



wwPDB EM Validation Summary Report ⓘ

Mar 9, 2026 – 04:24 PM UTC

PDB ID : 6V9H / pdb_00006v9h
EMDB ID : EMD-21120
Title : Ankyrin repeat and SOCS-box protein 9 (ASB9), ElonginB (ELOB), and ElonginC (ELOC) bound to its substrate Brain-type Creatine Kinase (CKB)
Authors : Komives, E.A.; Lumpkin, R.J.; Baker, R.W.; Leschziner, A.E.
Deposited on : 2019-12-13
Resolution : 4.10 Å (reported)
Based on initial models : 3DRB, 3ZNG

This is a wwPDB EM Validation Summary 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:

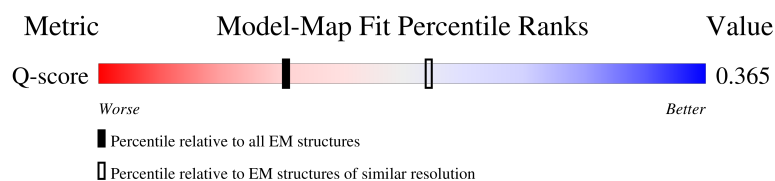
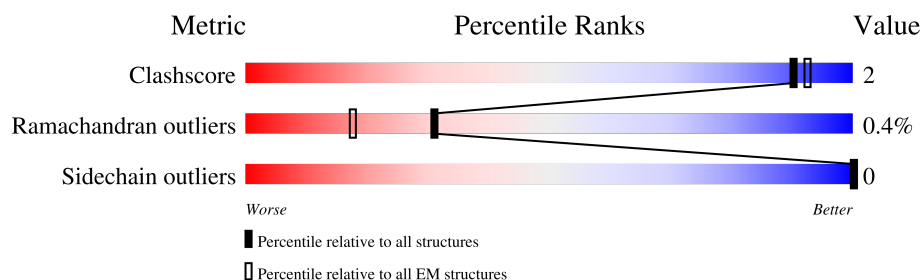
EMDB validation analysis : 0.0.1.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & 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

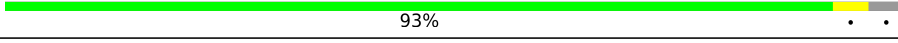
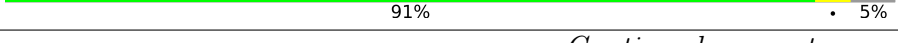
The reported resolution of this entry is 4.10 Å.

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.



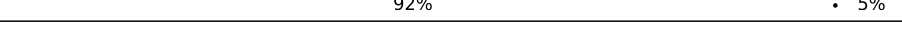
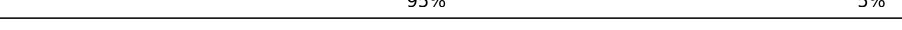
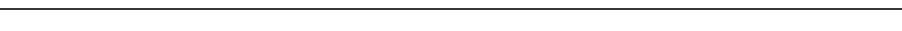
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	6458 (3.60 - 4.60)

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	1-A	381	 87% 9% . .
1	1-B	381	 88% 6% . 5%
1	10-A	381	 93% . .
1	10-B	381	 91% . 5%

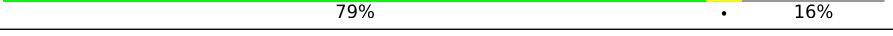
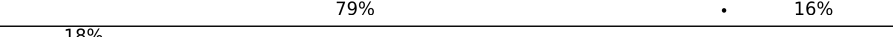
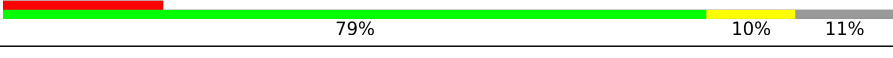
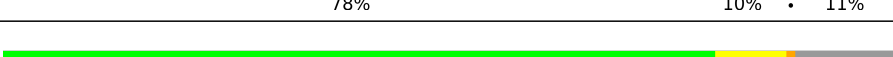
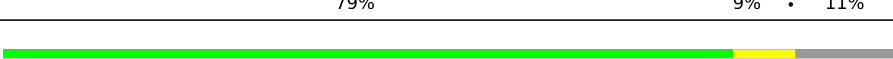
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Mol	Chain	Length	Quality of chain
1	2-A	381	 89% 7% . .
1	2-B	381	 86% 9% . 5%
1	3-A	381	 89% 6% . .
1	3-B	381	 87% 7% . 5%
1	4-A	381	 88% 8% . .
1	4-B	381	 87% 7% 5%
1	5-A	381	 89% 6% . .
1	5-B	381	 88% 7% 5%
1	6-A	381	 89% 7% . .
1	6-B	381	 88% 7% . 5%
1	7-A	381	 87% 9% . .
1	7-B	381	 91% . 5%
1	8-A	381	 92% . .
1	8-B	381	 92% . 5%
1	9-A	381	 91% 5% . .
1	9-B	381	 95% 5%
2	1-C	314	 79% 7% 14%
2	10-C	314	 81% 5% 14%
2	2-C	314	 79% 7% . 14%
2	3-C	314	 78% 8% 14%
2	4-C	314	 79% 7% 14%
2	5-C	314	 77% 8% 14%
2	6-C	314	 80% 6% 14%
2	7-C	314	 82% . 14%
2	8-C	314	 82% . 14%

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Mol	Chain	Length	Quality of chain
2	9-C	314	 84% 14%
3	1-D	97	 9% 77% 6% 16%
3	10-D	97	 79% 16%
3	2-D	97	 77% 6% 16%
3	3-D	97	 77% 5% 16%
3	4-D	97	 75% 8% 16%
3	5-D	97	 74% 8% 16%
3	6-D	97	 78% 16%
3	7-D	97	 79% 16%
3	8-D	97	 79% 16%
3	9-D	97	 79% 16%
4	1-E	118	 18% 79% 10% 11%
4	10-E	118	 82% 7% 11%
4	2-E	118	 78% 10% 11%
4	3-E	118	 80% 8% 11%
4	4-E	118	 80% 8% 11%
4	5-E	118	 79% 8% 11%
4	6-E	118	 79% 9% 11%
4	7-E	118	 82% 7% 11%
4	8-E	118	 84% 5% 11%
4	9-E	118	 82% 7% 11%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 93260 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 Creatine kinase B-type.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	1-A	367	Total	C	N	O	S	0	0
			2908	1830	509	554	15		
1	2-A	367	Total	C	N	O	S	0	0
			2908	1830	509	554	15		
1	3-A	367	Total	C	N	O	S	0	0
			2908	1830	509	554	15		
1	4-A	367	Total	C	N	O	S	0	0
			2908	1830	509	554	15		
1	5-A	367	Total	C	N	O	S	0	0
			2908	1830	509	554	15		
1	6-A	367	Total	C	N	O	S	0	0
			2908	1830	509	554	15		
1	7-A	367	Total	C	N	O	S	0	0
			2908	1830	509	554	15		
1	8-A	367	Total	C	N	O	S	0	0
			2908	1830	509	554	15		
1	9-A	367	Total	C	N	O	S	0	0
			2908	1830	509	554	15		
1	10-A	367	Total	C	N	O	S	0	0
			2908	1830	509	554	15		
1	1-B	362	Total	C	N	O	S	0	0
			2874	1811	502	546	15		
1	2-B	362	Total	C	N	O	S	0	0
			2874	1811	502	546	15		
1	3-B	362	Total	C	N	O	S	0	0
			2874	1811	502	546	15		
1	4-B	362	Total	C	N	O	S	0	0
			2874	1811	502	546	15		
1	5-B	362	Total	C	N	O	S	0	0
			2874	1811	502	546	15		
1	6-B	362	Total	C	N	O	S	0	0
			2874	1811	502	546	15		
1	7-B	362	Total	C	N	O	S	0	0
			2874	1811	502	546	15		

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Mol	Chain	Residues	Atoms					AltConf	Trace
1	8-B	362	Total	C	N	O	S	0	0
			2874	1811	502	546	15		
1	9-B	362	Total	C	N	O	S	0	0
			2874	1811	502	546	15		
1	10-B	362	Total	C	N	O	S	0	0
			2874	1811	502	546	15		

- Molecule 2 is a protein called Ankyrin repeat and SOCS box protein 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	1-C	270	Total	C	N	O	S	0	0
			2062	1293	376	379	14		
2	2-C	270	Total	C	N	O	S	0	0
			2062	1293	376	379	14		
2	3-C	270	Total	C	N	O	S	0	0
			2062	1293	376	379	14		
2	4-C	270	Total	C	N	O	S	0	0
			2062	1293	376	379	14		
2	5-C	270	Total	C	N	O	S	0	0
			2062	1293	376	379	14		
2	6-C	270	Total	C	N	O	S	0	0
			2062	1293	376	379	14		
2	7-C	270	Total	C	N	O	S	0	0
			2062	1293	376	379	14		
2	8-C	270	Total	C	N	O	S	0	0
			2062	1293	376	379	14		
2	9-C	270	Total	C	N	O	S	0	0
			2062	1293	376	379	14		
2	10-C	270	Total	C	N	O	S	0	0
			2062	1293	376	379	14		

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-19	MET	-	initiating methionine	UNP Q96DX5
C	-18	LYS	-	expression tag	UNP Q96DX5
C	-17	HIS	-	expression tag	UNP Q96DX5
C	-16	HIS	-	expression tag	UNP Q96DX5
C	-15	HIS	-	expression tag	UNP Q96DX5
C	-14	HIS	-	expression tag	UNP Q96DX5
C	-13	HIS	-	expression tag	UNP Q96DX5
C	-12	HIS	-	expression tag	UNP Q96DX5

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-11	HIS	-	expression tag	UNP Q96DX5
C	-10	HIS	-	expression tag	UNP Q96DX5
C	-9	GLY	-	expression tag	UNP Q96DX5
C	-8	GLY	-	expression tag	UNP Q96DX5
C	-7	LEU	-	expression tag	UNP Q96DX5
C	-6	VAL	-	expression tag	UNP Q96DX5
C	-5	PRO	-	expression tag	UNP Q96DX5
C	-4	ARG	-	expression tag	UNP Q96DX5
C	-3	GLY	-	expression tag	UNP Q96DX5
C	-2	SER	-	expression tag	UNP Q96DX5
C	-1	HIS	-	expression tag	UNP Q96DX5
C	0	GLY	-	expression tag	UNP Q96DX5

- Molecule 3 is a protein called Elongin-C.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	1-D	81	Total	C	N	O	S	0	0
			652	424	104	119	5		
3	2-D	81	Total	C	N	O	S	0	0
			652	424	104	119	5		
3	3-D	81	Total	C	N	O	S	0	0
			652	424	104	119	5		
3	4-D	81	Total	C	N	O	S	0	0
			652	424	104	119	5		
3	5-D	81	Total	C	N	O	S	0	0
			652	424	104	119	5		
3	6-D	81	Total	C	N	O	S	0	0
			652	424	104	119	5		
3	7-D	81	Total	C	N	O	S	0	0
			652	424	104	119	5		
3	8-D	81	Total	C	N	O	S	0	0
			652	424	104	119	5		
3	9-D	81	Total	C	N	O	S	0	0
			652	424	104	119	5		
3	10-D	81	Total	C	N	O	S	0	0
			652	424	104	119	5		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	16	MET	-	initiating methionine	UNP Q15369

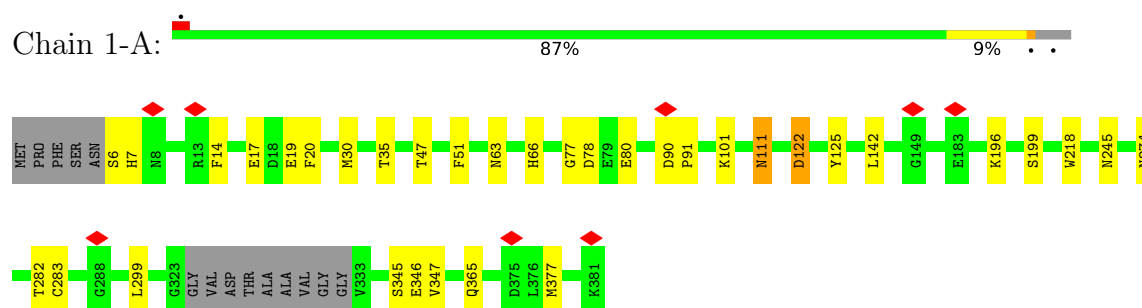
- Molecule 4 is a protein called Elongin-B.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	1-E	105	Total	C	N	O	S	0	0
			830	525	140	161	4		
4	2-E	105	Total	C	N	O	S	0	0
			830	525	140	161	4		
4	3-E	105	Total	C	N	O	S	0	0
			830	525	140	161	4		
4	4-E	105	Total	C	N	O	S	0	0
			830	525	140	161	4		
4	5-E	105	Total	C	N	O	S	0	0
			830	525	140	161	4		
4	6-E	105	Total	C	N	O	S	0	0
			830	525	140	161	4		
4	7-E	105	Total	C	N	O	S	0	0
			830	525	140	161	4		
4	8-E	105	Total	C	N	O	S	0	0
			830	525	140	161	4		
4	9-E	105	Total	C	N	O	S	0	0
			830	525	140	161	4		
4	10-E	105	Total	C	N	O	S	0	0
			830	525	140	161	4		

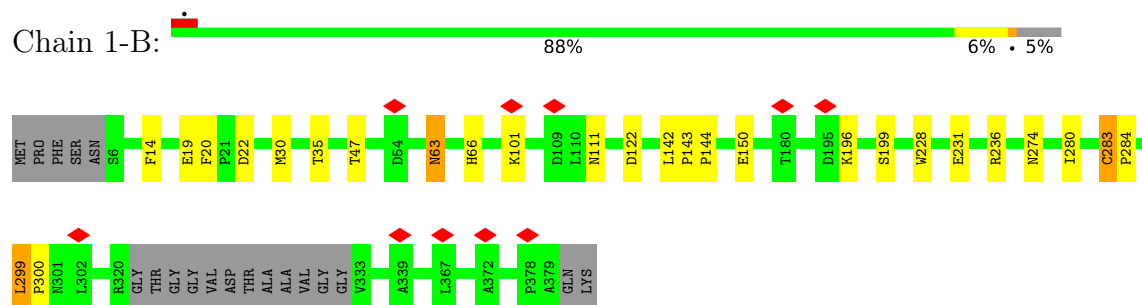
3 Residue-property plots

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.

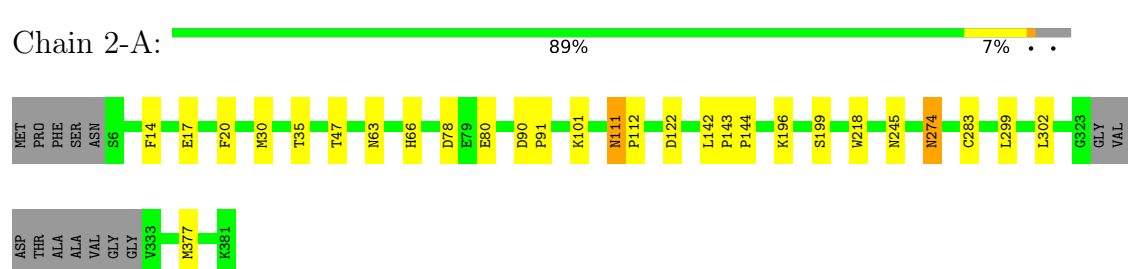
- Molecule 1: Creatine kinase B-type



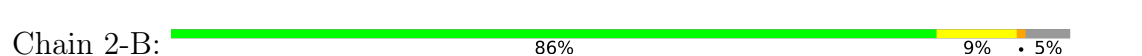
- Molecule 1: Creatine kinase B-type

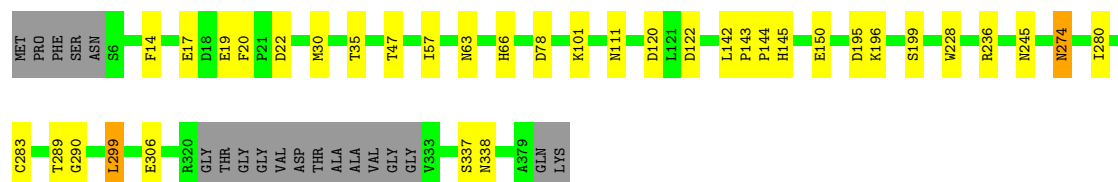


- Molecule 1: Creatine kinase B-type



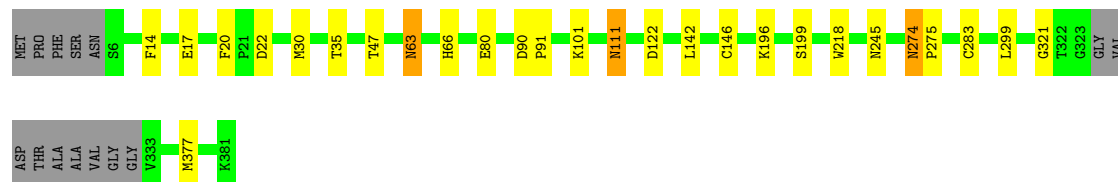
- Molecule 1: Creatine kinase B-type





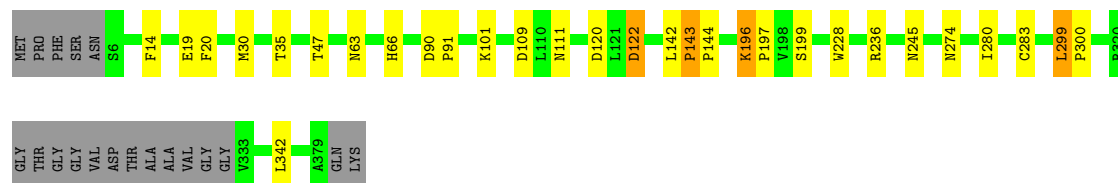
• Molecule 1: Creatine kinase B-type

Chain 3-A: 89% 6% . .



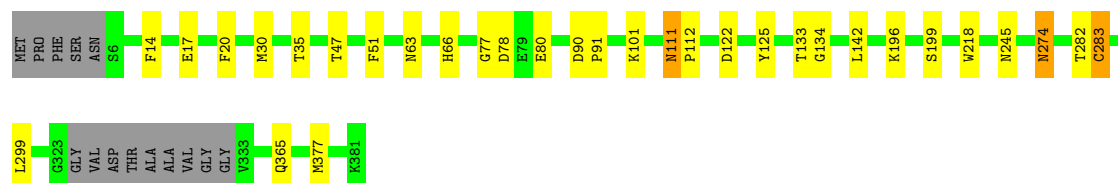
• Molecule 1: Creatine kinase B-type

Chain 3-B: 87% 7% 5%



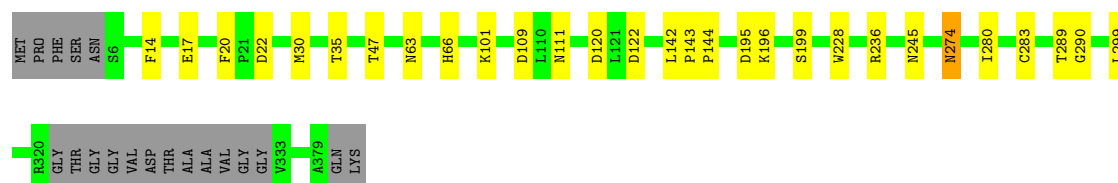
• Molecule 1: Creatine kinase B-type

Chain 4-A: 88% 8% . .



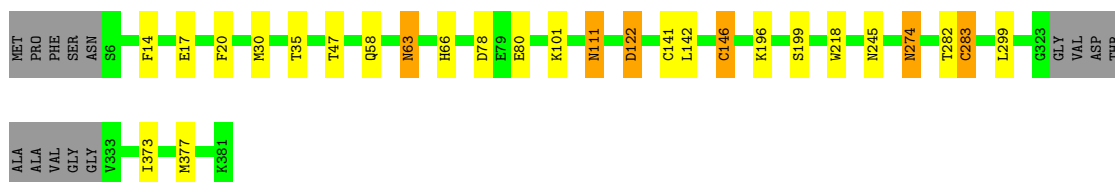
• Molecule 1: Creatine kinase B-type

Chain 4-B: 87% 7% 5%



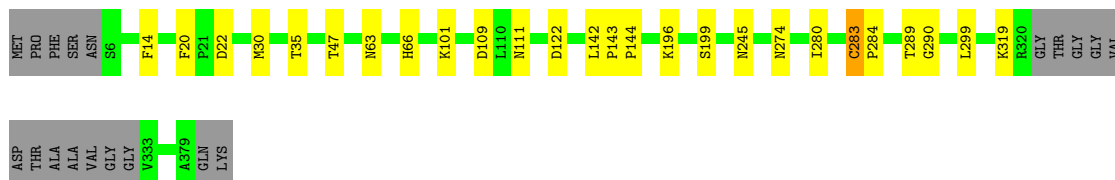
• Molecule 1: Creatine kinase B-type

Chain 5-A: 89% 6% . .



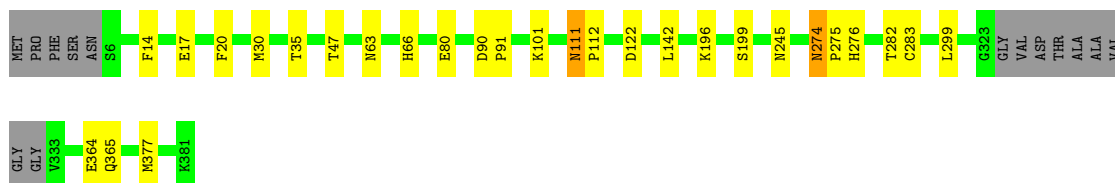
- Molecule 1: Creatine kinase B-type

Chain 5-B: 88% 7% 5%



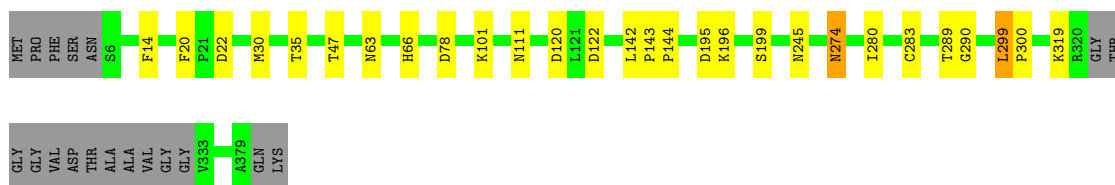
- Molecule 1: Creatine kinase B-type

Chain 6-A: 89% 7% . .



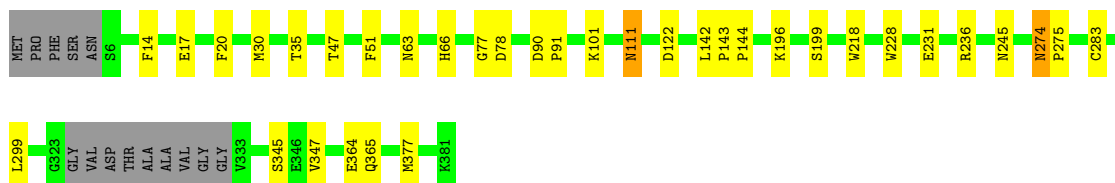
- Molecule 1: Creatine kinase B-type

Chain 6-B: 88% 7% 5%



- Molecule 1: Creatine kinase B-type

Chain 7-A: 87% 9% . .



- Molecule 1: Creatine kinase B-type

Chain 7-B: 91% . 5%



- Molecule 1: Creatine kinase B-type

Chain 8-A: 92%



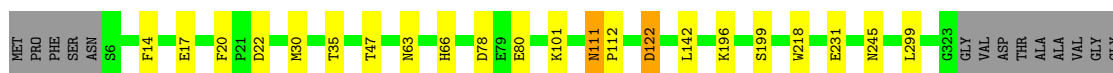
- Molecule 1: Creatine kinase B-type

Chain 8-B: 92%



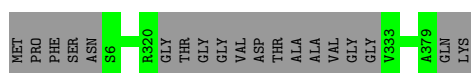
- Molecule 1: Creatine kinase B-type

Chain 9-A: 91%



- Molecule 1: Creatine kinase B-type

Chain 9-B: 95%



- Molecule 1: Creatine kinase B-type

Chain 10-A: 93%



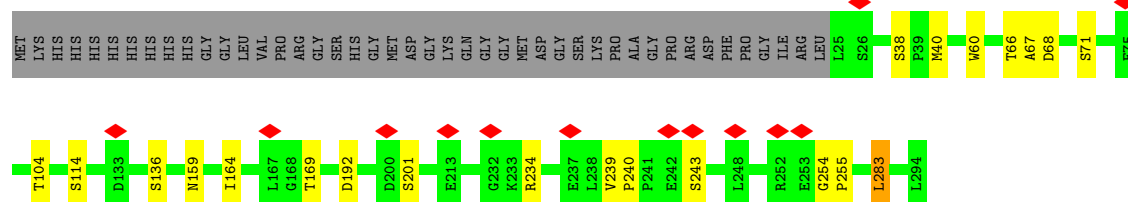
- Molecule 1: Creatine kinase B-type

Chain 10-B: 91%



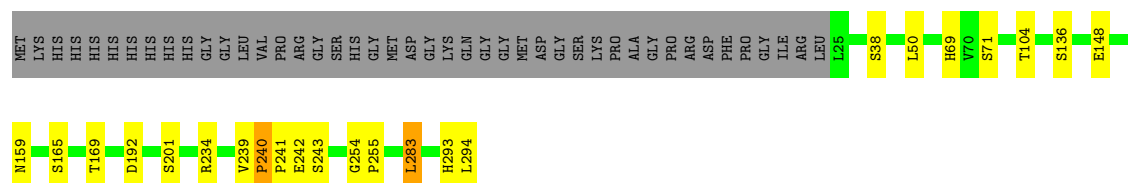
- Molecule 2: Ankyrin repeat and SOCS box protein 9

Chain 1-C:  79% 7% 14%



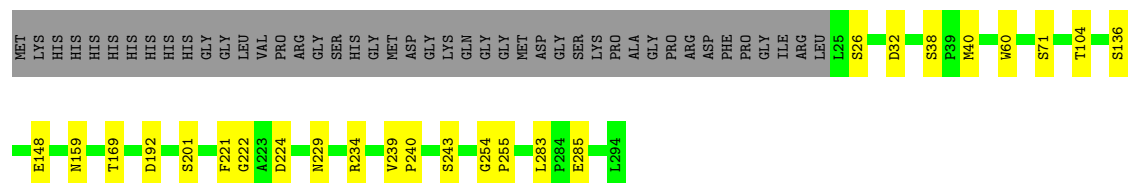
- Molecule 2: Ankyrin repeat and SOCS box protein 9

Chain 2-C:  79% 7% 14%



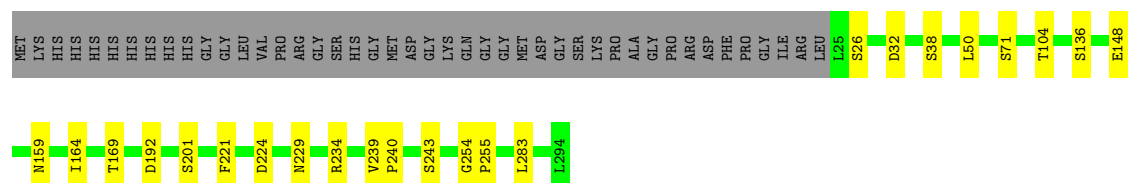
- Molecule 2: Ankyrin repeat and SOCS box protein 9

Chain 3-C:  78% 8% 14%



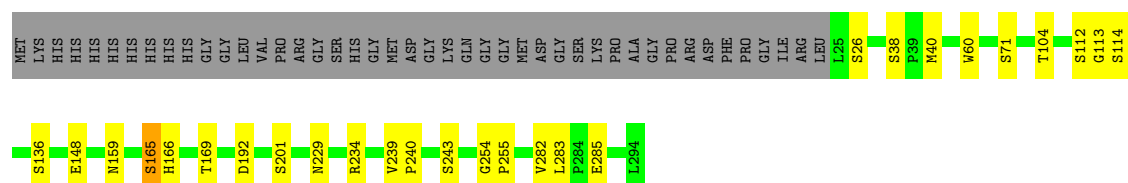
- Molecule 2: Ankyrin repeat and SOCS box protein 9

Chain 4-C:  79% 7% 14%



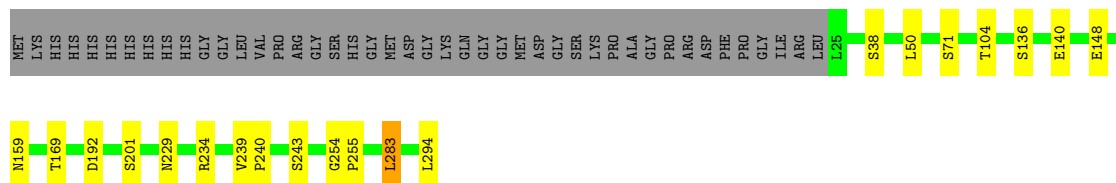
- Molecule 2: Ankyrin repeat and SOCS box protein 9

Chain 5-C:  77% 8% 14%



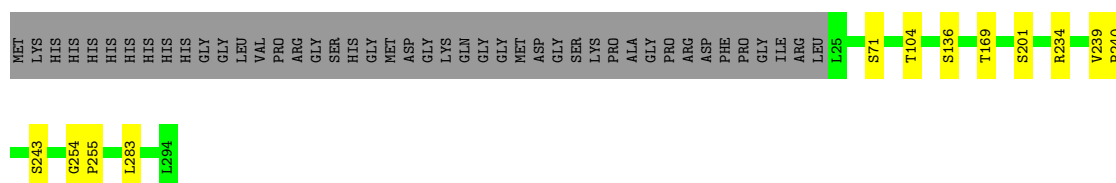
- Molecule 2: Ankyrin repeat and SOCS box protein 9

Chain 6-C:  80% 6% 14%



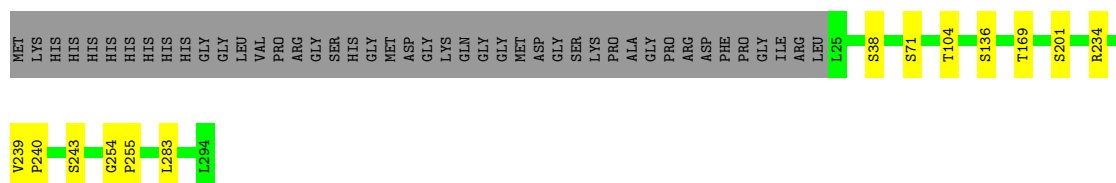
- Molecule 2: Ankyrin repeat and SOCS box protein 9

Chain 7-C:  82% 0% 14%



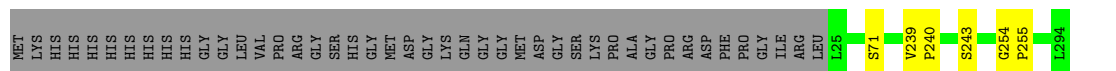
- Molecule 2: Ankyrin repeat and SOCS box protein 9

Chain 8-C:  82% 0% 14%



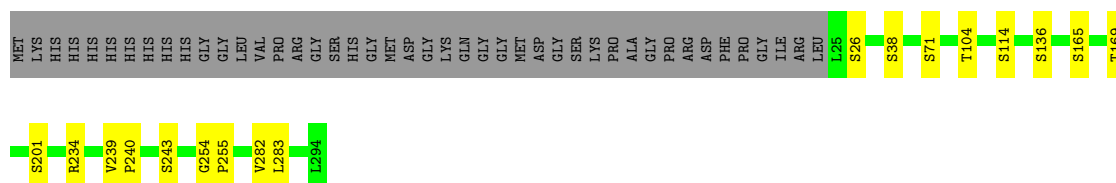
- Molecule 2: Ankyrin repeat and SOCS box protein 9

Chain 9-C:  84% 0% 14%

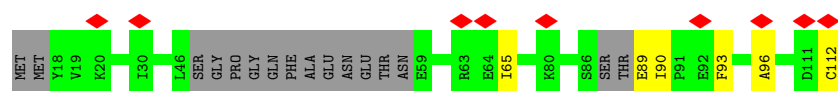
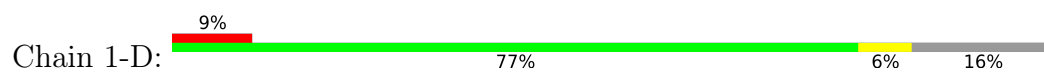


- Molecule 2: Ankyrin repeat and SOCS box protein 9

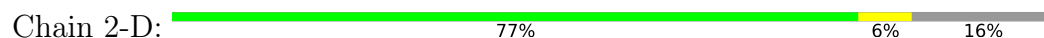
Chain 10-C:  81% 5% 14%



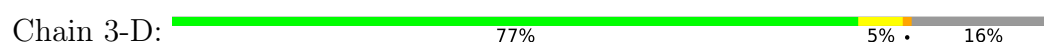
- Molecule 3: Elongin-C



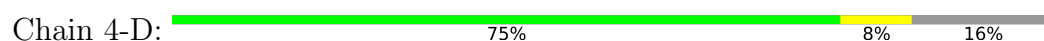
• Molecule 3: Elongin-C



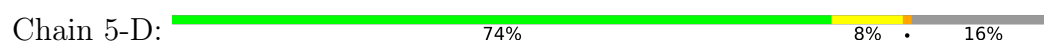
• Molecule 3: Elongin-C



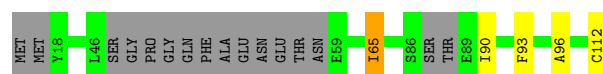
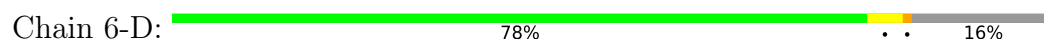
• Molecule 3: Elongin-C



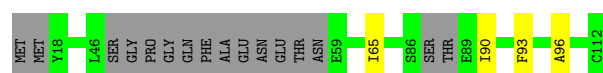
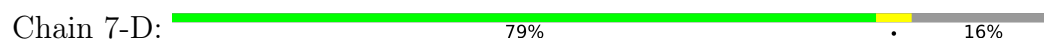
• Molecule 3: Elongin-C



• Molecule 3: Elongin-C

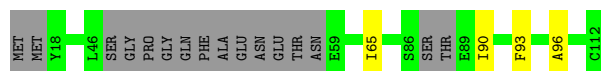


• Molecule 3: Elongin-C



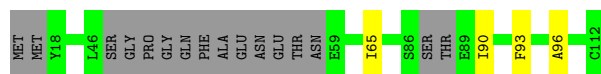
• Molecule 3: Elongin-C

Chain 8-D:  79% 16%



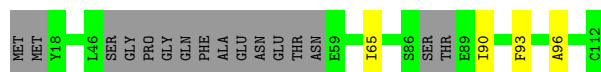
• Molecule 3: Elongin-C

Chain 9-D:  79% 16%



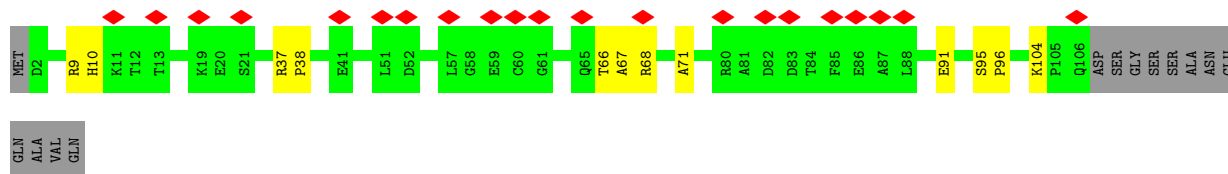
• Molecule 3: Elongin-C

Chain 10-D:  79% 16%



• Molecule 4: Elongin-B

Chain 1-E:  18% 79% 10% 11%



• Molecule 4: Elongin-B

Chain 2-E:  78% 10% 11%



• Molecule 4: Elongin-B

Chain 3-E:  80% 8% 11%



• Molecule 4: Elongin-B

Chain 4-E:  80% 8% 11%



● Molecule 4: Elongin-B

Chain 5-E:  79% 8% 11%

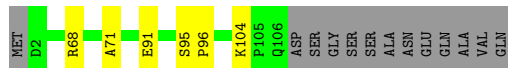
● Molecule 4: Elongin-B

Chain 6-E:  79% 9% 11%

● Molecule 4: Elongin-B

Chain 7-E:  82% 7% 11%

● Molecule 4: Elongin-B

Chain 8-E:  84% 5% 11%

● Molecule 4: Elongin-B

Chain 9-E:  82% 7% 11%

● Molecule 4: Elongin-B

Chain 10-E:  82% 7% 11%

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	285105	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	36000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	4.395	Depositor
Minimum map value	-2.643	Depositor
Average map value	-0.002	Depositor
Map value standard deviation	0.076	Depositor
Recommended contour level	0.8	Depositor
Map size (Å)	348.0, 348.0, 348.0	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.16, 1.16, 1.16	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	1-A	0.74	0/2971	0.88	32/4014 (0.8%)
1	1-B	0.72	0/2937	0.85	31/3971 (0.8%)
1	2-A	0.74	0/2971	0.88	32/4014 (0.8%)
1	2-B	0.72	0/2937	0.85	31/3971 (0.8%)
1	3-A	0.74	0/2971	0.88	32/4014 (0.8%)
1	3-B	0.72	0/2937	0.85	31/3971 (0.8%)
1	4-A	0.74	0/2971	0.88	32/4014 (0.8%)
1	4-B	0.72	0/2937	0.85	31/3971 (0.8%)
1	5-A	0.74	0/2971	0.88	32/4014 (0.8%)
1	5-B	0.72	0/2937	0.85	31/3971 (0.8%)
1	6-A	0.74	0/2971	0.88	32/4014 (0.8%)
1	6-B	0.72	0/2937	0.85	31/3971 (0.8%)
1	7-A	0.74	0/2971	0.88	32/4014 (0.8%)
1	7-B	0.72	0/2431	0.85	27/3278 (0.8%)
1	8-A	0.73	0/2704	0.90	32/3645 (0.9%)
1	8-B	0.71	0/2369	0.81	23/3190 (0.7%)
1	9-A	0.74	0/2158	0.92	26/2921 (0.9%)
1	10-A	0.74	0/2551	0.86	24/3435 (0.7%)
1	10-B	0.72	0/2937	0.85	31/3971 (0.8%)
2	1-C	0.63	0/2108	0.82	26/2862 (0.9%)
2	2-C	0.63	0/2108	0.82	26/2862 (0.9%)
2	3-C	0.63	0/2108	0.82	26/2862 (0.9%)
2	4-C	0.63	0/2108	0.82	26/2862 (0.9%)
2	5-C	0.63	0/2108	0.82	26/2862 (0.9%)
2	6-C	0.63	0/2108	0.82	26/2862 (0.9%)
2	7-C	0.63	0/1829	0.84	24/2479 (1.0%)
2	8-C	0.64	0/2038	0.83	26/2766 (0.9%)
2	9-C	0.63	0/633	0.96	12/848 (1.4%)
2	10-C	0.63	0/2108	0.82	26/2862 (0.9%)
3	1-D	0.67	0/665	0.87	8/895 (0.9%)
3	2-D	0.67	0/665	0.87	8/895 (0.9%)
3	3-D	0.67	0/665	0.87	8/895 (0.9%)
3	4-D	0.67	0/665	0.87	8/895 (0.9%)
3	5-D	0.67	0/665	0.87	8/895 (0.9%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
3	6-D	0.67	0/665	0.87	8/895 (0.9%)
3	7-D	0.68	0/611	0.88	8/821 (1.0%)
3	8-D	0.67	0/665	0.87	8/895 (0.9%)
3	9-D	0.66	0/611	0.89	8/821 (1.0%)
3	10-D	0.67	0/665	0.87	8/895 (0.9%)
4	1-E	0.62	0/847	0.98	16/1146 (1.4%)
4	2-E	0.62	0/847	0.98	16/1146 (1.4%)
4	3-E	0.62	0/847	0.98	16/1146 (1.4%)
4	4-E	0.62	0/847	0.98	16/1146 (1.4%)
4	5-E	0.62	0/847	0.98	16/1146 (1.4%)
4	6-E	0.62	0/847	0.98	16/1146 (1.4%)
4	7-E	0.62	0/847	0.98	16/1146 (1.4%)
4	8-E	0.56	0/585	1.02	12/791 (1.5%)
4	9-E	0.62	0/847	0.98	16/1146 (1.4%)
4	10-E	0.62	0/847	0.98	16/1146 (1.4%)
All	All	0.69	0/87575	0.87	1053/118398 (0.9%)

There are no bond length outliers.

The worst 5 of 1053 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	1-A	122	ASP	CA-C-N	9.07	128.71	119.82
1	1-A	122	ASP	C-N-CA	9.07	128.71	119.82
1	2-A	122	ASP	CA-C-N	9.07	128.71	119.82
1	2-A	122	ASP	C-N-CA	9.07	128.71	119.82
1	3-A	122	ASP	CA-C-N	9.07	128.71	119.82

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	1-A	2908	0	2843	15	0
1	1-B	2874	0	2811	11	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	2-A	2908	0	2843	13	0
1	2-B	2874	0	2811	16	0
1	3-A	2908	0	2843	12	0
1	3-B	2874	0	2811	13	0
1	4-A	2908	0	2845	16	0
1	4-B	2874	0	2811	11	0
1	5-A	2908	0	2843	15	0
1	5-B	2874	0	2811	8	0
1	6-A	2908	0	2843	11	0
1	6-B	2874	0	2811	12	0
1	7-A	2908	0	2843	17	0
1	7-B	2874	0	537	3	0
1	8-A	2908	0	0	0	0
1	8-B	2874	0	0	0	0
1	9-A	2908	0	1875	12	0
1	9-B	2874	0	0	0	0
1	10-A	2908	0	0	0	0
1	10-B	2874	0	0	0	0
2	1-C	2062	0	2054	7	0
2	2-C	2062	0	2054	9	0
2	3-C	2062	0	2054	10	0
2	4-C	2062	0	2054	10	0
2	5-C	2062	0	2054	8	0
2	6-C	2062	0	2054	9	0
2	7-C	2062	0	0	0	0
2	8-C	2062	0	0	0	0
2	9-C	2062	0	0	0	0
2	10-C	2062	0	0	0	0
3	1-D	652	0	655	2	0
3	2-D	652	0	655	2	0
3	3-D	652	0	655	4	0
3	4-D	652	0	655	5	0
3	5-D	652	0	655	5	0
3	6-D	652	0	655	2	0
3	7-D	652	0	0	0	0
3	8-D	652	0	0	0	0
3	9-D	652	0	0	0	0
3	10-D	652	0	0	0	0
4	1-E	830	0	827	2	0
4	2-E	830	0	827	3	0
4	3-E	830	0	827	2	0
4	4-E	830	0	827	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	5-E	830	0	827	4	0
4	6-E	830	0	827	3	0
4	7-E	830	0	0	0	0
4	8-E	830	0	0	0	0
4	9-E	830	0	0	0	0
4	10-E	830	0	0	0	0
All	All	93260	0	60397	270	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 2.

The worst 5 of 270 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:78:ASP:OD1	1:A:78:ASP:C	2.21	0.81
1:A:78:ASP:OD1	1:A:78:ASP:C	2.23	0.78
2:C:164:ILE:HG23	2:C:164:ILE:O	1.85	0.76
1:A:78:ASP:OD1	1:A:78:ASP:C	2.31	0.71
1:B:231:GLU:HA	1:B:231:GLU:OE1	1.92	0.69

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	1-A	363/381 (95%)	351 (97%)	10 (3%)	2 (1%)	21	58
1	1-B	358/381 (94%)	347 (97%)	11 (3%)	0	100	100
1	2-A	363/381 (95%)	354 (98%)	9 (2%)	0	100	100
1	2-B	358/381 (94%)	342 (96%)	15 (4%)	1 (0%)	36	70
1	3-A	363/381 (95%)	350 (96%)	11 (3%)	2 (1%)	21	58

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	3-B	358/381 (94%)	348 (97%)	9 (2%)	1 (0%)	36	70
1	4-A	363/381 (95%)	349 (96%)	13 (4%)	1 (0%)	36	70
1	4-B	358/381 (94%)	349 (98%)	9 (2%)	0	100	100
1	5-A	363/381 (95%)	347 (96%)	13 (4%)	3 (1%)	16	52
1	5-B	358/381 (94%)	346 (97%)	12 (3%)	0	100	100
1	6-A	363/381 (95%)	350 (96%)	12 (3%)	1 (0%)	36	70
1	6-B	358/381 (94%)	340 (95%)	18 (5%)	0	100	100
1	10-A	306/381 (80%)	293 (96%)	11 (4%)	2 (1%)	18	55
1	10-B	358/381 (94%)	346 (97%)	12 (3%)	0	100	100
2	1-C	268/314 (85%)	256 (96%)	10 (4%)	2 (1%)	18	55
2	2-C	268/314 (85%)	260 (97%)	7 (3%)	1 (0%)	30	65
2	3-C	268/314 (85%)	256 (96%)	10 (4%)	2 (1%)	18	55
2	4-C	268/314 (85%)	259 (97%)	8 (3%)	1 (0%)	30	65
2	5-C	268/314 (85%)	257 (96%)	7 (3%)	4 (2%)	8	39
2	6-C	268/314 (85%)	261 (97%)	7 (3%)	0	100	100
2	10-C	268/314 (85%)	257 (96%)	7 (3%)	4 (2%)	8	39
3	1-D	75/97 (77%)	72 (96%)	3 (4%)	0	100	100
3	2-D	75/97 (77%)	73 (97%)	2 (3%)	0	100	100
3	3-D	75/97 (77%)	72 (96%)	3 (4%)	0	100	100
3	4-D	75/97 (77%)	72 (96%)	3 (4%)	0	100	100
3	5-D	75/97 (77%)	72 (96%)	3 (4%)	0	100	100
3	6-D	75/97 (77%)	71 (95%)	4 (5%)	0	100	100
3	10-D	75/97 (77%)	72 (96%)	3 (4%)	0	100	100
4	1-E	103/118 (87%)	96 (93%)	6 (6%)	1 (1%)	12	46
4	2-E	103/118 (87%)	95 (92%)	8 (8%)	0	100	100
4	3-E	103/118 (87%)	95 (92%)	7 (7%)	1 (1%)	12	46
4	4-E	103/118 (87%)	98 (95%)	5 (5%)	0	100	100
4	5-E	103/118 (87%)	96 (93%)	7 (7%)	0	100	100
4	6-E	103/118 (87%)	96 (93%)	7 (7%)	0	100	100
4	10-E	103/118 (87%)	96 (93%)	7 (7%)	0	100	100
All	All	8112/9037 (90%)	7794 (96%)	289 (4%)	29 (0%)	31	65

5 of 29 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	1-A	282	THR
2	1-C	67	ALA
2	2-C	165	SER
1	3-A	146	CYS
1	4-A	282	THR

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	1-A	318/327 (97%)	318 (100%)	0	100	100
1	1-B	315/327 (96%)	315 (100%)	0	100	100
1	2-A	318/327 (97%)	318 (100%)	0	100	100
1	2-B	315/327 (96%)	315 (100%)	0	100	100
1	3-A	318/327 (97%)	318 (100%)	0	100	100
1	3-B	315/327 (96%)	315 (100%)	0	100	100
1	4-A	318/327 (97%)	318 (100%)	0	100	100
1	4-B	315/327 (96%)	315 (100%)	0	100	100
1	5-A	318/327 (97%)	318 (100%)	0	100	100
1	5-B	315/327 (96%)	315 (100%)	0	100	100
1	6-A	318/327 (97%)	318 (100%)	0	100	100
1	6-B	315/327 (96%)	315 (100%)	0	100	100
1	10-A	273/327 (84%)	273 (100%)	0	100	100
1	10-B	315/327 (96%)	315 (100%)	0	100	100
2	1-C	225/258 (87%)	225 (100%)	0	100	100
2	2-C	225/258 (87%)	225 (100%)	0	100	100
2	3-C	225/258 (87%)	225 (100%)	0	100	100
2	4-C	225/258 (87%)	225 (100%)	0	100	100
2	5-C	225/258 (87%)	225 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	6-C	225/258 (87%)	225 (100%)	0	100	100
2	10-C	225/258 (87%)	225 (100%)	0	100	100
3	1-D	73/86 (85%)	73 (100%)	0	100	100
3	2-D	73/86 (85%)	73 (100%)	0	100	100
3	3-D	73/86 (85%)	73 (100%)	0	100	100
3	4-D	73/86 (85%)	73 (100%)	0	100	100
3	5-D	73/86 (85%)	73 (100%)	0	100	100
3	6-D	73/86 (85%)	73 (100%)	0	100	100
3	10-D	73/86 (85%)	73 (100%)	0	100	100
4	1-E	93/103 (90%)	93 (100%)	0	100	100
4	2-E	93/103 (90%)	93 (100%)	0	100	100
4	3-E	93/103 (90%)	93 (100%)	0	100	100
4	4-E	93/103 (90%)	93 (100%)	0	100	100
4	5-E	93/103 (90%)	93 (100%)	0	100	100
4	6-E	93/103 (90%)	93 (100%)	0	100	100
4	10-E	93/103 (90%)	93 (100%)	0	100	100
All	All	7123/7707 (92%)	7123 (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. 5 of 19 such sidechains are listed below:

Mol	Chain	Res	Type
4	4-E	65	GLN
1	6-B	8	ASN
4	6-E	65	GLN
1	6-A	365	GLN
1	3-B	8	ASN

5.3.3 RNA ⓘ

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.

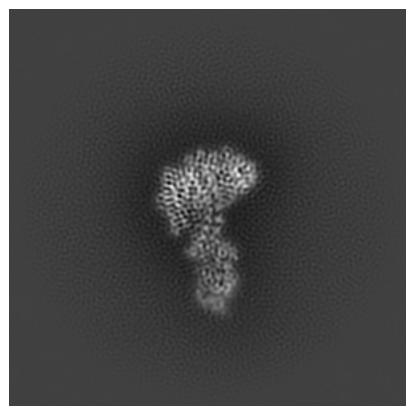
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-21120. These allow visual inspection of the internal detail of the map and identification of artifacts.

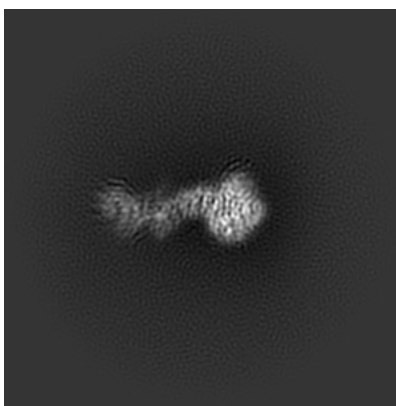
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

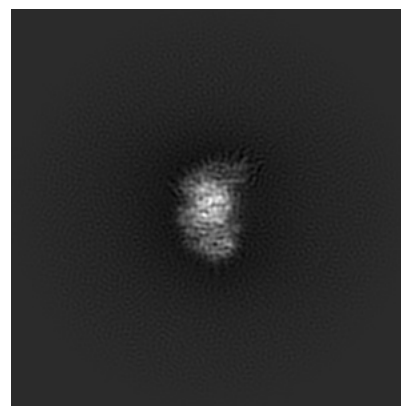
6.1.1 Primary map



X

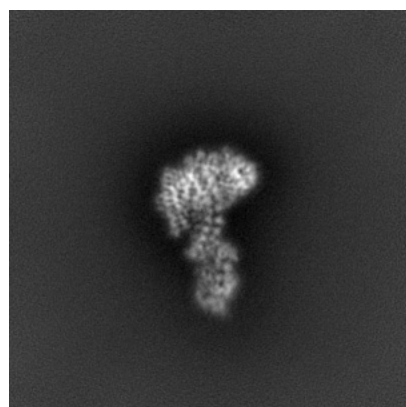


Y

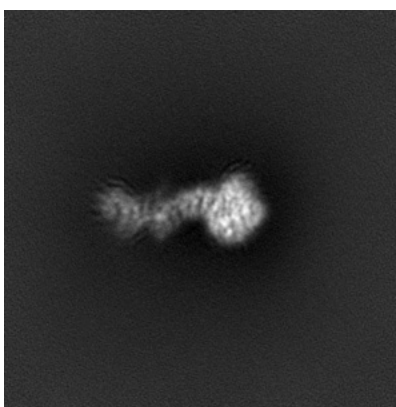


Z

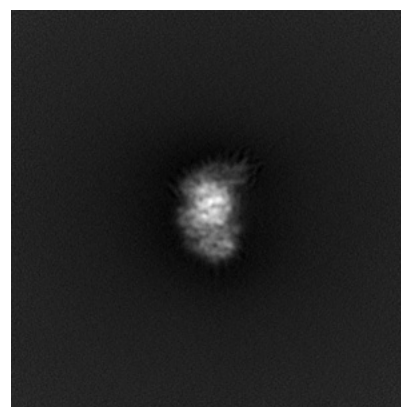
6.1.2 Raw map



X



Y

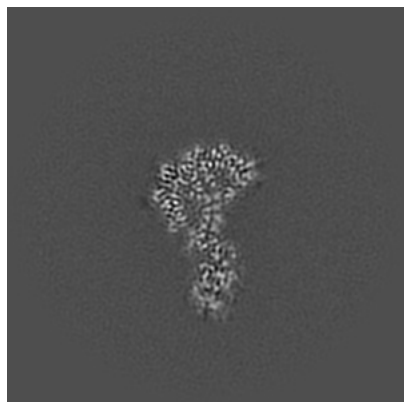


Z

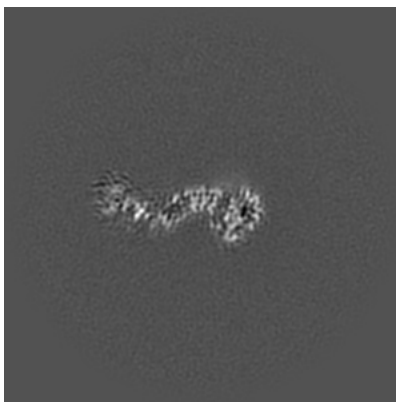
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

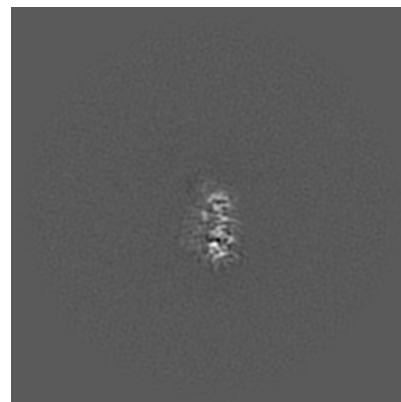
6.2.1 Primary map



X Index: 150

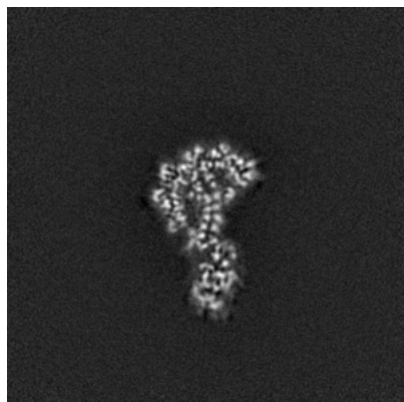


Y Index: 150

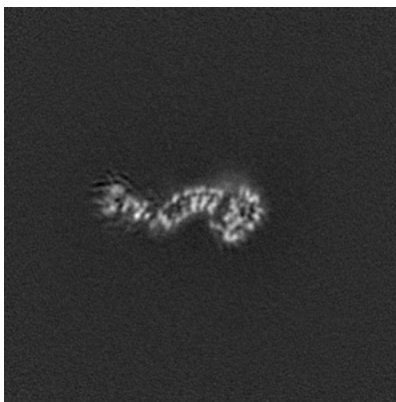


Z Index: 150

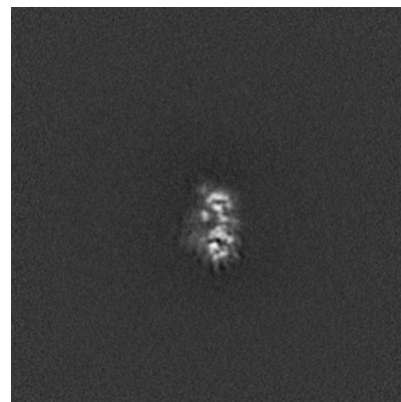
6.2.2 Raw map



X Index: 150



Y Index: 150

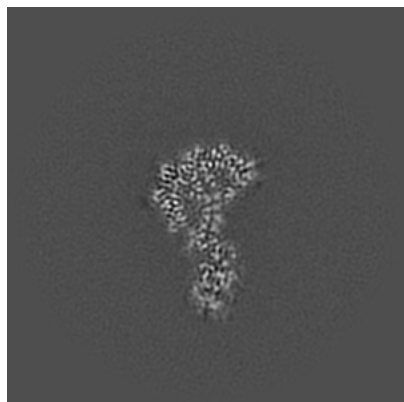


Z Index: 150

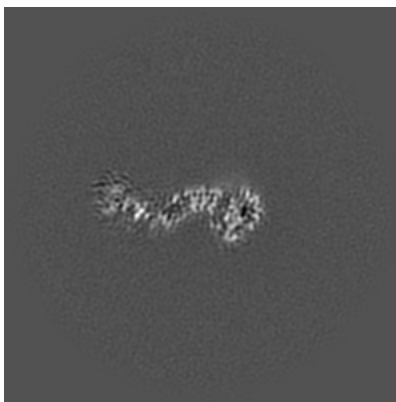
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

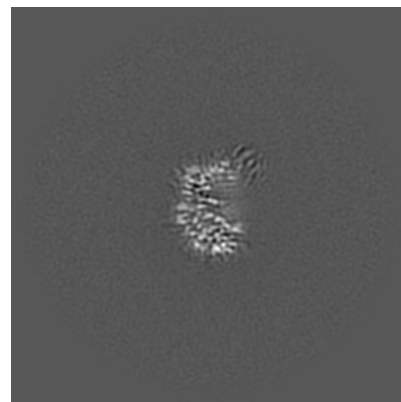
6.3.1 Primary map



X Index: 150

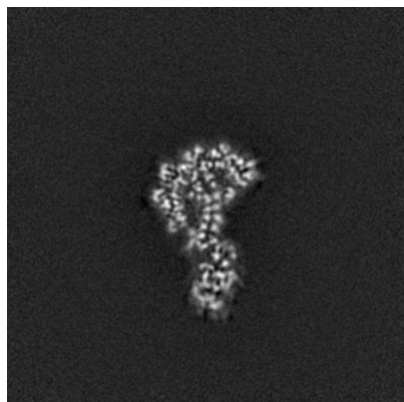


Y Index: 150

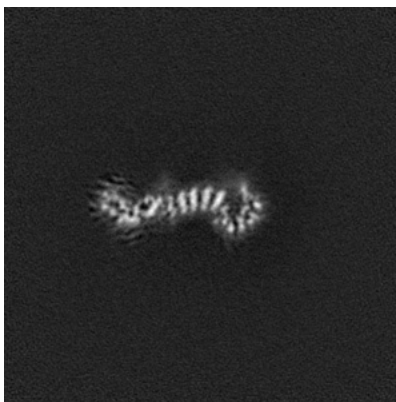


Z Index: 167

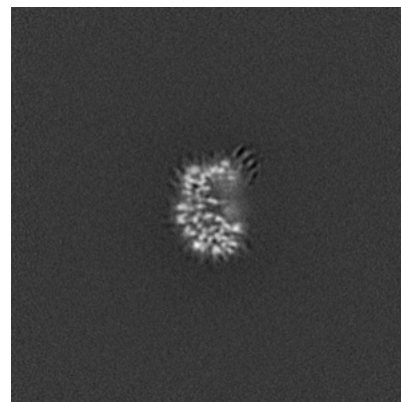
6.3.2 Raw map



X Index: 150



Y Index: 156

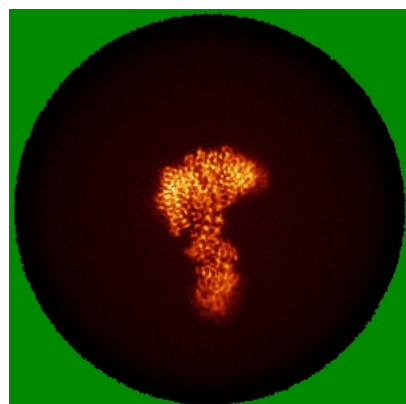


Z Index: 167

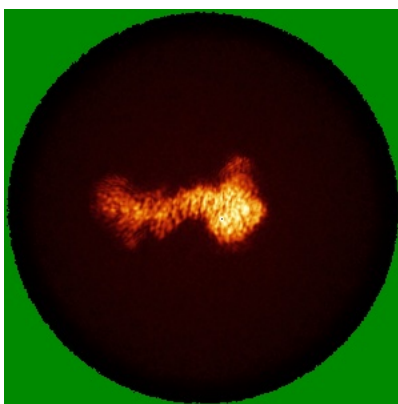
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) ⓘ

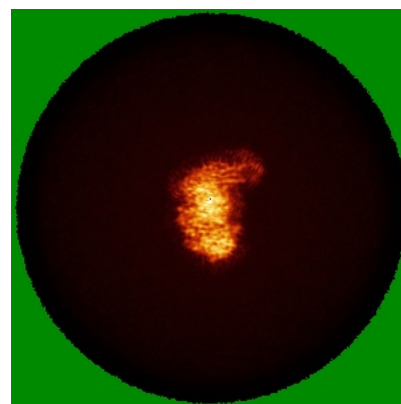
6.4.1 Primary map



X

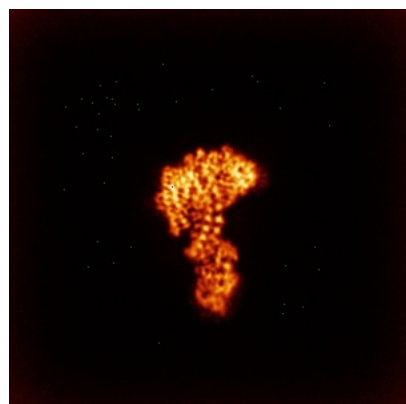


Y

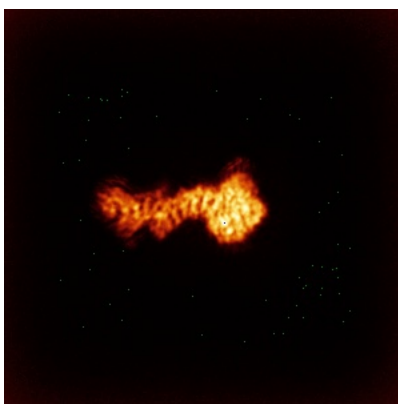


Z

6.4.2 Raw map



X



Y

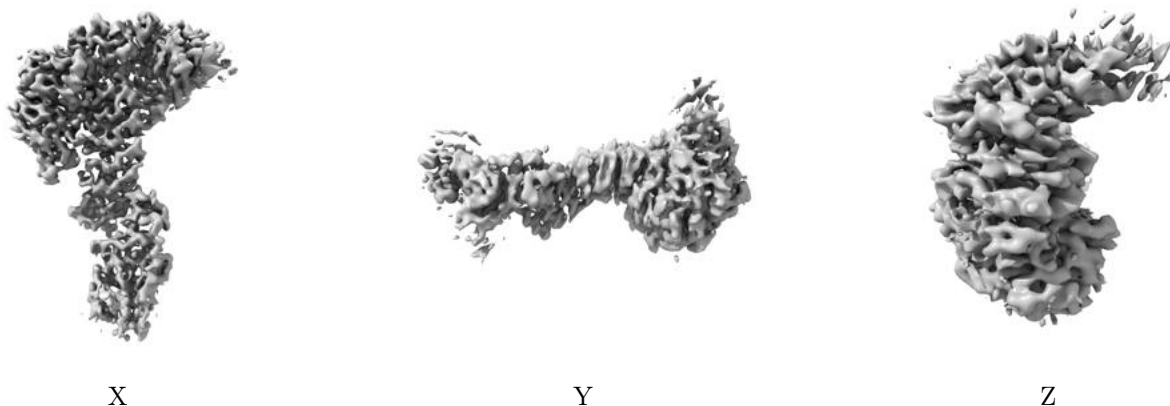


Z

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

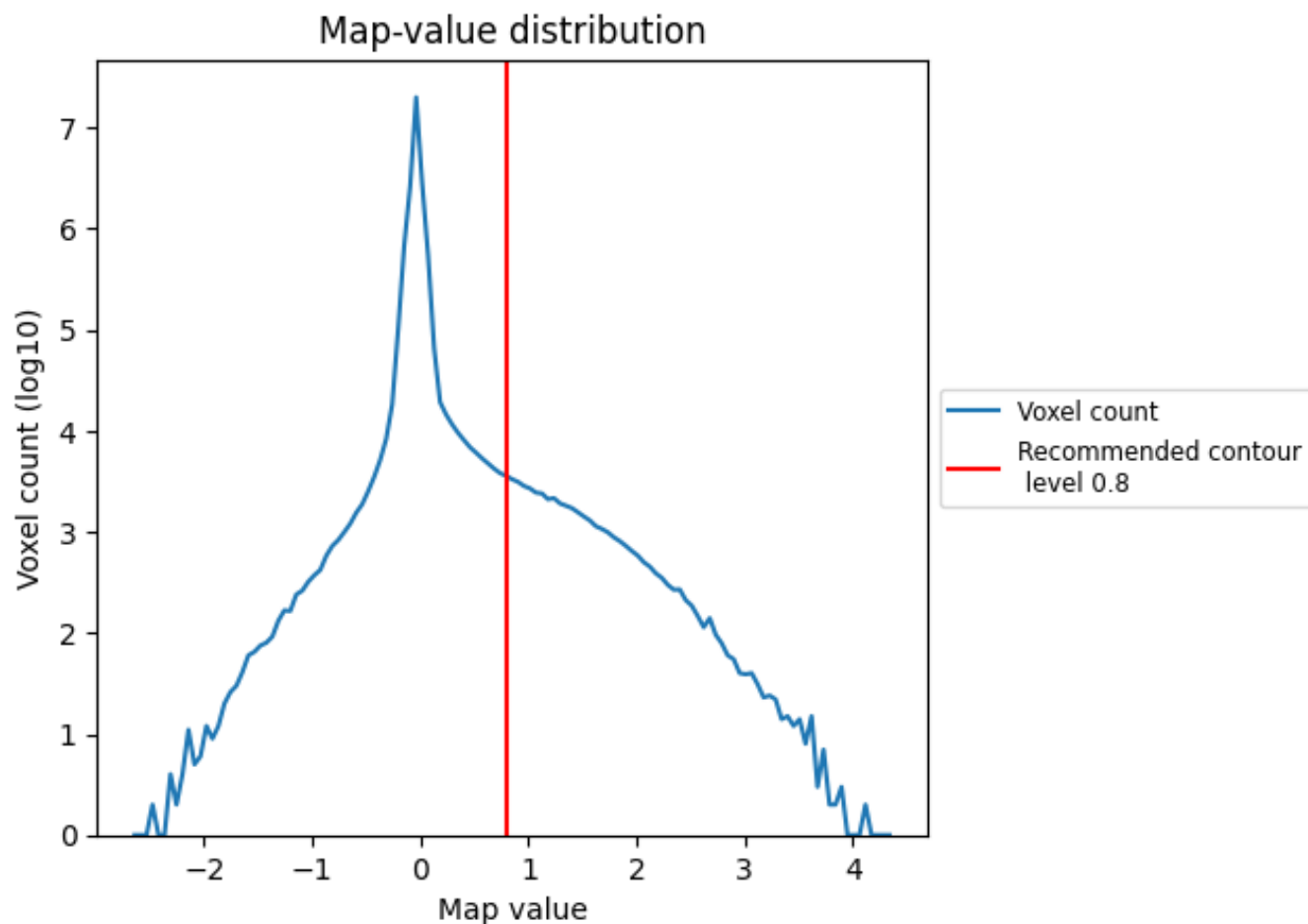
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

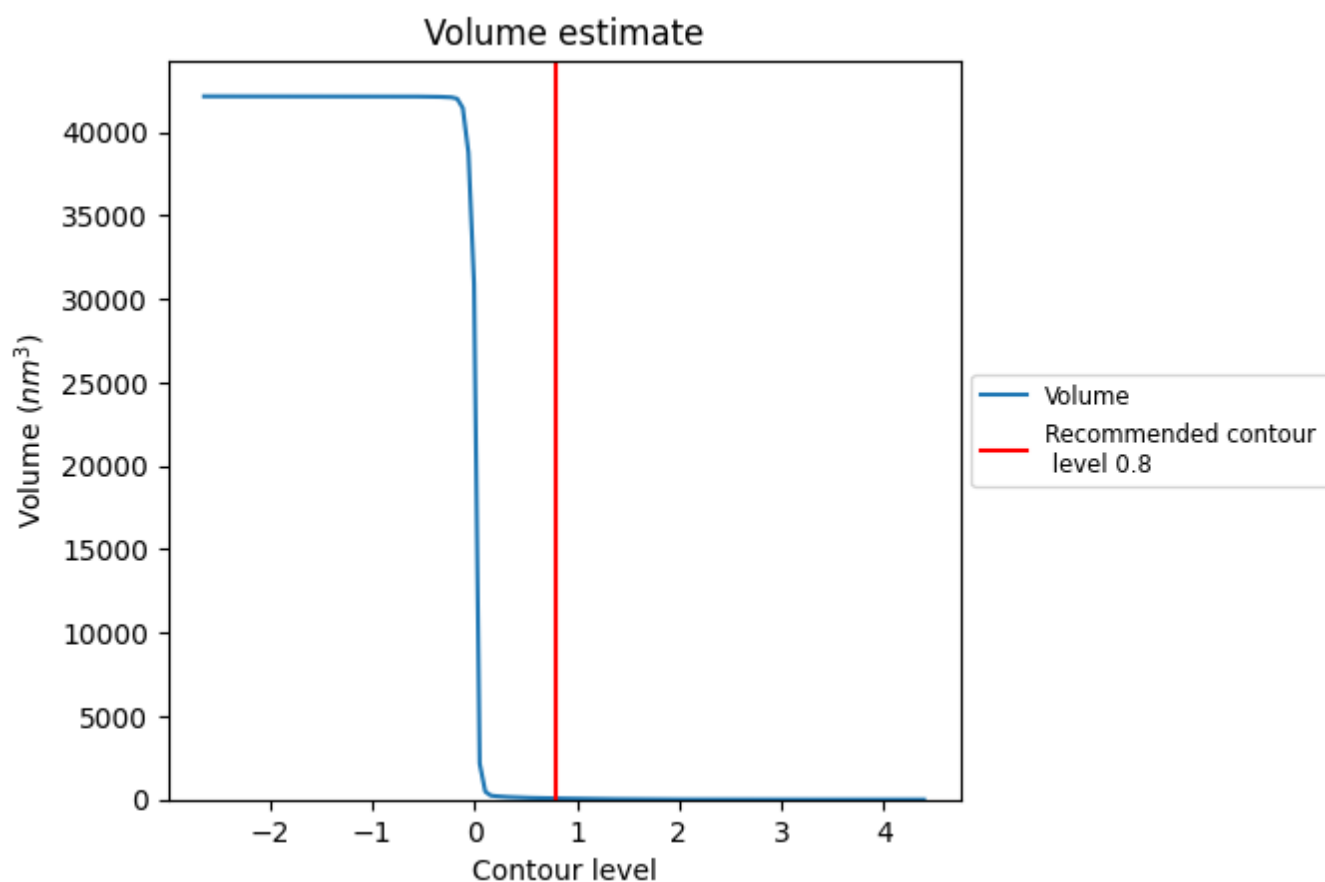
This section contains the results of statistical analysis of the map.

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.

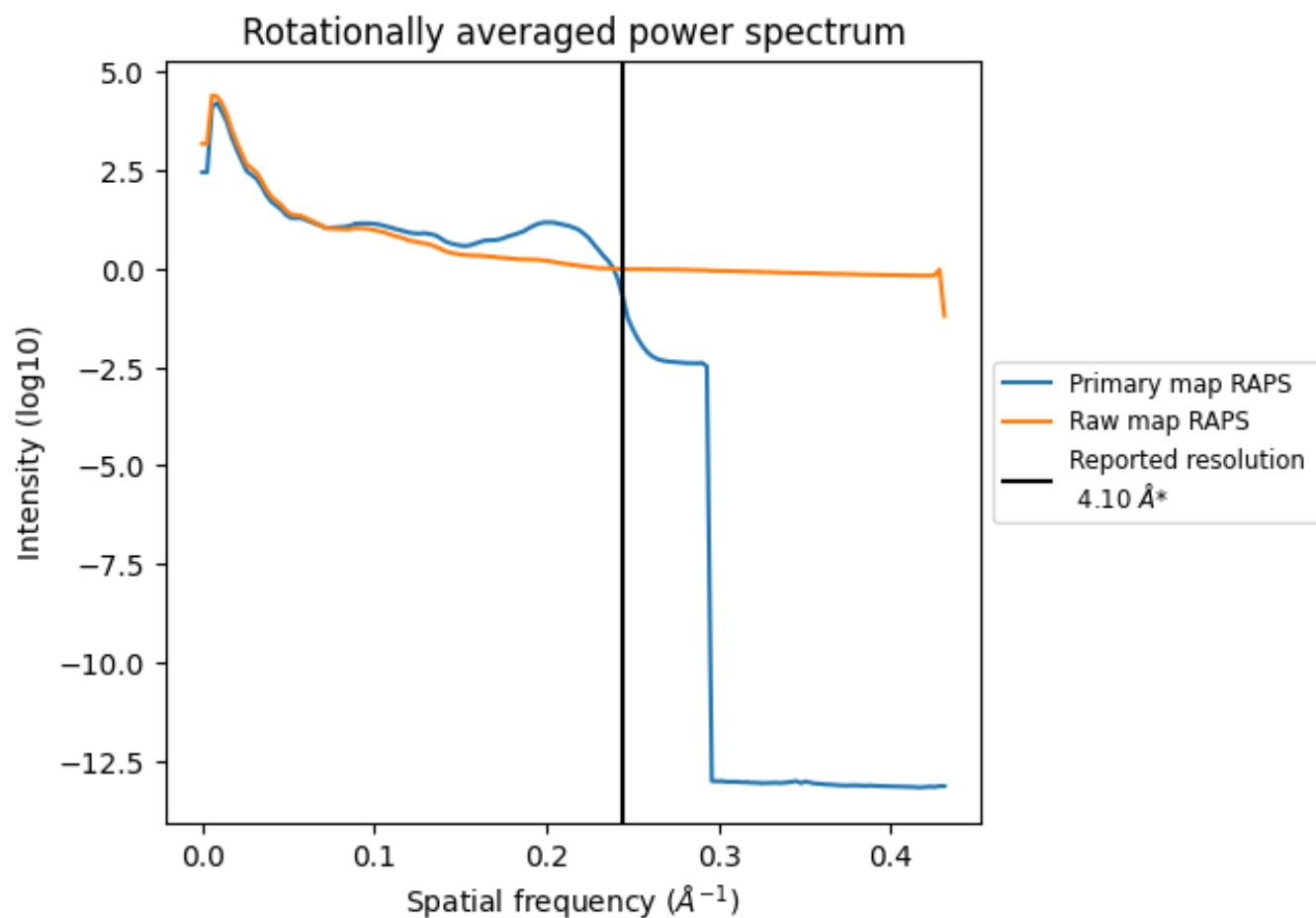
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 70 nm^3 ; this corresponds to an approximate mass of 63 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 ⓘ

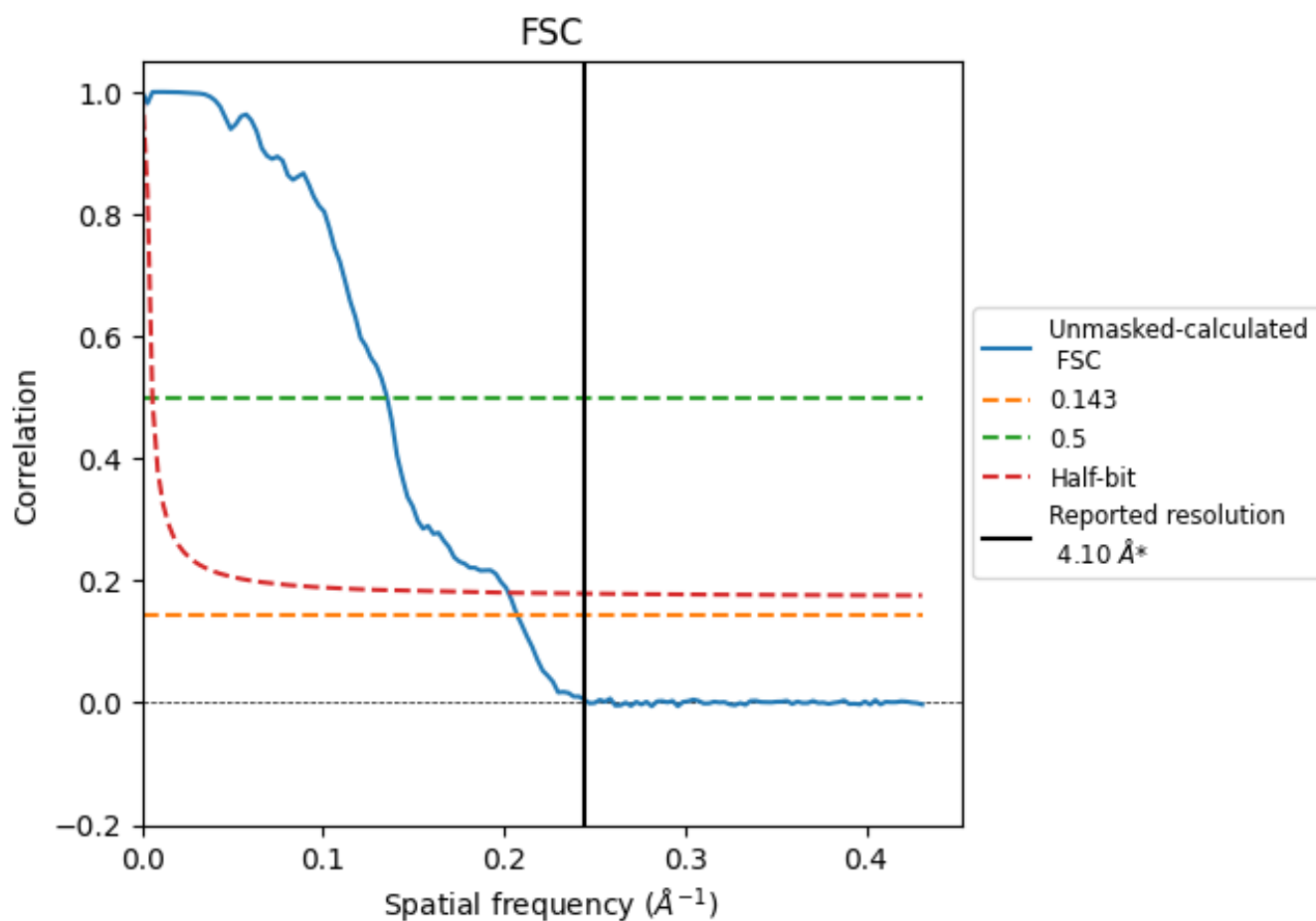


*Reported resolution corresponds to spatial frequency of 0.244 Å⁻¹

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 0.244 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

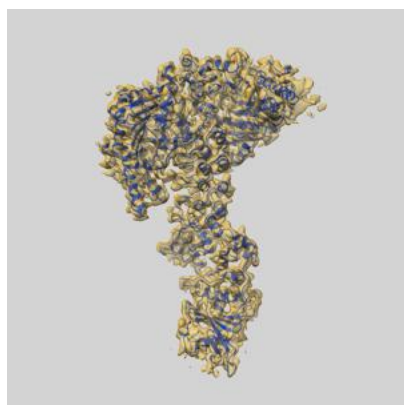
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.10	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.82	7.40	4.94

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.82 differs from the reported value 4.1 by more than 10 %

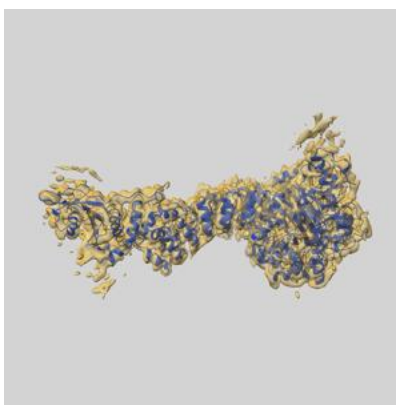
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-21120 and PDB model 6V9H. Per-residue inclusion information can be found in section [3](#) on page [9](#).

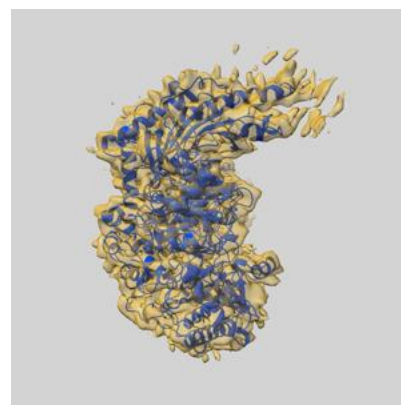
9.1 Map-model overlay [i](#)



X



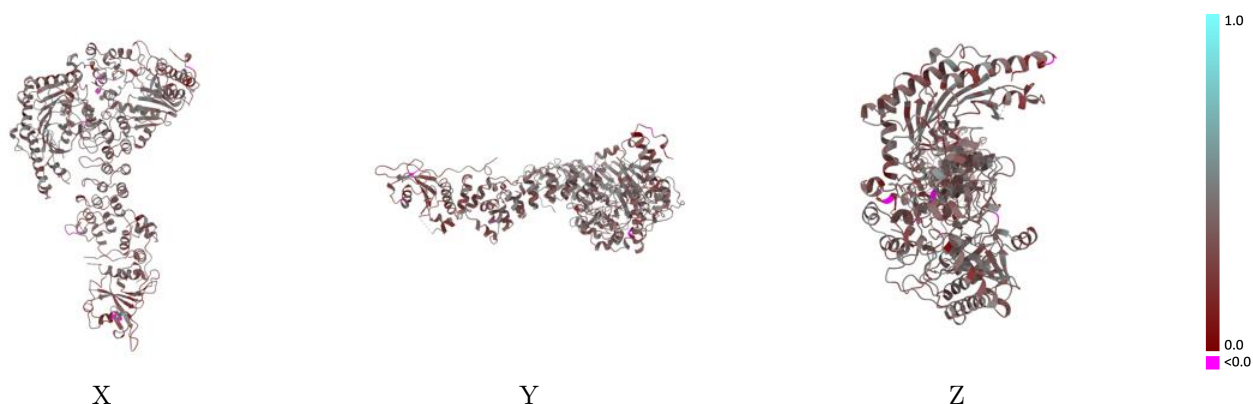
Y



Z

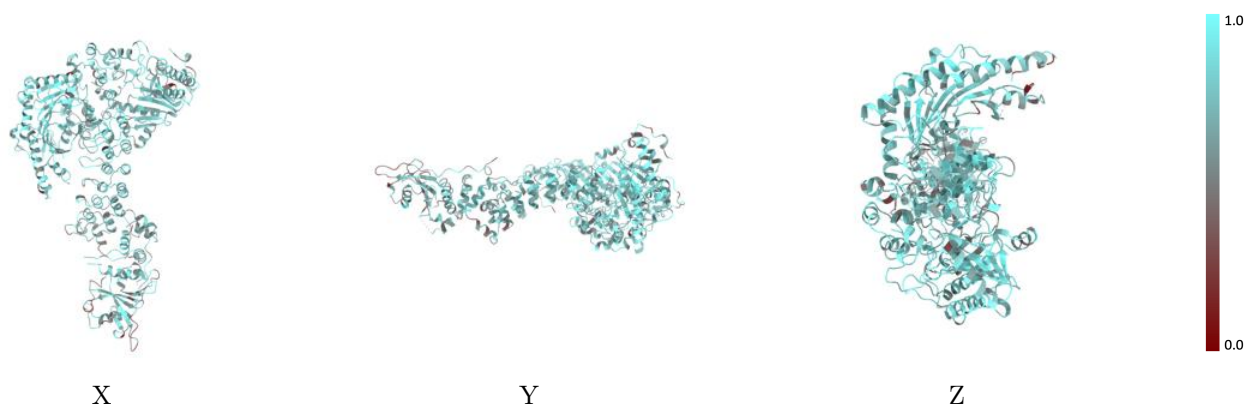
The images above show the 3D surface view of the map at the recommended contour level 0.8 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



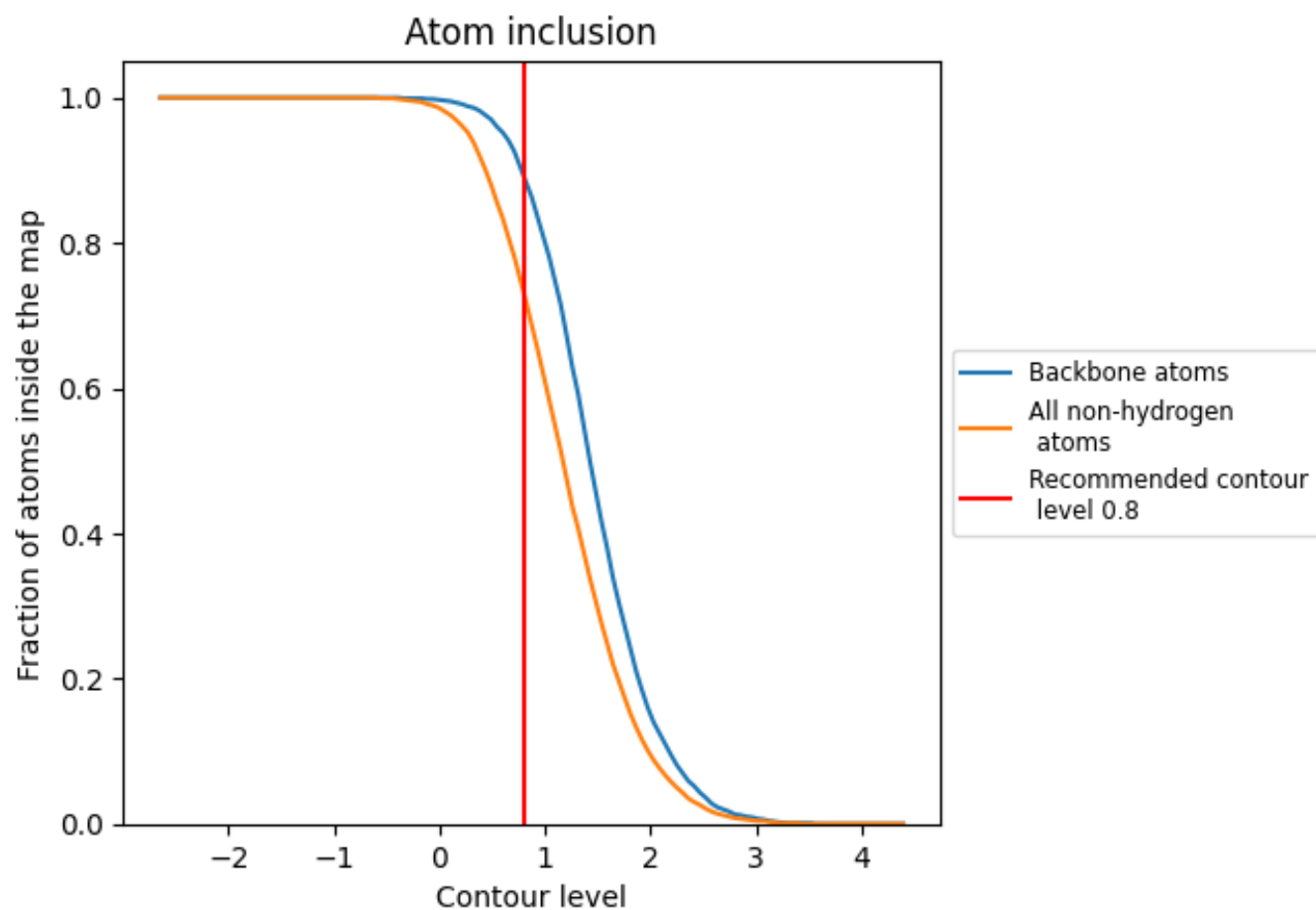
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.8).

9.4 Atom inclusion [i](#)



At the recommended contour level, 89% 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 (0.8) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7310	0.3650
A	0.7750	0.3880
B	0.7510	0.3670
C	0.7130	0.3610
D	0.6850	0.3400
E	0.5900	0.3020

