E	144	Total	C	N	O	S	0	0
			1105	681	180	235	9		
2	H	144	Total	C	N	O	S	0	0
			1105	681	180	235	9		
2	K	144	Total	C	N	O	S	0	0
			1105	681	180	235	9		

- Molecule 3 is a protein called MCherry fluorescent protein, Potassium voltage-gated channel subfamily E member 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	47	Total 394	C 256	N 68	O 68	S 2	0	0
3	F	47	Total 394	C 256	N 68	O 68	S 2	0	0
3	I	47	Total 394	C 256	N 68	O 68	S 2	0	0
3	L	47	Total 394	C 256	N 68	O 68	S 2	0	0

There are 88 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-251	GLY	-	expression tag	UNP X5DSL3
C	-250	GLY	-	expression tag	UNP X5DSL3
C	-153	ASN	LYS	conflict	UNP X5DSL3
C	-107	CYS	LYS	conflict	UNP X5DSL3
C	-106	ARG	LYS	conflict	UNP X5DSL3
C	-98	THR	SER	conflict	UNP X5DSL3
C	-49	ASP	ASN	conflict	UNP X5DSL3
C	-43	LEU	THR	conflict	UNP X5DSL3
C	-13	GLY	-	linker	UNP X5DSL3
C	-12	SER	-	linker	UNP X5DSL3
C	-11	GLY	-	linker	UNP X5DSL3
C	-10	GLU	-	linker	UNP X5DSL3
C	-9	ASN	-	linker	UNP X5DSL3
C	-8	LEU	-	linker	UNP X5DSL3
C	-7	TYR	-	linker	UNP X5DSL3
C	-6	PHE	-	linker	UNP X5DSL3
C	-5	GLN	-	linker	UNP X5DSL3
C	-4	SER	-	linker	UNP X5DSL3
C	-3	SER	-	linker	UNP X5DSL3
C	-2	ARG	-	linker	UNP X5DSL3
C	-1	ALA	-	linker	UNP X5DSL3
C	0	THR	-	linker	UNP X5DSL3
F	-251	GLY	-	expression tag	UNP X5DSL3
F	-250	GLY	-	expression tag	UNP X5DSL3
F	-153	ASN	LYS	conflict	UNP X5DSL3
F	-107	CYS	LYS	conflict	UNP X5DSL3
F	-106	ARG	LYS	conflict	UNP X5DSL3
F	-98	THR	SER	conflict	UNP X5DSL3
F	-49	ASP	ASN	conflict	UNP X5DSL3
F	-43	LEU	THR	conflict	UNP X5DSL3
F	-13	GLY	-	linker	UNP X5DSL3

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Chain	Residue	Modelled	Actual	Comment	Reference
F	-12	SER	-	linker	UNP X5DSL3
F	-11	GLY	-	linker	UNP X5DSL3
F	-10	GLU	-	linker	UNP X5DSL3
F	-9	ASN	-	linker	UNP X5DSL3
F	-8	LEU	-	linker	UNP X5DSL3
F	-7	TYR	-	linker	UNP X5DSL3
F	-6	PHE	-	linker	UNP X5DSL3
F	-5	GLN	-	linker	UNP X5DSL3
F	-4	SER	-	linker	UNP X5DSL3
F	-3	SER	-	linker	UNP X5DSL3
F	-2	ARG	-	linker	UNP X5DSL3
F	-1	ALA	-	linker	UNP X5DSL3
F	0	THR	-	linker	UNP X5DSL3
I	-251	GLY	-	expression tag	UNP X5DSL3
I	-250	GLY	-	expression tag	UNP X5DSL3
I	-153	ASN	LYS	conflict	UNP X5DSL3
I	-107	CYS	LYS	conflict	UNP X5DSL3
I	-106	ARG	LYS	conflict	UNP X5DSL3
I	-98	THR	SER	conflict	UNP X5DSL3
I	-49	ASP	ASN	conflict	UNP X5DSL3
I	-43	LEU	THR	conflict	UNP X5DSL3
I	-13	GLY	-	linker	UNP X5DSL3
I	-12	SER	-	linker	UNP X5DSL3
I	-11	GLY	-	linker	UNP X5DSL3
I	-10	GLU	-	linker	UNP X5DSL3
I	-9	ASN	-	linker	UNP X5DSL3
I	-8	LEU	-	linker	UNP X5DSL3
I	-7	TYR	-	linker	UNP X5DSL3
I	-6	PHE	-	linker	UNP X5DSL3
I	-5	GLN	-	linker	UNP X5DSL3
I	-4	SER	-	linker	UNP X5DSL3
I	-3	SER	-	linker	UNP X5DSL3
I	-2	ARG	-	linker	UNP X5DSL3
I	-1	ALA	-	linker	UNP X5DSL3
I	0	THR	-	linker	UNP X5DSL3
L	-251	GLY	-	expression tag	UNP X5DSL3
L	-250	GLY	-	expression tag	UNP X5DSL3
L	-153	ASN	LYS	conflict	UNP X5DSL3
L	-107	CYS	LYS	conflict	UNP X5DSL3
L	-106	ARG	LYS	conflict	UNP X5DSL3
L	-98	THR	SER	conflict	UNP X5DSL3
L	-49	ASP	ASN	conflict	UNP X5DSL3

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Chain	Residue	Modelled	Actual	Comment	Reference
L	-43	LEU	THR	conflict	UNP X5DSL3
L	-13	GLY	-	linker	UNP X5DSL3
L	-12	SER	-	linker	UNP X5DSL3
L	-11	GLY	-	linker	UNP X5DSL3
L	-10	GLU	-	linker	UNP X5DSL3
L	-9	ASN	-	linker	UNP X5DSL3
L	-8	LEU	-	linker	UNP X5DSL3
L	-7	TYR	-	linker	UNP X5DSL3
L	-6	PHE	-	linker	UNP X5DSL3
L	-5	GLN	-	linker	UNP X5DSL3
L	-4	SER	-	linker	UNP X5DSL3
L	-3	SER	-	linker	UNP X5DSL3
L	-2	ARG	-	linker	UNP X5DSL3
L	-1	ALA	-	linker	UNP X5DSL3
L	0	THR	-	linker	UNP X5DSL3

- Molecule 4 is CALCIUM ION (CCD ID: CA) (formula: Ca).

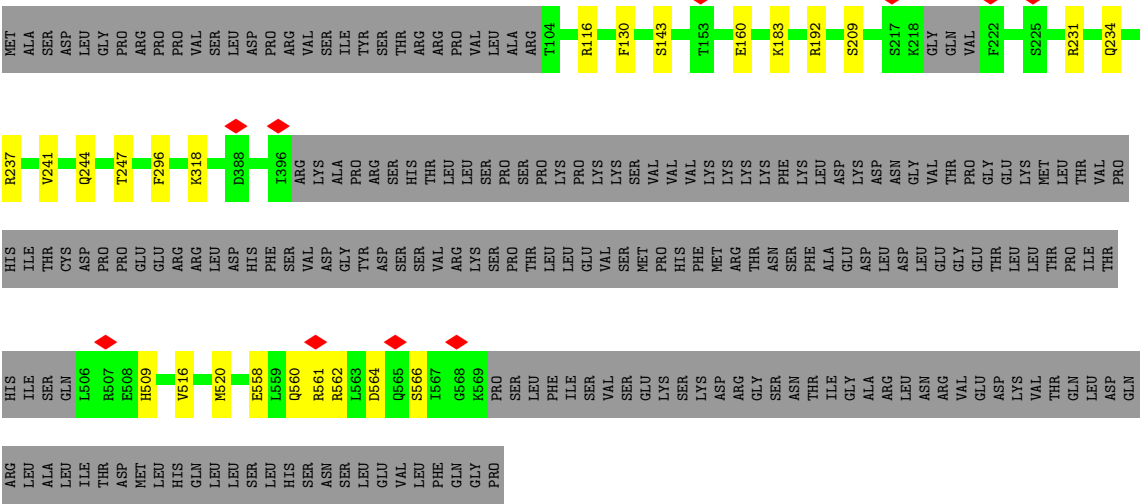
Mol	Chain	Residues	Atoms	AltConf
4	B	2	Total Ca 2 2	0
4	E	2	Total Ca 2 2	0
4	H	2	Total Ca 2 2	0
4	K	2	Total Ca 2 2	0



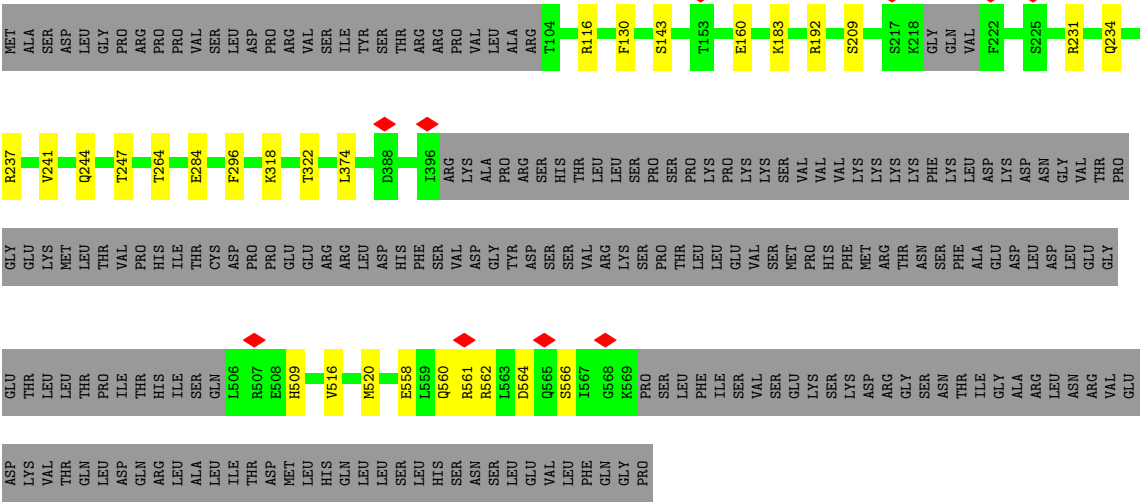


ASP  
GLN  
ARG  
ASP  
LEU  
ALA  
LEU  
TLE  
THR  
MET  
ASP  
LEU  
GLN  
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ASN  
GLU  
VAL  
PHE  
GLN  
GLY  
PRO

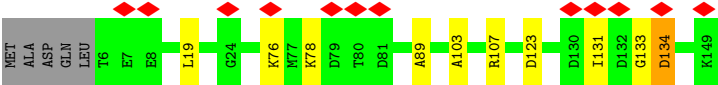
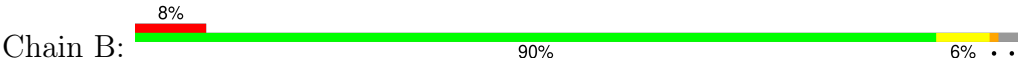
- Molecule 1: Potassium voltage-gated channel subfamily KQT member 1



- Molecule 1: Potassium voltage-gated channel subfamily KQT member 1

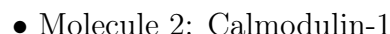


- Molecule 2: Calmodulin-1

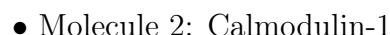


- Molecule 2: Calmodulin-1

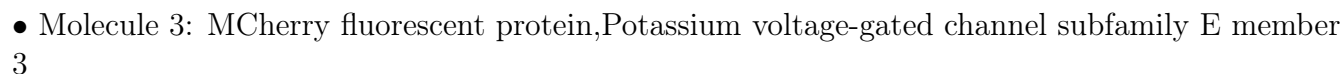
Chain E:



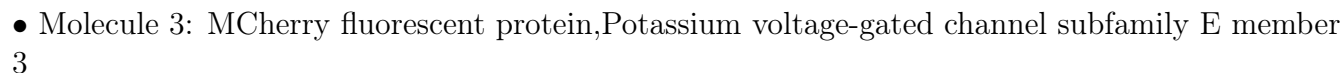
Chain H:



Chain K:



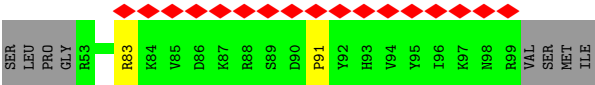
Chain C:



Chain F:







## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	39074	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	94	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	34.472	Depositor
Minimum map value	-19.068	Depositor
Average map value	0.000	Depositor
Map value standard deviation	1.000	Depositor
Recommended contour level	6	Depositor
Map size ( $\text{\AA}$ )	309.0, 309.0, 309.0	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.03, 1.03, 1.03	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: CA

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	0.33	0/2935	0.59	0/3972
1	D	0.33	0/2935	0.59	0/3972
1	G	0.33	0/2935	0.59	0/3972
1	J	0.33	0/2935	0.59	0/3972
2	B	0.24	0/1117	0.52	0/1503
2	E	0.25	0/1117	0.52	0/1503
2	H	0.25	0/1117	0.52	0/1503
2	K	0.25	0/1117	0.52	0/1503
3	C	0.33	0/403	0.67	0/543
3	F	0.33	0/403	0.67	0/543
3	I	0.33	0/403	0.67	0/543
3	L	0.33	0/403	0.67	0/543
All	All	0.31	0/17820	0.58	0/24072

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	2864	0	2929	18	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	2864	0	2929	16	0
1	G	2864	0	2929	15	0
1	J	2864	0	2929	18	0
2	B	1105	0	1020	6	0
2	E	1105	0	1020	5	0
2	H	1105	0	1020	5	0
2	K	1105	0	1020	6	0
3	C	394	0	391	3	0
3	F	394	0	391	3	0
3	I	394	0	391	2	0
3	L	394	0	391	2	0
4	B	2	0	0	0	0
4	E	2	0	0	0	0
4	H	2	0	0	0	0
4	K	2	0	0	0	0
All	All	17460	0	17360	88	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 (88) 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)
2:H:133:GLY:O	2:H:134:ASP:CB	2.46	0.64
2:K:133:GLY:O	2:K:134:ASP:CB	2.46	0.64
2:E:133:GLY:O	2:E:134:ASP:CB	2.46	0.63
2:B:133:GLY:O	2:B:134:ASP:CB	2.45	0.62
1:A:183:LYS:O	1:A:192:ARG:NH2	2.36	0.59
1:D:183:LYS:O	1:D:192:ARG:NH2	2.36	0.59
1:G:183:LYS:O	1:G:192:ARG:NH2	2.36	0.59
2:B:76:LYS:HG3	2:B:78:LYS:H	1.68	0.59
2:H:76:LYS:HG3	2:H:78:LYS:H	1.68	0.59
2:E:76:LYS:HG3	2:E:78:LYS:H	1.68	0.58
2:K:76:LYS:HG3	2:K:78:LYS:H	1.68	0.58
1:J:183:LYS:O	1:J:192:ARG:NH2	2.36	0.57
3:I:83:ARG:NH1	3:I:83:ARG:O	2.40	0.55
3:C:83:ARG:O	3:C:83:ARG:NH1	2.40	0.55
1:D:516:VAL:HG12	1:D:520:MET:HE2	1.89	0.55
3:F:83:ARG:O	3:F:83:ARG:NH1	2.40	0.55
3:L:83:ARG:NH1	3:L:83:ARG:O	2.40	0.55
1:G:516:VAL:HG12	1:G:520:MET:HE2	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:209:SER:OG	1:G:237:ARG:NH1	2.41	0.54
1:A:209:SER:OG	1:A:237:ARG:NH1	2.41	0.54
1:J:516:VAL:HG12	1:J:520:MET:HE2	1.89	0.54
1:J:209:SER:OG	1:J:237:ARG:NH1	2.41	0.54
1:D:209:SER:OG	1:D:237:ARG:NH1	2.41	0.53
1:A:516:VAL:HG12	1:A:520:MET:HE2	1.89	0.53
1:J:509:HIS:HB2	2:K:19:LEU:HD21	1.92	0.52
1:D:509:HIS:HB2	2:E:19:LEU:HD21	1.92	0.52
1:G:509:HIS:HB2	2:H:19:LEU:HD21	1.92	0.52
1:A:509:HIS:HB2	2:B:19:LEU:HD21	1.94	0.50
2:H:107:ARG:NH1	2:H:123:ASP:OD1	2.41	0.50
2:E:107:ARG:NH1	2:E:123:ASP:OD1	2.41	0.50
1:G:296:PHE:HE1	1:G:318:LYS:HB3	1.77	0.50
1:J:143:SER:OG	1:J:231:ARG:NH2	2.45	0.49
1:A:143:SER:OG	1:A:231:ARG:NH2	2.45	0.49
1:A:160:GLU:OE1	1:A:234:GLN:NE2	2.45	0.49
1:J:160:GLU:OE1	1:J:234:GLN:NE2	2.45	0.49
1:D:183:LYS:HB2	1:D:192:ARG:HH21	1.78	0.49
1:D:296:PHE:HE1	1:D:318:LYS:HB3	1.77	0.49
1:G:143:SER:OG	1:G:231:ARG:NH2	2.45	0.49
1:J:296:PHE:HE1	1:J:318:LYS:HB3	1.77	0.49
1:G:183:LYS:HB2	1:G:192:ARG:HH21	1.78	0.49
1:A:183:LYS:HB2	1:A:192:ARG:HH21	1.78	0.48
1:J:183:LYS:HB2	1:J:192:ARG:HH21	1.78	0.48
1:A:296:PHE:HE1	1:A:318:LYS:HB3	1.77	0.48
1:D:160:GLU:OE1	1:D:234:GLN:NE2	2.46	0.48
1:G:160:GLU:OE1	1:G:234:GLN:NE2	2.46	0.48
1:D:143:SER:OG	1:D:231:ARG:NH2	2.45	0.48
2:B:107:ARG:NH1	2:B:123:ASP:OD1	2.41	0.47
1:G:560:GLN:NE2	1:G:564:ASP:OD2	2.48	0.47
1:J:560:GLN:NE2	1:J:564:ASP:OD2	2.47	0.47
1:A:560:GLN:NE2	1:A:564:ASP:OD2	2.48	0.46
1:J:284:GLU:OE2	1:J:322:THR:OG1	2.32	0.46
3:F:83:ARG:HH21	3:F:91:PRO:HD3	1.82	0.45
3:C:83:ARG:HH21	3:C:91:PRO:HD3	1.82	0.45
1:G:130:PHE:HD1	1:G:241:VAL:HG21	1.82	0.45
3:I:83:ARG:HH21	3:I:91:PRO:HD3	1.82	0.45
3:L:83:ARG:HH21	3:L:91:PRO:HD3	1.81	0.45
1:J:558:GLU:OE2	1:J:562:ARG:NH2	2.50	0.45
2:K:107:ARG:NH1	2:K:123:ASP:OD1	2.41	0.45
1:A:130:PHE:HD1	1:A:241:VAL:HG21	1.82	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:560:GLN:NE2	1:D:564:ASP:OD2	2.48	0.44
1:D:558:GLU:OE2	1:D:562:ARG:NH2	2.50	0.44
1:G:562:ARG:O	1:G:566:SER:HB3	2.18	0.44
1:A:558:GLU:OE2	1:A:562:ARG:NH2	2.50	0.44
1:J:562:ARG:O	1:J:566:SER:HB3	2.18	0.44
1:G:558:GLU:OE2	1:G:562:ARG:NH2	2.50	0.44
1:D:130:PHE:HD1	1:D:241:VAL:HG21	1.82	0.44
2:B:103:ALA:HB2	2:B:131:ILE:HD11	2.00	0.44
1:J:130:PHE:HD1	1:J:241:VAL:HG21	1.82	0.44
2:H:103:ALA:HB2	2:H:131:ILE:HD11	2.00	0.43
1:A:134:LEU:HD21	3:C:65:MET:HB3	2.00	0.43
1:A:562:ARG:O	1:A:566:SER:HB3	2.18	0.43
1:D:562:ARG:O	1:D:566:SER:HB3	2.18	0.43
2:E:103:ALA:HB2	2:E:131:ILE:HD11	2.00	0.43
2:K:103:ALA:HB2	2:K:131:ILE:HD11	2.00	0.43
1:A:264:THR:HG23	1:J:247:THR:HG23	2.01	0.41
1:D:116:ARG:HA	1:D:244:GLN:HE21	1.85	0.41
1:D:558:GLU:OE2	1:D:561:ARG:NH2	2.54	0.41
1:G:116:ARG:HA	1:G:244:GLN:HE21	1.85	0.41
1:J:116:ARG:HA	1:J:244:GLN:HE21	1.85	0.41
1:J:558:GLU:OE2	1:J:561:ARG:NH2	2.54	0.41
1:A:374:LEU:HD23	2:B:89:ALA:HB2	2.02	0.41
1:A:116:ARG:HA	1:A:244:GLN:HE21	1.85	0.41
1:G:558:GLU:OE2	1:G:561:ARG:NH2	2.54	0.41
1:A:558:GLU:OE2	1:A:561:ARG:NH2	2.54	0.40
1:G:247:THR:HG23	1:J:264:THR:HG23	2.03	0.40
1:J:374:LEU:HD23	2:K:89:ALA:HB2	2.04	0.40
1:A:247:THR:HG23	1:D:264:THR:HG23	2.02	0.40
1:D:134:LEU:HD21	3:F:65:MET:HB3	2.04	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	348/557 (62%)	335 (96%)	13 (4%)	0	100	100
1	D	348/557 (62%)	335 (96%)	13 (4%)	0	100	100
1	G	348/557 (62%)	335 (96%)	13 (4%)	0	100	100
1	J	348/557 (62%)	335 (96%)	13 (4%)	0	100	100
2	B	142/149 (95%)	135 (95%)	6 (4%)	1 (1%)	19	51
2	E	142/149 (95%)	135 (95%)	6 (4%)	1 (1%)	19	51
2	H	142/149 (95%)	135 (95%)	6 (4%)	1 (1%)	19	51
2	K	142/149 (95%)	135 (95%)	6 (4%)	1 (1%)	19	51
3	C	45/355 (13%)	41 (91%)	4 (9%)	0	100	100
3	F	45/355 (13%)	41 (91%)	4 (9%)	0	100	100
3	I	45/355 (13%)	41 (91%)	4 (9%)	0	100	100
3	L	45/355 (13%)	41 (91%)	4 (9%)	0	100	100
All	All	2140/4244 (50%)	2044 (96%)	92 (4%)	4 (0%)	45	74

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	134	ASP
2	E	134	ASP
2	H	134	ASP
2	K	134	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	301/490 (61%)	301 (100%)	0	100	100
1	D	301/490 (61%)	301 (100%)	0	100	100
1	G	301/490 (61%)	301 (100%)	0	100	100
1	J	301/490 (61%)	301 (100%)	0	100	100
2	B	114/127 (90%)	114 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	E	114/127 (90%)	114 (100%)	0	100	100
2	H	114/127 (90%)	114 (100%)	0	100	100
2	K	114/127 (90%)	114 (100%)	0	100	100
3	C	43/302 (14%)	43 (100%)	0	100	100
3	F	43/302 (14%)	43 (100%)	0	100	100
3	I	43/302 (14%)	43 (100%)	0	100	100
3	L	43/302 (14%)	43 (100%)	0	100	100
All	All	1832/3676 (50%)	1832 (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 (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	386	ASN
1	A	509	HIS
1	A	510	HIS
1	A	549	HIS
2	B	42	GLN
3	C	93	HIS
1	D	386	ASN
1	D	509	HIS
1	D	510	HIS
1	D	549	HIS
2	E	42	GLN
3	F	93	HIS
1	G	386	ASN
1	G	509	HIS
1	G	510	HIS
1	G	549	HIS
2	H	42	GLN
3	I	93	HIS
1	J	386	ASN
1	J	509	HIS
1	J	510	HIS
1	J	549	HIS
2	K	42	GLN
3	L	93	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](#)

Of 8 ligands modelled in this entry, 8 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

### 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.

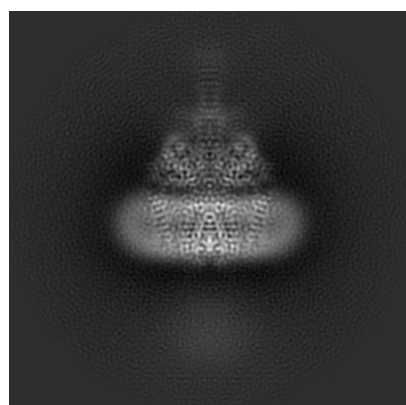
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-20966. These allow visual inspection of the internal detail of the map and identification of artifacts.

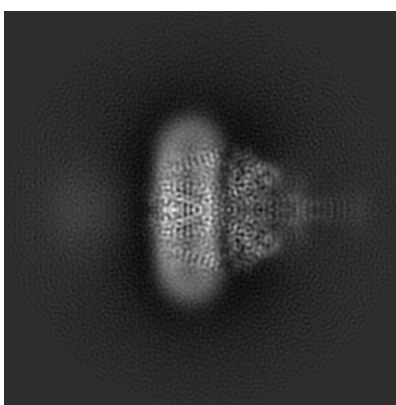
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

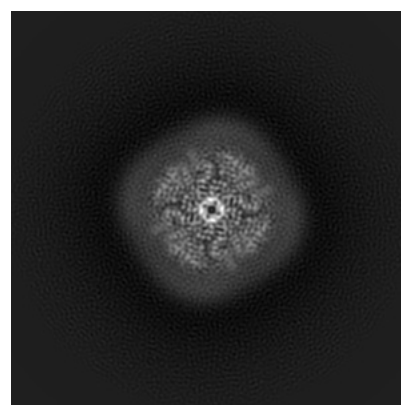
#### 6.1.1 Primary map



X



Y

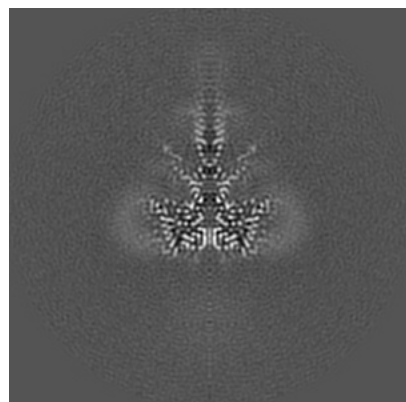


Z

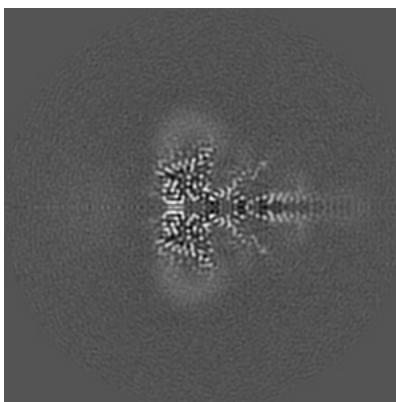
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

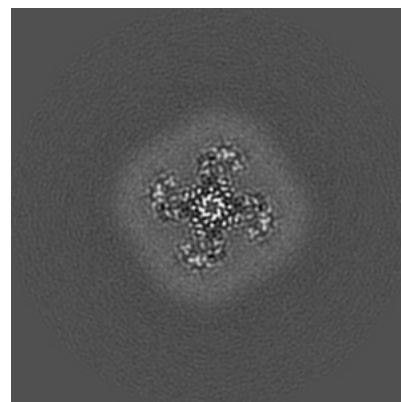
#### 6.2.1 Primary map



X Index: 150



Y Index: 150

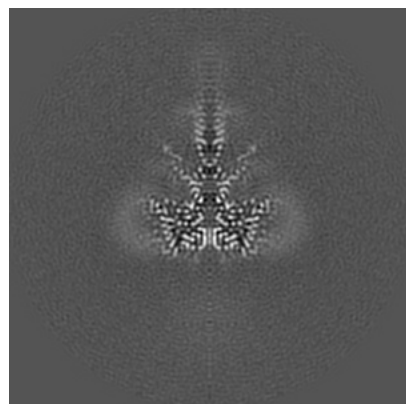


Z Index: 150

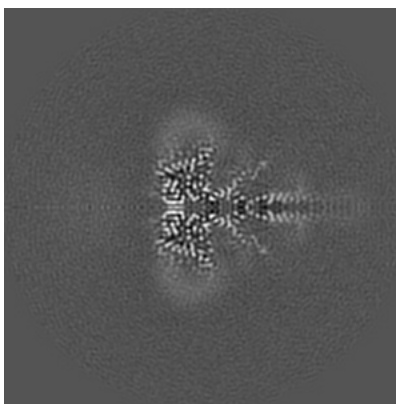
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

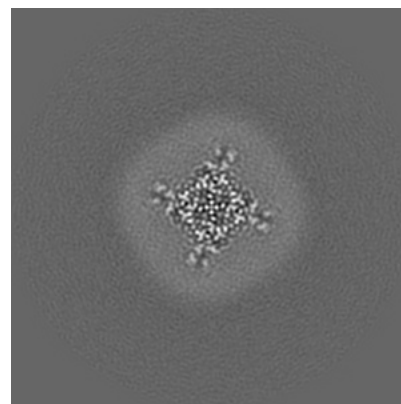
### 6.3.1 Primary map



X Index: 150



Y Index: 150

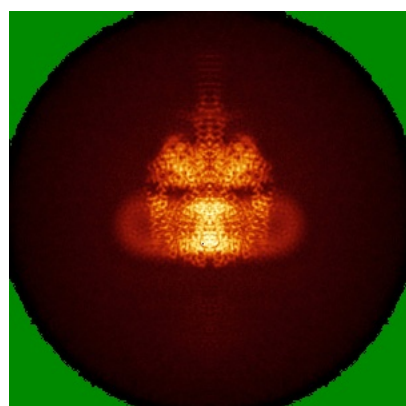


Z Index: 127

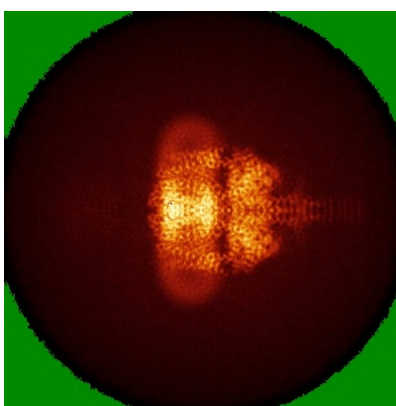
The images above show the largest variance slices of the map in three orthogonal directions.

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

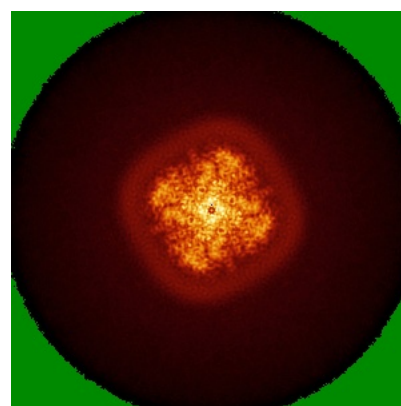
### 6.4.1 Primary map



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 6.0. 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](#)

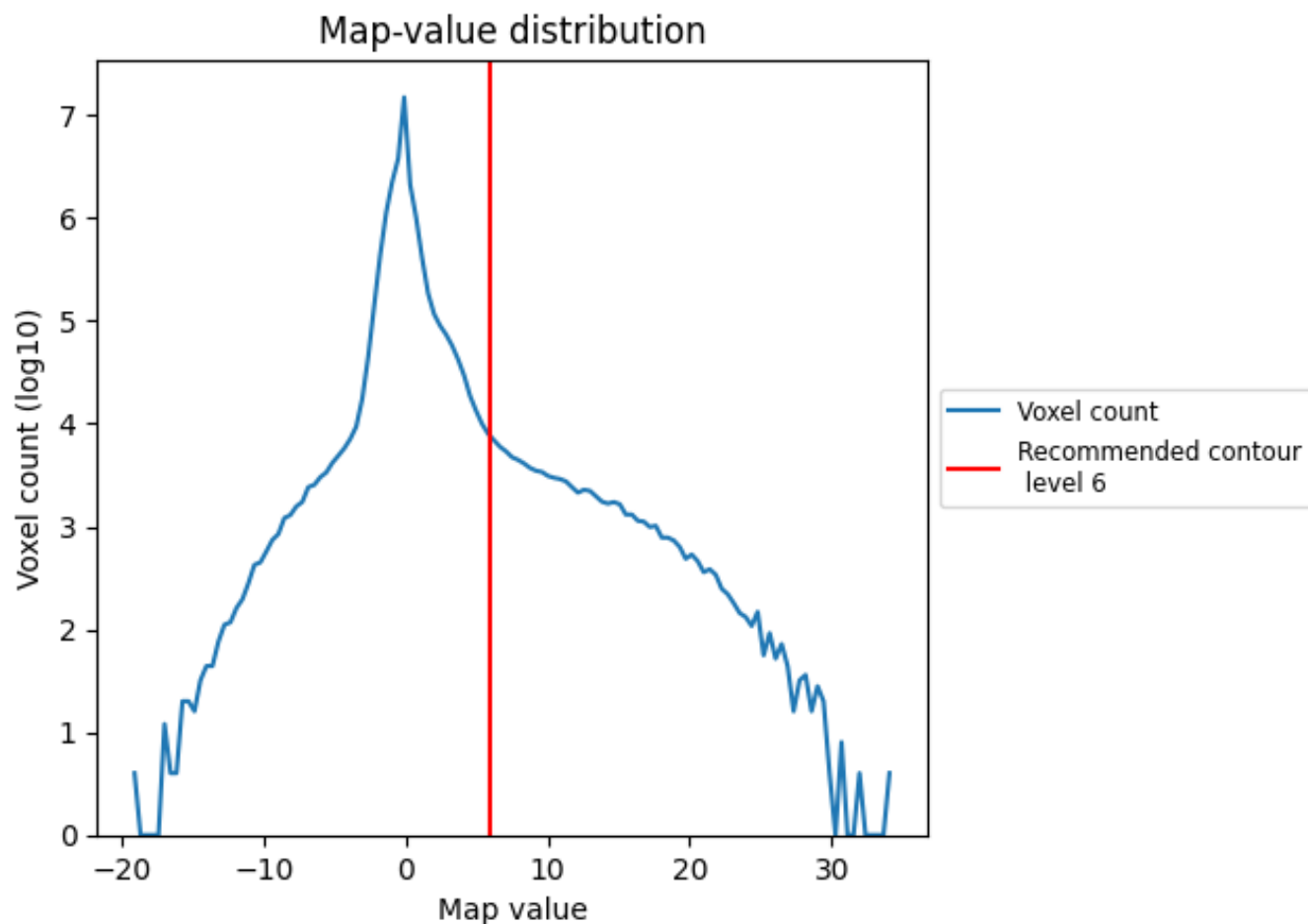
This section was not generated. No masks/segmentation were deposited.



## 7 Map analysis [i](#)

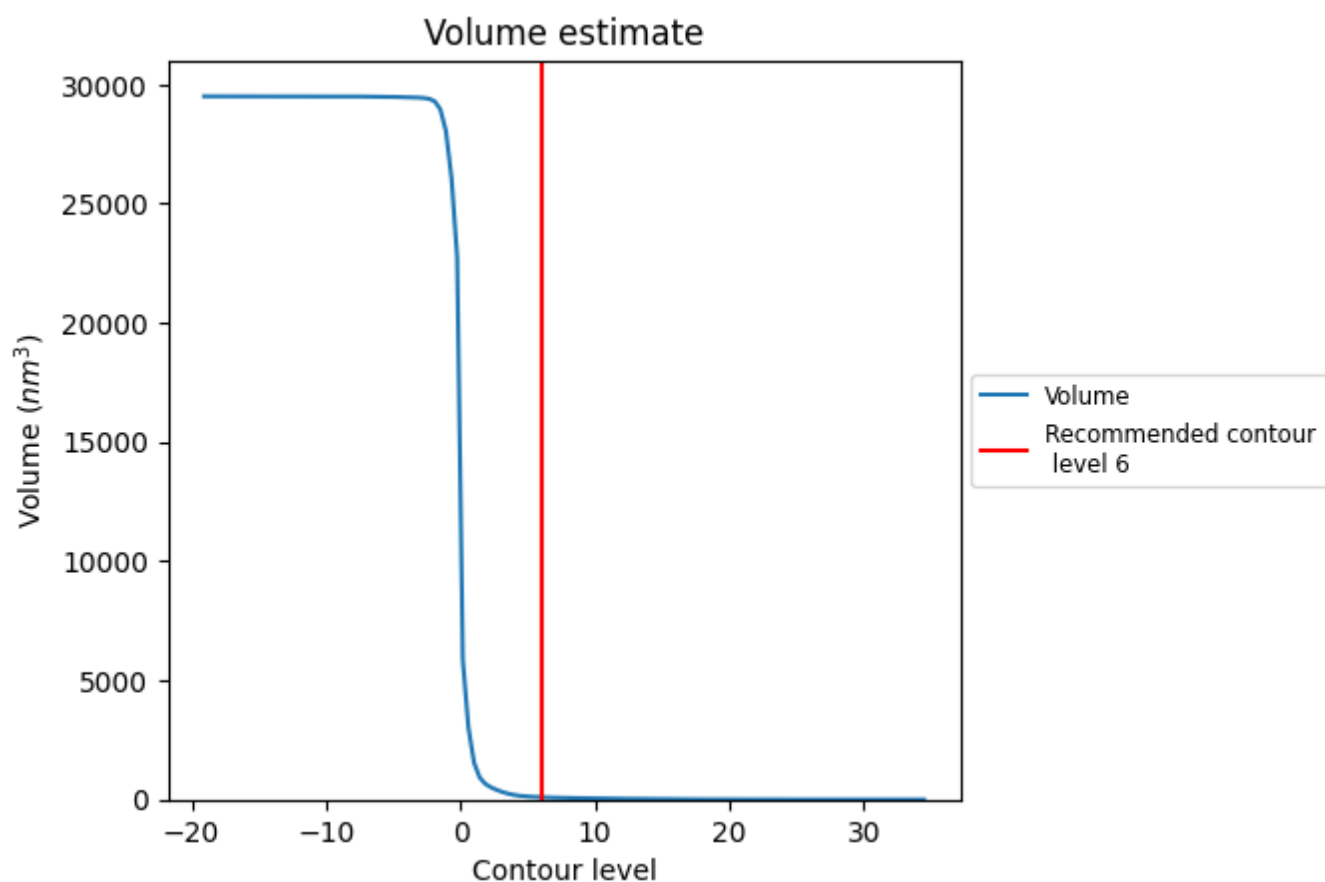
This section contains the results of statistical analysis of the map.

### 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.

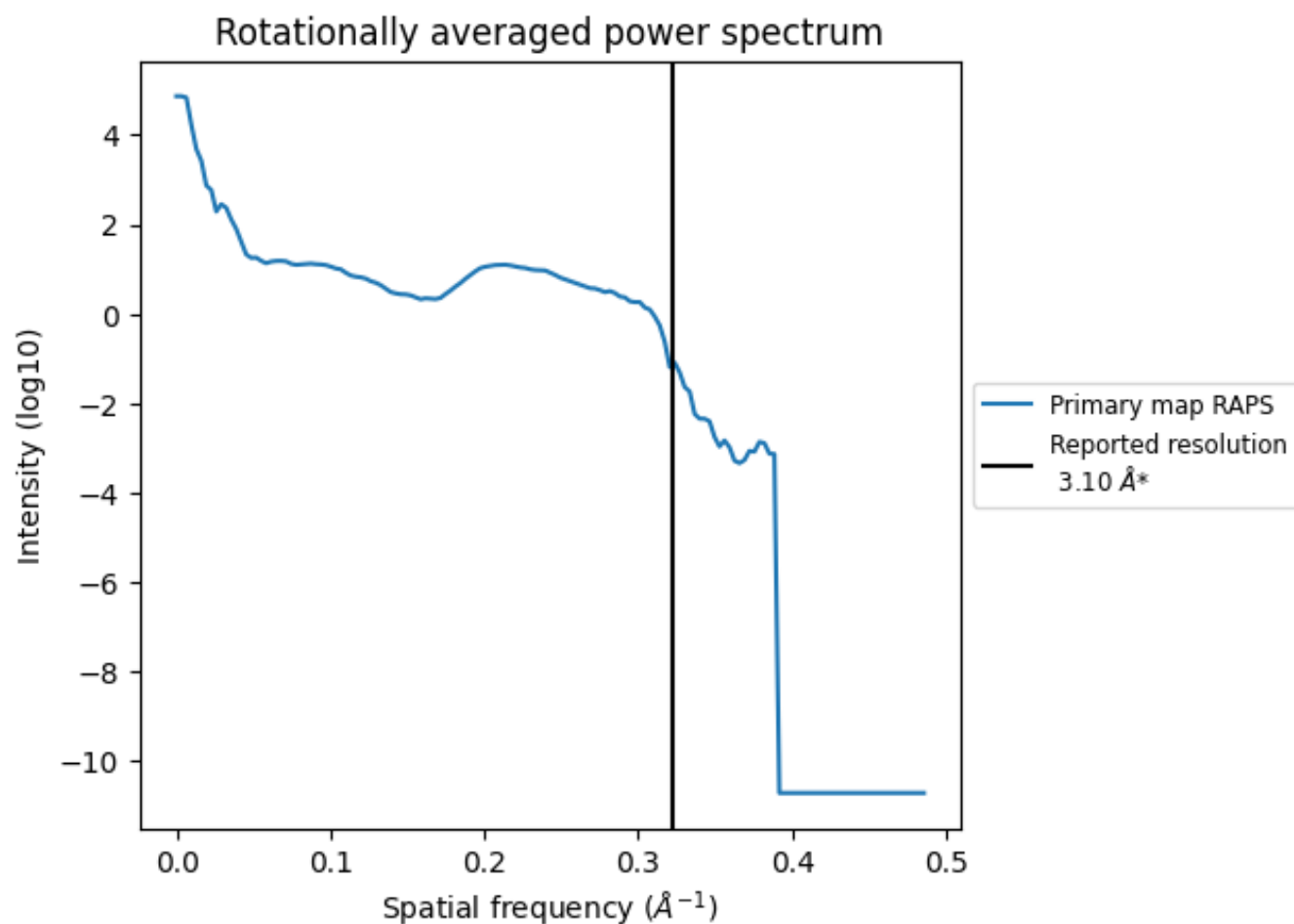
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 98 nm<sup>3</sup>; this corresponds to an approximate mass of 89 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 0.323  $\text{\AA}^{-1}$

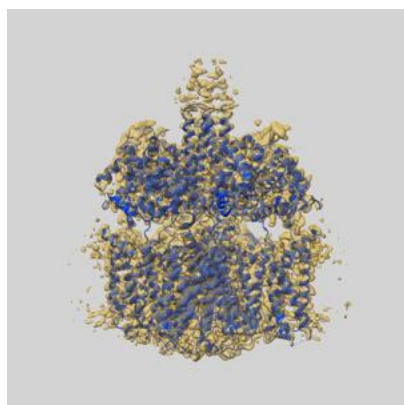
## 8 Fourier-Shell correlation

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

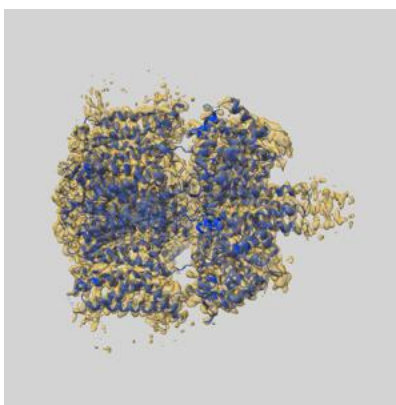
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-20966 and PDB model 6V00. Per-residue inclusion information can be found in section [3](#) on page [9](#).

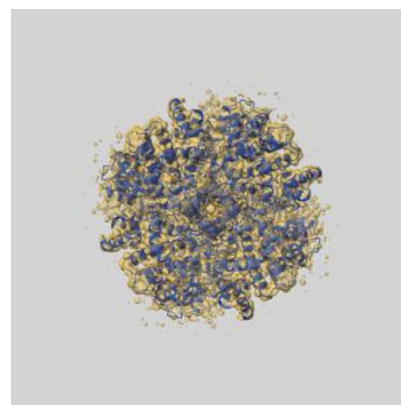
### 9.1 Map-model overlay [i](#)



X



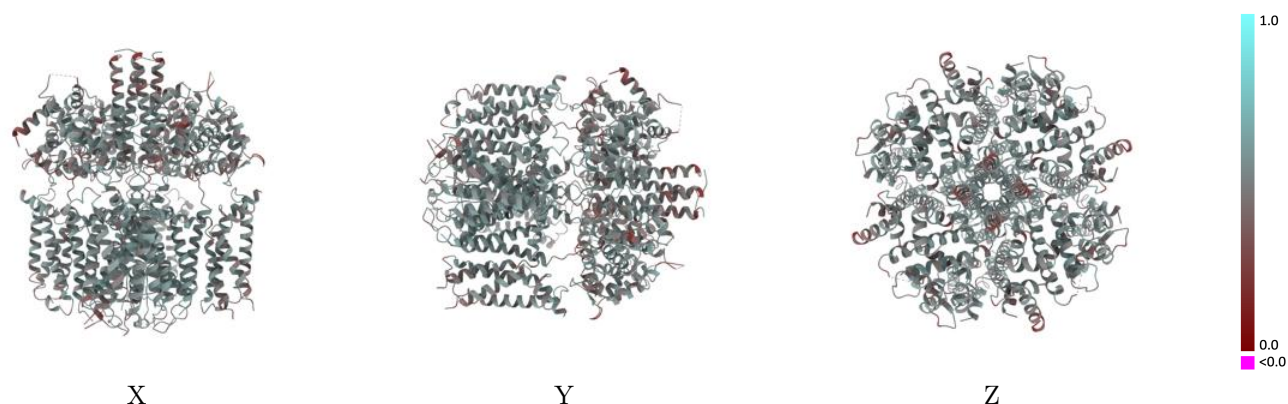
Y



Z

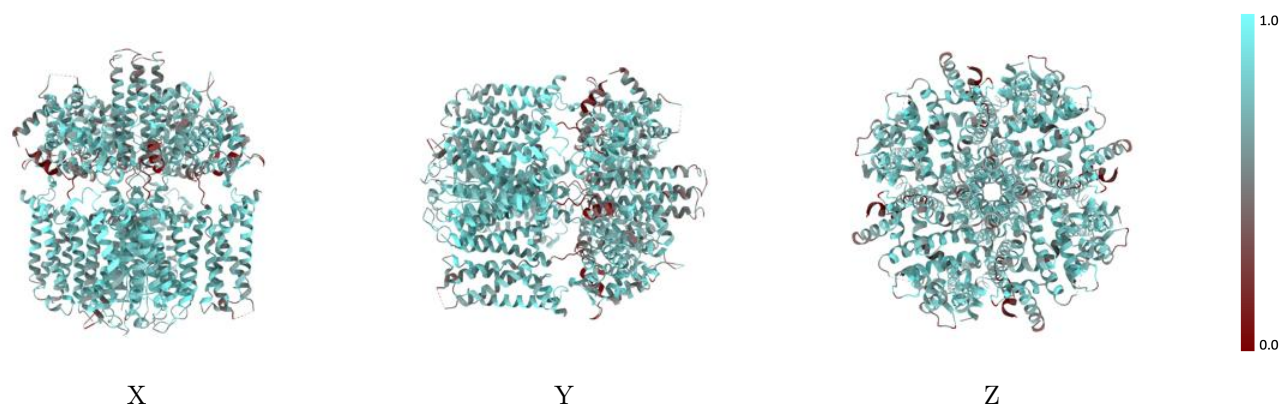
The images above show the 3D surface view of the map at the recommended contour level 6.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



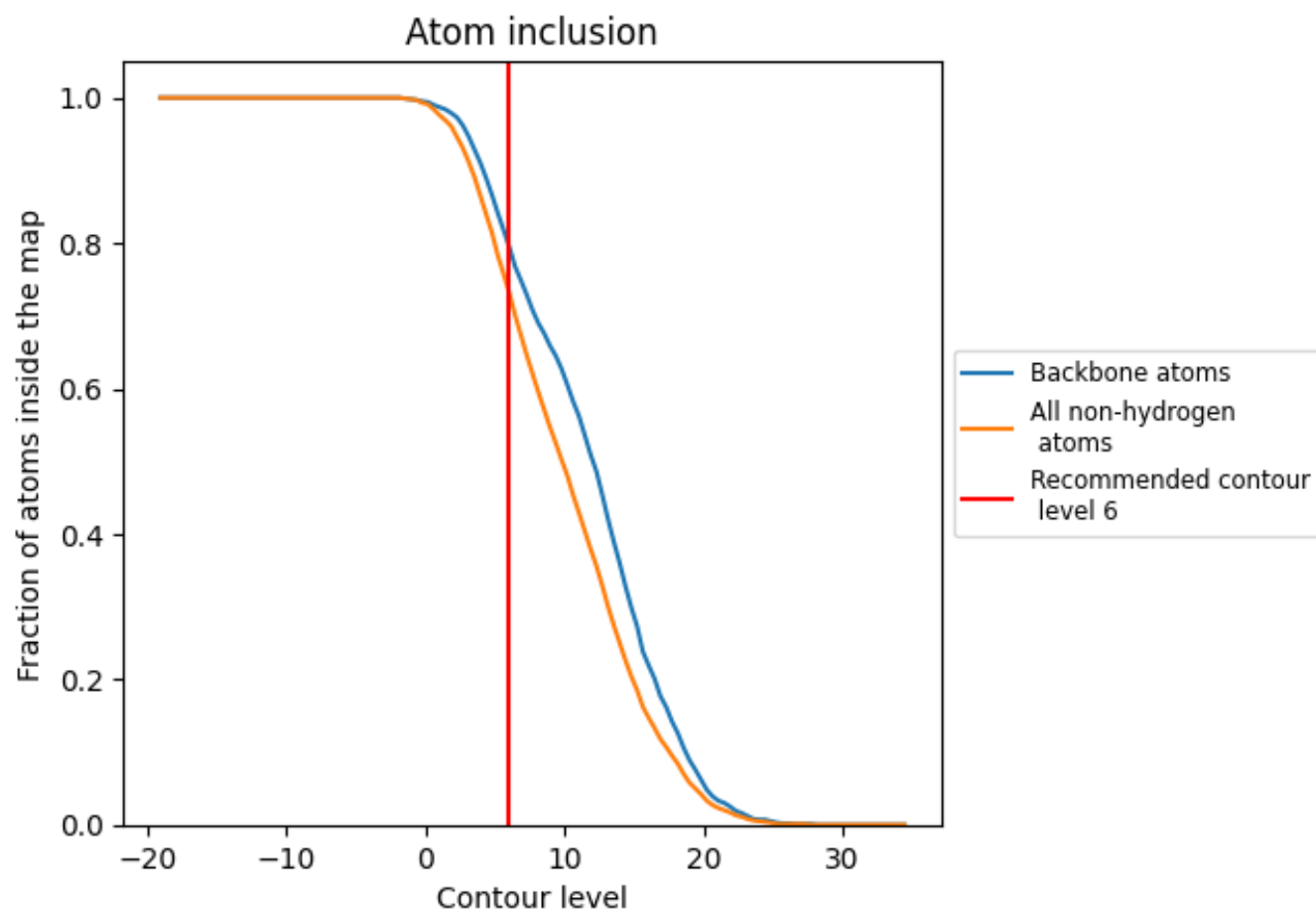
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (6).



























## 9.4 Atom inclusion [i](#)



At the recommended contour level, 80% of all backbone atoms, 73% 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 (6) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7340	 0.5060
A	 0.7760	 0.5170
B	 0.6910	 0.4870
C	 0.5330	 0.4850
D	 0.7760	 0.5180
E	 0.6900	 0.4860
F	 0.5410	 0.4860
G	 0.7760	 0.5160
H	 0.6900	 0.4850
I	 0.5490	 0.4820
J	 0.7770	 0.5160
K	 0.6910	 0.4880
L	 0.5490	 0.4870

