



wwPDB EM Validation Summary Report ⓘ

May 12, 2024 – 02:36 PM EDT

PDB ID : 8F5P
EMDB ID : EMD-28867
Title : Structure of Leishmania tarentolae IFT-A (state 2)
Authors : Zhou, H.; Brown, A.
Deposited on : 2022-11-14
Resolution : 3.40 Å (reported)

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.dev92
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36.2

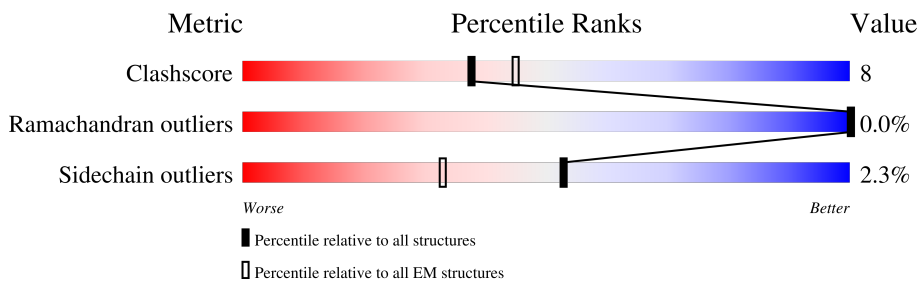
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.40 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	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	368	
2	B	1247	
3	C	1292	
4	D	1642	
5	E	1654	
6	F	1376	

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 39437 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 NET domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	75	585	361	97	120	7	0	0

- Molecule 2 is a protein called Intraflagellar transport protein 122B, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	1128	8917	5645	1557	1652	63	0	0

- Molecule 3 is a protein called Intraflagellar transport protein 122 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	1176	9337	5918	1619	1732	68	0	0

- Molecule 4 is a protein called TPR_REGION domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	612	4826	3026	862	912	26	0	0

- Molecule 5 is a protein called WD_REPEATS_REGION domain-containing protein.

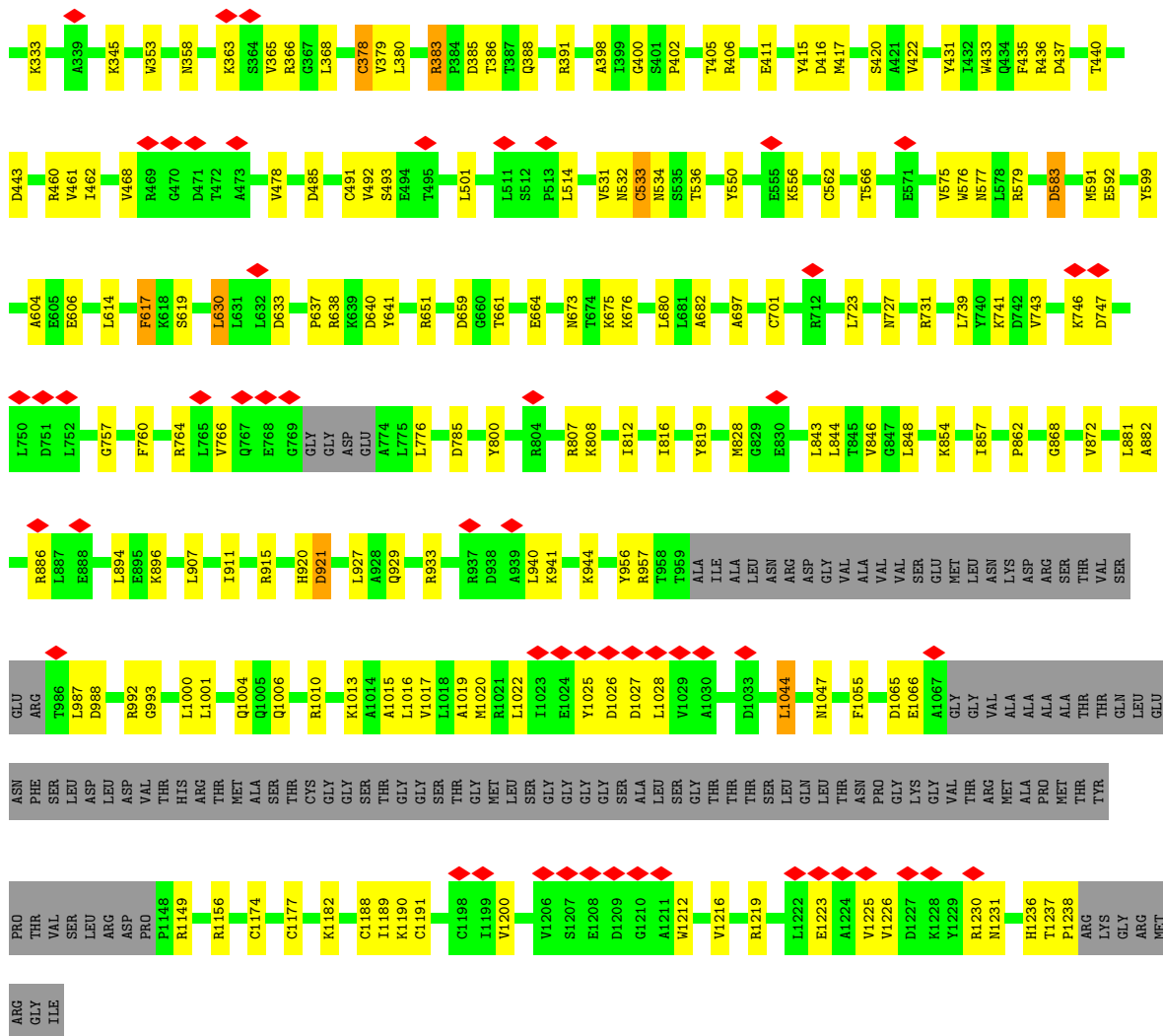
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	1057	8269	5228	1430	1561	50	0	0

- Molecule 6 is a protein called WD_REPEATS_REGION domain-containing protein.

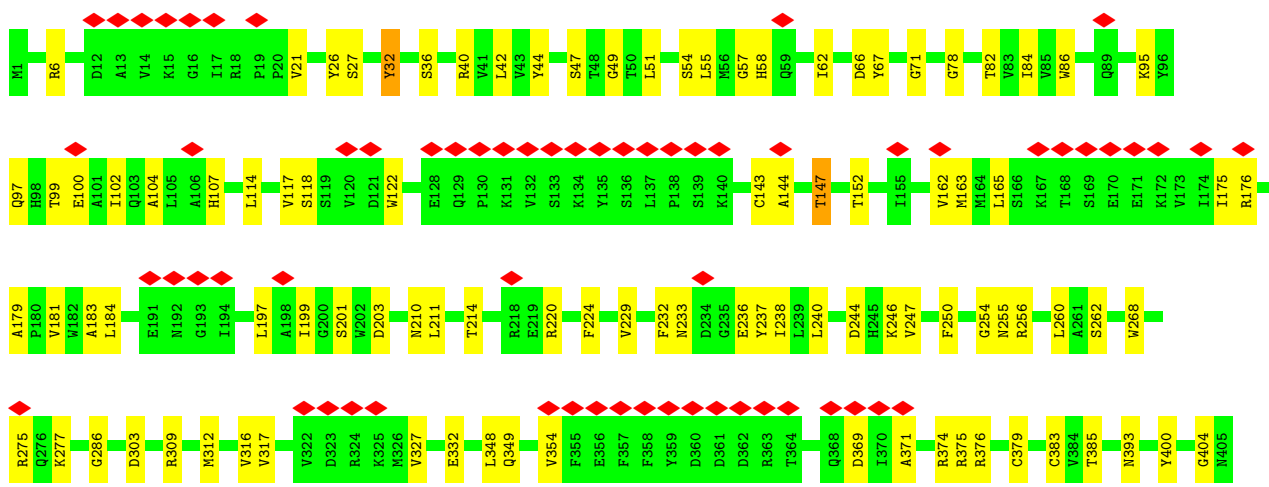
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F	970	7499	4713	1315	1436	35	0	0

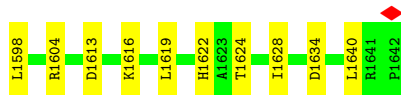
- Molecule 7 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
7	B	2	Total 2	Zn 2	0
7	C	2	Total 2	Zn 2	0

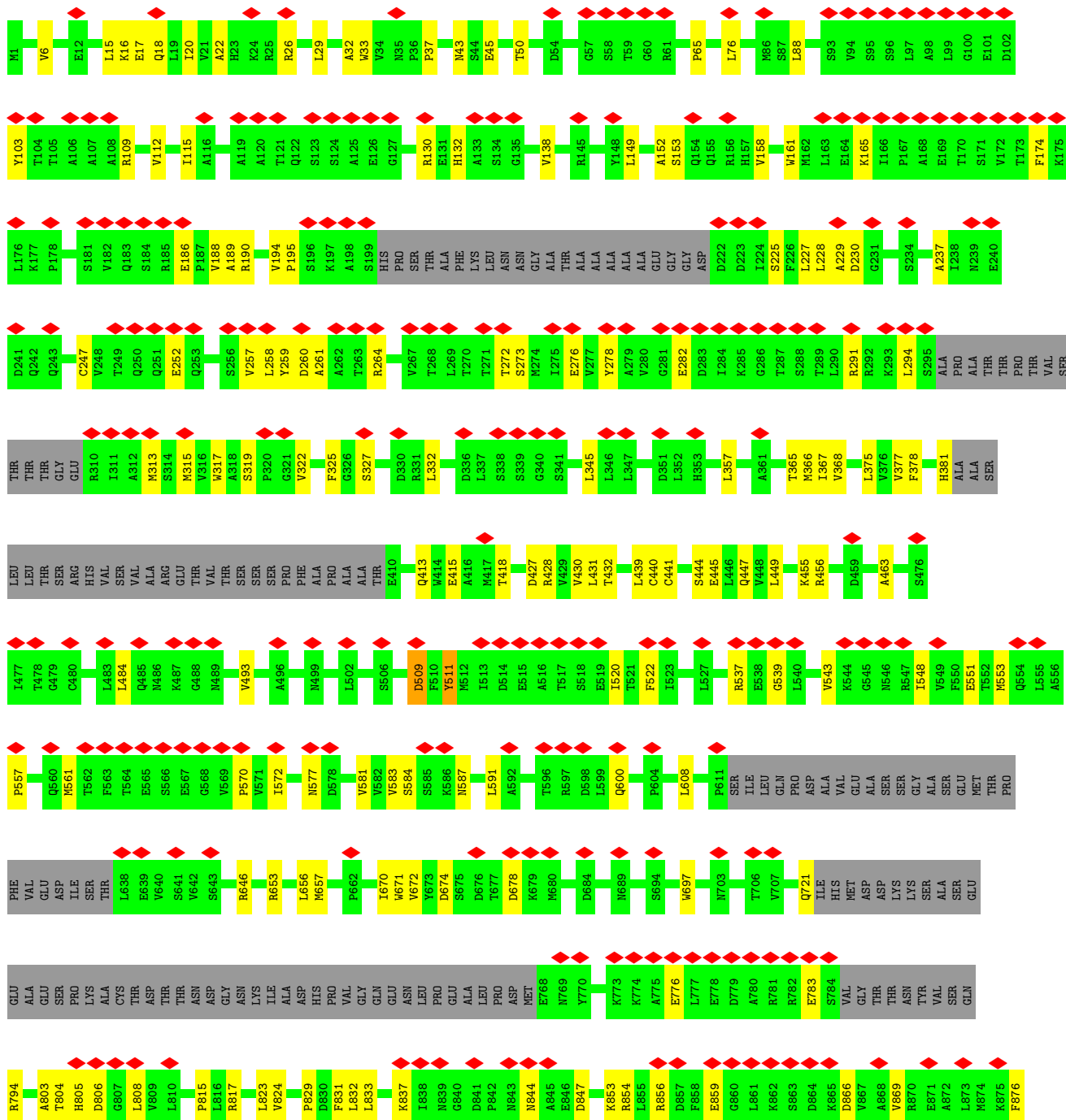


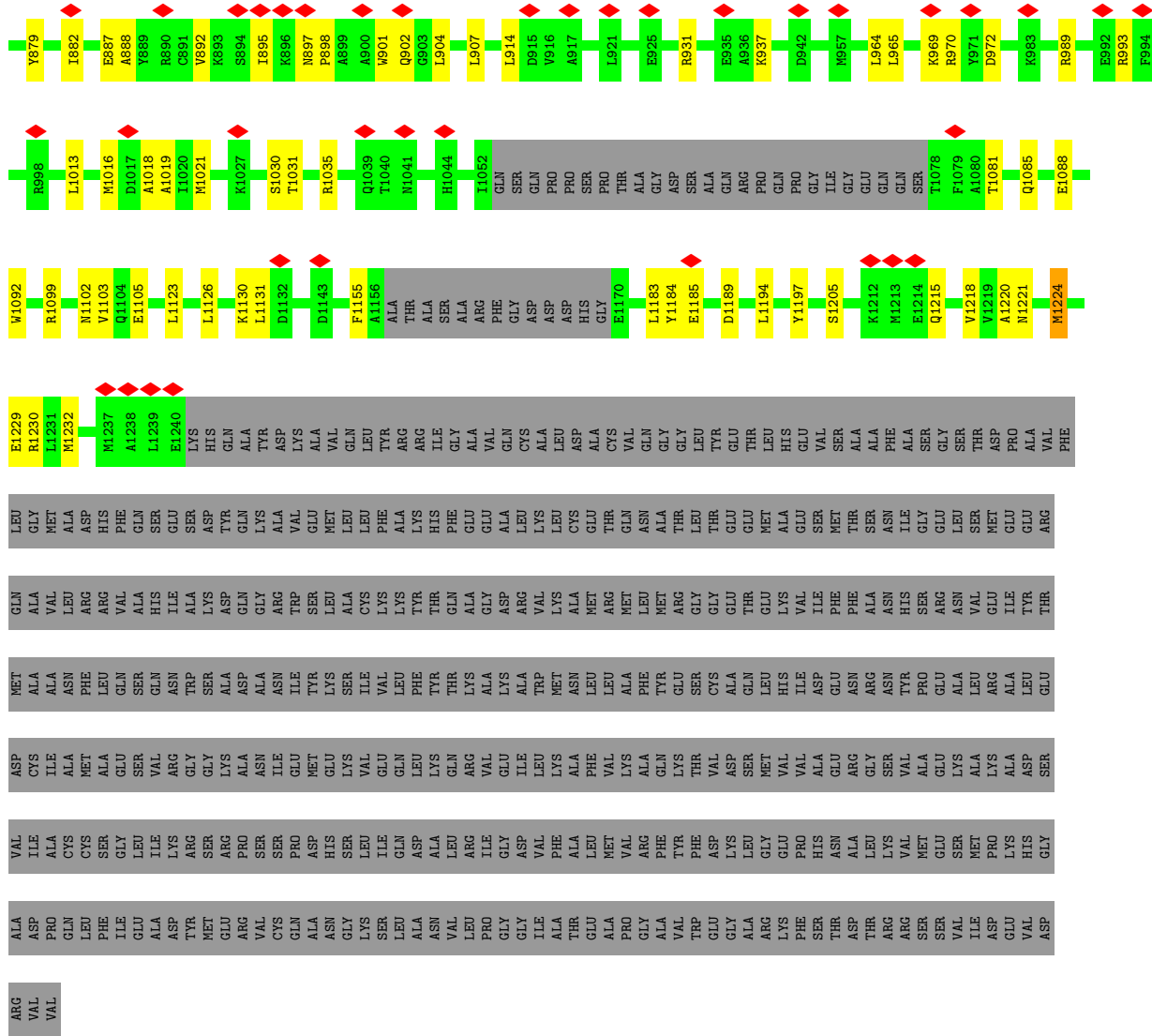
• Molecule 3: Intraflagellar transport protein 122 homolog



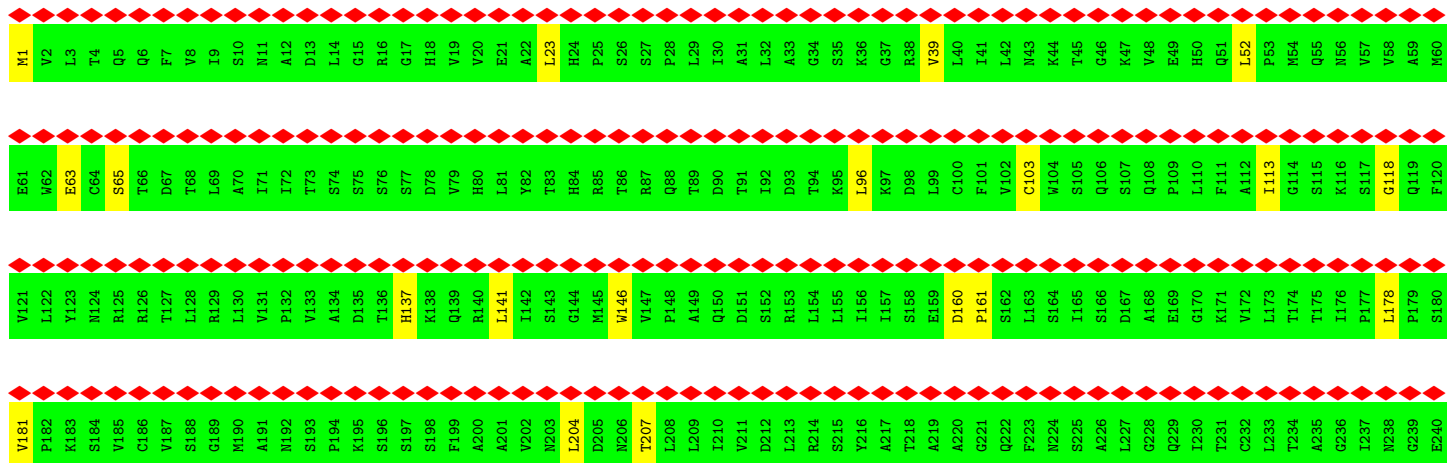


● Molecule 5: WD_REPEATS_REGION domain-containing protein





● Molecule 6: WD_REPEATS_REGION domain-containing protein



F241	D301	I367	T441	H526	P626	V716	G812	Q879	V939	GLU
L242	G302	G368	V442	L529	G626	L721	L813	Q880	E940	PHE
A243	I303	N371	E443	A532	Y627	K722	L814	R881	E941	LEU
G244	A304	L372	Y444	F533	T628	K723	R819	H882	A942	VAL
F245	P305	L372	P445	A533	T631	K724	H820	E883	E943	LEU
A246	Q306	Q373	S446	A534	L632	I724	H820	E884	A944	ALA
S247	G307	Q373	P447	N535	L632	I727	H823	E885	F945	LEU
G248	D308	D374	V448	N539	F633	I727	E824	A886	A946	LEU
T249	E309	N375	T449	T539	R634	K730	E824	Q887	Q947	GLY
V250	A310	R376	V456	Y643	G635	K731	V827	A887	A948	ALA
A251	S311	T380	L457	S548	C639	L732	T828	L888	A948	PHE
L252	S311	V381	V461	E549	Q640	L733	T828	Y889	E949	GLU
L253	L312	V381	Y462	L550	Q640	L734	H829	E890	D950	LEU
D254	E313	V383	D463	L550	T641	S738	Q830	R891	W951	LEU
L255	S314	V383	D463	V553	P642	H739	E831	R892	D952	THR
L255	E315	D386	H464	V553	P642	Q748	E834	G893	N953	THR
A256	R316	P387	R465	A560	G644	Q748	R834	D894	A954	ASP
G257	G317	P388	R466	A560	T645	R753	E837	I895	V955	LEU
S258	V318	F389	V466	G655	L646	R753	Q838	E896	V955	LEU
E259	V318	I390	L468	Y666	E647	R761	Q839	R897	L957	THR
V260	P319	S591	I471	Y667	T648	L761	R840	A898	R958	GLU
R261	D320	H394	R472	P568	T648	R764	Q841	A899	I959	THR
L262	L321	A395	D473	Q570	P650	R765	Q842	T900	E960	ALA
R263	L322	A395	T474	Q570	L651	D766	G842	T901	E961	LEU
G264	A323	G400	P475	V573	Q652	R767	A843	I901	Y902	LEU
S265	W324	Y401	E476	L574	T653	R768	A844	Y902	L962	LEU
L266	S225	M402	A477	W575	H654	Q769	R845	I903	I963	GLU
R267	R326	V405	A478	A578	I657	E778	S846	E904	D964	VAL
L268	D327	E409	A479	I584	F658	A781	Q847	E905	L965	VAL
L269	G328	I412	F483	T585	L659	F782	R848	Q907	L965	VAL
K270	Q329	I412	P484	Y586	R660	E783	R849	R908	G967	GLY
N271	L331	PRO	E485	D587	T661	E784	L850	I909	A968	GLY
A272	F332	ASN	S486	S588	P662	I788	G851	L909	L969	LEU
V273	V333	SER	G487	E589	P662	S789	R852	K910	Y970	THR
E274	G334	LEU	D488	K590	A664	Y792	R853	A911	Y971	THR
M275	G334	PRO	T489	C591	E665	A793	L854	A912	Y972	THR
V276	T335	PRO	R490	F594	M670	L796	D855	E913	R973	VAL
V277	N336	MET	L491	R601	W678	E797	R857	E914	Q974	GLU
F278	Q337	VAL	V492	R601	S679	Y798	T859	R914	T975	THR
G279	G338	ASP	S493	R601	S680	R799	V860	L915	R976	THR
E280	N339	PRO	I494	R601	N681	R799	V860	L916	S977	THR
G281	V340	ALA	S497	K612	N681	G800	R861	F918	A978	THR
G282	T341	LYS	E498	D613	T684	V801	R861	F918	A978	THR
G283	V342	VAL	V499	S614	T684	Y802	E862	K920	N979	THR
G283	F343	SER	T505	S615	S685	R803	E862	K920	A980	THR
V284	T344	SER	T506	E616	E688	A803	S863	S921	A981	THR
V285	L345	SER	T507	N618	E688	A804	S864	R922	A982	THR
V285	L345	GLN	S507	N618	E688	A805	E865	R923	L983	THR
A286	K346	GLN	S507	N618	E688	A805	E865	R923	L983	THR
A287	V347	GLN	R508	L619	K695	E806	V866	I924	Y984	THR
V288	L348	ALA	A434	L619	K695	E806	V866	I924	Y984	THR
A289	N349	HA35	H435	Y620	H698	R807	S867	G926	K986	THR
D290	V350	LYS	N516	T621	H698	R807	S867	G926	K986	THR
N291	S351	GLY	L439	T622	L700	Q810	F868	I927	K987	THR
R292	A352	GLY	R440	L623	I706	R811	V869	Y928	K987	THR
V293	S360	GLY	F361	L623	R707	R811	V869	Y928	K987	THR
G294	F361	THR	T362	L623	R707	R811	V869	Y928	K987	THR
L295	S363	THR	L296	L623	R707	R811	V869	Y928	K987	THR
L296	S363	THR	L297	L623	R707	R811	V869	Y928	K987	THR
R297	N364	ALA	I298	L623	R707	R811	V869	Y928	K987	THR
I298	R365	VAL	I299	L623	R707	R811	V869	Y928	K987	THR
T299	T366	VAL	E300	L623	R707	R811	V869	Y928	K987	THR

ILE
ASP
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ASN
PRO
GLU
LEU
LYS
ALA
LEU
LEU

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	563466	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	57.8	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	74.154	Depositor
Minimum map value	-32.225	Depositor
Average map value	0.007	Depositor
Map value standard deviation	0.778	Depositor
Recommended contour level	7.0	Depositor
Map size (\AA)	514.6, 514.6, 514.6	wwPDB
Map dimensions	620, 620, 620	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	0.83, 0.83, 0.83	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:
ZN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.25	0/592	0.47	0/800
2	B	0.28	0/9108	0.50	0/12341
3	C	0.26	0/9531	0.50	0/12900
4	D	0.26	0/4905	0.51	0/6650
5	E	0.25	0/8429	0.50	0/11438
6	F	0.24	0/7633	0.49	0/10368
All	All	0.26	0/40198	0.50	0/54497

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	585	0	565	22	0
2	B	8917	0	8815	162	0
3	C	9337	0	9275	168	0
4	D	4826	0	4799	105	0
5	E	8269	0	8212	125	0
6	F	7499	0	7503	91	0
7	B	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	C	2	0	0	0	0
All	All	39437	0	39169	636	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 8.

The worst 5 of 636 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)
5:E:539:GLY:HA3	5:E:551:GLU:O	1.71	0.91
3:C:1061:CYS:HB3	3:C:1064:CYS:SG	2.19	0.82
3:C:62:ILE:HA	3:C:78:GLY:HA2	1.66	0.76
5:E:656:LEU:HB2	5:E:671:TRP:HB2	1.68	0.76
2:B:1174:CYS:HB3	2:B:1177:CYS:SG	2.26	0.75

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	73/368 (20%)	69 (94%)	4 (6%)	0	100	100
2	B	1120/1247 (90%)	1070 (96%)	50 (4%)	0	100	100
3	C	1170/1292 (91%)	1133 (97%)	37 (3%)	0	100	100
4	D	596/1642 (36%)	567 (95%)	27 (4%)	2 (0%)	41	72
5	E	1039/1654 (63%)	1001 (96%)	38 (4%)	0	100	100
6	F	966/1376 (70%)	946 (98%)	20 (2%)	0	100	100
All	All	4964/7579 (66%)	4786 (96%)	176 (4%)	2 (0%)	100	100

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	D	1058	VAL
4	D	1057	VAL

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	64/288 (22%)	64 (100%)	0	100	100
2	B	956/1046 (91%)	927 (97%)	29 (3%)	41	68
3	C	1012/1094 (92%)	987 (98%)	25 (2%)	47	72
4	D	505/1320 (38%)	487 (96%)	18 (4%)	35	63
5	E	892/1373 (65%)	879 (98%)	13 (2%)	65	82
6	F	822/1177 (70%)	809 (98%)	13 (2%)	62	81
All	All	4251/6298 (68%)	4153 (98%)	98 (2%)	53	74

5 of 98 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	D	1031	ARG
4	D	1624	THR
4	D	1118	GLU
4	D	1404	LEU
5	E	325	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
3	C	417	GLN
4	D	1221	ASN
4	D	1223	ASN
4	D	1622	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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 4 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.

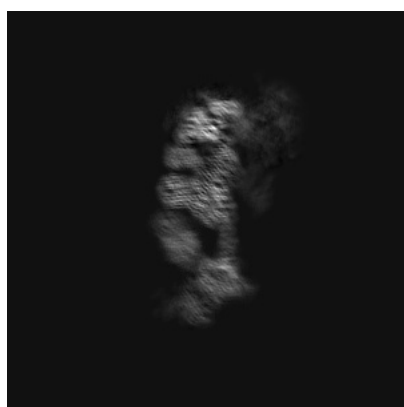
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-28867. These allow visual inspection of the internal detail of the map and identification of artifacts.

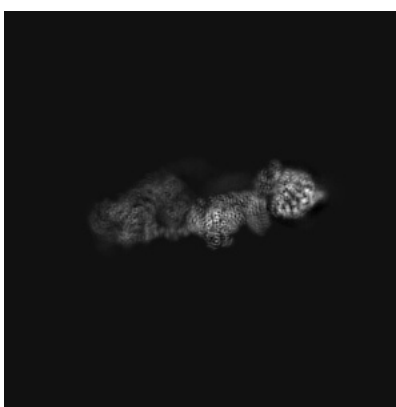
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

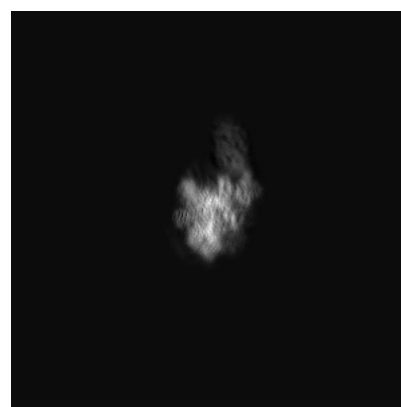
6.1.1 Primary map



X



Y

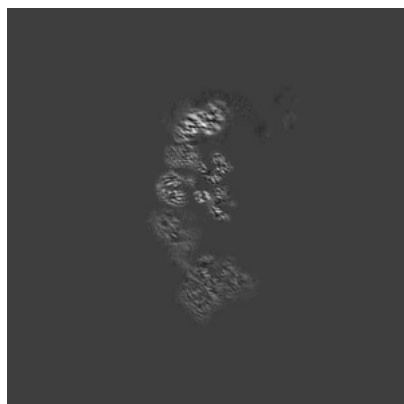


Z

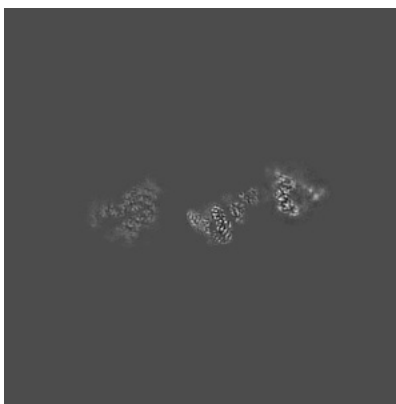
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

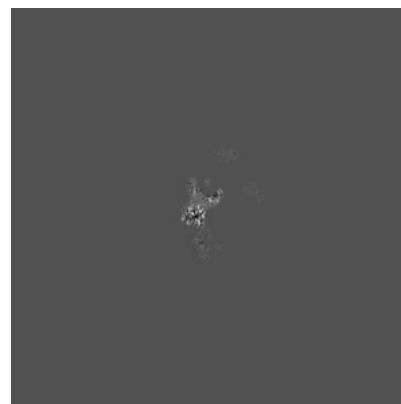
6.2.1 Primary map



X Index: 310



Y Index: 310

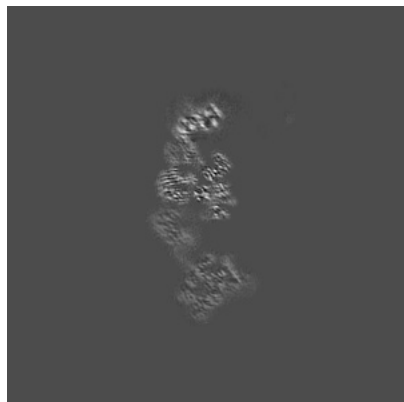


Z Index: 310

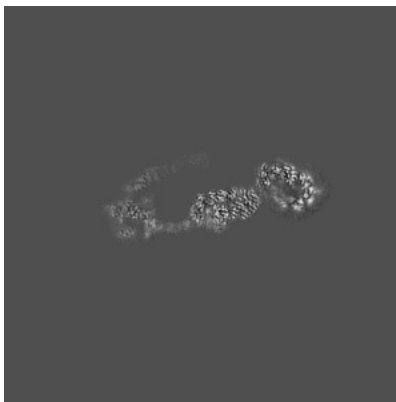
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

6.3.1 Primary map



X Index: 306



Y Index: 328

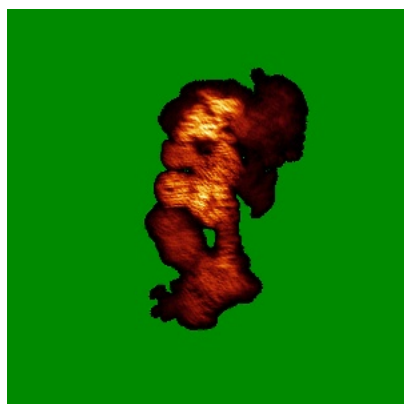


Z Index: 330

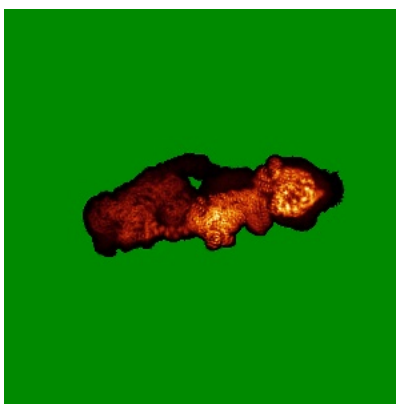
The images above show the largest variance slices of the map in three orthogonal directions.

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

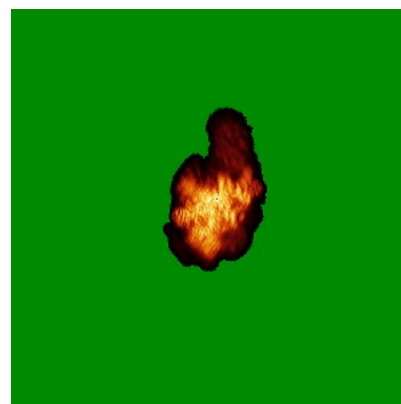
6.4.1 Primary map



X



Y

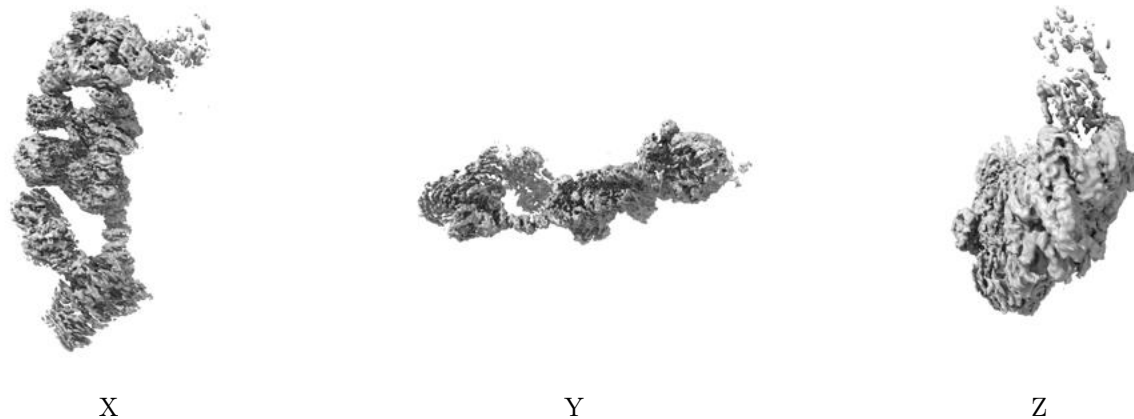


Z

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

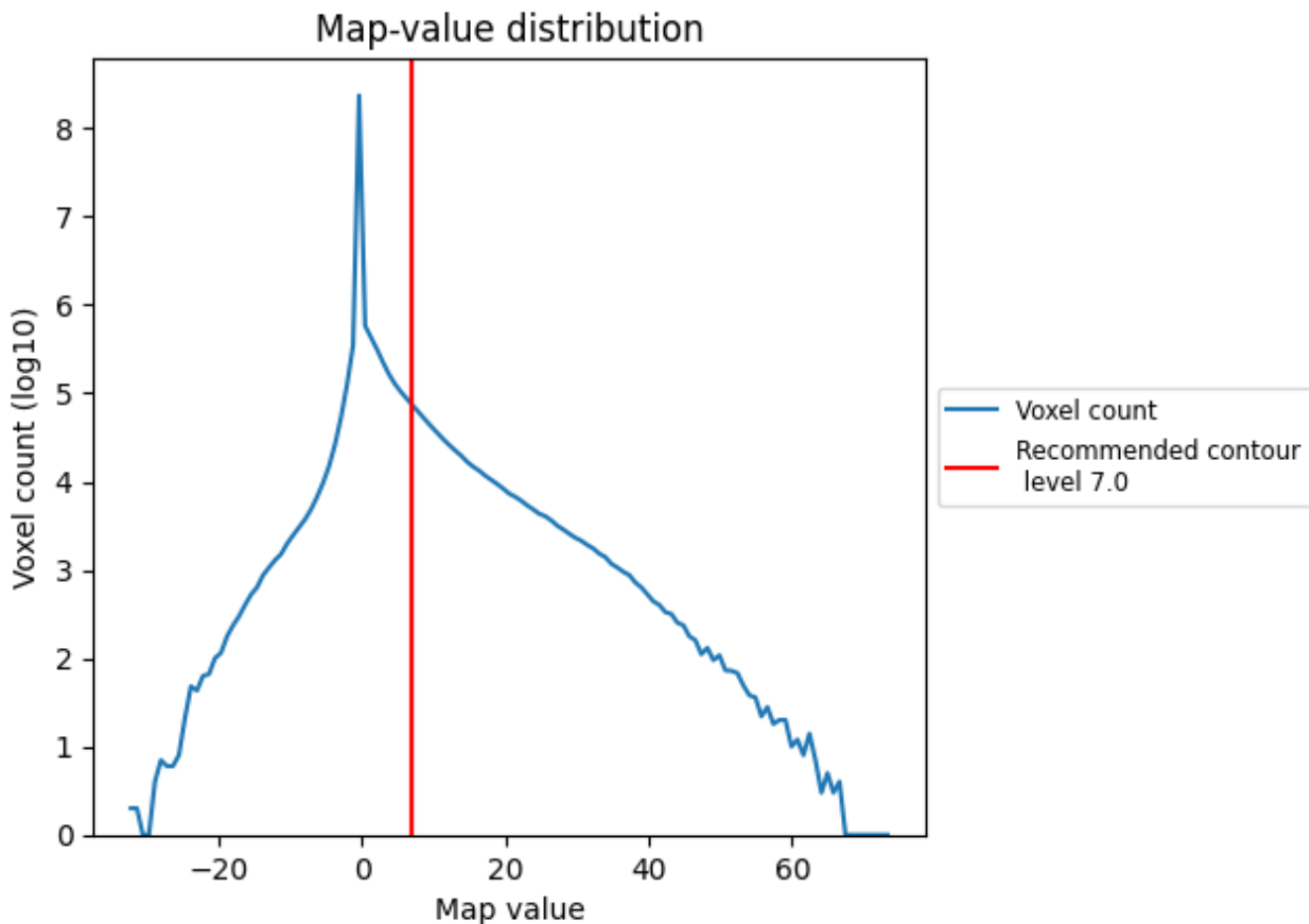
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

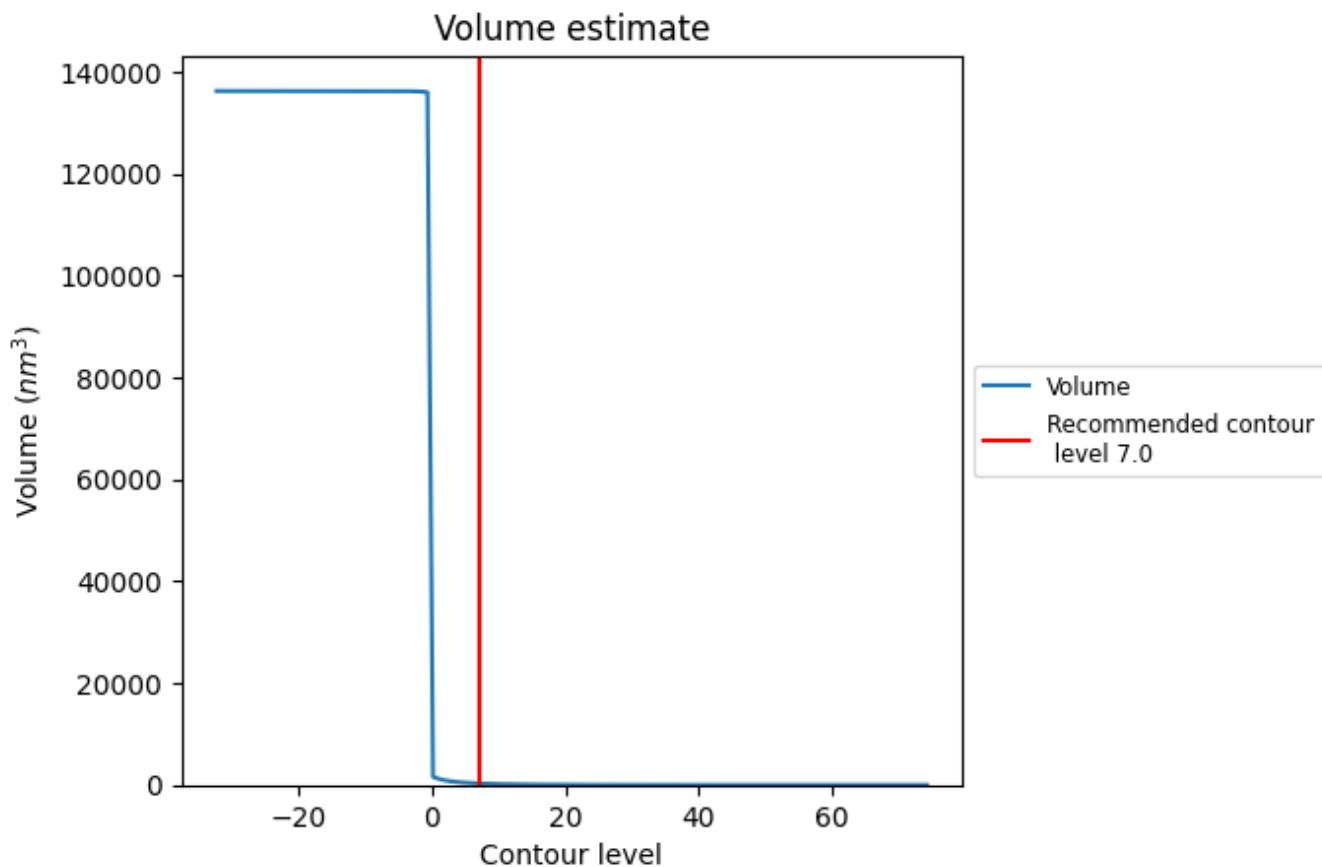
This section contains the results of statistical analysis of the map.

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.

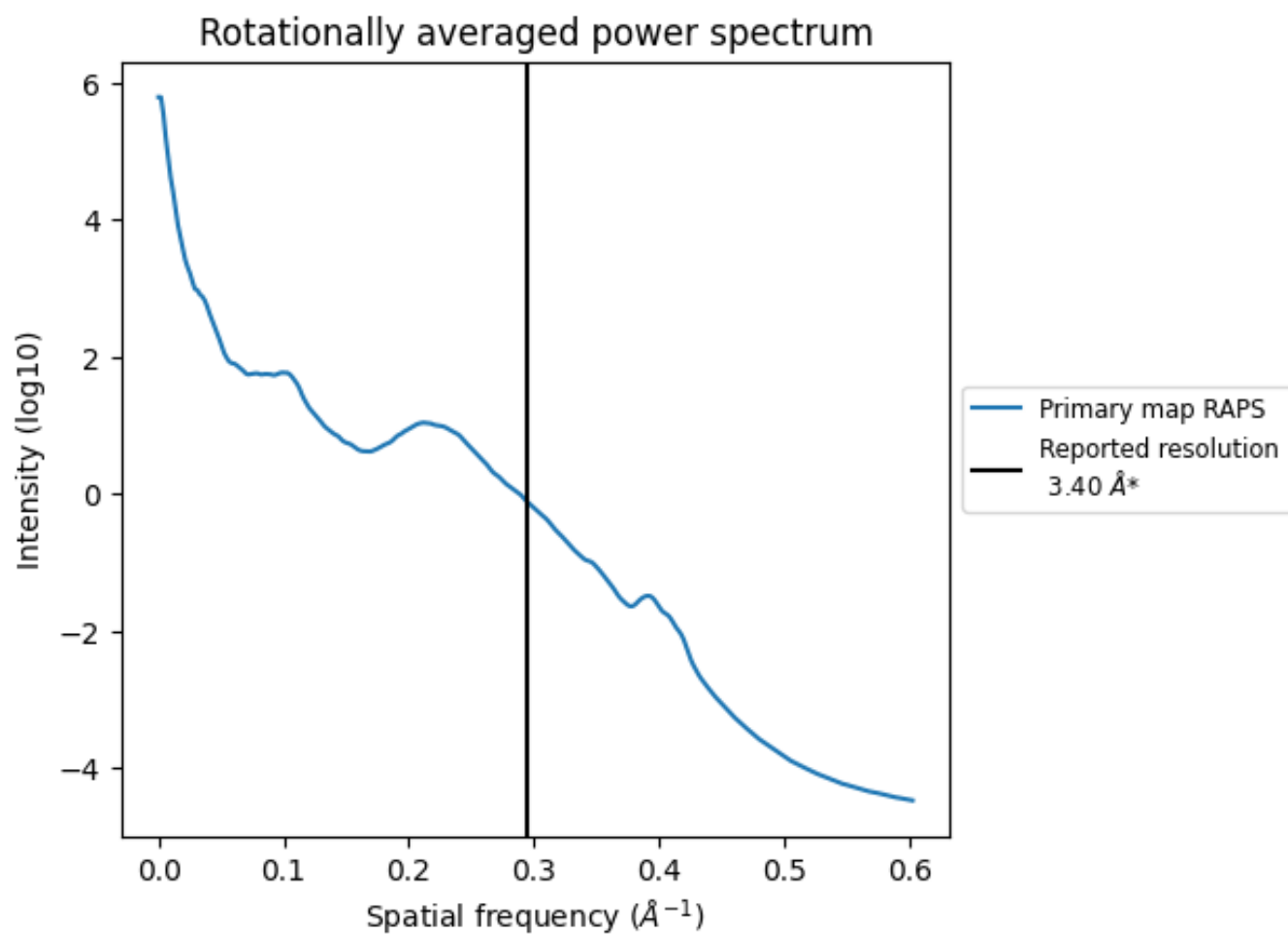
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 303 nm³; this corresponds to an approximate mass of 273 kDa.

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

7.3 Rotationally averaged power spectrum [i](#)



*Reported resolution corresponds to spatial frequency of 0.294 Å⁻¹

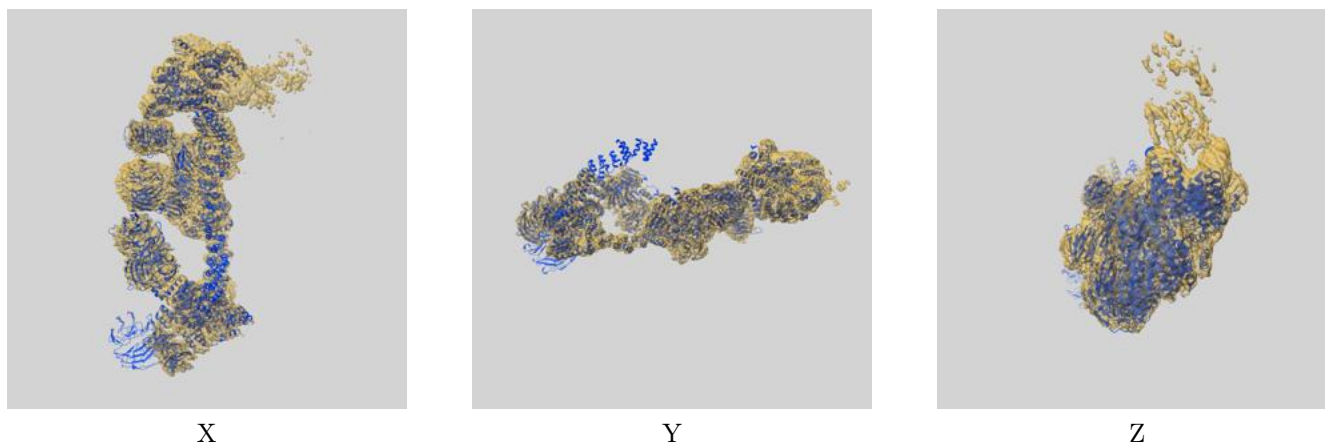
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

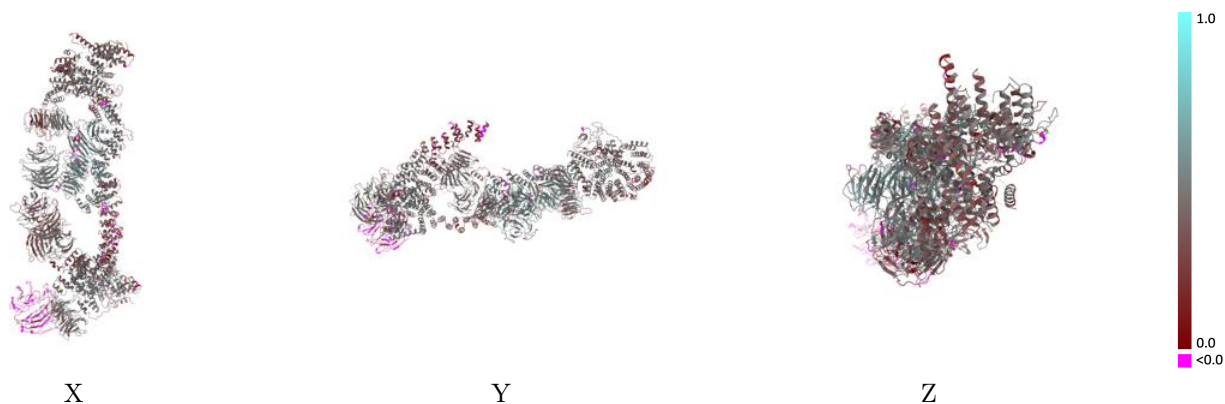
This section contains information regarding the fit between EMDB map EMD-28867 and PDB model 8F5P. Per-residue inclusion information can be found in section 3 on page 5.

9.1 Map-model overlay [i](#)



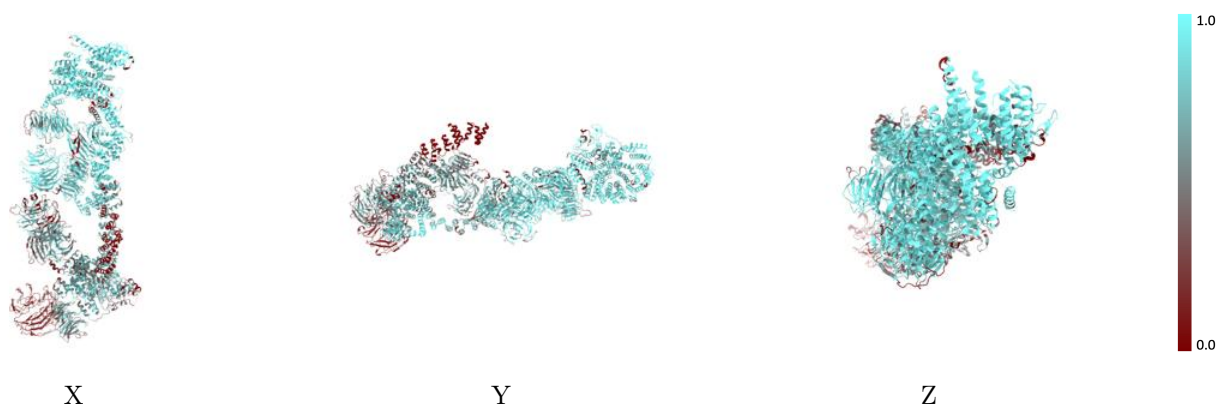
The images above show the 3D surface view of the map at the recommended contour level 7.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



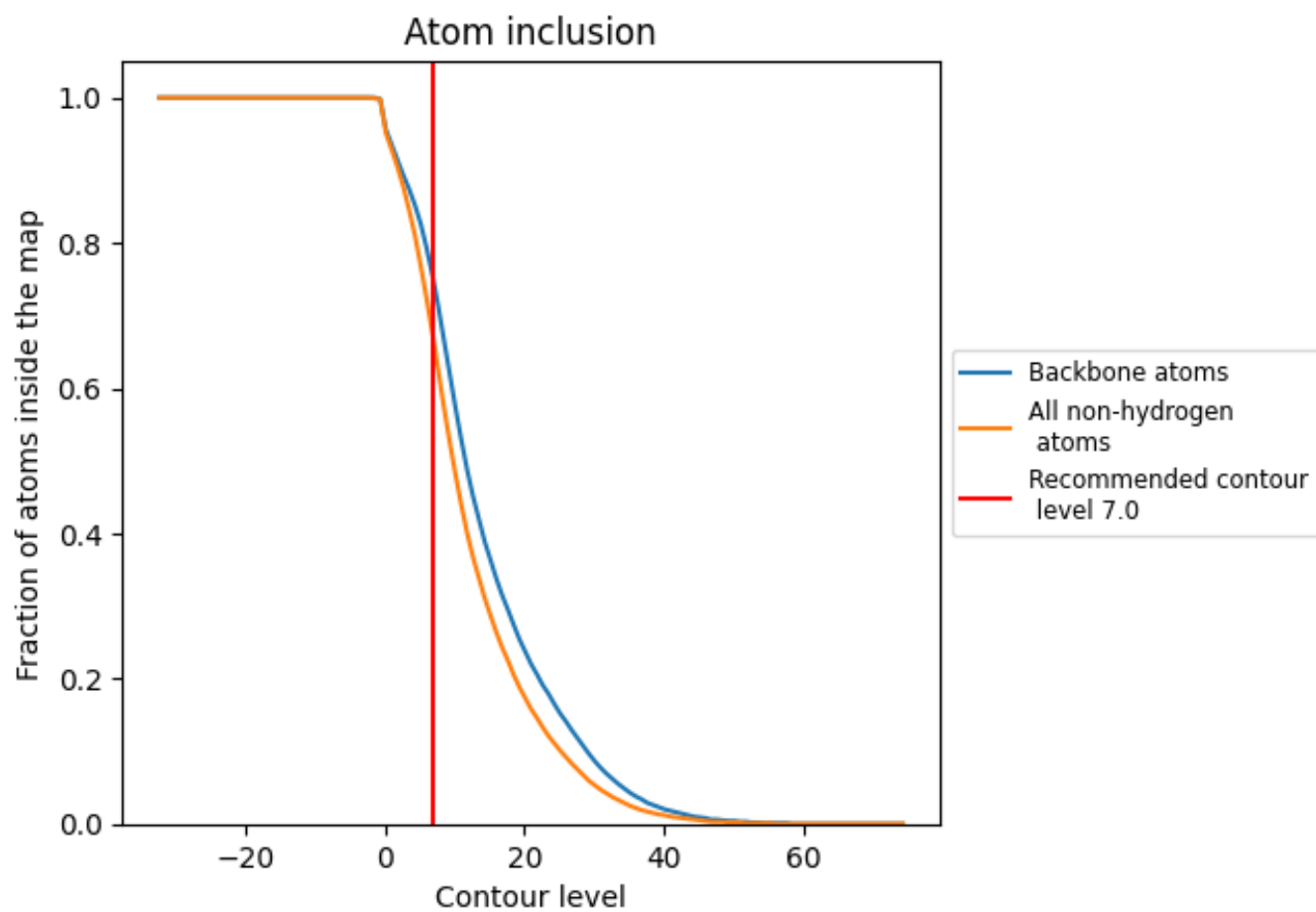
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (7.0).















9.4 Atom inclusion [i](#)



At the recommended contour level, 75% of all backbone atoms, 67% 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 (7.0) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6660	 0.3860
A	 0.6460	 0.3640
B	 0.8720	 0.4660
C	 0.7460	 0.4180
D	 0.9020	 0.3900
E	 0.5750	 0.3960
F	 0.2760	 0.2390

