W O R L D W I D E

wwPDB

P R O T E I N   D A T A   B A N K

wwPDB EM Validation Summary Report (i)

Nov 19, 2022 – 07:40 pm GMT

PDB ID	:	6EJF
EMDB ID	:	EMD-3882
Title	:	Thermus thermophilus PilF ATPase (apoprotein form)
Authors	:	Derrick, J.P.; Collins, R.F.
Deposited on	:	2017-09-21
Resolution	:	8.00 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 (i) 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 (i)) were used in the production of this report:

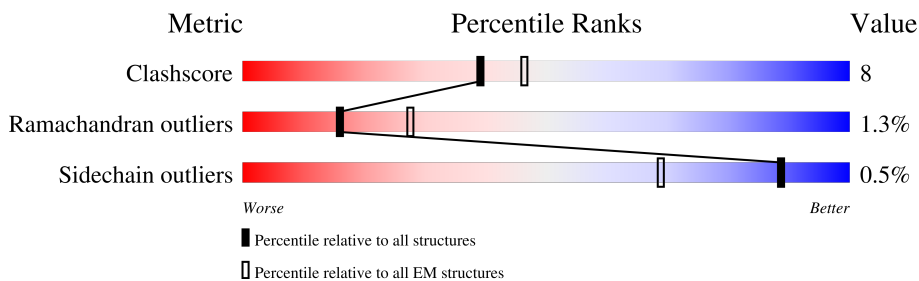|		
EMDB validation analysis	:	0.0.1.dev43
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.2

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 8.00 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	Percentile Ranks	Value
Clashscore		8
Ramachandran outliers		1.3%
Sidechain outliers		0.5%

Worse   *Better*

■ Percentile relative to all structures

▯ Percentile relative to all EM structures

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 <=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	G	146	50% / 88% 12%
1	H	146	34% / 79% 18% •
1	I	146	35% / 84% 16% •
1	M	146	49% / 85% 12% • •
1	Q	146	36% / 81% 14% • •
1	R	146	37% / 84% 12% •
2	J	137	53% / 80% 16% •
2	K	137	58% / 76% 18% 7%

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Mol	Chain	Length	Quality of chain
2	L	137	48% / 80% 18%
2	N	137	54% / 90% 7%
2	O	137	60% / 80% 16%
2	P	137	47% / 80% 15%
3	A	409	42% / 75% 13% 6% 6%
3	B	409	42% / 78% 12% 6%
3	C	409	39% / 69% 19% 6% 6%
3	D	409	38% / 71% 18% 5% 6%
3	E	409	37% / 78% 15% 6%
3	F	409	39% / 72% 19% 6%

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 31260 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 Type IV pilus assembly protein PilF.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	G	146	Total	C	N	O	S	0	0
			1144	726	205	211	2		
1	H	146	Total	C	N	O	S	0	0
			1144	726	205	211	2		
1	I	146	Total	C	N	O	S	0	0
			1144	726	205	211	2		
1	M	146	Total	C	N	O	S	0	0
			1144	726	205	211	2		
1	Q	146	Total	C	N	O	S	0	0
			1144	726	205	211	2		
1	R	146	Total	C	N	O	S	0	0
			1144	726	205	211	2		

- Molecule 2 is a protein called Type IV pilus assembly protein PilF.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	J	137	Total	C	N	O	0	0
			1091	699	190	202		
2	K	137	Total	C	N	O	0	0
			1091	699	190	202		
2	L	137	Total	C	N	O	0	0
			1091	699	190	202		
2	N	137	Total	C	N	O	0	0
			1091	699	190	202		
2	O	137	Total	C	N	O	0	0
			1091	699	190	202		
2	P	137	Total	C	N	O	0	0
			1091	699	190	202		

- Molecule 3 is a protein called Type IV pilus assembly protein PilF.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	A	384	Total	C	N	O	S	0	0
			2975	1874	535	556	10		

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wwPDB
PROTEIN DATA BANK

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Mol	Chain	Residues	Atoms					AltConf	Trace
3	B	383	Total	C	N	O	S	0	0
			2966	1868	534	554	10		
3	C	384	Total	C	N	O	S	0	0
			2975	1874	535	556	10		
3	D	384	Total	C	N	O	S	0	0
			2975	1874	535	556	10		
3	E	384	Total	C	N	O	S	0	0
			2975	1874	535	556	10		
3	F	385	Total	C	N	O	S	0	0
			2984	1879	536	559	10		

There are 144 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	890	ALA	-	expression tag	UNP Q5SLC9
A	891	ALA	-	expression tag	UNP Q5SLC9
A	892	ALA	-	expression tag	UNP Q5SLC9
A	893	GLU	-	expression tag	UNP Q5SLC9
A	894	LEU	-	expression tag	UNP Q5SLC9
A	895	ALA	-	expression tag	UNP Q5SLC9
A	896	LEU	-	expression tag	UNP Q5SLC9
A	897	VAL	-	expression tag	UNP Q5SLC9
A	898	PRO	-	expression tag	UNP Q5SLC9
A	899	ARG	-	expression tag	UNP Q5SLC9
A	900	GLY	-	expression tag	UNP Q5SLC9
A	901	SER	-	expression tag	UNP Q5SLC9
A	902	SER	-	expression tag	UNP Q5SLC9
A	903	ALA	-	expression tag	UNP Q5SLC9
A	904	HIS	-	expression tag	UNP Q5SLC9
A	905	HIS	-	expression tag	UNP Q5SLC9
A	906	HIS	-	expression tag	UNP Q5SLC9
A	907	HIS	-	expression tag	UNP Q5SLC9
A	908	HIS	-	expression tag	UNP Q5SLC9
A	909	HIS	-	expression tag	UNP Q5SLC9
A	910	HIS	-	expression tag	UNP Q5SLC9
A	911	HIS	-	expression tag	UNP Q5SLC9
A	912	HIS	-	expression tag	UNP Q5SLC9
A	913	HIS	-	expression tag	UNP Q5SLC9
B	890	ALA	-	expression tag	UNP Q5SLC9
B	891	ALA	-	expression tag	UNP Q5SLC9
B	892	ALA	-	expression tag	UNP Q5SLC9
B	893	GLU	-	expression tag	UNP Q5SLC9
B	894	LEU	-	expression tag	UNP Q5SLC9

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Chain	Residue	Modelled	Actual	Comment	Reference
B	895	ALA	-	expression tag	UNP Q5SLC9
B	896	LEU	-	expression tag	UNP Q5SLC9
B	897	VAL	-	expression tag	UNP Q5SLC9
B	898	PRO	-	expression tag	UNP Q5SLC9
B	899	ARG	-	expression tag	UNP Q5SLC9
B	900	GLY	-	expression tag	UNP Q5SLC9
B	901	SER	-	expression tag	UNP Q5SLC9
B	902	SER	-	expression tag	UNP Q5SLC9
B	903	ALA	-	expression tag	UNP Q5SLC9
B	904	HIS	-	expression tag	UNP Q5SLC9
B	905	HIS	-	expression tag	UNP Q5SLC9
B	906	HIS	-	expression tag	UNP Q5SLC9
B	907	HIS	-	expression tag	UNP Q5SLC9
B	908	HIS	-	expression tag	UNP Q5SLC9
B	909	HIS	-	expression tag	UNP Q5SLC9
B	910	HIS	-	expression tag	UNP Q5SLC9
B	911	HIS	-	expression tag	UNP Q5SLC9
B	912	HIS	-	expression tag	UNP Q5SLC9
B	913	HIS	-	expression tag	UNP Q5SLC9
C	890	ALA	-	expression tag	UNP Q5SLC9
C	891	ALA	-	expression tag	UNP Q5SLC9
C	892	ALA	-	expression tag	UNP Q5SLC9
C	893	GLU	-	expression tag	UNP Q5SLC9
C	894	LEU	-	expression tag	UNP Q5SLC9
C	895	ALA	-	expression tag	UNP Q5SLC9
C	896	LEU	-	expression tag	UNP Q5SLC9
C	897	VAL	-	expression tag	UNP Q5SLC9
C	898	PRO	-	expression tag	UNP Q5SLC9
C	899	ARG	-	expression tag	UNP Q5SLC9
C	900	GLY	-	expression tag	UNP Q5SLC9
C	901	SER	-	expression tag	UNP Q5SLC9
C	902	SER	-	expression tag	UNP Q5SLC9
C	903	ALA	-	expression tag	UNP Q5SLC9
C	904	HIS	-	expression tag	UNP Q5SLC9
C	905	HIS	-	expression tag	UNP Q5SLC9
C	906	HIS	-	expression tag	UNP Q5SLC9
C	907	HIS	-	expression tag	UNP Q5SLC9
C	908	HIS	-	expression tag	UNP Q5SLC9
C	909	HIS	-	expression tag	UNP Q5SLC9
C	910	HIS	-	expression tag	UNP Q5SLC9
C	911	HIS	-	expression tag	UNP Q5SLC9
C	912	HIS	-	expression tag	UNP Q5SLC9

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Chain	Residue	Modelled	Actual	Comment	Reference
C	913	HIS	-	expression tag	UNP Q5SLC9
D	890	ALA	-	expression tag	UNP Q5SLC9
D	891	ALA	-	expression tag	UNP Q5SLC9
D	892	ALA	-	expression tag	UNP Q5SLC9
D	893	GLU	-	expression tag	UNP Q5SLC9
D	894	LEU	-	expression tag	UNP Q5SLC9
D	895	ALA	-	expression tag	UNP Q5SLC9
D	896	LEU	-	expression tag	UNP Q5SLC9
D	897	VAL	-	expression tag	UNP Q5SLC9
D	898	PRO	-	expression tag	UNP Q5SLC9
D	899	ARG	-	expression tag	UNP Q5SLC9
D	900	GLY	-	expression tag	UNP Q5SLC9
D	901	SER	-	expression tag	UNP Q5SLC9
D	902	SER	-	expression tag	UNP Q5SLC9
D	903	ALA	-	expression tag	UNP Q5SLC9
D	904	HIS	-	expression tag	UNP Q5SLC9
D	905	HIS	-	expression tag	UNP Q5SLC9
D	906	HIS	-	expression tag	UNP Q5SLC9
D	907	HIS	-	expression tag	UNP Q5SLC9
D	908	HIS	-	expression tag	UNP Q5SLC9
D	909	HIS	-	expression tag	UNP Q5SLC9
D	910	HIS	-	expression tag	UNP Q5SLC9
D	911	HIS	-	expression tag	UNP Q5SLC9
D	912	HIS	-	expression tag	UNP Q5SLC9
D	913	HIS	-	expression tag	UNP Q5SLC9
E	890	ALA	-	expression tag	UNP Q5SLC9
E	891	ALA	-	expression tag	UNP Q5SLC9
E	892	ALA	-	expression tag	UNP Q5SLC9
E	893	GLU	-	expression tag	UNP Q5SLC9
E	894	LEU	-	expression tag	UNP Q5SLC9
E	895	ALA	-	expression tag	UNP Q5SLC9
E	896	LEU	-	expression tag	UNP Q5SLC9
E	897	VAL	-	expression tag	UNP Q5SLC9
E	898	PRO	-	expression tag	UNP Q5SLC9
E	899	ARG	-	expression tag	UNP Q5SLC9
E	900	GLY	-	expression tag	UNP Q5SLC9
E	901	SER	-	expression tag	UNP Q5SLC9
E	902	SER	-	expression tag	UNP Q5SLC9
E	903	ALA	-	expression tag	UNP Q5SLC9
E	904	HIS	-	expression tag	UNP Q5SLC9
E	905	HIS	-	expression tag	UNP Q5SLC9
E	906	HIS	-	expression tag	UNP Q5SLC9

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Chain	Residue	Modelled	Actual	Comment	Reference
E	907	HIS	-	expression tag	UNP Q5SLC9
E	908	HIS	-	expression tag	UNP Q5SLC9
E	909	HIS	-	expression tag	UNP Q5SLC9
E	910	HIS	-	expression tag	UNP Q5SLC9
E	911	HIS	-	expression tag	UNP Q5SLC9
E	912	HIS	-	expression tag	UNP Q5SLC9
E	913	HIS	-	expression tag	UNP Q5SLC9
F	890	ALA	-	expression tag	UNP Q5SLC9
F	891	ALA	-	expression tag	UNP Q5SLC9
F	892	ALA	-	expression tag	UNP Q5SLC9
F	893	GLU	-	expression tag	UNP Q5SLC9
F	894	LEU	-	expression tag	UNP Q5SLC9
F	895	ALA	-	expression tag	UNP Q5SLC9
F	896	LEU	-	expression tag	UNP Q5SLC9
F	897	VAL	-	expression tag	UNP Q5SLC9
F	898	PRO	-	expression tag	UNP Q5SLC9
F	899	ARG	-	expression tag	UNP Q5SLC9
F	900	GLY	-	expression tag	UNP Q5SLC9
F	901	SER	-	expression tag	UNP Q5SLC9
F	902	SER	-	expression tag	UNP Q5SLC9
F	903	ALA	-	expression tag	UNP Q5SLC9
F	904	HIS	-	expression tag	UNP Q5SLC9
F	905	HIS	-	expression tag	UNP Q5SLC9
F	906	HIS	-	expression tag	UNP Q5SLC9
F	907	HIS	-	expression tag	UNP Q5SLC9
F	908	HIS	-	expression tag	UNP Q5SLC9
F	909	HIS	-	expression tag	UNP Q5SLC9
F	910	HIS	-	expression tag	UNP Q5SLC9
F	911	HIS	-	expression tag	UNP Q5SLC9
F	912	HIS	-	expression tag	UNP Q5SLC9
F	913	HIS	-	expression tag	UNP Q5SLC9

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: Type IV pilus assembly protein PilF

Chain G:

• Molecule 1: Type IV pilus assembly protein PilF

Chain H:

• Molecule 1: Type IV pilus assembly protein PilF

Chain I:

• Molecule 1: Type IV pilus assembly protein PilF

Chain M:
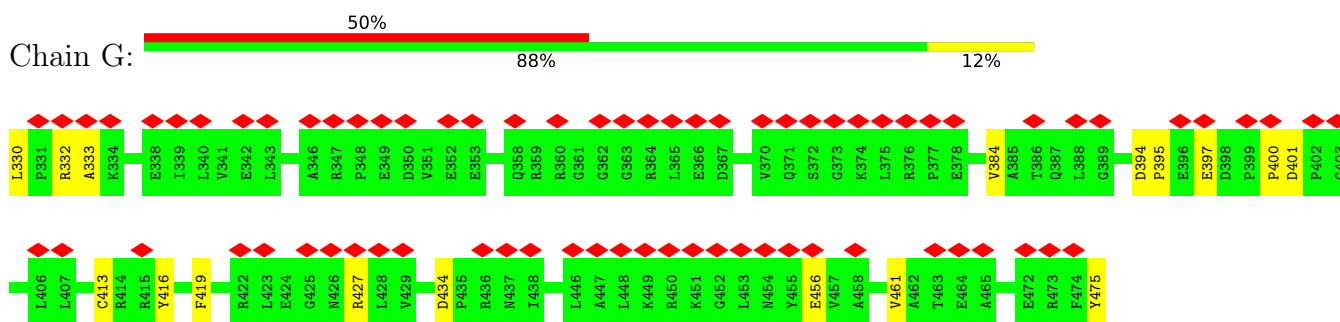
• Molecule 1: Type IV pilus assembly protein PilF

• Molecule 1: Type IV pilus assembly protein PilF

• Molecule 2: Type IV pilus assembly protein PilF
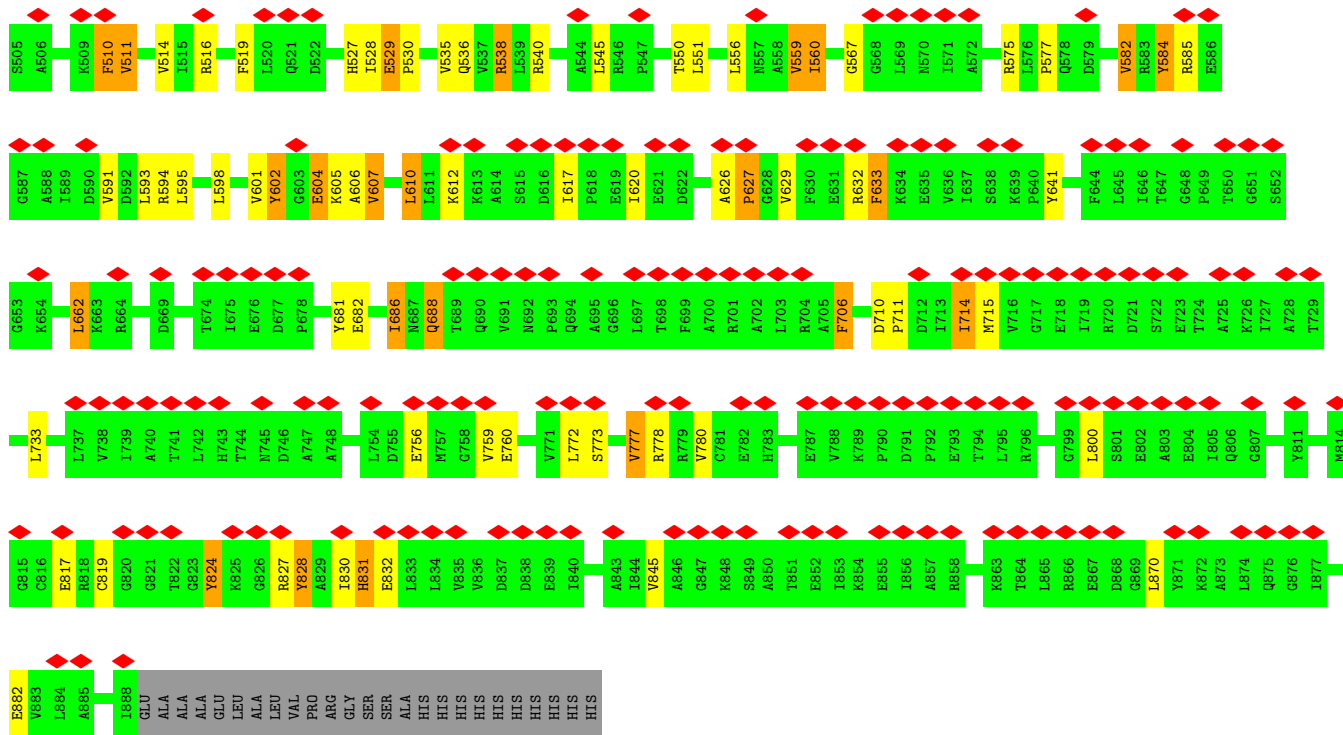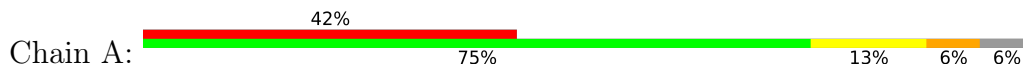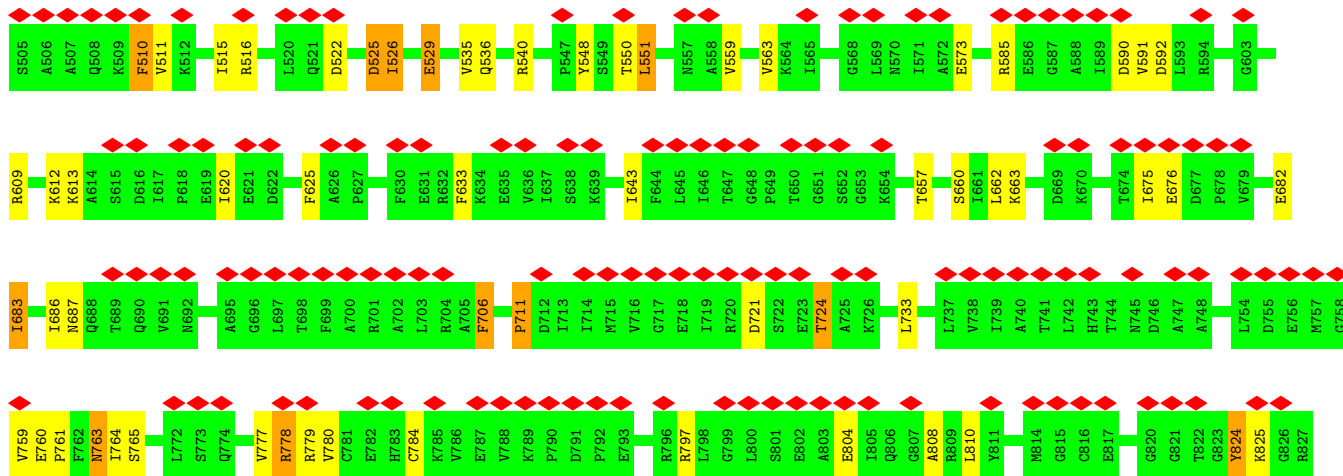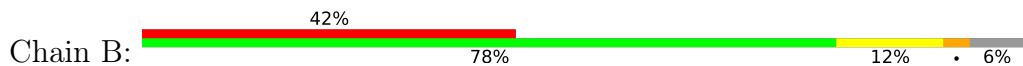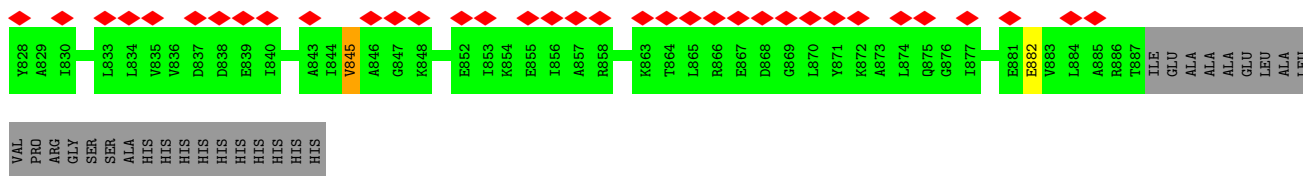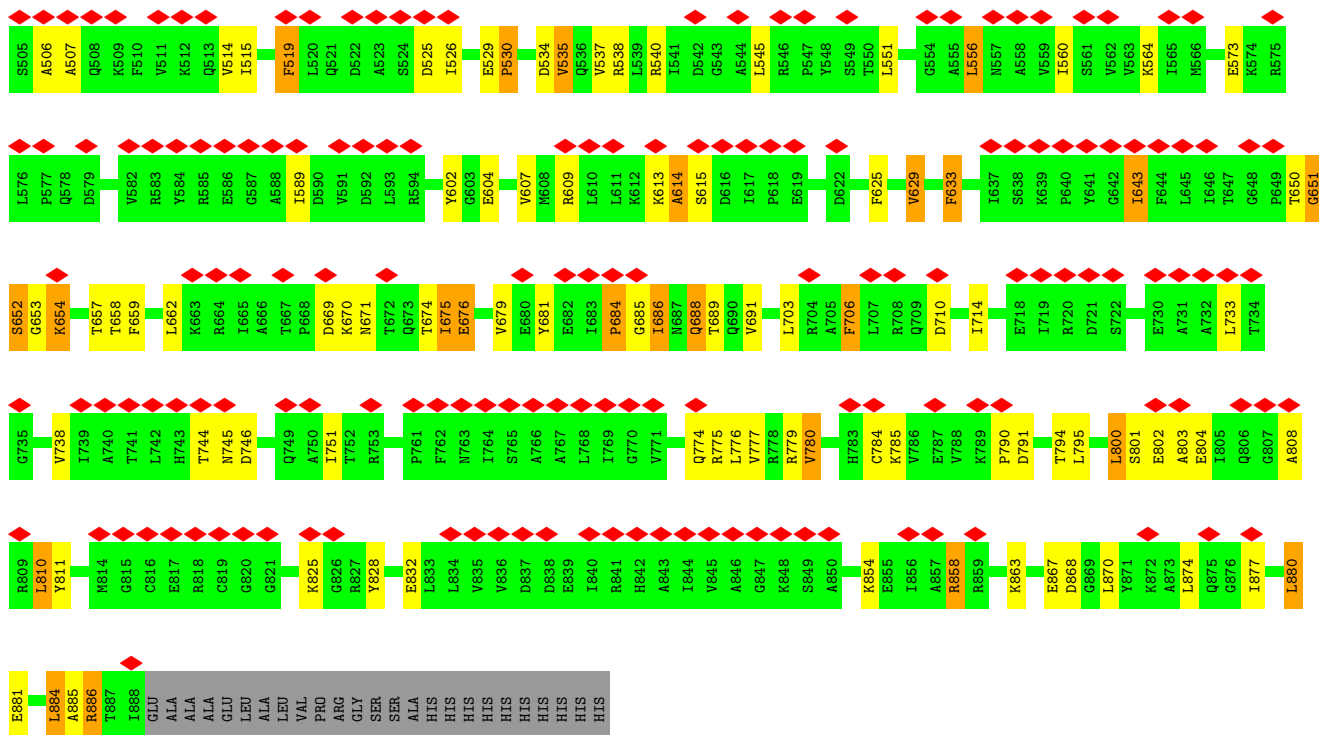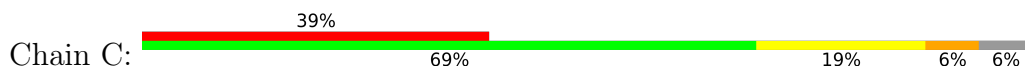

• Molecule 2: Type IV pilus assembly protein PilF

D233 P234 S235 A236 A237 L238 L239 L240 L241 R242 S243 D244 A245 L246 R247 V251 P252 I253 G254 F255 Q256 N257 E258 E259 V260 E261 L264 S265 D266 P267 R268 H269 K270 E271 A272 V273 A274 Q275 L276 L277 N278 R279 P280 A281 R282 F283 Y284 L285 A286 L287 P288 Q289 A290 W291 E292 E293 L294 F295
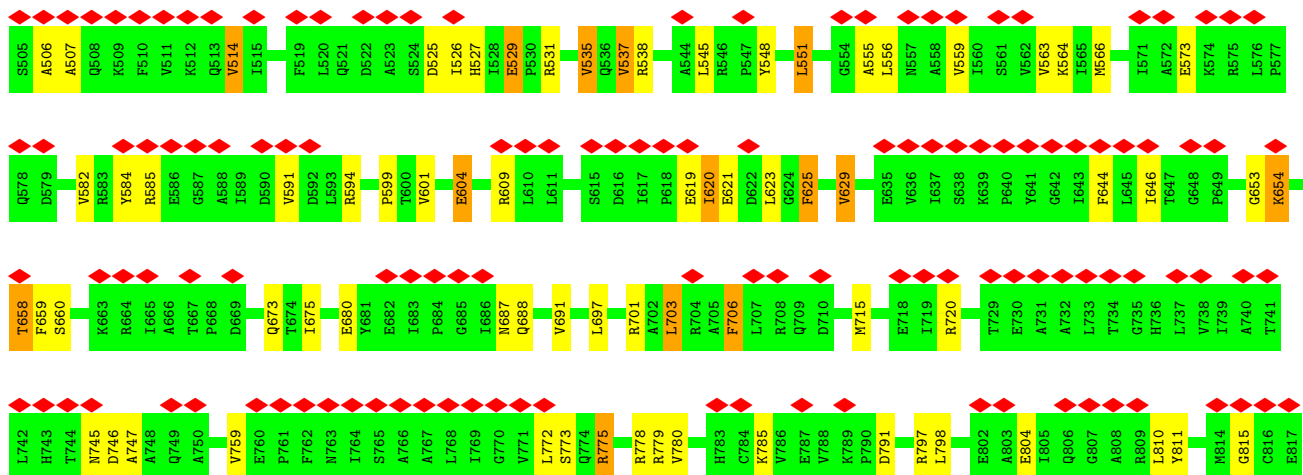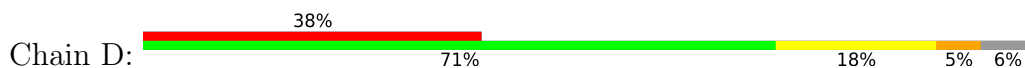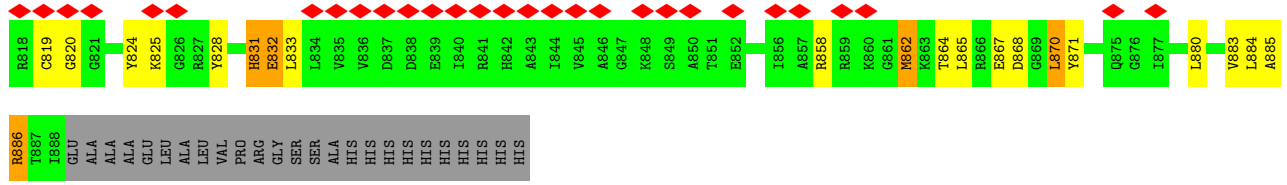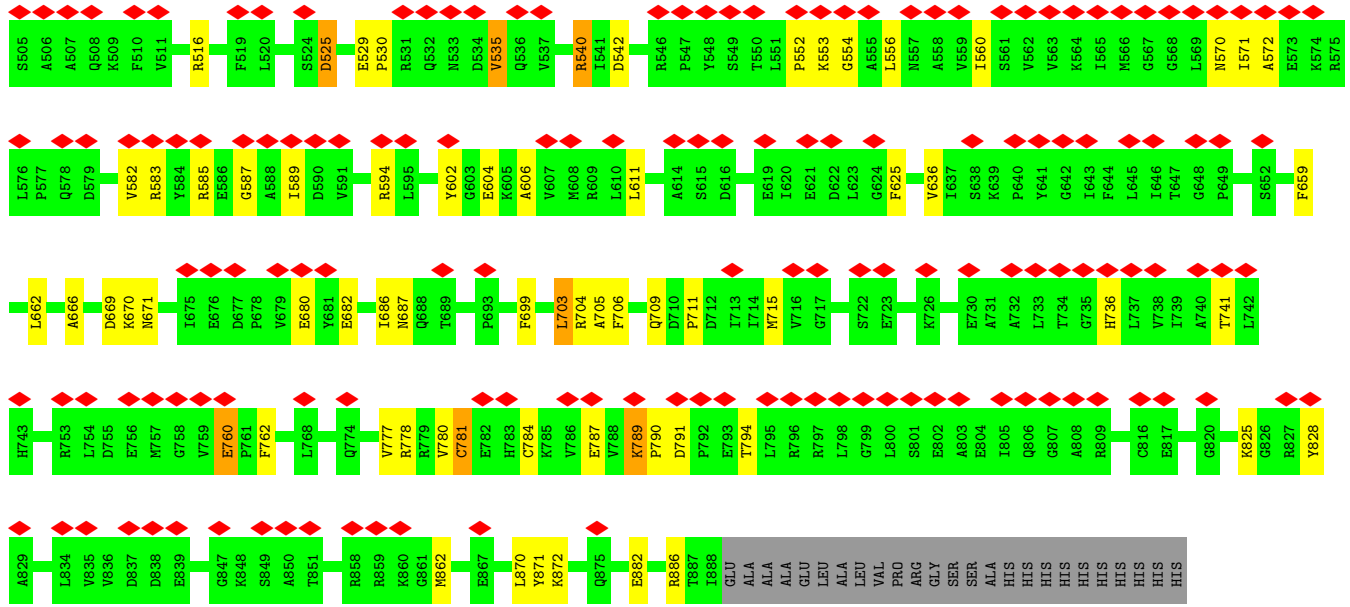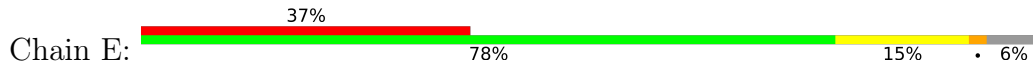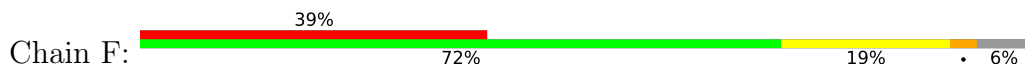
R296 R297 A298 Y299

• Molecule 2: Type IV pilus assembly protein PilF

Chain L:

48%
80%   18%

Q163 K164 D165 L166 K167 E170 L173 Q174 I178 S179 R180 E181 A182 L183 E184 E185 E191 K192 T193 I200 L201 V202 R203 K204 G205 L206 P207 E208 E209 E217 Q218 K219 L224 E225 S226 T227 E228 G229 I230 V231 P232 D233 P234 S235 A236 A237 L238 L239 L240 L241 R242 S243 D244

R247 Y248 I253 G254 E259 V260 E261 V262 V263 L264 S265 D266 K270 E271 A272 V273 A274 Q275 L276 L277 N278 R279 P280 A281 R282 L287 P288 Q289 A290 W291 E292 E293 L294 F295 R296 R297 A298 Y299

• Molecule 2: Type IV pilus assembly protein PilF

Chain N:

54%
90%   7%

Q163 K164 D165 L166 K167 L171 L172 L173 Q174 K175 G176 W177 I178 S179 R180 E181 E184 K192 T193 G198 R199 I200 L201 V202 R203 K204 G205 L206 P207 E208 E209 A210 L211 Y212 E217 Q218 K219 G220 L221 E222 F223 L224 E225 S226 T227 E228 G229 I230 V231 P232 D233 P234 S235 A236 A237

L238 L239 L240 L241 R242 S243 D244 A245 L246 R247 Y248 V251 P252 I253 Q256 N257 G258 E259 V260 R268 H269 K270 E271 A272 V273 L276 L277 N278 R279 F283 Y284 L285 A286 L287 A290 W291 E292 E293 L294 F295 R296 R297 A298 Y299

• Molecule 2: Type IV pilus assembly protein PilF

Chain O:

60%
80%   16%

Q163 K164 D165 L166 K167 E170 L173 Q174 W177 I178 S179 R180 E181 A182 L183 E184 E185 T193 L196 L197 G198 V202 R203 K204 G205 L206 P207 E208 E209 A210 L211 Y212 R213 A216 E217 Q218 K219 G220 L221 E222 E225 S226 T227 E228 G229 I230 V231 P232 D233 P234 S235 A236

A237 L238 L239 L240 L241 R242 S243 D244 A245 L246 R247 Y248 V251 P252 I253 G254 F255 Q256 N257 G258 V263 L264 S265 D266 P267 R268 H269 K270 E271 A272 V273 A274 Q275 L276 L277 N278 R279 P280 A281 R282 F283 Y284 L285 A286 L287 P288 Q289 A290 W291 E292 E293 F295 R296 R297 A298 Y299

• Molecule 2: Type IV pilus assembly protein PilF

Chain P:

47%
80%   15%

Q163 K164 D165 L166 E170 L173 Q174 W177 I178 S179 R180 E181 A182 L183 E184 E185 K192 L196 R199 I200 L201 V202 R203 K204 G205 L206 P207 E208 E209 A210 L211 Y212 F223 L224 E225 S226 T227 E228 G229 I230 V231 P232 D233 P234 S235 A236 A237 L238 L239 L240 L241 R242 S243

D244 R247 V251 P252 I253 G254 N257 V260 E261 D266 H269 K270 E271 A272 V273 A274 Q275 L276 L277 N278 R279 P280 A281 R282 L285 A286 L287 P288 Q289 A290 W291 E292 E293 L294 F295 R296 R297 A298 Y299

• Molecule 3: Type IV pilus assembly protein PilF

Chain A:

42%

75%   13%   6%   6%

S505 A506 K509 F510 V511 V514 I515 R516 F519 L520 Q521 D522 H527 I528 E529 P530 V535 Q536 V537 R538 L539 R540 A544 L545 R546 P547 T550 L551 L556 N557 A558 V559 I560 G567 G568 L569 N570 I571 A572 R575 L576 P577 Q578 D579 V582 R583 Y584 R585 E586

G587 A588 I589 D590 V591 D592 L593 R594 L595 L598 V601 Y602 G603 E604 K605 A606 V607 L610 L611 K612 K613 A614 S615 D616 I617 P618 E619 I620 E621 D622 A626 P627 G628 V629 F630 E631 R632 F633 K634 E635 V636 I637 S638 K639 P640 Y641 F644 L645 I646 T647 G648 P649 T650 G651 S652

G653 K654 L662 K663 R664 D669 T674 I675 E676 D677 P678 Y681 E682 I686 N687 Q688 T689 Q690 V691 N692 P693 Q694 A695 G696 L697 T698 F699 A700 R701 A702 L703 R704 A705 F706 D710 P711 D712 I713 I714 M715 V716 G717 E718 I719 R720 D721 S722 E723 T724 A725 K726 I727 A728 T729

L733 L737 V738 I739 A740 T741 L742 H743 T744 N745 D746 A747 A748 L754 D755 E756 M757 G758 V759 E760 V771 L772 S773 V777 R778 R779 V780 C781 E782 H783 E787 V788 K789 P790 D791 P792 E793 T794 L795 R796 G799 L800 S801 E802 A803 E804 I805 Q806 G807 Y811 M814

G815 C816 E817 R818 C819 G820 G821 T822 G823 Y824 K825 G826 R827 Y828 A829 I830 H831 E832 L833 L834 V835 V836 D837 D838 E839 I840 A843 I844 V845 A846 G847 K848 S849 A850 T851 E852 I853 K854 E855 I856 A857 R858 K863 T864 L865 R866 E867 D868 G869 L870 Y871 K872 A873 L874 Q875 G876 I877

E882 V883 L884 A885 I888 GLU ALA ALA ALA GLU LEU ALA LEU VAL PRO ARG GLY SER SER ALA HIS HIS HIS HIS HIS HIS HIS HIS HIS HIS

• Molecule 3: Type IV pilus assembly protein PilF

Chain B:

42%

78%   12%   •   6%

S505 A506 A507 Q508 K509 F510 V511 K512 I515 R516 L520 Q521 D522 D525 I526 E529 V535 Q536 R540 P547 Y548 S549 T550 L551 N557 A558 V559 V563 K564 I565 G568 L569 N570 I571 A572 E573 R585 E586 G587 A588 I589 D590 V591 D592 L593 R594 G603

R609 K612 K613 A614 S615 D616 I617 P618 E619 I620 E621 D622 F625 A626 P627 F630 E631 R632 F633 K634 E635 V636 I637 S638 K639 I643 F644 L645 I646 T647 G648 P649 T650 G651 S652 G653 K654 T657 S660 I661 L662 K663 D669 K670 T674 I675 E676 D677 P678 V679 E682

I683 I686 N687 Q688 T689 Q690 V691 N692 A695 G696 L697 T698 F699 A700 R701 A702 L703 R704 A705 F706 P711 D712 I713 I714 M715 V716 G717 E718 I719 R720 D721 S722 E723 T724 A725 K726 L733 L737 V738 I739 A740 T741 L742 H743 T744 N745 D746 A747 A748 L754 D755 E756 M757 G758

V759 E760 P761 F762 N763 I764 S765 L772 S773 Q774 V777 R778 R779 V780 C781 E782 H783 C784 K785 V786 E787 V788 K789 P790 D791 P792 E793 R796 R797 L798 G799 L800 S801 E802 A803 E804 I805 Q806 G807 A808 R809 L810 Y811 M814 G815 C816 E817 G820 G821 T822 G823 Y824 K825 G826 R827

• Molecule 3: Type IV pilus assembly protein PilF

Chain C:

39%

69% 19% 6% 6%

• Molecule 3: Type IV pilus assembly protein PilF

Chain D:

38%

71% 18% 5% 6%

• Molecule 3: Type IV pilus assembly protein PilF

Chain E:

• Molecule 3: Type IV pilus assembly protein PilF

Chain F:

HIS HIS HIS HIS HIS HIS HIS HIS HIS

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	45000	Depositor
Resolution determination method	FSC 0.5 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	45	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	4500	Depositor
Magnification	Not provided	
Image detector	GATAN K2 BASE (4k x 4k)	Depositor
Maximum map value	6.449	Depositor
Minimum map value	-4.043	Depositor
Average map value	0.033	Depositor
Map value standard deviation	0.367	Depositor
Recommended contour level	1.9	Depositor
Map size (Å)	307.2, 307.2, 307.2	wwPDB
Map dimensions	192, 192, 192	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.6, 1.6, 1.6	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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	G	1.23	5/1165 (0.4%)	1.10	2/1580 (0.1%)
1	H	1.27	5/1165 (0.4%)	1.17	8/1580 (0.5%)
1	I	1.24	5/1165 (0.4%)	1.02	0/1580
1	M	1.31	11/1165 (0.9%)	1.03	3/1580 (0.2%)
1	Q	1.28	6/1165 (0.5%)	1.13	8/1580 (0.5%)
1	R	1.23	6/1165 (0.5%)	1.04	4/1580 (0.3%)
2	J	1.22	3/1110 (0.3%)	1.13	7/1499 (0.5%)
2	K	1.39	8/1110 (0.7%)	1.18	6/1499 (0.4%)
2	L	1.28	8/1110 (0.7%)	1.17	7/1499 (0.5%)
2	N	1.25	7/1110 (0.6%)	1.08	3/1499 (0.2%)
2	O	1.31	8/1110 (0.7%)	1.16	5/1499 (0.3%)
2	P	1.45	13/1110 (1.2%)	1.16	8/1499 (0.5%)
3	A	1.51	41/3017 (1.4%)	1.19	16/4073 (0.4%)
3	B	1.39	27/3008 (0.9%)	1.18	13/4061 (0.3%)
3	C	1.51	45/3017 (1.5%)	1.22	14/4073 (0.3%)
3	D	1.47	41/3017 (1.4%)	1.21	19/4073 (0.5%)
3	E	1.30	16/3017 (0.5%)	1.13	9/4073 (0.2%)
3	F	1.40	35/3026 (1.2%)	1.18	17/4085 (0.4%)
All	All	1.37	290/31752 (0.9%)	1.16	149/42912 (0.3%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	M	0	1
1	Q	0	1
2	P	0	1
3	C	0	4
3	D	0	8
3	E	0	2
3	F	0	6

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Mol	Chain	#Chirality outliers	#Planarity outliers
All	All	0	23

The worst 5 of 290 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	511	VAL	CB-CG2	-16.02	1.19	1.52
3	C	529	GLU	CG-CD	-13.24	1.32	1.51
1	M	413	CYS	CB-SG	-12.71	1.60	1.82
3	A	591	VAL	CB-CG1	-11.17	1.29	1.52
3	D	529	GLU	CG-CD	-10.26	1.36	1.51

The worst 5 of 149 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	538	ARG	NE-CZ-NH2	-12.23	114.19	120.30
3	F	720	ARG	NE-CZ-NH2	-10.98	114.81	120.30
2	P	212	TYR	CB-CG-CD1	-10.61	114.63	121.00
3	E	540	ARG	NE-CZ-NH2	-10.11	115.25	120.30
1	H	455	TYR	CB-CG-CD2	-10.06	114.96	121.00

There are no chirality outliers.

5 of 23 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	C	506	ALA	Peptide,Mainchain
3	C	684	PRO	Mainchain
1	M	455	TYR	Sidechain
2	P	212	TYR	Sidechain
1	Q	416	TYR	Sidechain

5.2   Too-close contacts   ⓘ

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	G	1144	0	1182	10	0
1	H	1144	0	1182	15	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	I	1144	0	1182	16	0
1	M	1144	0	1182	10	0
1	Q	1144	0	1182	23	0
1	R	1144	0	1182	11	0
2	J	1091	0	1117	22	0
2	K	1091	0	1117	27	0
2	L	1091	0	1117	21	0
2	N	1091	0	1117	11	0
2	O	1091	0	1117	29	0
2	P	1091	0	1117	19	0
3	A	2975	0	3080	53	0
3	B	2966	0	3066	40	0
3	C	2975	0	3080	69	0
3	D	2975	0	3080	49	0
3	E	2975	0	3080	38	0
3	F	2984	0	3084	38	0
All	All	31260	0	32264	493	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 493 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:J:276:LEU:O	2:J:276:LEU:HD23	1.39	1.17
1:Q:393:VAL:O	1:Q:393:VAL:HG13	1.46	1.05
2:O:263:VAL:HG23	2:O:263:VAL:O	1.73	0.87
2:L:219:LYS:O	2:L:219:LYS:HG3	1.75	0.85
3:F:710:ASP:O	3:F:710:ASP:OD2	1.96	0.82

There are no symmetry-related clashes.

5.3   Torsion angles ⓘ

5.3.1   Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	G	144/146 (99%)	135 (94%)	8 (6%)	1 (1%)	22	63
1	H	144/146 (99%)	132 (92%)	8 (6%)	4 (3%)	5	30
1	I	144/146 (99%)	131 (91%)	12 (8%)	1 (1%)	22	63
1	M	144/146 (99%)	132 (92%)	9 (6%)	3 (2%)	7	36
1	Q	144/146 (99%)	130 (90%)	8 (6%)	6 (4%)	3	22
1	R	144/146 (99%)	126 (88%)	13 (9%)	5 (4%)	3	25
2	J	135/137 (98%)	124 (92%)	9 (7%)	2 (2%)	10	46
2	K	135/137 (98%)	123 (91%)	9 (7%)	3 (2%)	6	35
2	L	135/137 (98%)	118 (87%)	15 (11%)	2 (2%)	10	46
2	N	135/137 (98%)	126 (93%)	9 (7%)	0	100	100
2	O	135/137 (98%)	124 (92%)	8 (6%)	3 (2%)	6	35
2	P	135/137 (98%)	122 (90%)	11 (8%)	2 (2%)	10	46
3	A	382/409 (93%)	365 (96%)	16 (4%)	1 (0%)	41	77
3	B	381/409 (93%)	363 (95%)	16 (4%)	2 (0%)	29	69
3	C	382/409 (93%)	363 (95%)	15 (4%)	4 (1%)	15	55
3	D	382/409 (93%)	361 (94%)	17 (4%)	4 (1%)	15	55
3	E	382/409 (93%)	363 (95%)	16 (4%)	3 (1%)	19	60
3	F	383/409 (94%)	362 (94%)	15 (4%)	6 (2%)	9	44
All	All	3966/4152 (96%)	3700 (93%)	214 (5%)	52 (1%)	16	48

5 of 52 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	G	456	GLU
2	K	203	ARG
1	H	399	PRO
1	H	422	ARG
1	H	455	TYR

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	G	120/120 (100%)	120 (100%)	0	100	100
1	H	120/120 (100%)	118 (98%)	2 (2%)	60	78
1	I	120/120 (100%)	119 (99%)	1 (1%)	81	89
1	M	120/120 (100%)	119 (99%)	1 (1%)	81	89
1	Q	120/120 (100%)	120 (100%)	0	100	100
1	R	120/120 (100%)	120 (100%)	0	100	100
2	J	112/112 (100%)	111 (99%)	1 (1%)	78	87
2	K	112/112 (100%)	110 (98%)	2 (2%)	59	77
2	L	112/112 (100%)	111 (99%)	1 (1%)	78	87
2	N	112/112 (100%)	111 (99%)	1 (1%)	78	87
2	O	112/112 (100%)	111 (99%)	1 (1%)	78	87
2	P	112/112 (100%)	111 (99%)	1 (1%)	78	87
3	A	317/336 (94%)	317 (100%)	0	100	100
3	B	315/336 (94%)	315 (100%)	0	100	100
3	C	317/336 (94%)	315 (99%)	2 (1%)	86	92
3	D	317/336 (94%)	314 (99%)	3 (1%)	78	87
3	E	317/336 (94%)	316 (100%)	1 (0%)	92	95
3	F	318/336 (95%)	317 (100%)	1 (0%)	92	95
All	All	3293/3408 (97%)	3275 (100%)	18 (0%)	89	93

5 of 18 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	D	644	PHE
3	F	581	ARG
3	E	585	ARG
2	N	248	TYR
3	D	551	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
3	A	673	GLN

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Mol	Chain	Res	Type
3	B	527	HIS
3	E	774	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-3882. 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 ⓘ

6.1.1 Primary map

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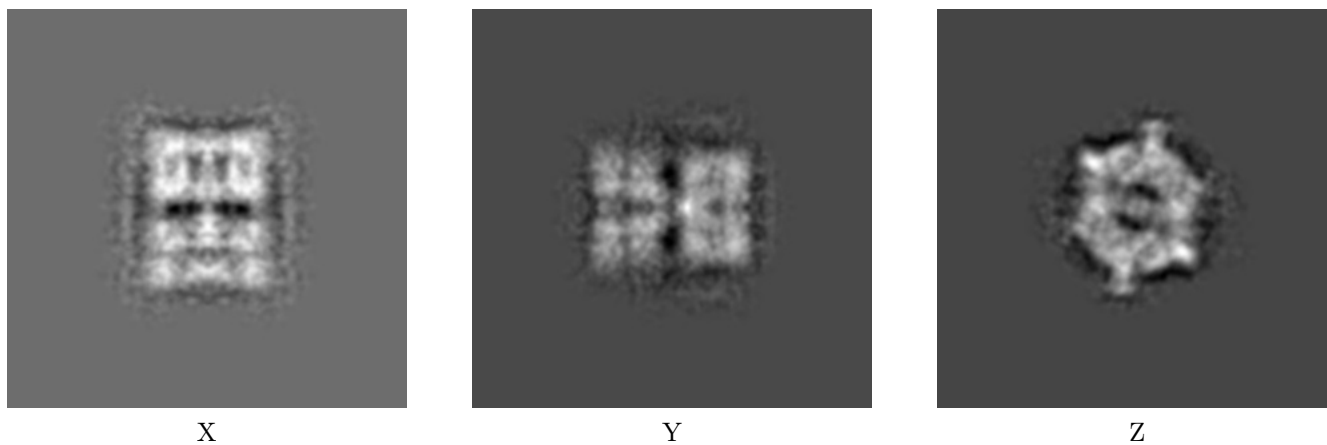
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ

6.2.1 Primary map

X Index: 96	Y Index: 96	Z Index: 96
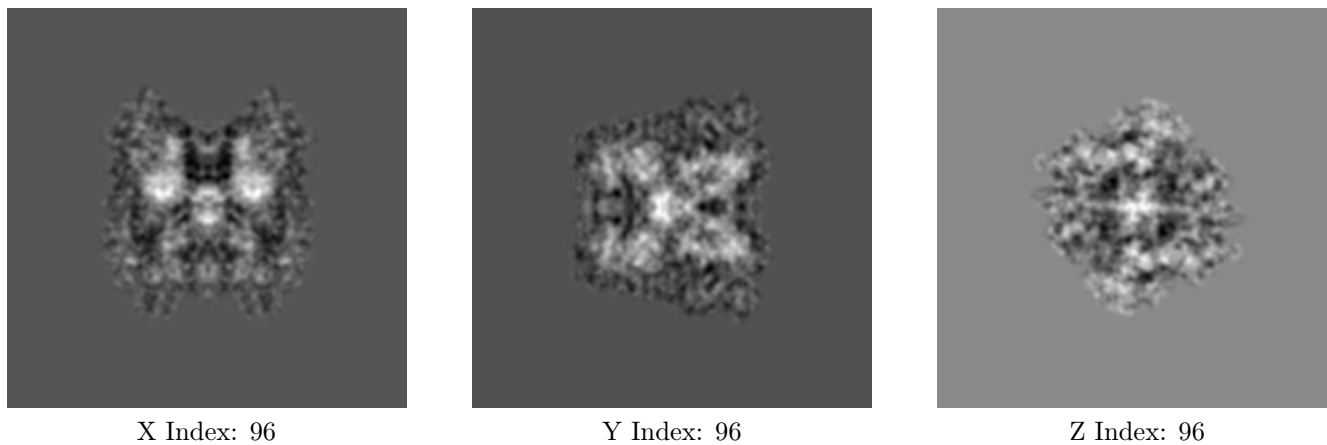
The images above show central slices of the map in three orthogonal directions.

6.3   Largest variance slices (i)

6.3.1   Primary map
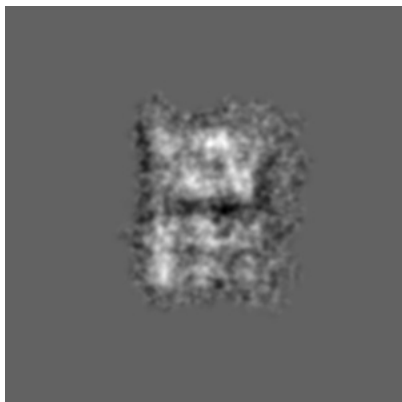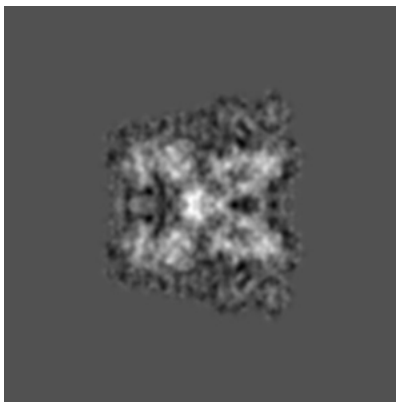
<table>
<tr><td>X Index: 114</td><td>Y Index: 96</td><td>Z Index: 106</td></tr>
</table>
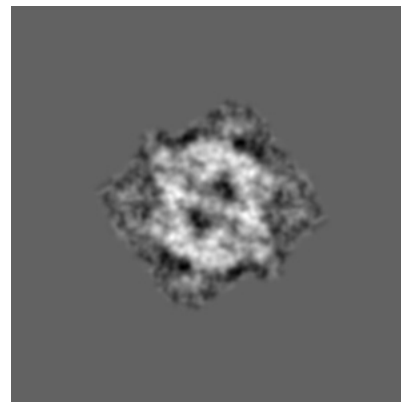
The images above show the largest variance slices of the map in three orthogonal directions.

6.4   Orthogonal surface views (i)

6.4.1   Primary map

<table>
<tr><td>X</td><td>Y</td><td>Z</td></tr>
</table>
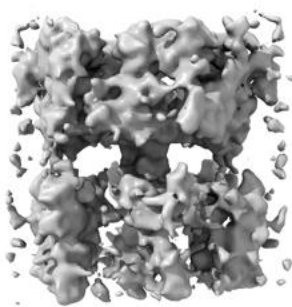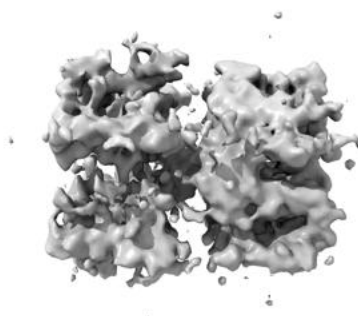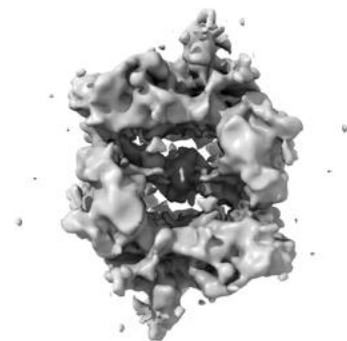
The images above show the 3D surface view of the map at the recommended contour level 1.9. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5 Mask visualisation ⓘ

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

7   Map analysis ⓘ

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

7.1   Map-value distribution ⓘ
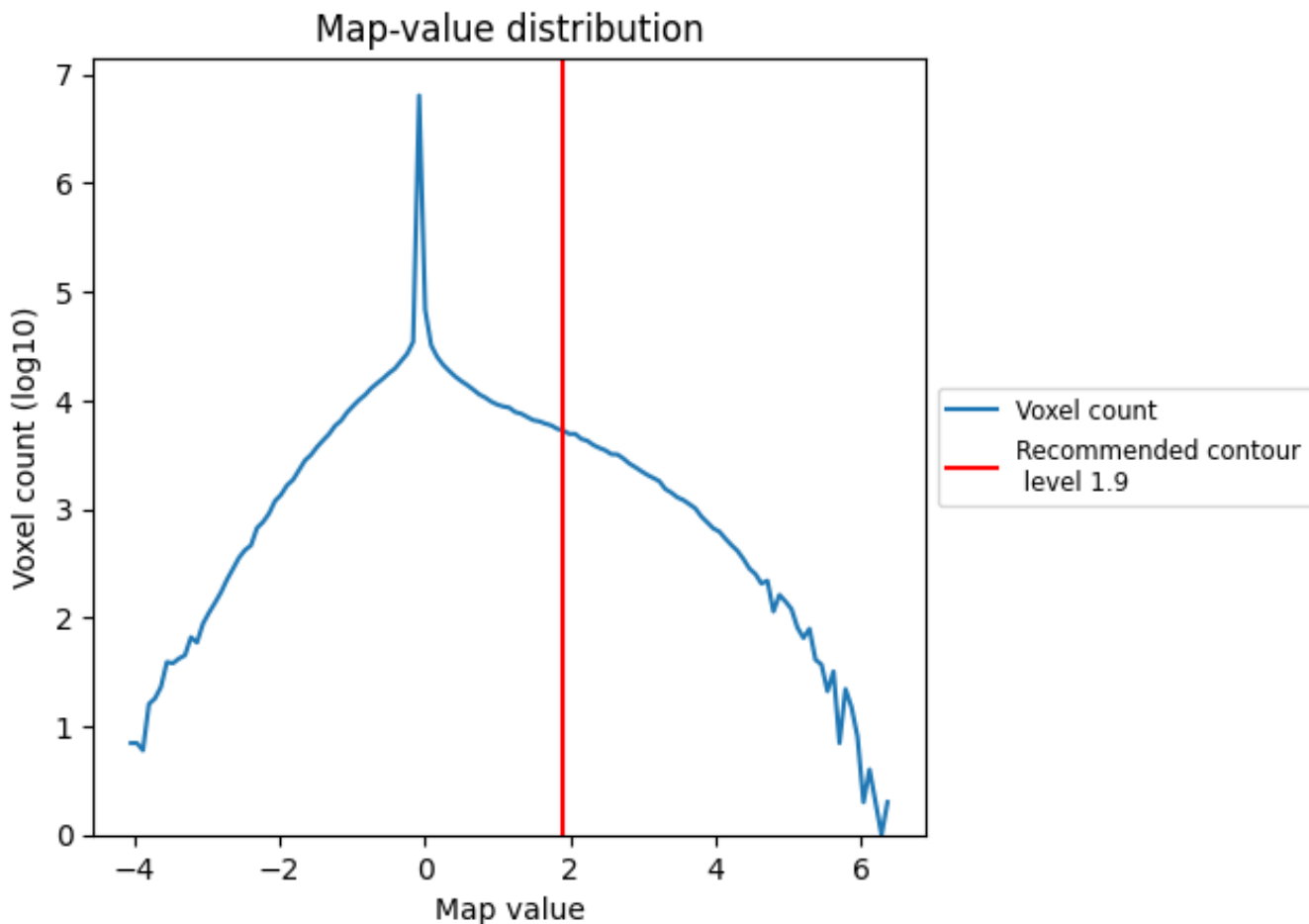
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2　Volume estimate ⓘ
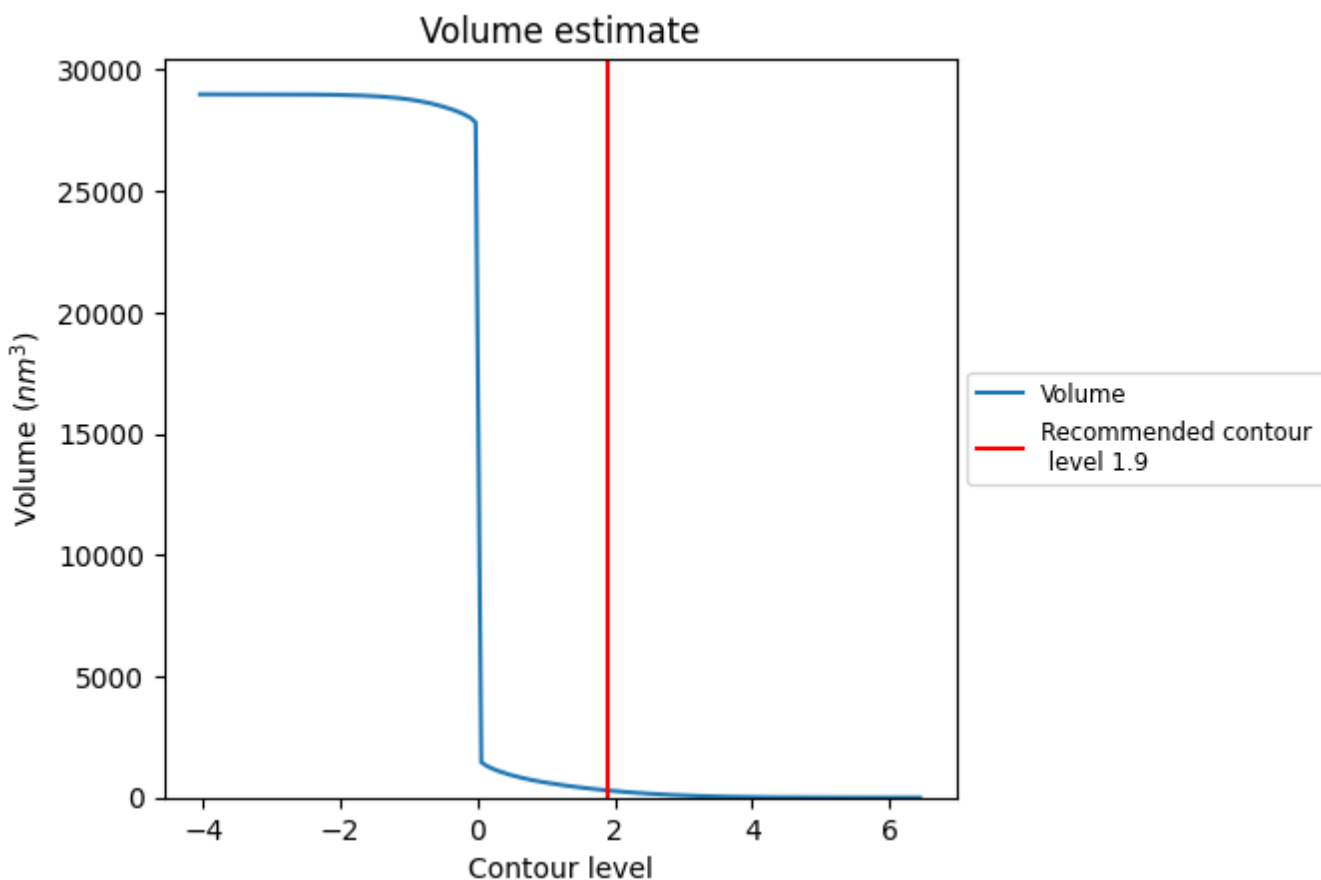
The volume at the recommended contour level is 294 nm^3; this corresponds to an approximate mass of 265 kDa.

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 ⓘ
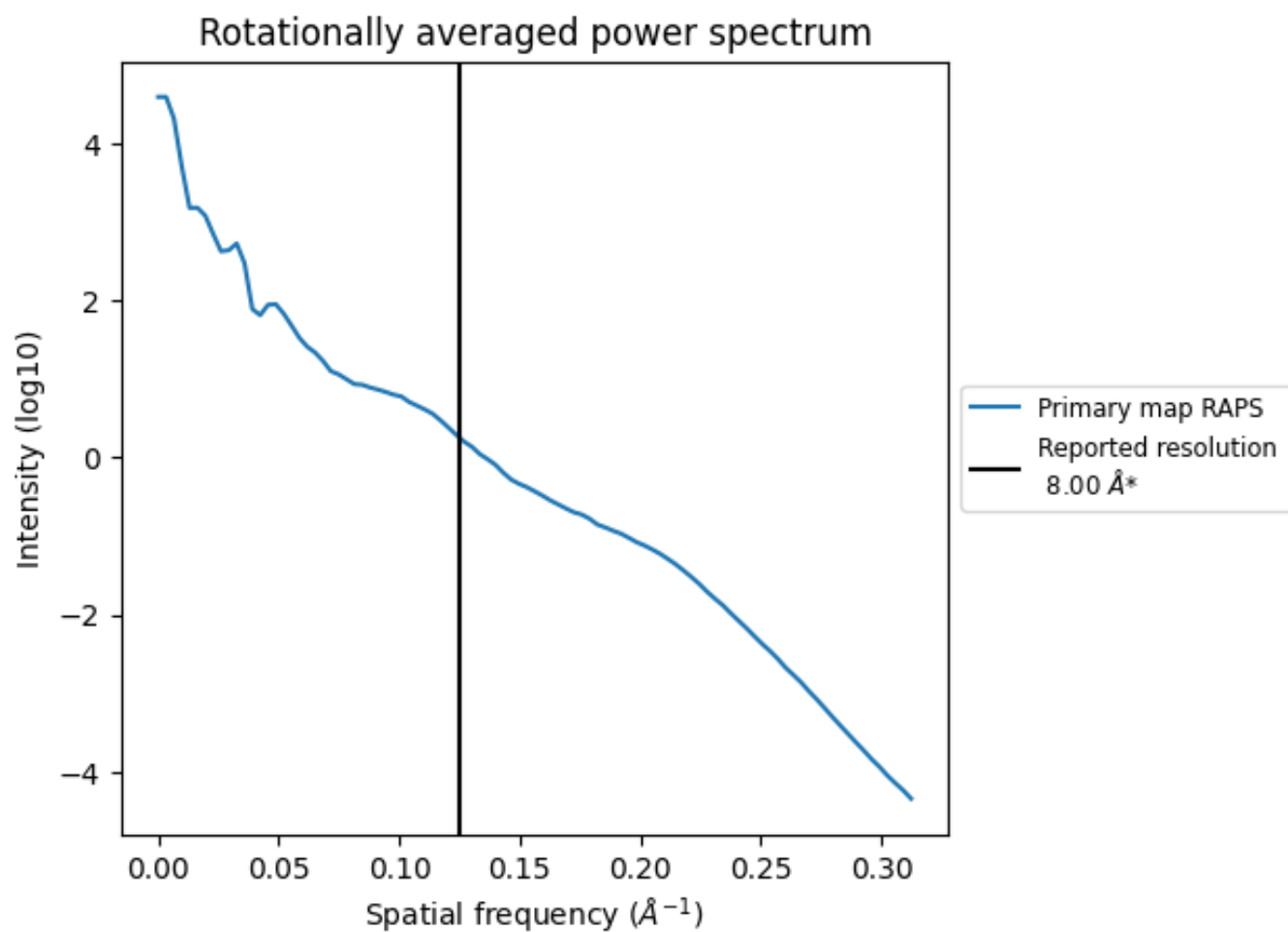
*Reported resolution corresponds to spatial frequency of 0.125 Å^{-1}

8 Fourier-Shell correlation ⓘ

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

9   Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-3882 and PDB model 6EJF. Per-residue inclusion information can be found in section 3 on page 9.

9.1   Map-model overlay ⓘ

| X | Y | Z |
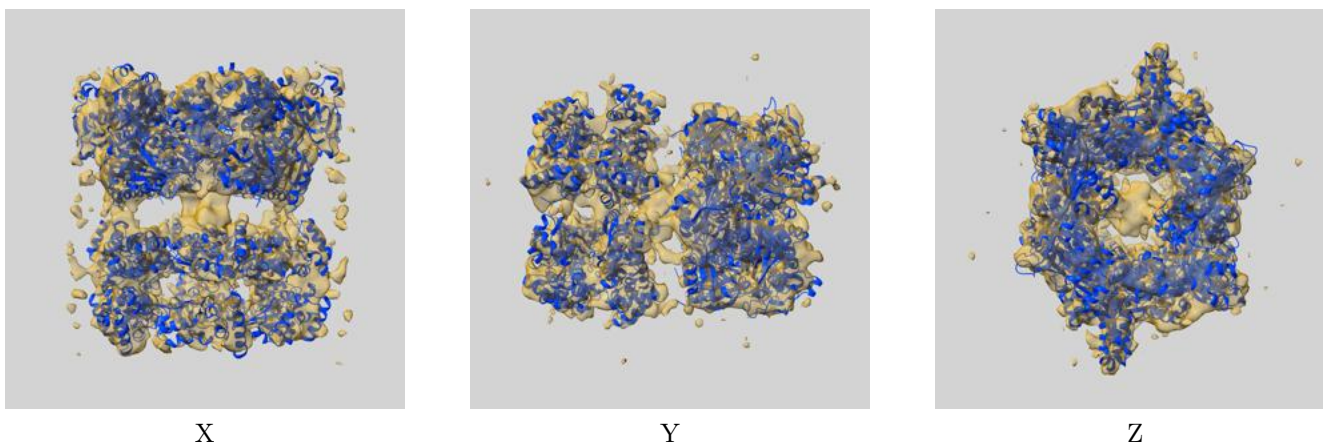
The images above show the 3D surface view of the map at the recommended contour level 1.9 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model ⓘ

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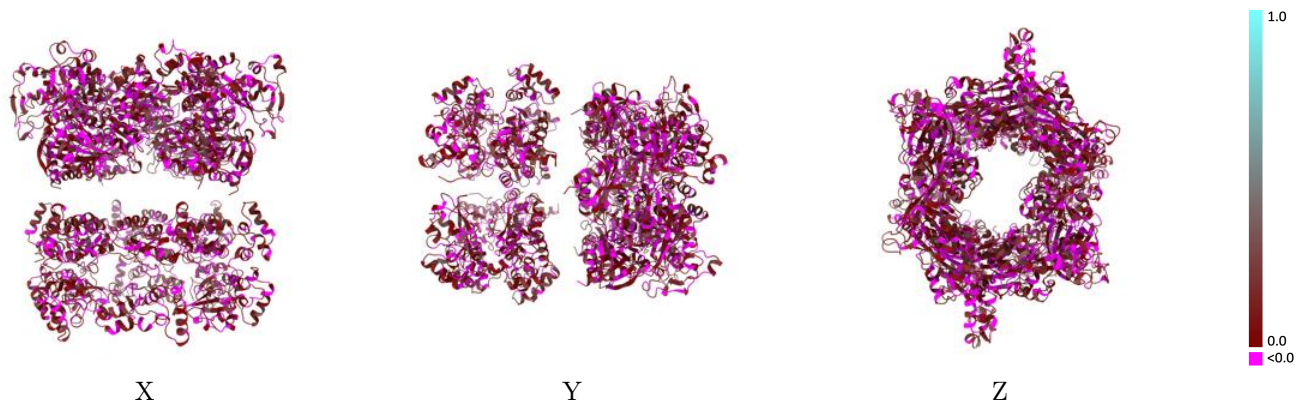
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

X   Y   Z
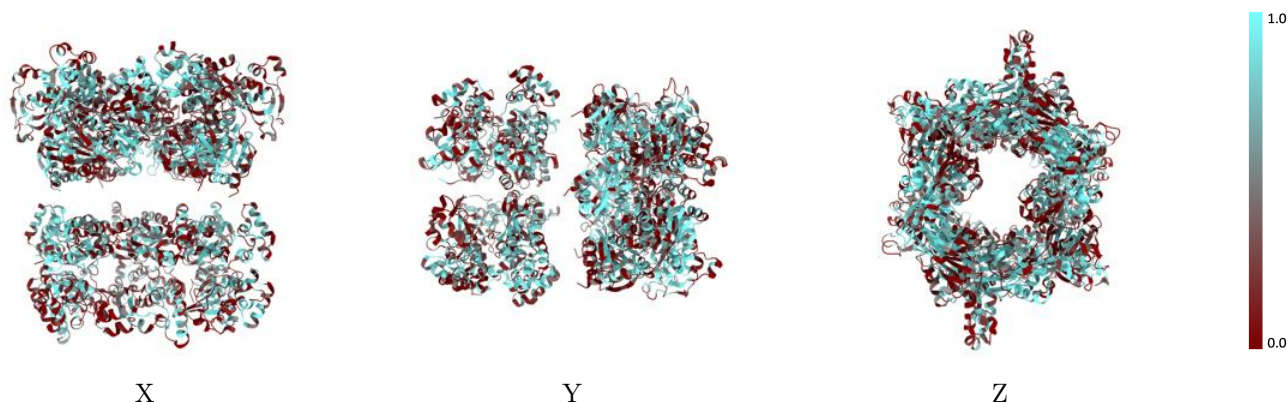
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (1.9).

9.4 Atom inclusion ⓘ
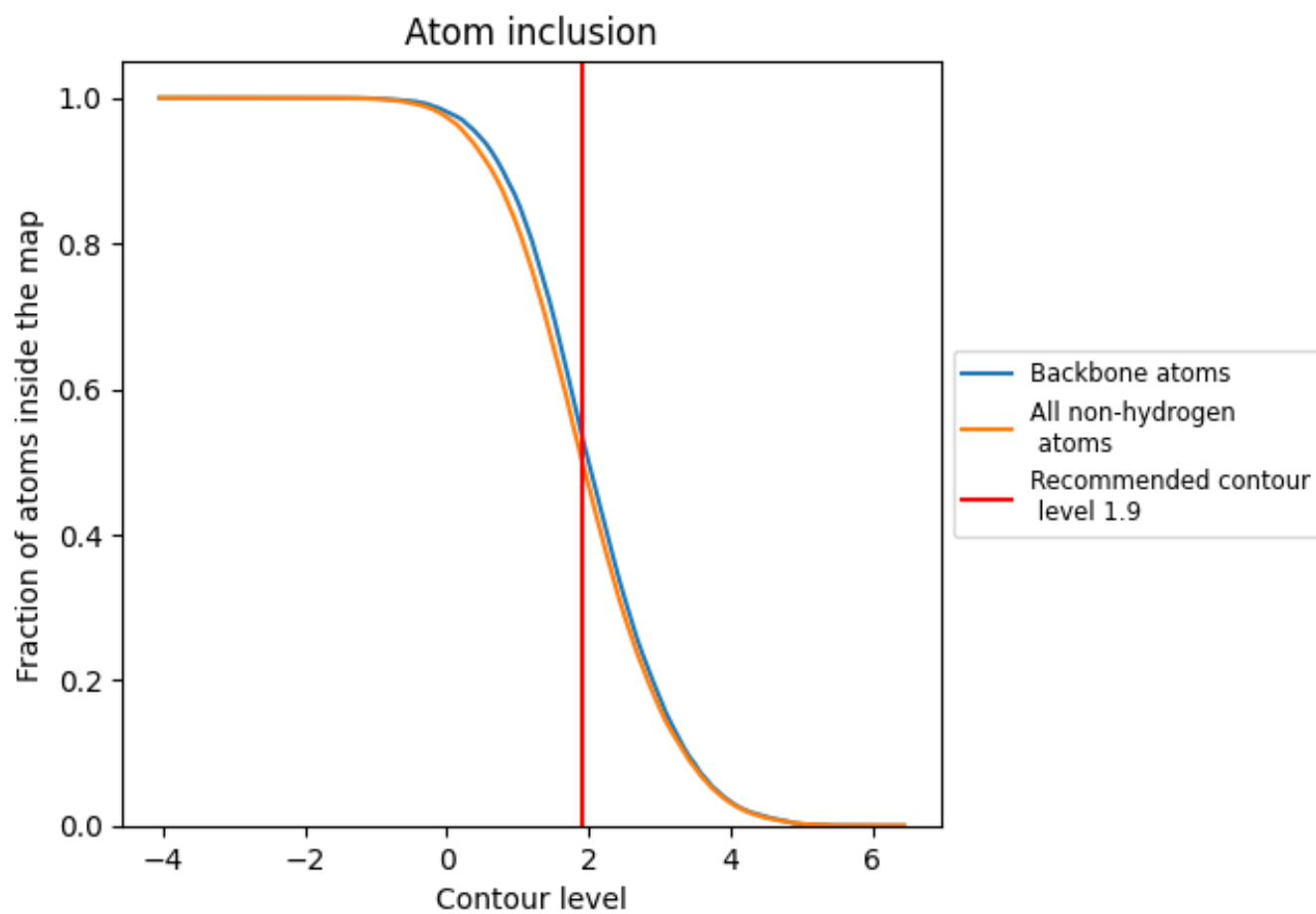
At the recommended contour level, 54% of all backbone atoms, 50% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (1.9) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5047	0.0690
A	0.5148	0.0660
B	0.5071	0.0510
C	0.5393	0.0640
D	0.5486	0.0700
E	0.5203	0.0570
F	0.5314	0.0580
G	0.4437	0.0870
H	0.5644	0.0760
I	0.5644	0.0800
J	0.3979	0.0840
K	0.3791	0.0730
L	0.4741	0.0730
M	0.4536	0.0830
N	0.4111	0.0920
O	0.3810	0.0740
P	0.4948	0.0690
Q	0.5590	0.0800
R	0.5626	0.0730

1.0

0.0
<0.0