



wwPDB EM Validation Summary Report ⓘ

Nov 21, 2023 – 08:46 PM JST

PDB ID : 8K3Y
EMDB ID : EMD-36867
Title : The "5+1" heteromeric structure of Lon protease consisting of a spiral pentamer with Y224S mutation and an N-terminal-truncated monomeric E613K mutant
Authors : Li, S.; Hsieh, K.Y.; Kuo, C.I.; Zhang, K.; Chang, C.I.
Deposited on : 2023-07-17
Resolution : 4.42 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:

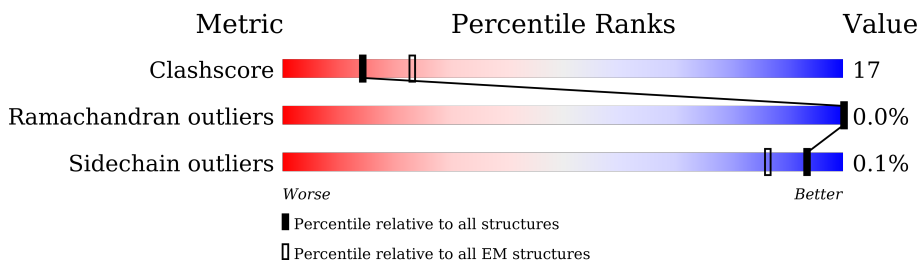
EMDB validation analysis : 0.0.1.dev70
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 4.42 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	799	
1	B	799	
1	C	799	
1	D	799	
1	E	799	
2	F	570	

2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 34589 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 Lon protease.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	773	6069	3832	1067	1149	21	0	0
1	B	773	6069	3832	1067	1149	21	0	0
1	C	773	6069	3832	1067	1149	21	0	0
1	D	773	6069	3832	1067	1149	21	0	0
1	E	773	6069	3832	1067	1149	21	0	0

There are 35 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	224	SER	TYR	engineered mutation	UNP A0A059VAZ3
A	794	HIS	-	expression tag	UNP A0A059VAZ3
A	795	HIS	-	expression tag	UNP A0A059VAZ3
A	796	HIS	-	expression tag	UNP A0A059VAZ3
A	797	HIS	-	expression tag	UNP A0A059VAZ3
A	798	HIS	-	expression tag	UNP A0A059VAZ3
A	799	HIS	-	expression tag	UNP A0A059VAZ3
B	224	SER	TYR	engineered mutation	UNP A0A059VAZ3
B	794	HIS	-	expression tag	UNP A0A059VAZ3
B	795	HIS	-	expression tag	UNP A0A059VAZ3
B	796	HIS	-	expression tag	UNP A0A059VAZ3
B	797	HIS	-	expression tag	UNP A0A059VAZ3
B	798	HIS	-	expression tag	UNP A0A059VAZ3
B	799	HIS	-	expression tag	UNP A0A059VAZ3
C	224	SER	TYR	engineered mutation	UNP A0A059VAZ3
C	794	HIS	-	expression tag	UNP A0A059VAZ3
C	795	HIS	-	expression tag	UNP A0A059VAZ3
C	796	HIS	-	expression tag	UNP A0A059VAZ3
C	797	HIS	-	expression tag	UNP A0A059VAZ3
C	798	HIS	-	expression tag	UNP A0A059VAZ3

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Chain	Residue	Modelled	Actual	Comment	Reference
C	799	HIS	-	expression tag	UNP A0A059VAZ3
D	224	SER	TYR	engineered mutation	UNP A0A059VAZ3
D	794	HIS	-	expression tag	UNP A0A059VAZ3
D	795	HIS	-	expression tag	UNP A0A059VAZ3
D	796	HIS	-	expression tag	UNP A0A059VAZ3
D	797	HIS	-	expression tag	UNP A0A059VAZ3
D	798	HIS	-	expression tag	UNP A0A059VAZ3
D	799	HIS	-	expression tag	UNP A0A059VAZ3
E	224	SER	TYR	engineered mutation	UNP A0A059VAZ3
E	794	HIS	-	expression tag	UNP A0A059VAZ3
E	795	HIS	-	expression tag	UNP A0A059VAZ3
E	796	HIS	-	expression tag	UNP A0A059VAZ3
E	797	HIS	-	expression tag	UNP A0A059VAZ3
E	798	HIS	-	expression tag	UNP A0A059VAZ3
E	799	HIS	-	expression tag	UNP A0A059VAZ3

- Molecule 2 is a protein called Lon protease.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	F	531	4136	2615	726	780	15	0	0

There are 19 discrepancies between the modelled and reference sequences:

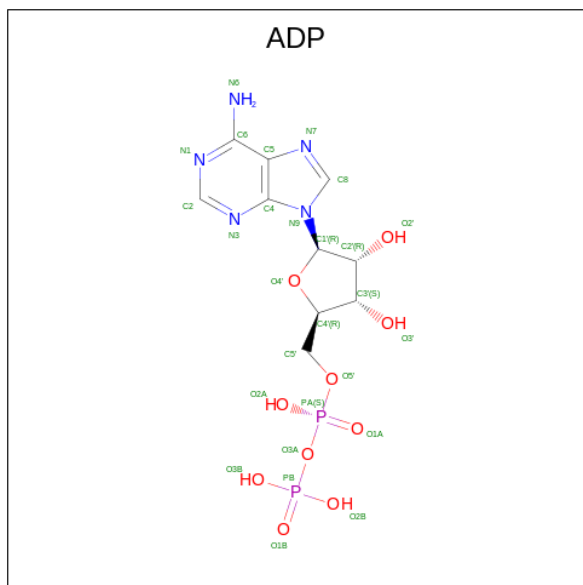
Chain	Residue	Modelled	Actual	Comment	Reference
F	224	HIS	-	expression tag	UNP A0A059VAZ3
F	225	HIS	-	expression tag	UNP A0A059VAZ3
F	226	HIS	-	expression tag	UNP A0A059VAZ3
F	227	HIS	-	expression tag	UNP A0A059VAZ3
F	228	HIS	-	expression tag	UNP A0A059VAZ3
F	229	HIS	-	expression tag	UNP A0A059VAZ3
F	230	SER	-	expression tag	UNP A0A059VAZ3
F	231	SER	-	expression tag	UNP A0A059VAZ3
F	232	GLY	-	expression tag	UNP A0A059VAZ3
F	233	GLU	-	expression tag	UNP A0A059VAZ3
F	234	ASN	-	expression tag	UNP A0A059VAZ3
F	235	LEU	-	expression tag	UNP A0A059VAZ3
F	236	TYR	-	expression tag	UNP A0A059VAZ3
F	237	PHE	-	expression tag	UNP A0A059VAZ3
F	238	GLN	-	expression tag	UNP A0A059VAZ3
F	239	GLY	-	expression tag	UNP A0A059VAZ3
F	240	HIS	-	expression tag	UNP A0A059VAZ3

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Chain	Residue	Modelled	Actual	Comment	Reference
F	241	MET	-	expression tag	UNP A0A059VAZ3
F	613	LYS	GLU	engineered mutation	UNP A0A059VAZ3

- Molecule 3 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: C₁₀H₁₅N₅O₁₀P₂) (labeled as "Ligand of Interest" by depositor).

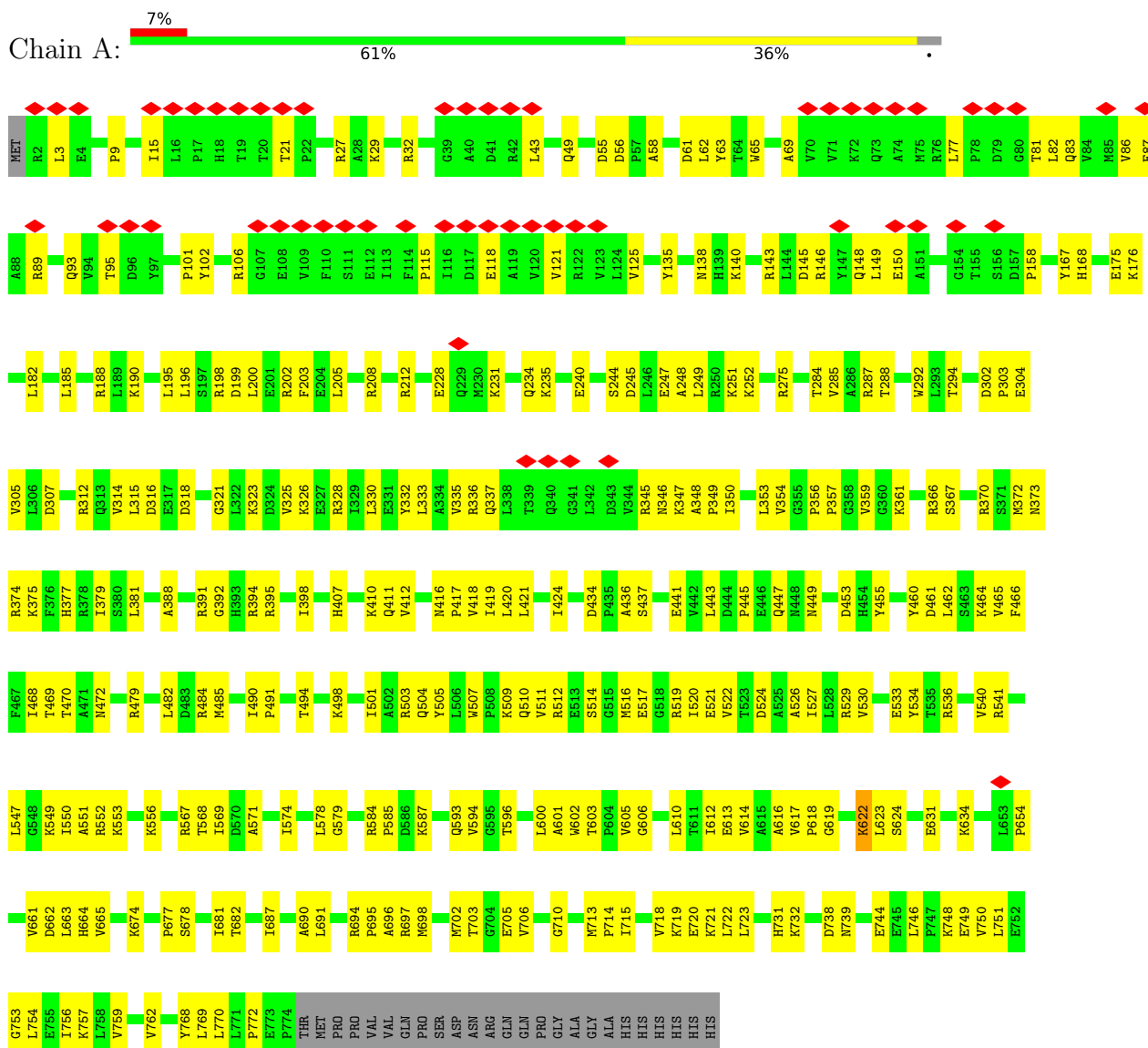


Mol	Chain	Residues	Atoms				AltConf	
			Total	C	N	O		P
3	B	1	27	10	5	10	2	0
3	C	1	27	10	5	10	2	0
3	D	1	27	10	5	10	2	0
3	E	1	27	10	5	10	2	0

3 Residue-property plots (i)

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

• Molecule 1: Lon protease



• Molecule 1: Lon protease

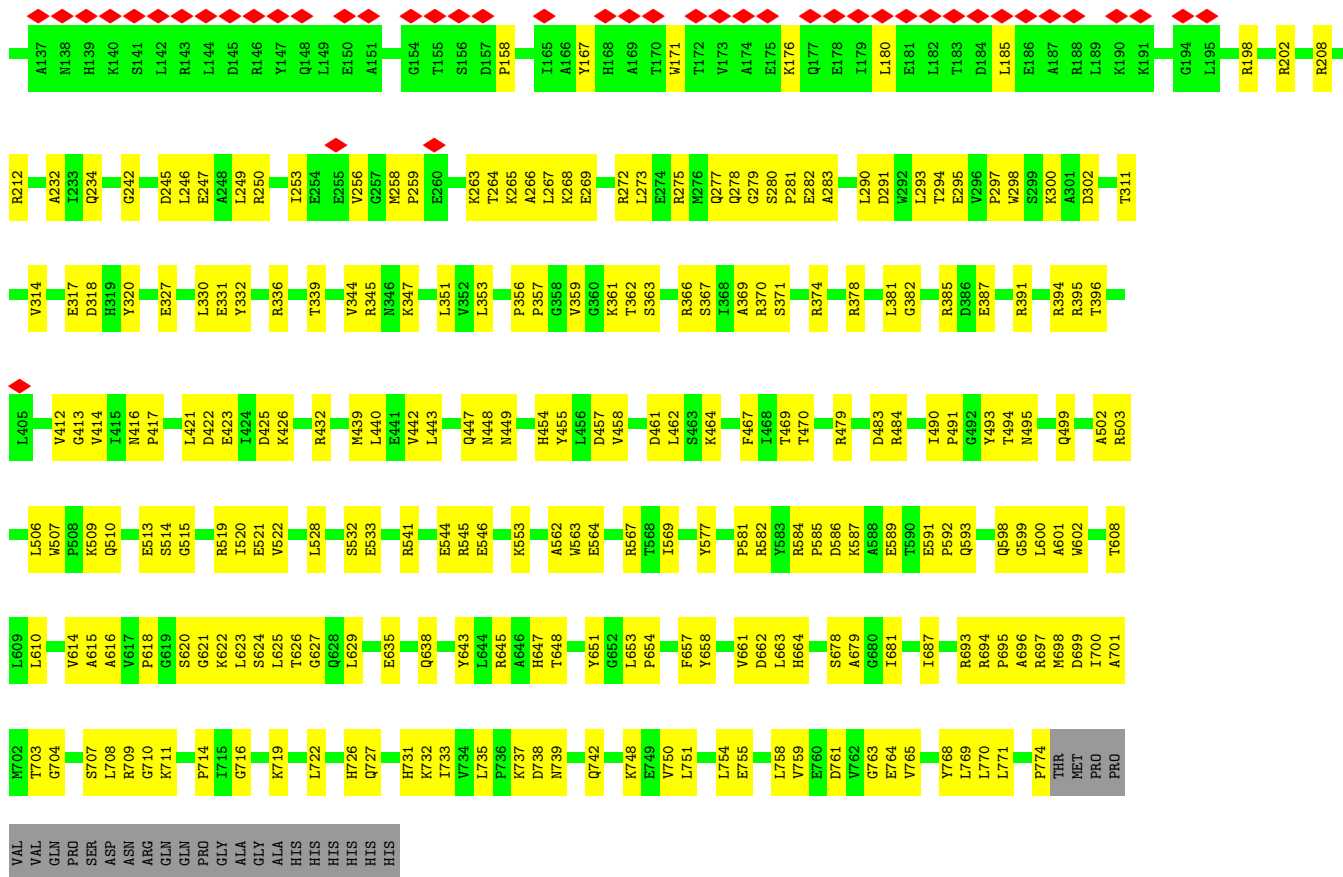


MET	R2	L3	E4	L5	P6	V7	I8	P9	L10	R11	N12	T13	V14	I15	L16	P17	H18	T19	T20	P22	V23	D24	V25	G26	R27	A28	K29	S30	K31	R32	A33	V34	E35	E36	A37	M38	G39	A40	D41	R42	L43	I44	F45	L46	L47	A48	Q49	R50	D51	P52	E53	D55	D56	P57	A58	P59	D60		
D61	L62	Y63	T64	W65	G66	V67	Q68	A69	V70	V71	K72	Q73	A74	M75	R76	L77	P78	D79	G80	T81	L82	Q83	V84	M85	V86	R87	A88	R89	S90	K91	A92	Q93	V94	T95	D96	Y97	I98	P99	G100	P101	I102	L103	R104	A105	R106	G107	E108	V109	F110	S111	E112	I113	F114	P115	I116	D117	A118	A119	V120
V121	R122	V123	L124	V125	E126	E127	L128	K129	E130	A131	F132	E133	K134	Y135	V136	A137	M138	H139	K140	S141	L142	R143	L144	D145	R146	Y147	Q148	L149	E150	A151	V152	K153	G154	T155	S156	D157	P158	A159	M160	L161	A162	D163	T164	I165	A166	Y167	H168	A169	T170	W171	T172	V173	A174	E175	K176	Q177	A178	I179	L180
E181	L182	T183	D184	L185	E186	A187	R188	L189	K190	K191	V192	L193	G194	L195	L196	S197	R198	D199	L200	E201	R202	F203	E204	L205	D206	K207	R208	V209	A210	Q211	R212	V213	K214	E215	Q216	W217	D218	N219	N220	Q221	Y222	L226	R227	E228	Q229	M230	K231	A232	I233	E236	L237	G238	G239	L243	S244	D245			
R250	L253	M258	V262	A266	K268	E269	L270	D271	R272	E274	Q277	Q278	G279	E282	A283	V285	L290	T294	E295	W298	S299	K300	A301	D302	E304	D307	L308	N309	H310	T311	R312	Q313	V314	E317	L322	K326	E327	R328	L330																				
E331	T332	L333	A334	V335	M336	Q337	L338	T339	Q340	K347	L351	V354	G355	P356	V359	G360	K361	R374	L379	S380	L381	V384	R385	D386	E387	A388	E389	R390	K391	A392	H393	R394	R395	T396	V397	A400	G403	K404	H407	K410	Q411	V412	M416	P417	V418	L419	L420												
L421	D422	I424	D425	K426	M427	S428	W431	R432	P435	A436	L440	E441	V442	L443	D444	Q447	M448	N449	T452	D453	H454	L455	P459	Y460	D461	L462	K464	V465	F466	I468	A471	M472	T473	L474	P480	L481	L482	D483	I488	Y493	K498	Q499	A500	L600	A601														
A502	R503	Q504	Y505	L506	Q510	V511	R512	E513	S514	L520	E521	V522	A526	I527	L528	R529	V530	I531	S532	E533	Y534	E535	R536	G539	R552	A562	N563	E564	R567	E568	I569	D570	A571	I574	P575	L578	G579	I580	P581	P582	Q593	V594	G595	A597	Q598	G599	L600	A601											
W602	G607	T608	L609	L610	T611	I612	E613	V614	A615	P618	G622	L629	K629	E651	E655	Y658	V661	D662	H666	V667	P668	D669	G670	A671	K674	S678	I681	T682	T685	A688	L691	R694	P695	A696	R697	M698	D699																						
I700	A701	E705	V706	S707	G710	K711	L712	V713	P714	G716	G717	V718	K719	E720	K721	H726	Q727	I730	H731	G732	K737	Q742	L743	L746	P747	K748	L751	L754	K757	E760	G763	E764	V765	L766	E767	Y768	L769	L770	P772	E773	THR	MET	PRO	PRO															
VAL	VAL	GLN	PRO	SER	ASP	ASN	ARG	GLN	GLN	PRO	GLY	ALA	ALA	HIS	HIS	HIS	HIS	VAL	VAL	GLN	PRO	GLY	ALA	ALA	HIS	HIS	HIS	HIS	VAL	VAL	GLN	PRO	GLY	ALA	ALA	HIS	HIS	HIS	VAL	VAL	GLN	PRO	GLY	ALA	ALA	HIS	HIS	HIS	VAL	VAL	GLN	PRO	GLY	ALA	ALA	HIS	HIS	HIS	

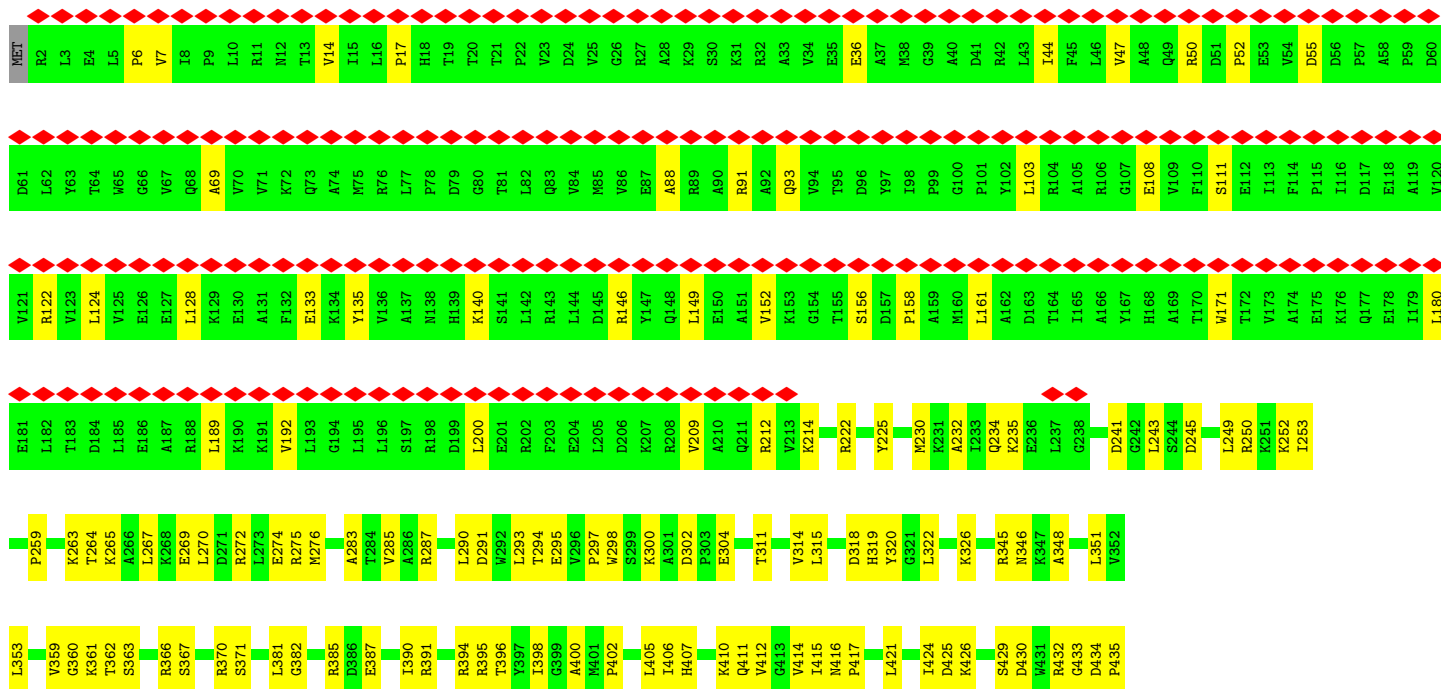
Molecule 1: Lon protease

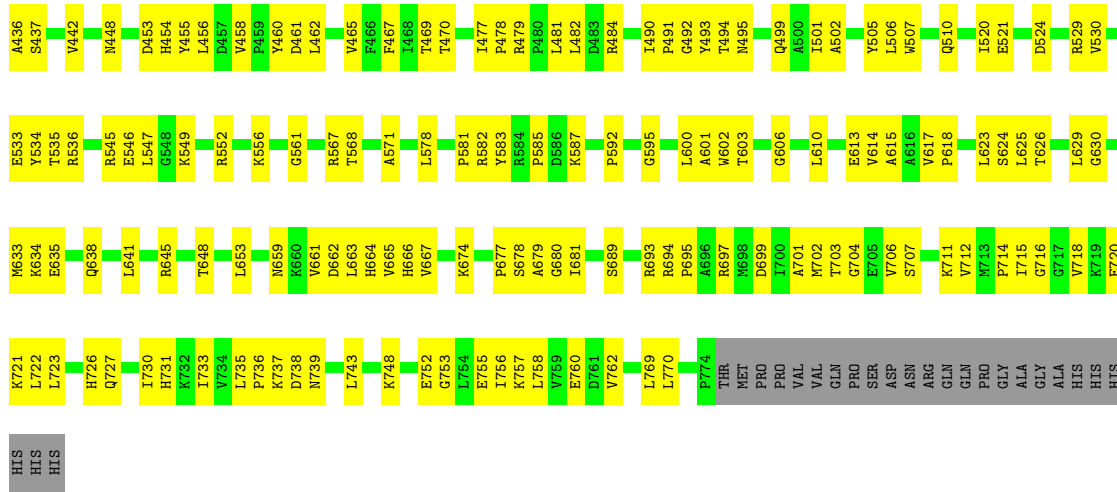


MET	R2	L3	E4	L5	P6	V7	I8	P9	L10	R11	N12	T13	V14	I15	L16	P17	H18	T19	T20	V23	D24	V25	G26	R27	A28	K29	S30	K31	R32	A33	V34	E35	E36	G39	A40	D41	L46	V47	A48	Q49	D51	P52	E53	E54	D55	D56	P57	P59	D60	D61	L62	V63	T64	W65		
G66	V67	V70	V71	Q72	K73	A74	W75	R76	L77	P78	D79	G80	T81	L82	Q83	E87	A88	H89	D90	R91	Q93	Y94	T95	D96	Y97	I98	P99	G100	P101	Y102	L103	R104	A105	R106	G107	E108	A109	F110	S111	E112	I113	F114	P115	D116	D117	E118	A119	V120	L121	R122	V123	L124	V125	E126	E127	L128

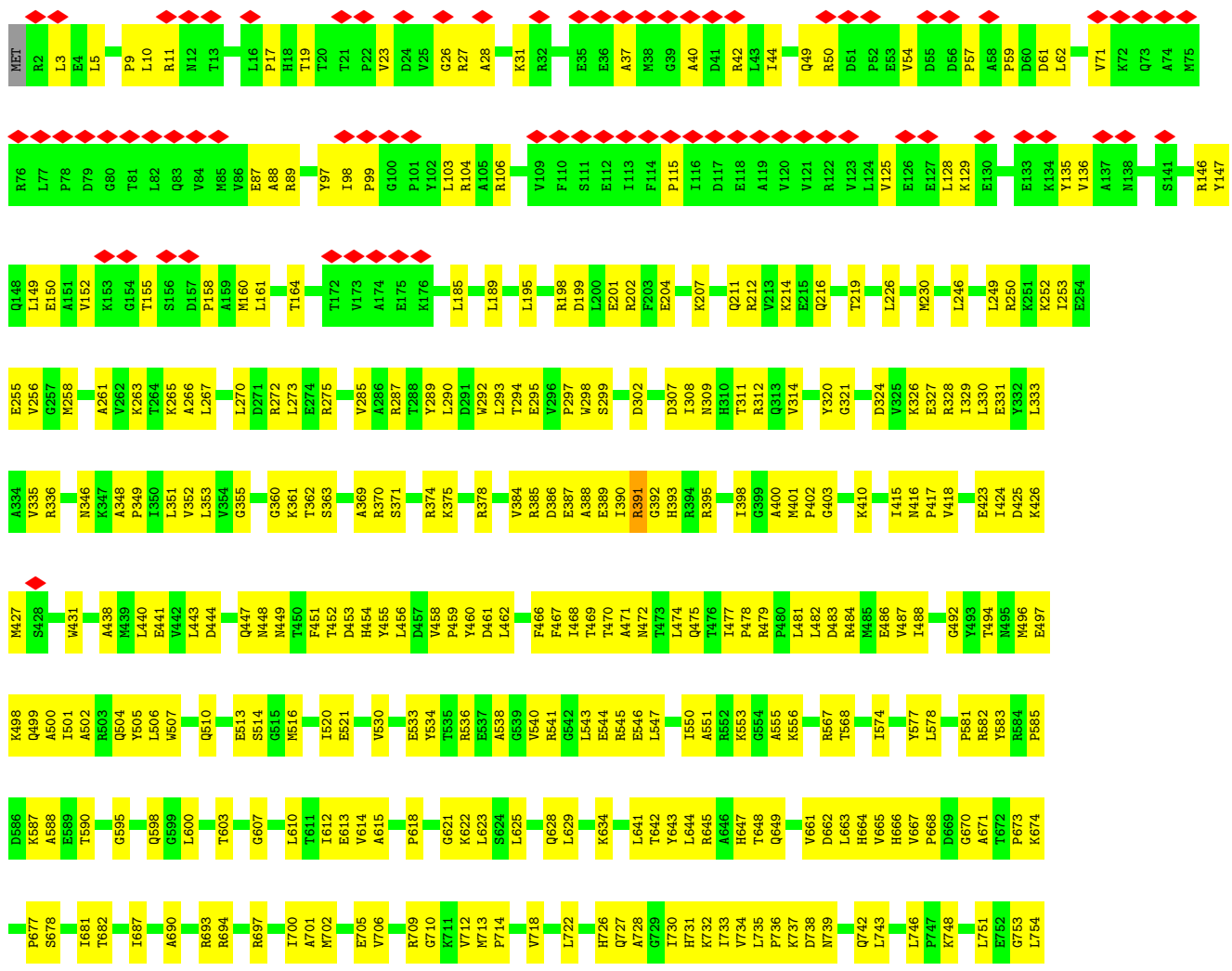


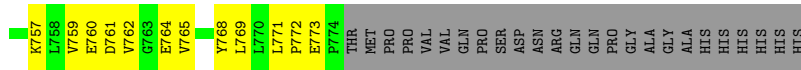
● Molecule 1: Lon protease



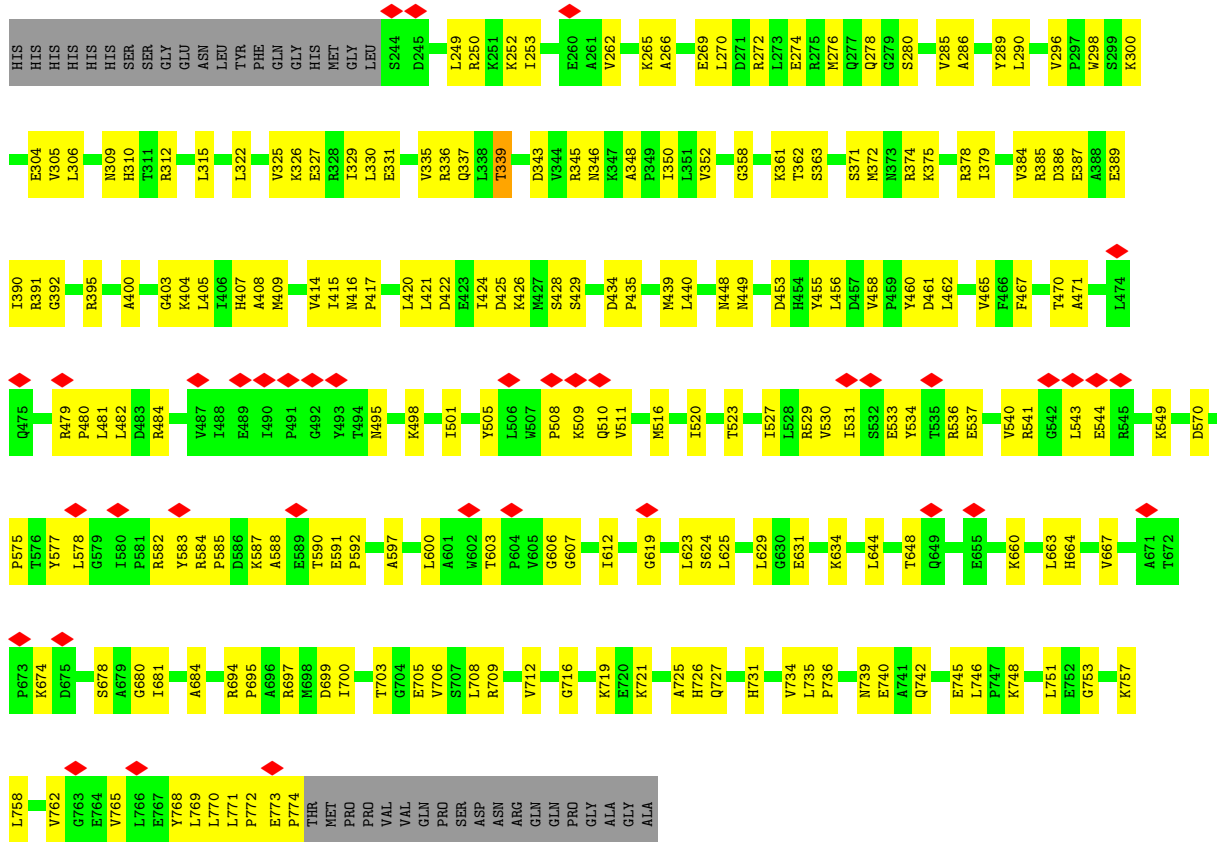


● Molecule 1: Lon protease





• Molecule 2: Lon protease



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	70828	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	52	Depositor
Minimum defocus (nm)	1400	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	81000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.763	Depositor
Minimum map value	-0.186	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.032	Depositor
Recommended contour level	0.1	Depositor
Map size (\AA)	339.52, 339.52, 339.52	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.061, 1.061, 1.061	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: ADP

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	0/6177	0.60	0/8370
1	B	0.34	0/6177	0.62	0/8370
1	C	0.34	0/6177	0.64	0/8370
1	D	0.34	0/6177	0.63	0/8370
1	E	0.35	0/6177	0.63	0/8370
2	F	0.32	0/4213	0.65	0/5709
All	All	0.34	0/35098	0.63	0/47559

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	6069	0	6184	225	0
1	B	6069	0	6184	199	0
1	C	6069	0	6184	208	0
1	D	6069	0	6184	213	0
1	E	6069	0	6184	261	0
2	F	4136	0	4222	152	0
3	B	27	0	12	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	27	0	12	3	0
3	D	27	0	12	3	0
3	E	27	0	12	4	0
All	All	34589	0	35190	1206	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 17.

The worst 5 of 1206 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:E:392:GLY:HA3	1:E:455:TYR:HB2	1.44	0.97
1:A:398:ILE:HG21	1:C:432:ARG:HD3	1.47	0.96
1:D:253:ILE:HG23	1:D:294:THR:HG21	1.47	0.96
1:D:293:LEU:HD13	1:D:458:VAL:HG11	1.55	0.88
2:F:549:LYS:HE2	2:F:578:LEU:HD21	1.52	0.88

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	771/799 (96%)	716 (93%)	55 (7%)	0	100	100
1	B	771/799 (96%)	716 (93%)	55 (7%)	0	100	100
1	C	771/799 (96%)	726 (94%)	45 (6%)	0	100	100
1	D	771/799 (96%)	722 (94%)	49 (6%)	0	100	100
1	E	771/799 (96%)	715 (93%)	56 (7%)	0	100	100
2	F	529/570 (93%)	486 (92%)	42 (8%)	1 (0%)	47	81
All	All	4384/4565 (96%)	4081 (93%)	302 (7%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	F	339	THR

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	649/671 (97%)	648 (100%)	1 (0%)	93	96
1	B	649/671 (97%)	647 (100%)	2 (0%)	92	95
1	C	649/671 (97%)	649 (100%)	0	100	100
1	D	649/671 (97%)	649 (100%)	0	100	100
1	E	649/671 (97%)	647 (100%)	2 (0%)	92	95
2	F	442/474 (93%)	442 (100%)	0	100	100
All	All	3687/3829 (96%)	3682 (100%)	5 (0%)	93	96

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	622	LYS
1	B	512	ARG
1	B	578	LEU
1	E	146	ARG
1	E	391	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 6 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	739	ASN
1	C	742	GLN
1	D	726	HIS
1	C	313	GLN
1	B	598	GLN

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](#)

4 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	ADP	B	801	-	24,29,29	0.98	1 (4%)	29,45,45	1.45	3 (10%)
3	ADP	D	801	-	24,29,29	0.96	1 (4%)	29,45,45	1.33	4 (13%)
3	ADP	C	801	-	24,29,29	0.94	1 (4%)	29,45,45	1.50	5 (17%)
3	ADP	E	801	-	24,29,29	0.97	1 (4%)	29,45,45	1.42	5 (17%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ADP	B	801	-	-	4/12/32/32	0/3/3/3
3	ADP	D	801	-	-	5/12/32/32	0/3/3/3
3	ADP	C	801	-	-	6/12/32/32	0/3/3/3
3	ADP	E	801	-	-	4/12/32/32	0/3/3/3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	801	ADP	C5-C4	2.55	1.47	1.40
3	E	801	ADP	C5-C4	2.51	1.47	1.40
3	B	801	ADP	C5-C4	2.50	1.47	1.40
3	C	801	ADP	C5-C4	2.41	1.47	1.40

The worst 5 of 17 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	801	ADP	PA-O3A-PB	-4.04	118.97	132.83
3	C	801	ADP	PA-O3A-PB	-3.85	119.60	132.83
3	E	801	ADP	PA-O3A-PB	-3.42	121.09	132.83
3	C	801	ADP	N3-C2-N1	-3.20	123.67	128.68
3	D	801	ADP	C3'-C2'-C1'	3.16	105.73	100.98

There are no chirality outliers.

5 of 19 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	801	ADP	C5'-O5'-PA-O1A
3	B	801	ADP	C5'-O5'-PA-O3A
3	C	801	ADP	PA-O3A-PB-O2B
3	D	801	ADP	C5'-O5'-PA-O1A
3	D	801	ADP	C5'-O5'-PA-O2A

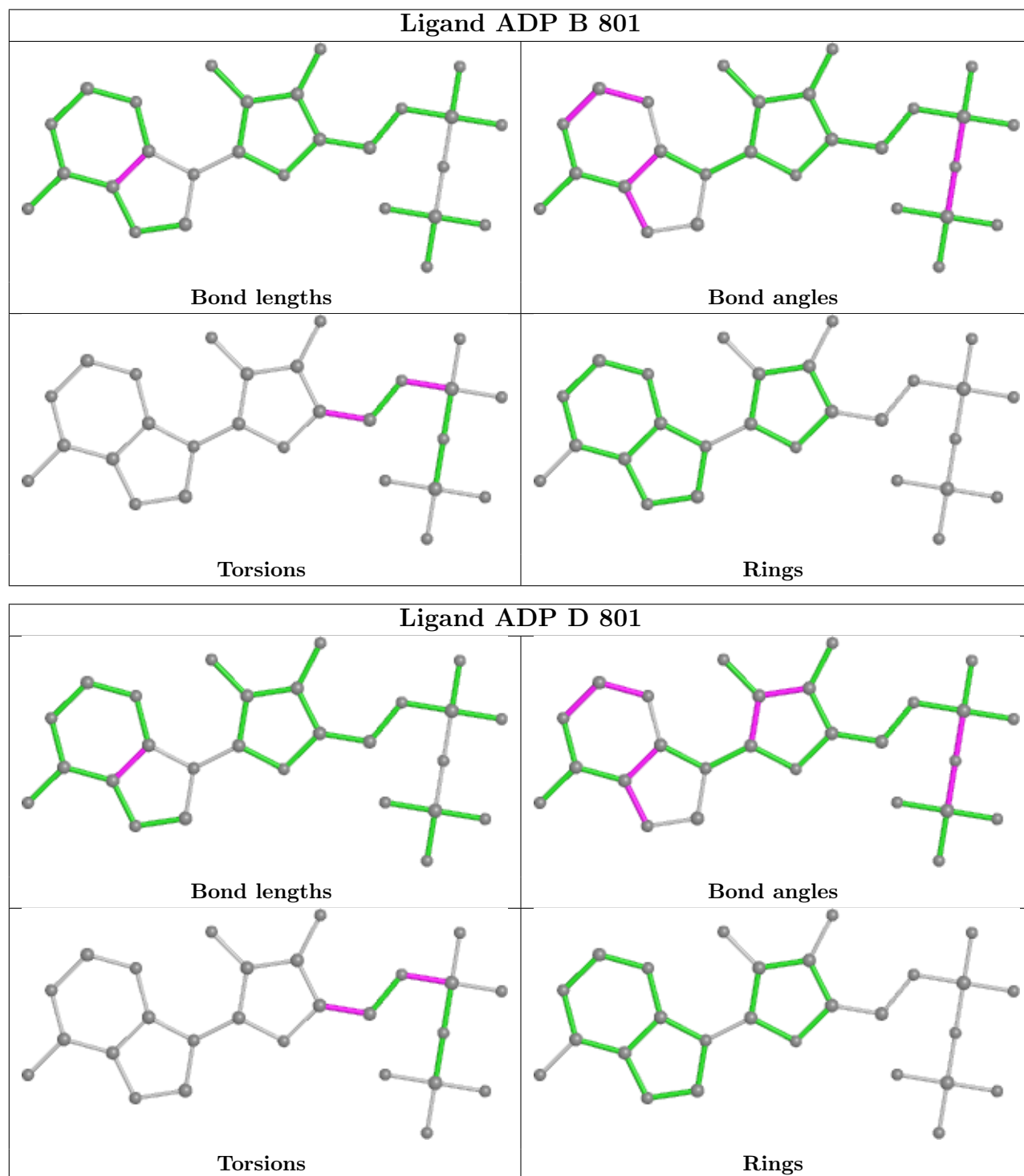
There are no ring outliers.

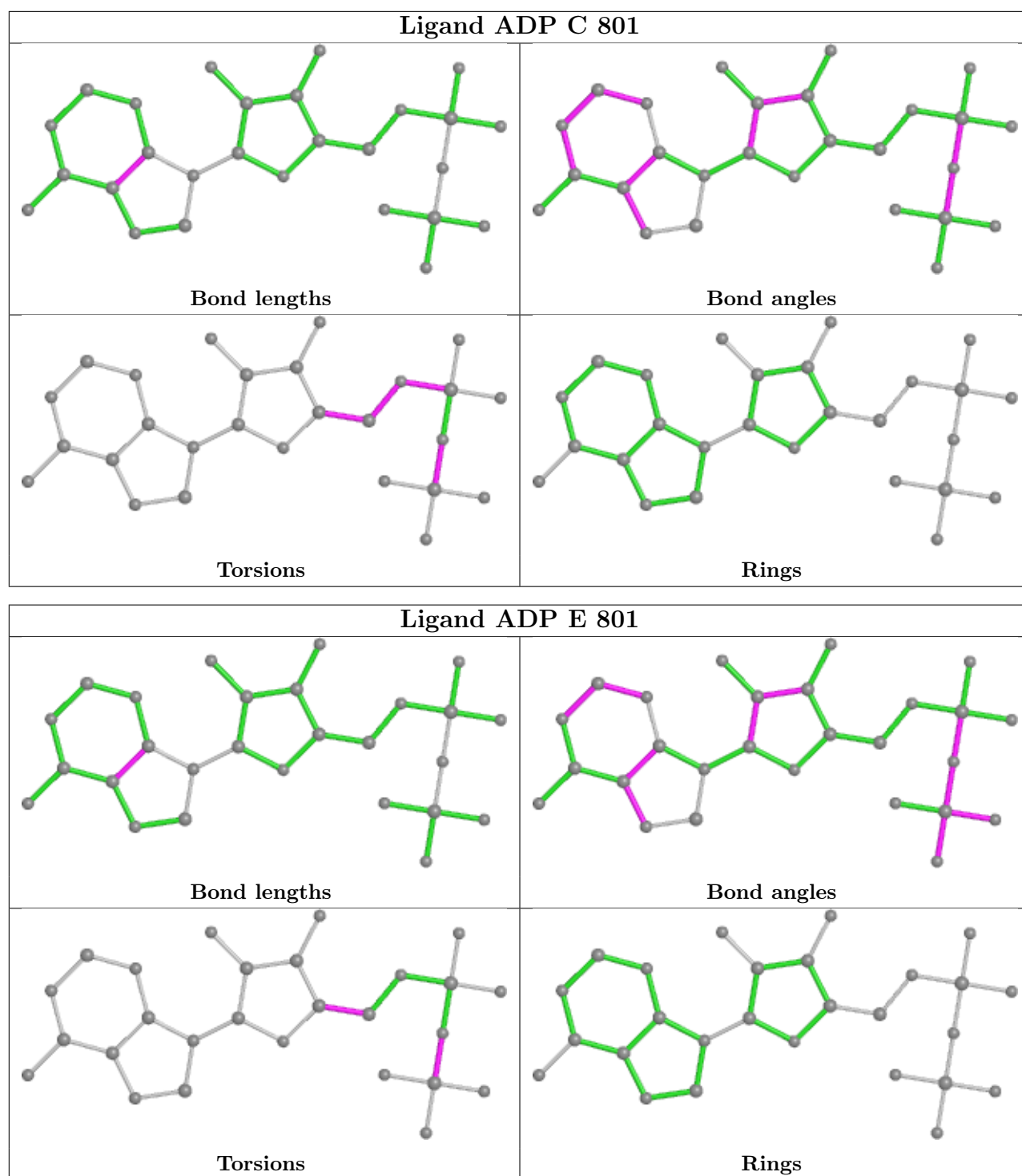
4 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	801	ADP	1	0
3	D	801	ADP	3	0
3	C	801	ADP	3	0
3	E	801	ADP	4	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the

average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

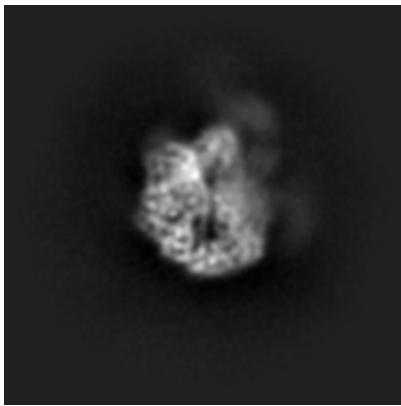
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-36867. These allow visual inspection of the internal detail of the map and identification of artifacts.

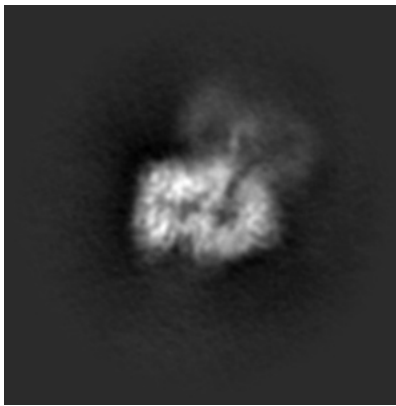
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

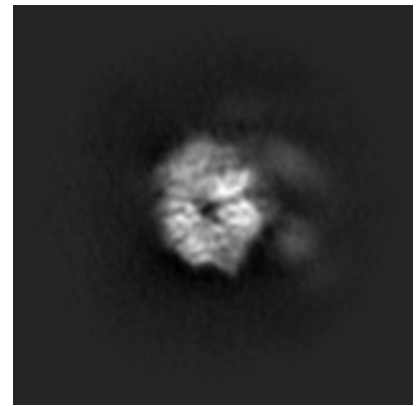
6.1.1 Primary map



X

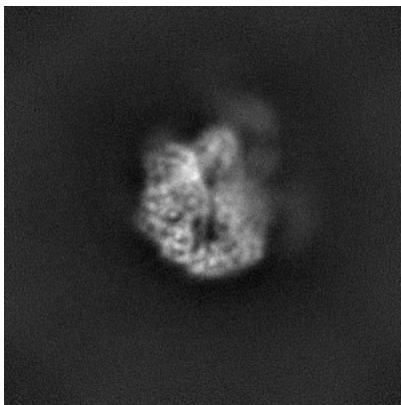


Y

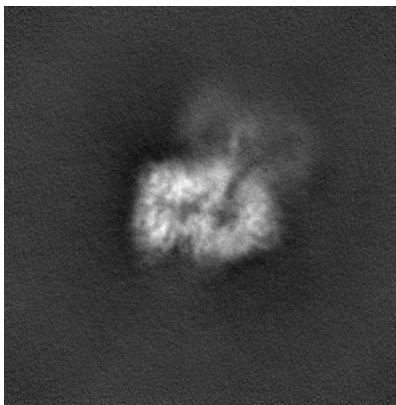


Z

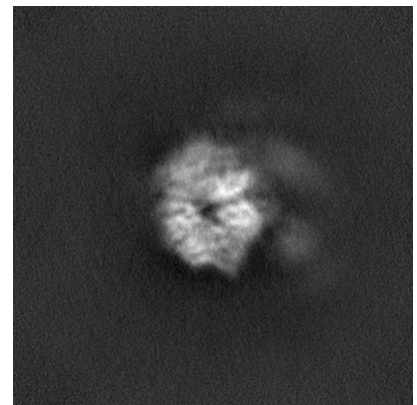
6.1.2 Raw map



X



Y

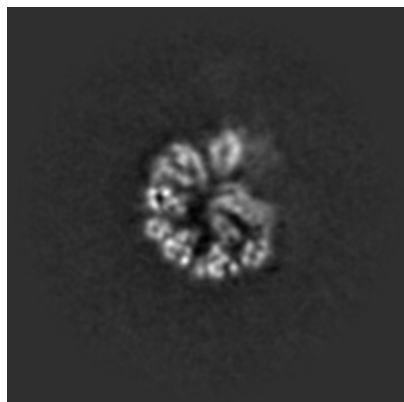


Z

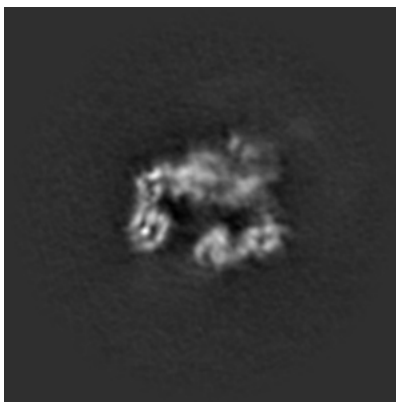
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

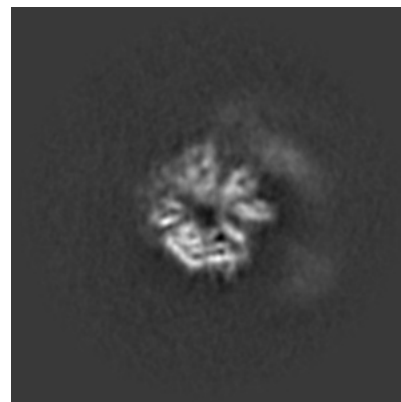
6.2.1 Primary map



X Index: 160

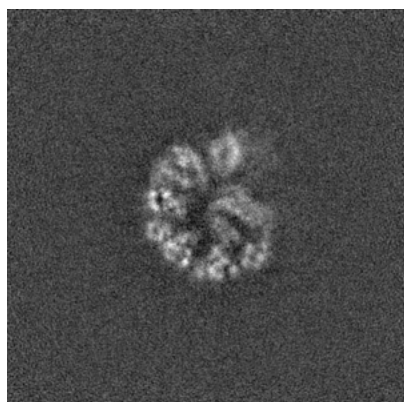


Y Index: 160

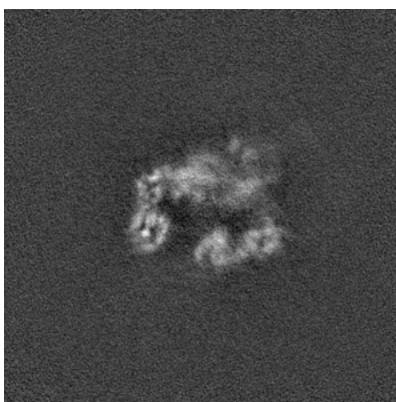


Z Index: 160

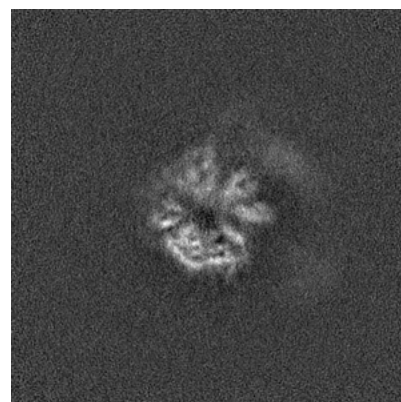
6.2.2 Raw map



X Index: 160



Y Index: 160

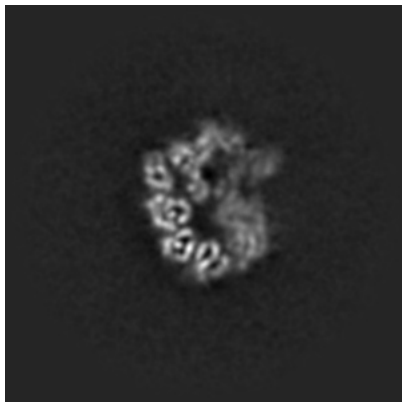


Z Index: 160

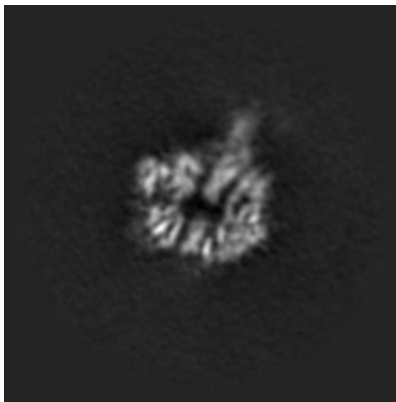
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

6.3.1 Primary map



X Index: 141

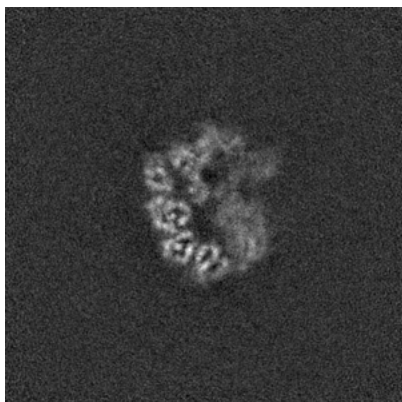


Y Index: 147

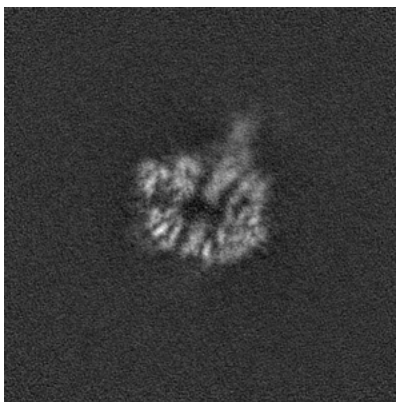


Z Index: 119

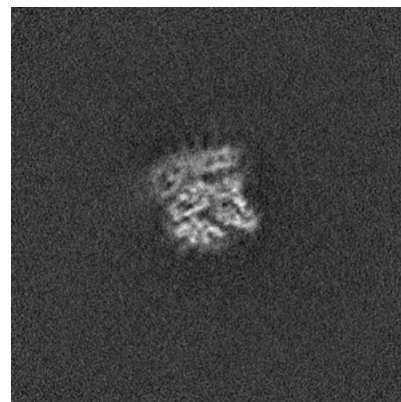
6.3.2 Raw map



X Index: 141



Y Index: 147

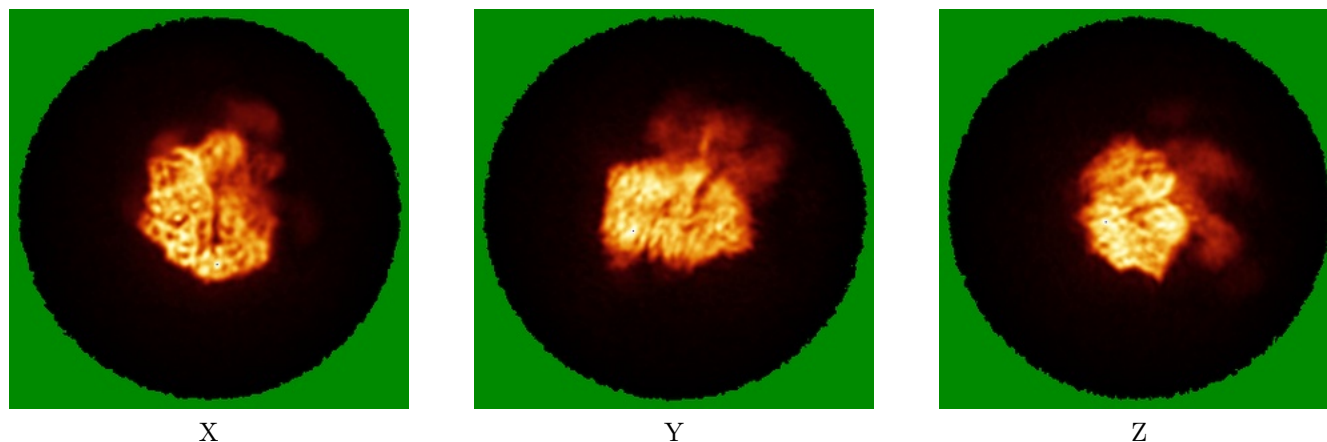


Z Index: 118

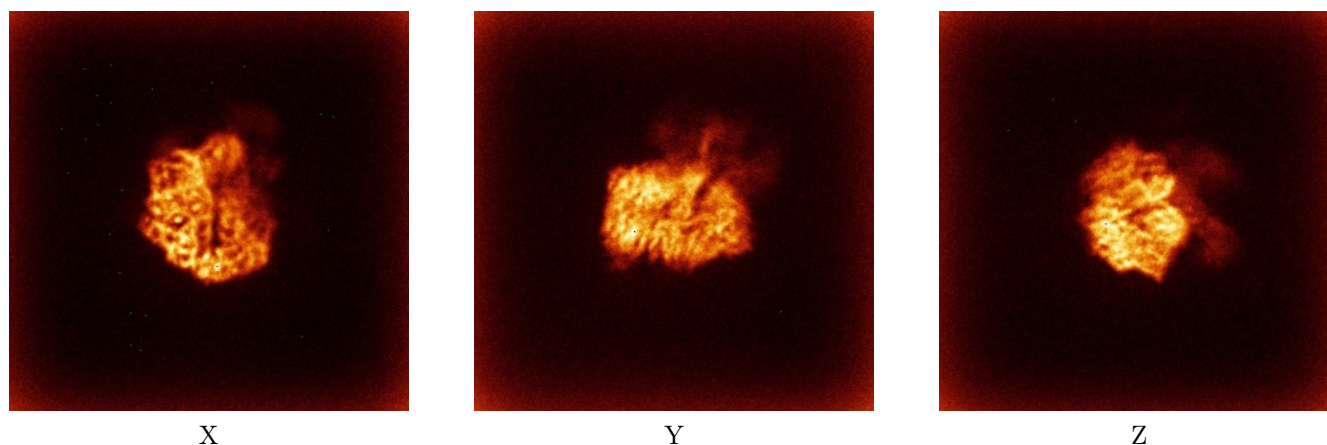
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



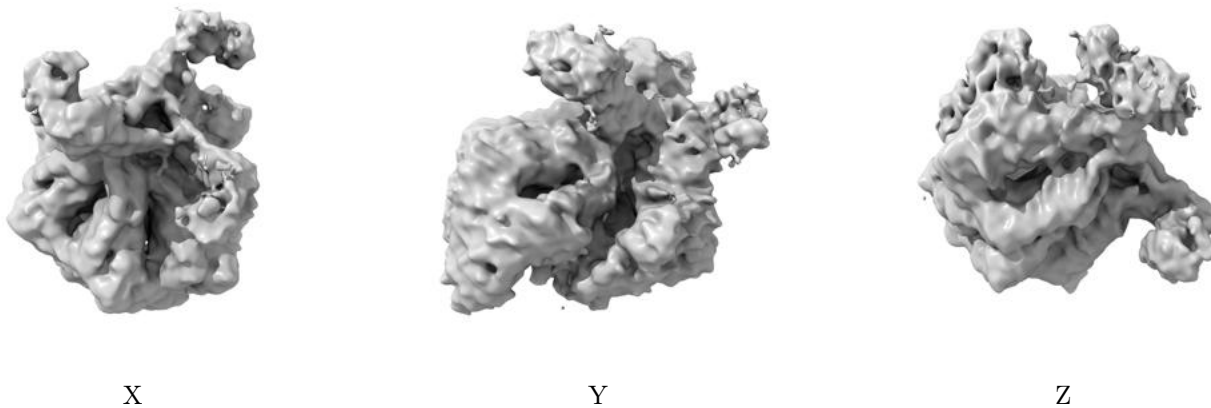
6.4.2 Raw map



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

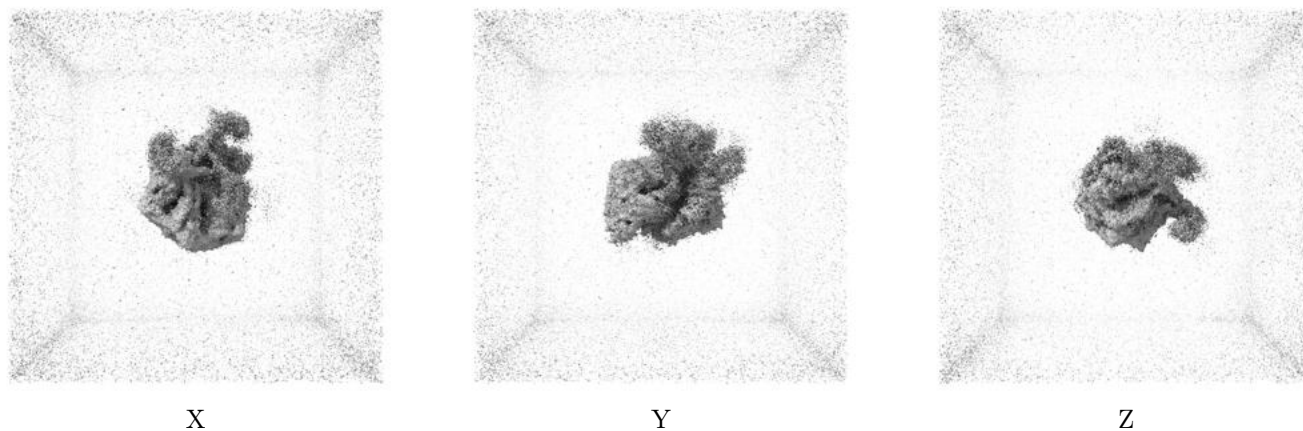
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



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

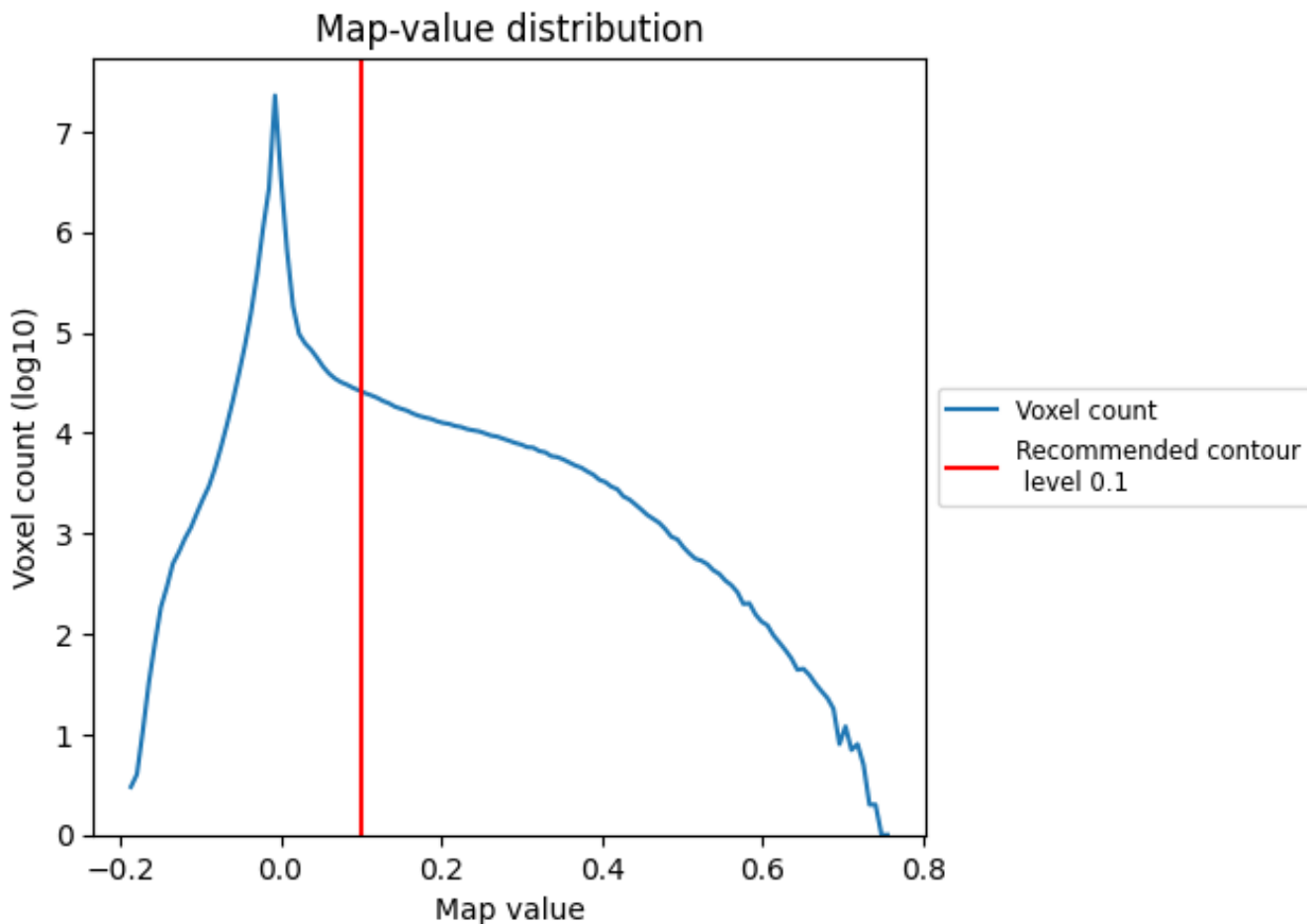
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

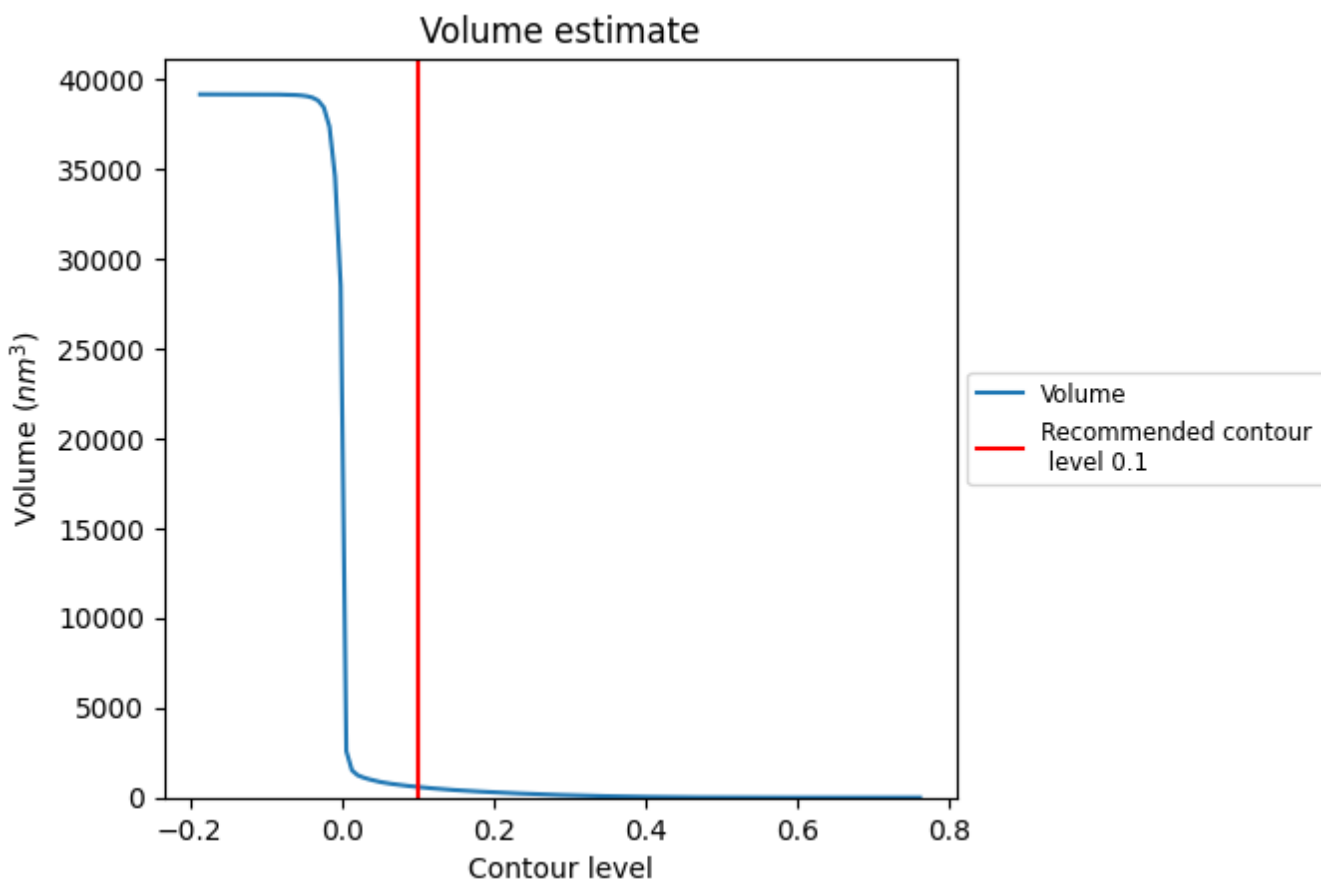
This section contains the results of statistical analysis of the map.

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.

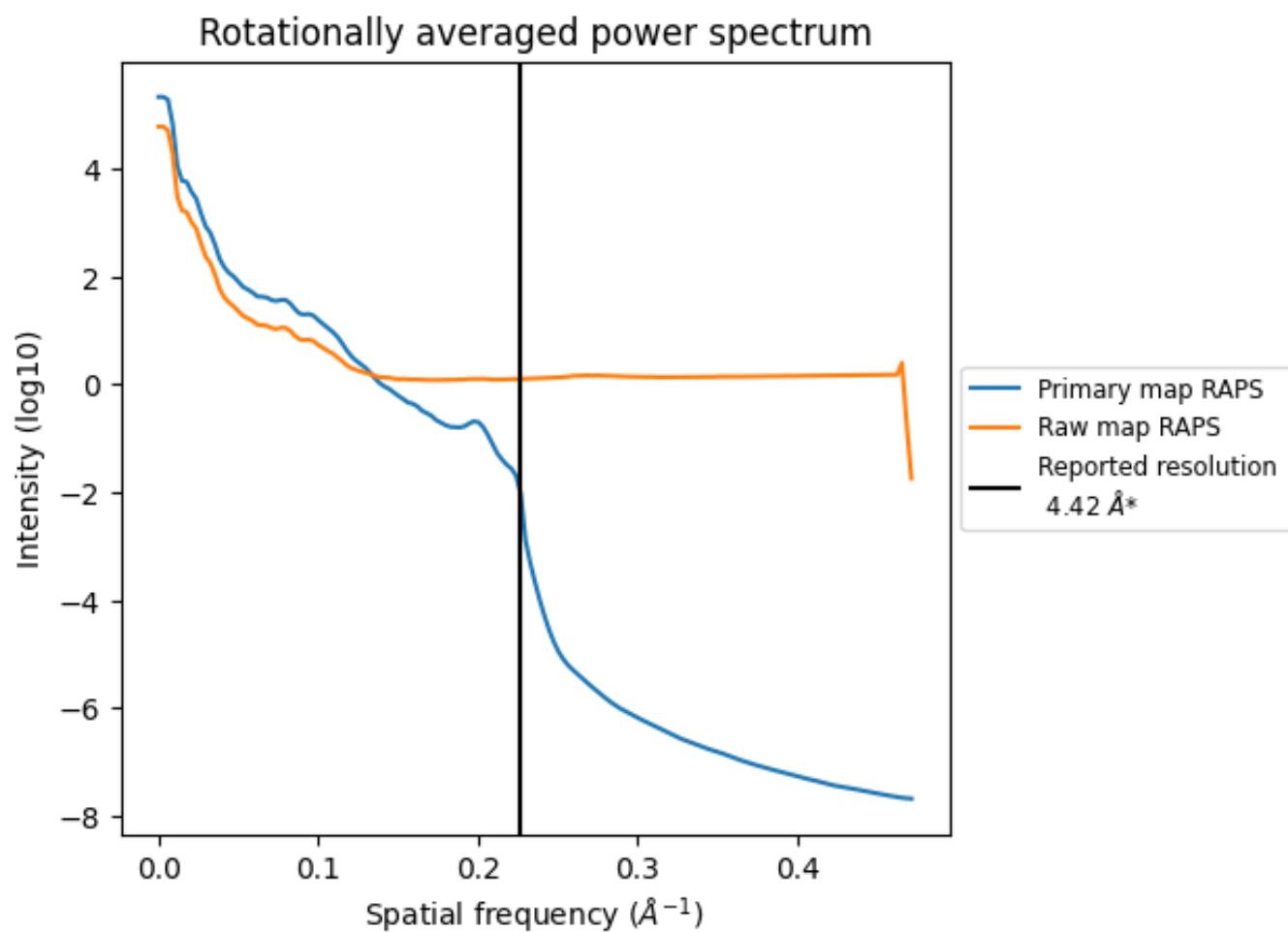
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 593 nm³; this corresponds to an approximate mass of 536 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

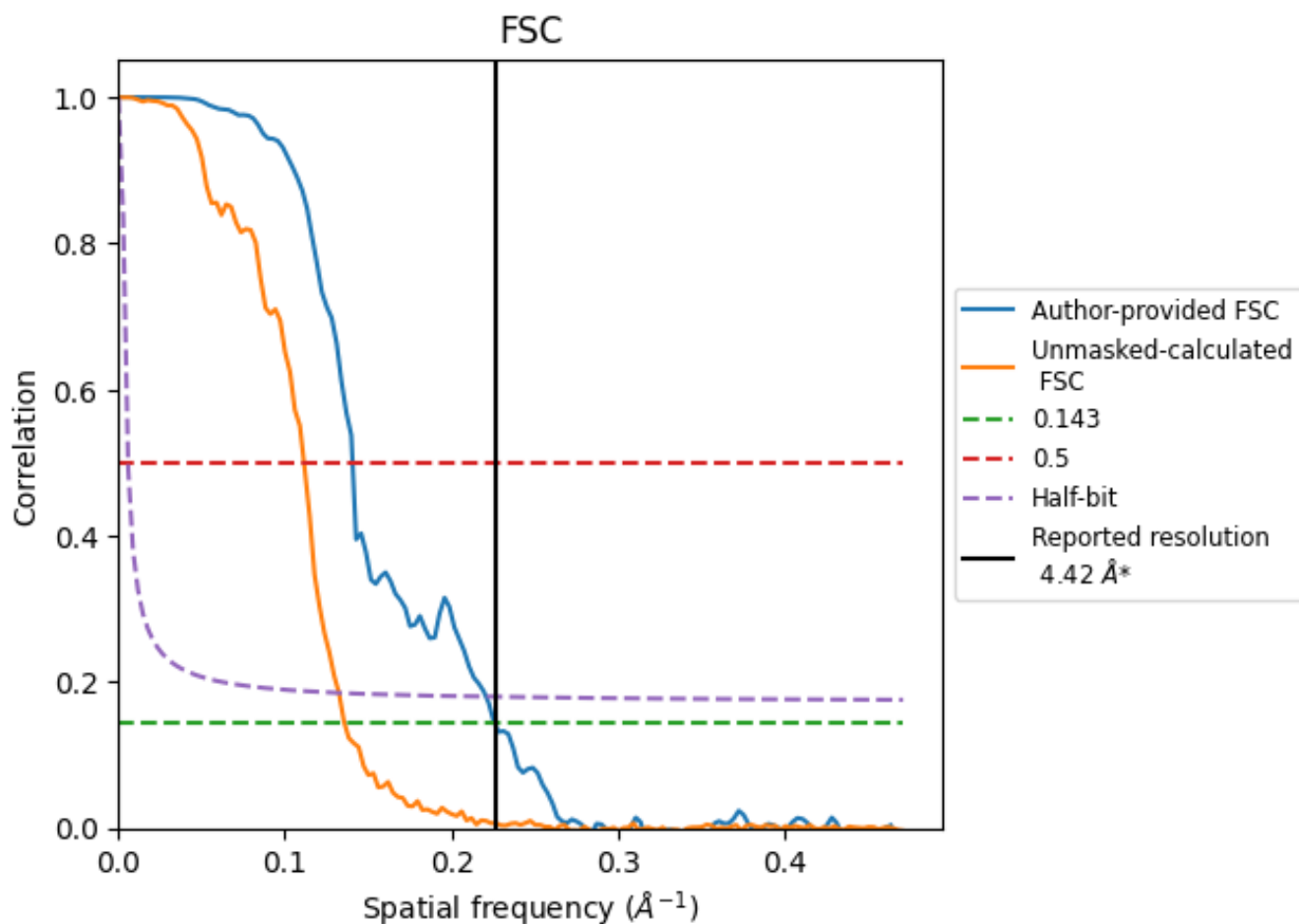


*Reported resolution corresponds to spatial frequency of 0.226 Å⁻¹

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 0.226 Å⁻¹

8.2 Resolution estimates [i](#)

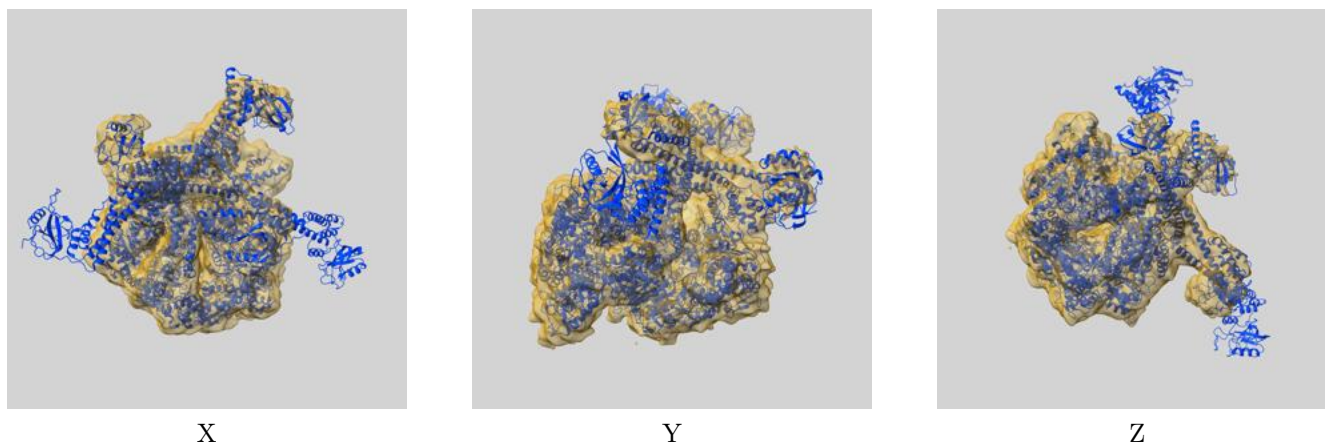
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.42	-	-
Author-provided FSC curve	4.42	7.11	4.53
Unmasked-calculated*	7.36	8.97	7.55

*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 7.36 differs from the reported value 4.42 by more than 10 %

9 Map-model fit [i](#)

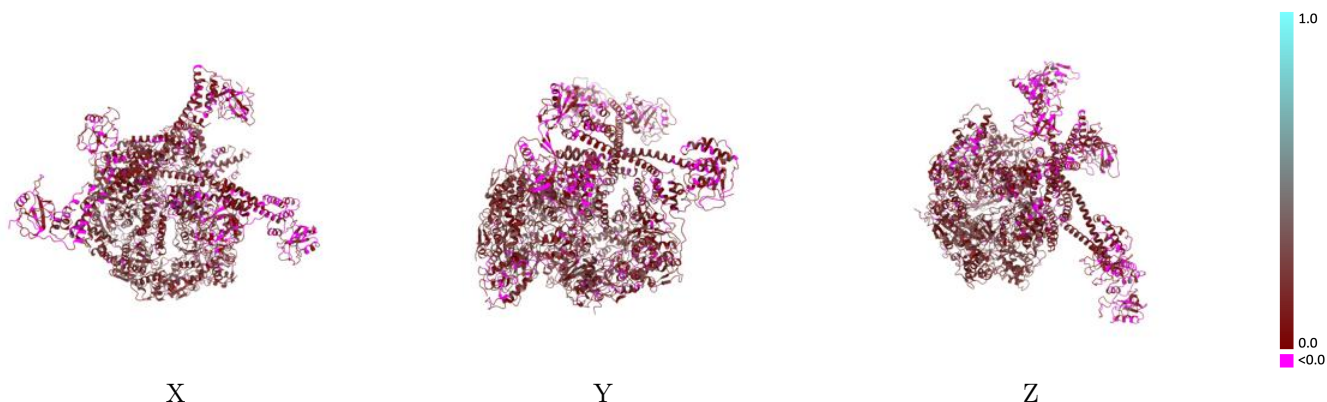
This section contains information regarding the fit between EMDB map EMD-36867 and PDB model 8K3Y. Per-residue inclusion information can be found in section 3 on page 6.

9.1 Map-model overlay [i](#)



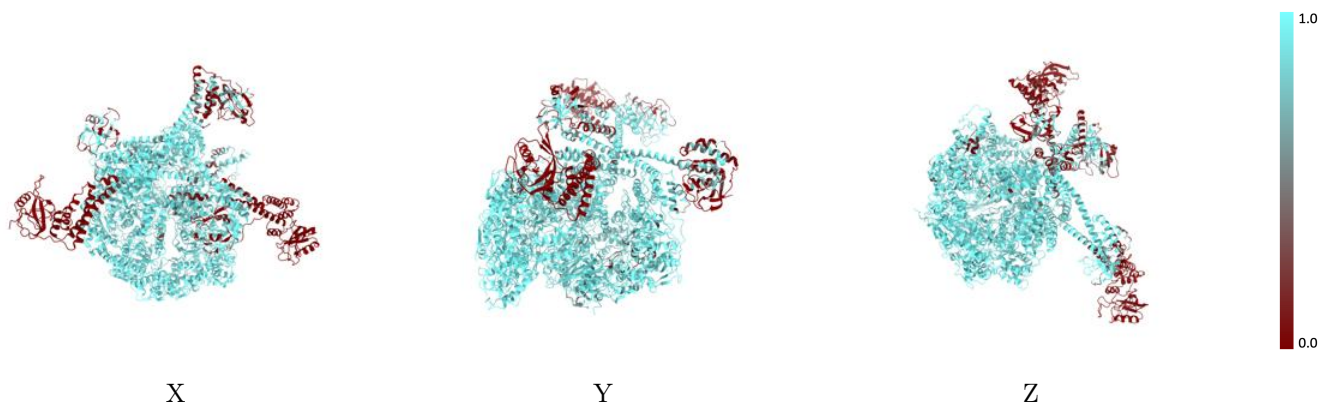
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



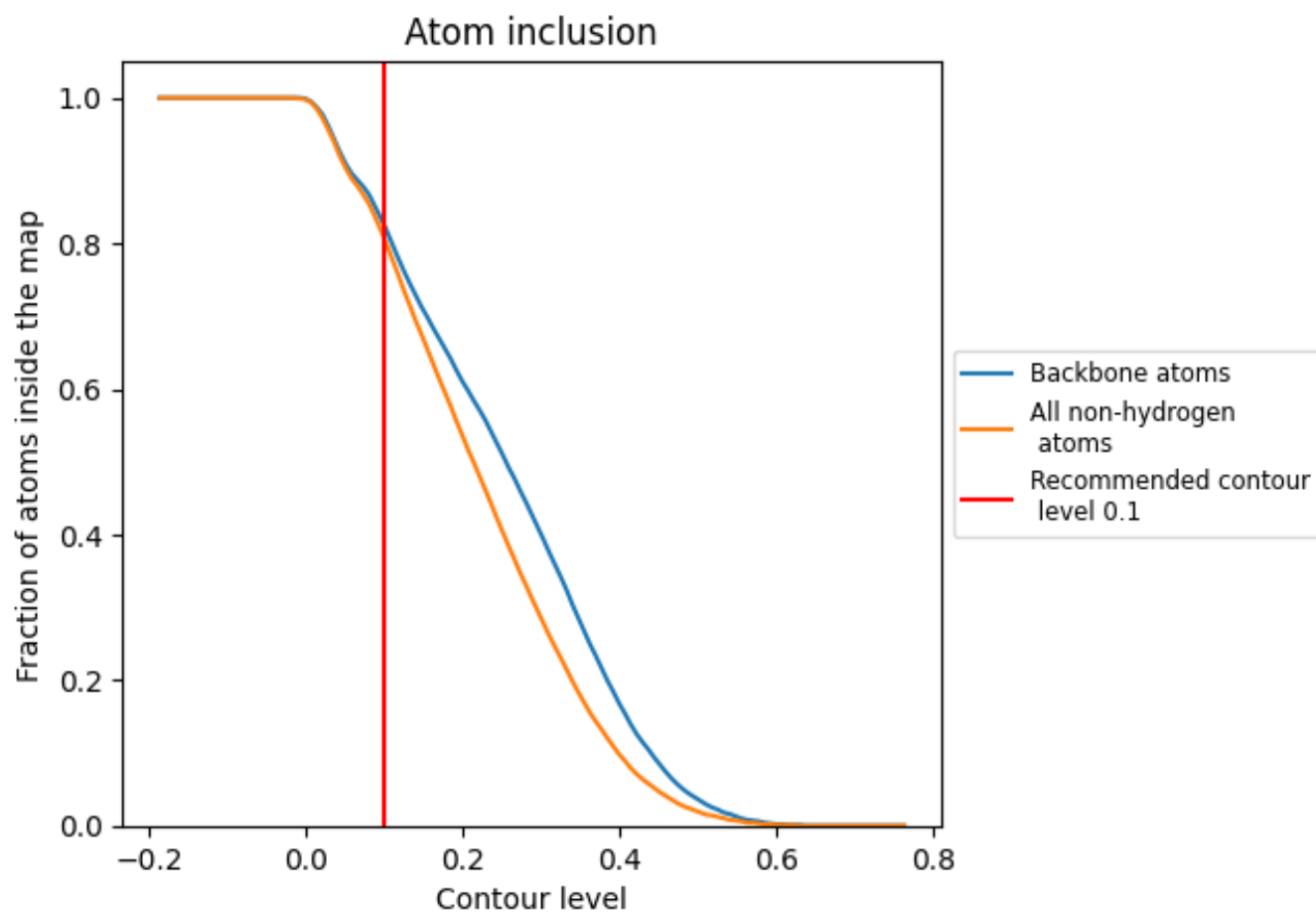
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.1).















9.4 Atom inclusion [i](#)



At the recommended contour level, 82% of all backbone atoms, 81% 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 (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8070	 0.1390
A	 0.8980	 0.1260
B	 0.6940	 0.1390
C	 0.8090	 0.1550
D	 0.7120	 0.1520
E	 0.8750	 0.1390
F	 0.8810	 0.1170

