Full wwPDB EM Validation Report

Nov 18, 2026 – 06:31 PM JST

PDB ID	:	23SU / pdb_000023su
EMDB ID	:	EMD-69223
Title	:	The tail-tip structure of F-pyocin
Authors	:	Zhang, Z.L.; Yang, F.L.; Lei, D.S.; He, Y.X.
Deposited on	:	2026-02-16
Resolution	:	2.52 Å(reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
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:

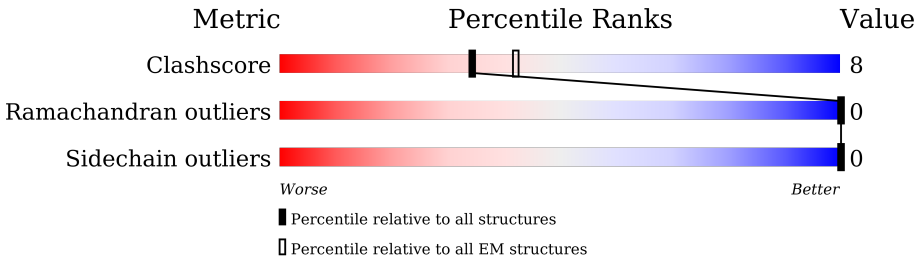
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.2
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

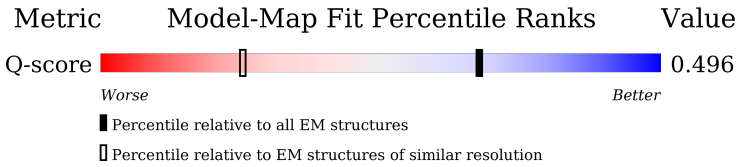
1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.52 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.





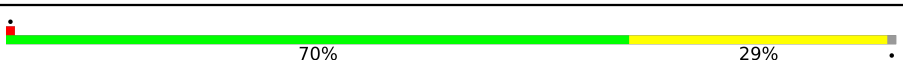
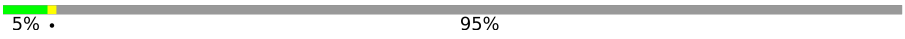
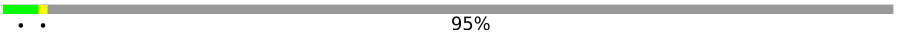
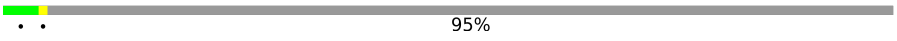
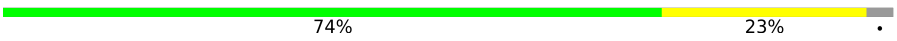
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	7226 (2.02 - 3.02)

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	B	164	71% 29%
1	G	164	70% 29%
1	H	164	69% 30%
1	M	164	63% 36%

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Mol	Chain	Length	Quality of chain
1	O	164	
1	P	164	
2	C	611	
2	Q	611	
2	R	611	
3	D	113	
3	F	113	
3	I	113	
3	J	113	
3	V	113	
3	W	113	
4	E	231	
4	K	231	
4	U	231	
5	L	200	
5	N	200	
5	a	200	
6	S	1204	
6	T	1204	
6	X	1204	

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 41310 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 Phage tail protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	B	163	Total	C	N	O	S	0	0
			1230	779	206	244	1		
1	G	163	Total	C	N	O	S	0	0
			1230	779	206	244	1		
1	H	163	Total	C	N	O	S	0	0
			1230	779	206	244	1		
1	M	163	Total	C	N	O	S	0	0
			1230	779	206	244	1		
1	O	163	Total	C	N	O	S	0	0
			1230	779	206	244	1		
1	P	163	Total	C	N	O	S	0	0
			1230	779	206	244	1		

- Molecule 2 is a protein called Bacteriophage tail tape measure C-terminal domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	C	33	Total	C	N	O	S	0	0
			245	150	49	44	2		
2	Q	33	Total	C	N	O	S	0	0
			245	150	49	44	2		
2	R	33	Total	C	N	O	S	0	0
			245	150	49	44	2		

- Molecule 3 is a protein called Phage tail protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
3	D	110	Total	C	N	O	0	0
			878	554	163	161		
3	F	110	Total	C	N	O	0	0
			878	554	163	161		
3	I	110	Total	C	N	O	0	0
			878	554	163	161		

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Mol	Chain	Residues	Atoms				AltConf	Trace
3	J	110	Total 878	C 554	N 163	O 161	0	0
3	V	110	Total 878	C 554	N 163	O 161	0	0
3	W	110	Total 878	C 554	N 163	O 161	0	0

- Molecule 4 is a protein called Probable bacteriophage protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	E	230	Total 1769	C 1102	N 316	O 341	S 10	0	0
4	K	230	Total 1769	C 1102	N 316	O 341	S 10	0	0
4	U	230	Total 1769	C 1102	N 316	O 341	S 10	0	0

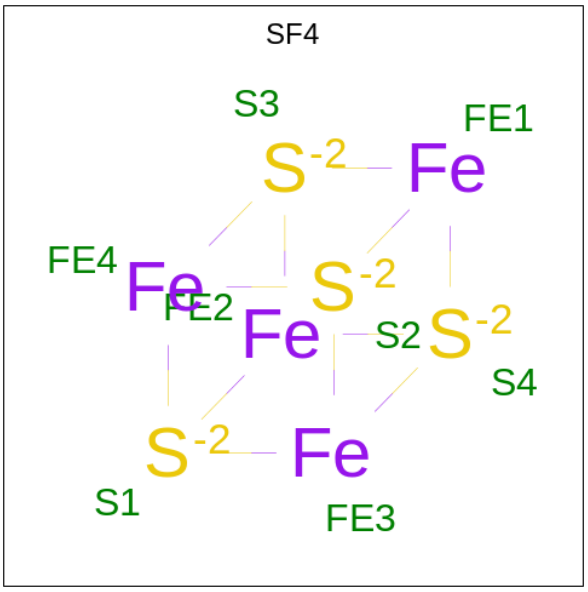
- Molecule 5 is a protein called Probable bacteriophage protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	L	74	Total 528	C 333	N 96	O 96	S 3	0	0
5	N	74	Total 528	C 333	N 96	O 96	S 3	0	0
5	a	74	Total 528	C 333	N 96	O 96	S 3	0	0

- Molecule 6 is a protein called Probable bacteriophage protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	S	904	Total 7004	C 4371	N 1273	O 1345	S 15	0	0
6	T	904	Total 7004	C 4371	N 1273	O 1345	S 15	0	0
6	X	904	Total 7004	C 4371	N 1273	O 1345	S 15	0	0

- Molecule 7 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe_4S_4) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	AltConf
7	E	1	Total Fe S 8 4 4	0
7	K	1	Total Fe S 8 4 4	0
7	U	1	Total Fe S 8 4 4	0

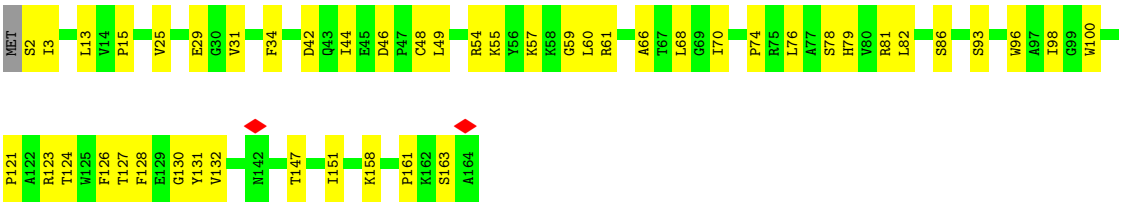
3 Residue-property plots (i)

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: Phage tail protein

Chain B:

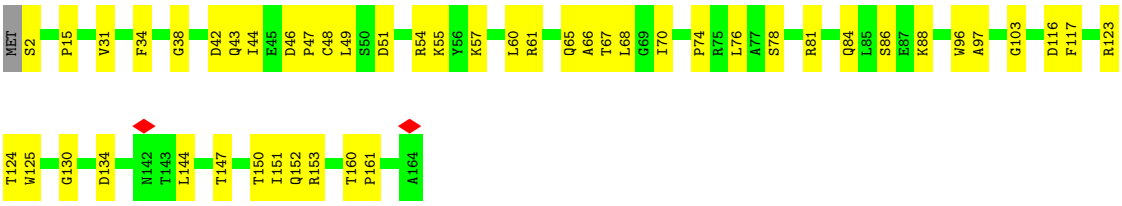




• Molecule 1: Phage tail protein

Chain G:

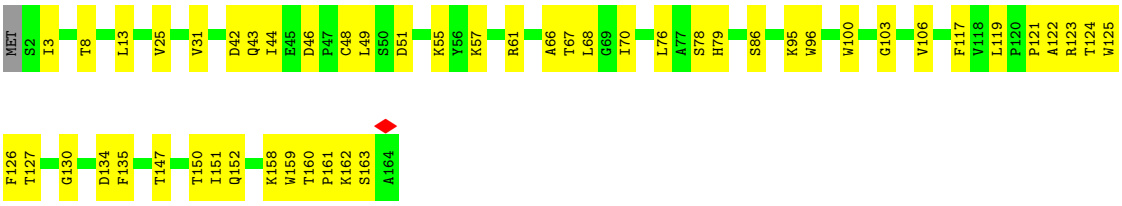




• Molecule 1: Phage tail protein

Chain H:

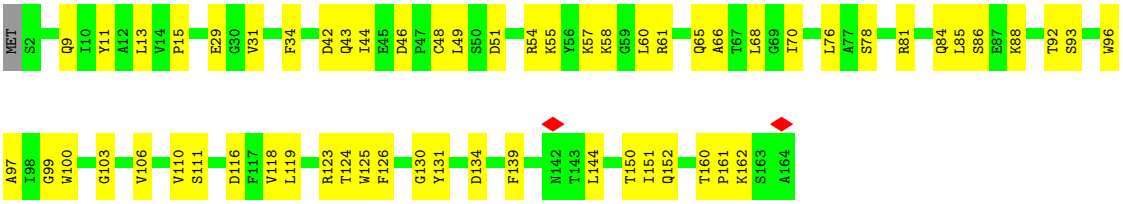




• Molecule 1: Phage tail protein

Chain M:

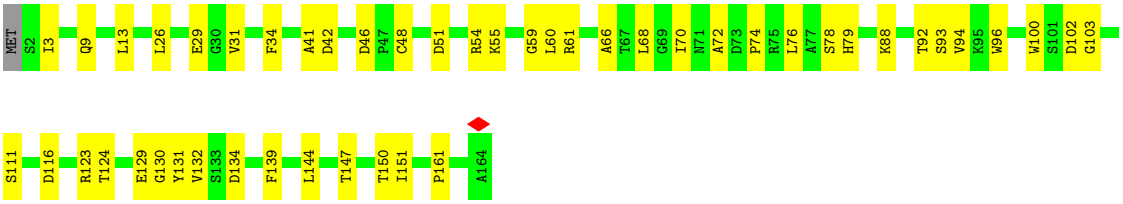




• Molecule 1: Phage tail protein

Chain O:

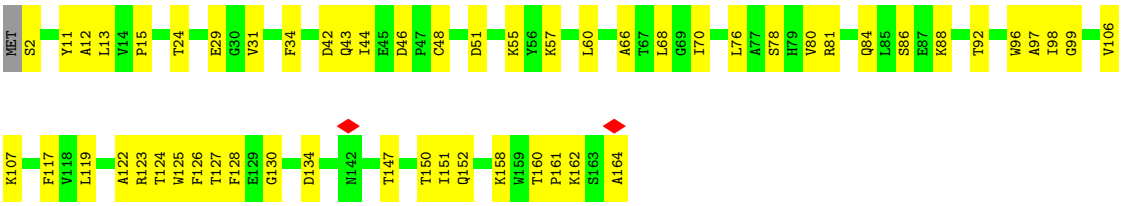




• Molecule 1: Phage tail protein

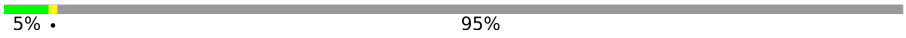
Chain P:

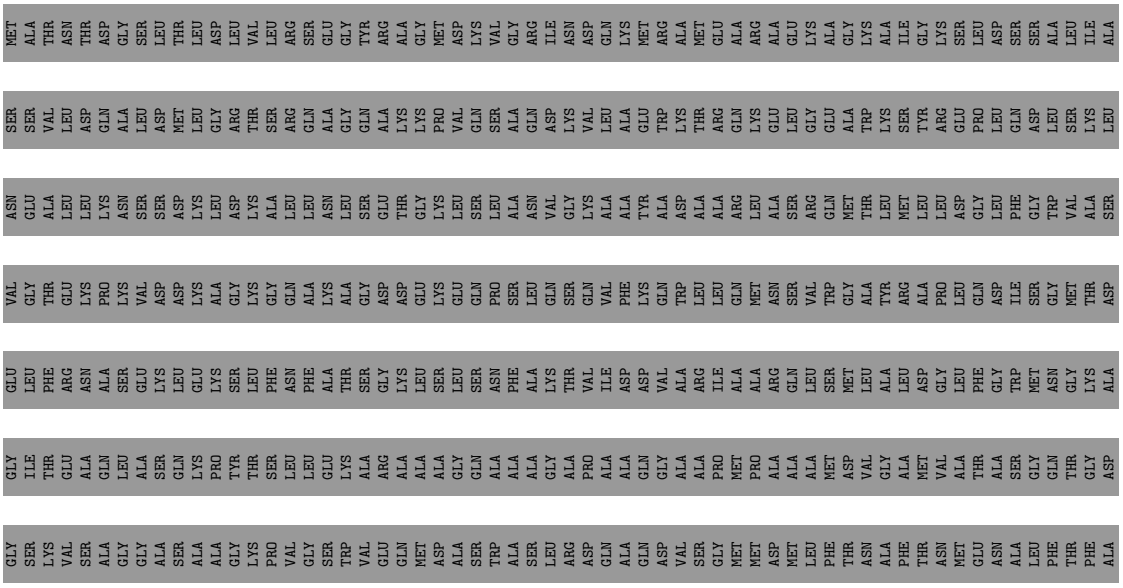


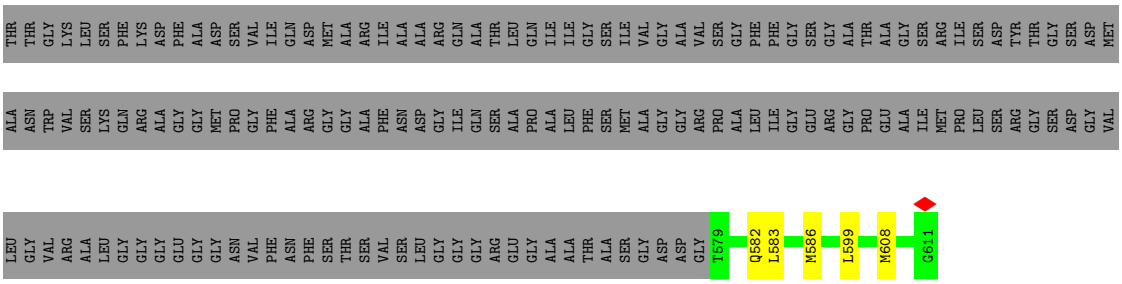


• Molecule 2: Bacteriophage tail tape measure C-terminal domain-containing protein

Chain C:

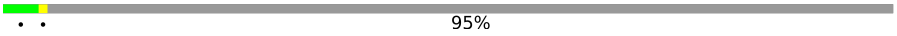


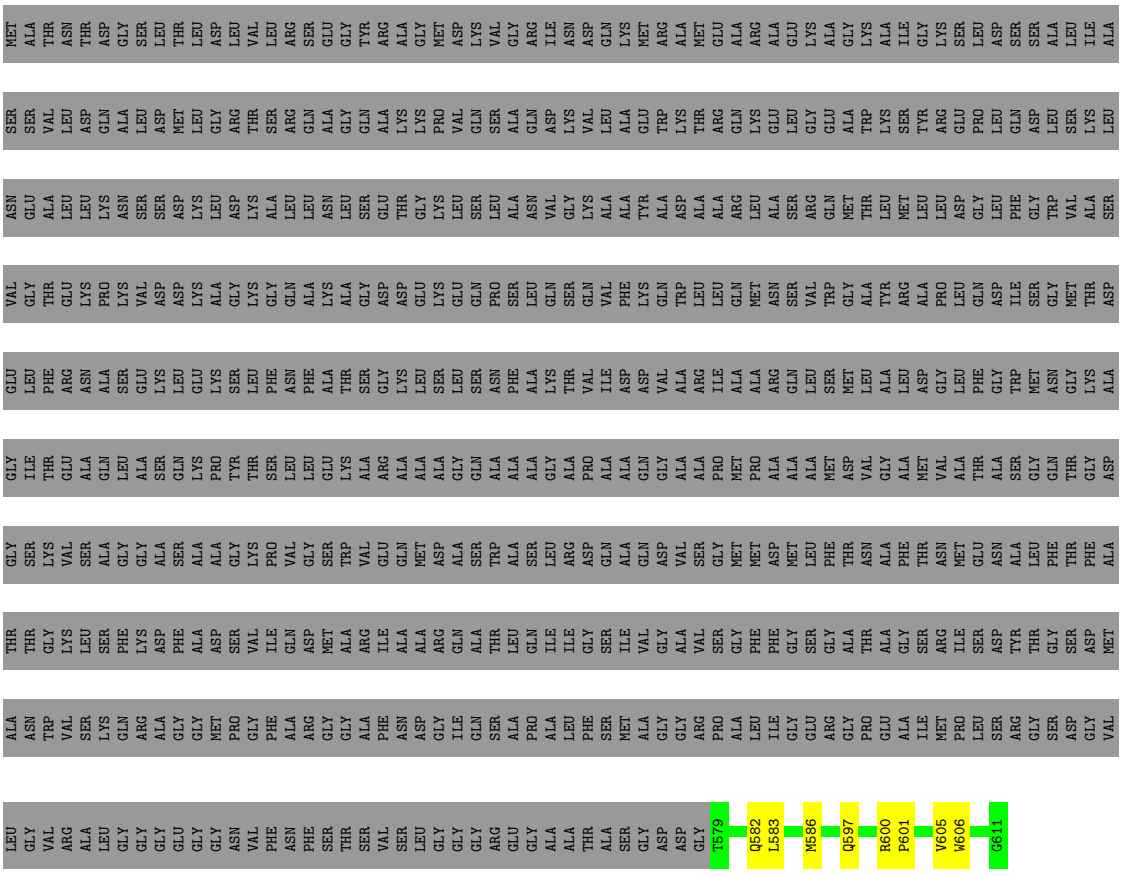




• Molecule 2: Bacteriophage tail tape measure C-terminal domain-containing protein

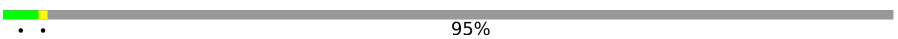
Chain Q:

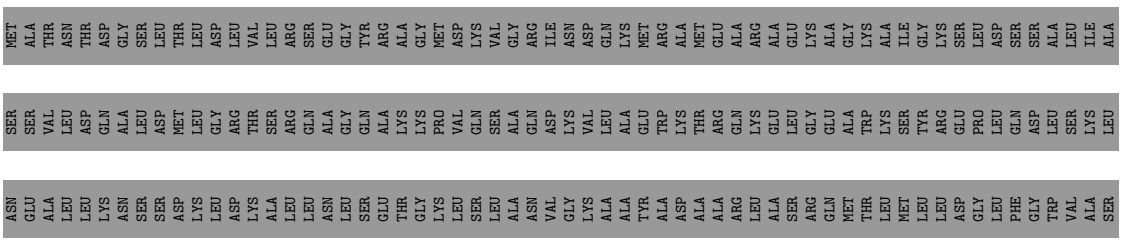


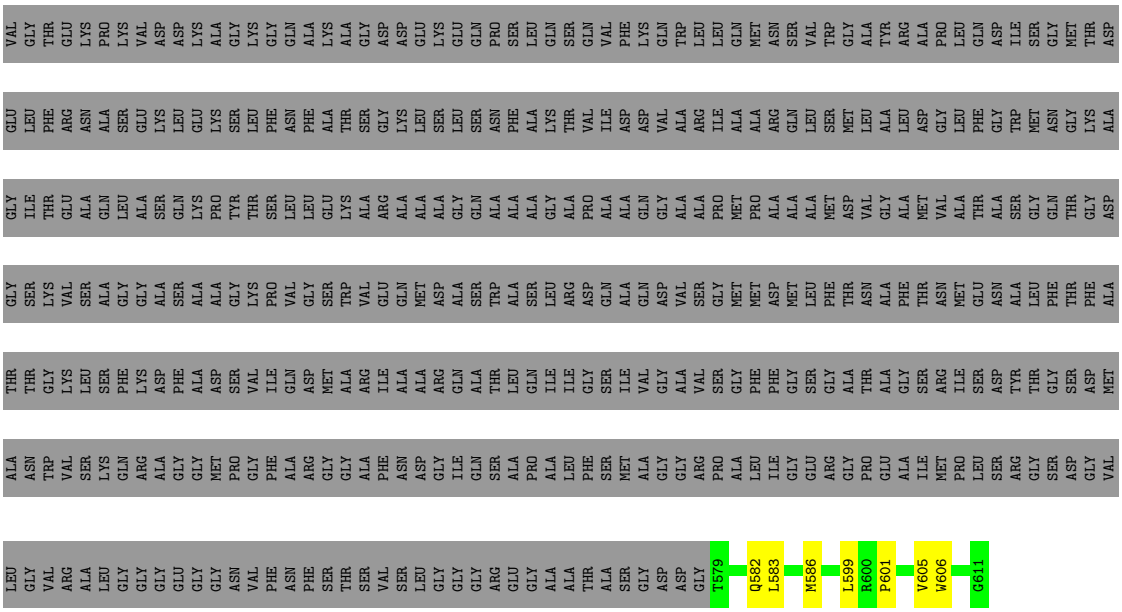


• Molecule 2: Bacteriophage tail tape measure C-terminal domain-containing protein

Chain R:



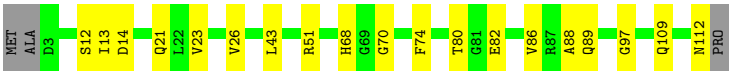




• Molecule 3: Phage tail protein

Chain D:

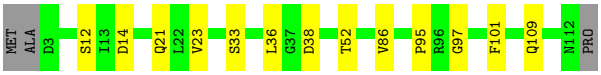




• Molecule 3: Phage tail protein

Chain F:

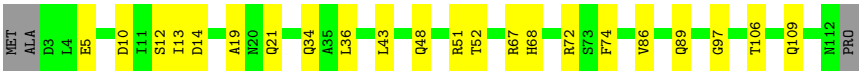




• Molecule 3: Phage tail protein

Chain I:

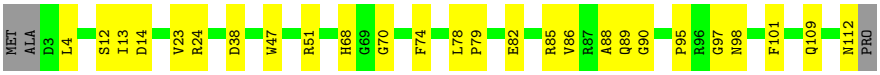




• Molecule 3: Phage tail protein

Chain J:

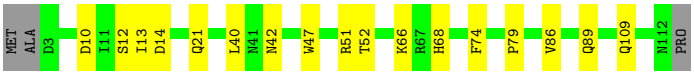




• Molecule 3: Phage tail protein

Chain V:





• Molecule 3: Phage tail protein

Chain W:

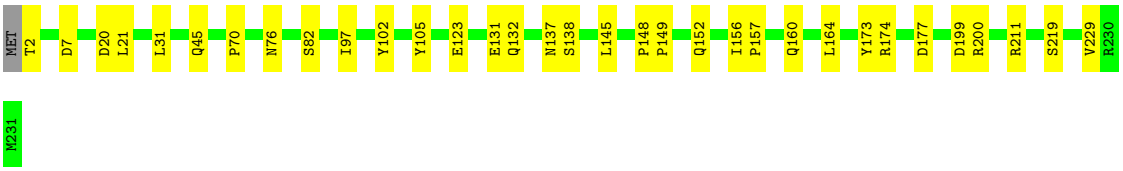




• Molecule 4: Probable bacteriophage protein

Chain E:

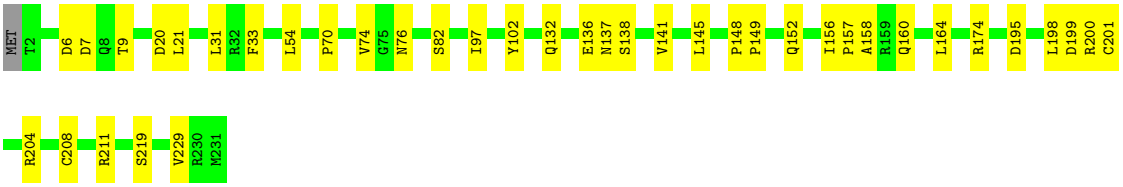




• Molecule 4: Probable bacteriophage protein

Chain K:

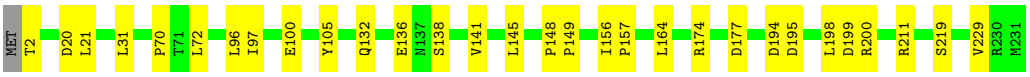




• Molecule 4: Probable bacteriophage protein

Chain U:

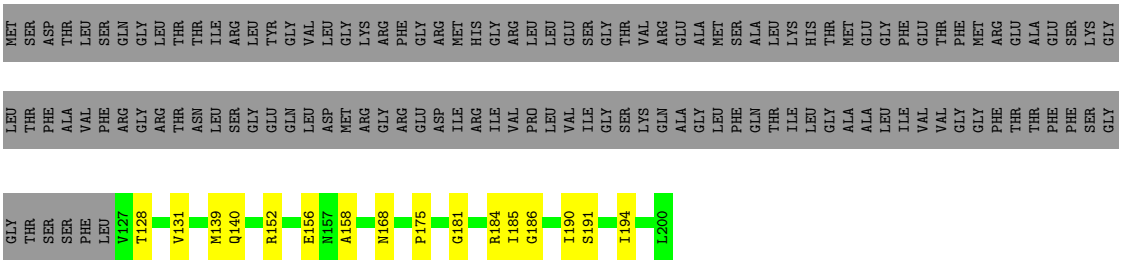




• Molecule 5: Probable bacteriophage protein

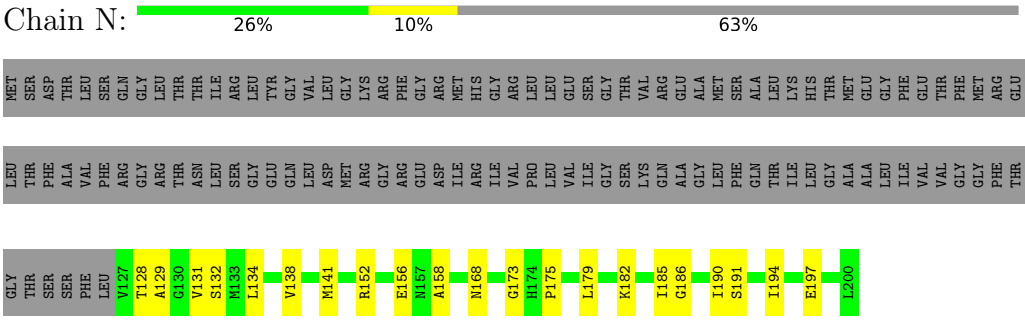
Chain L:





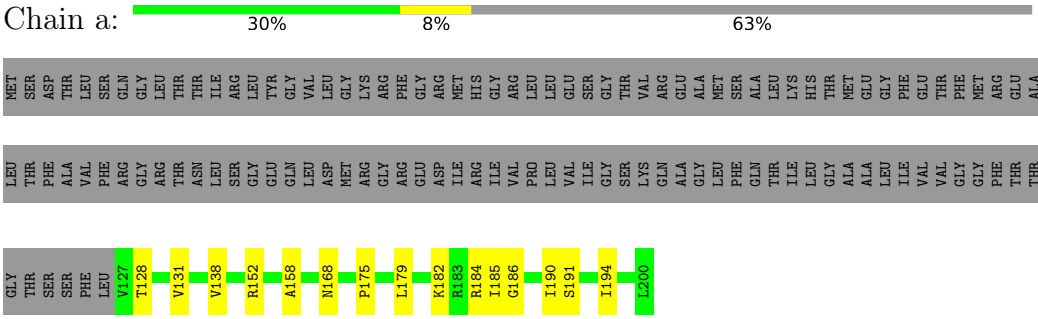
• Molecule 5: Probable bacteriophage protein

Chain N:



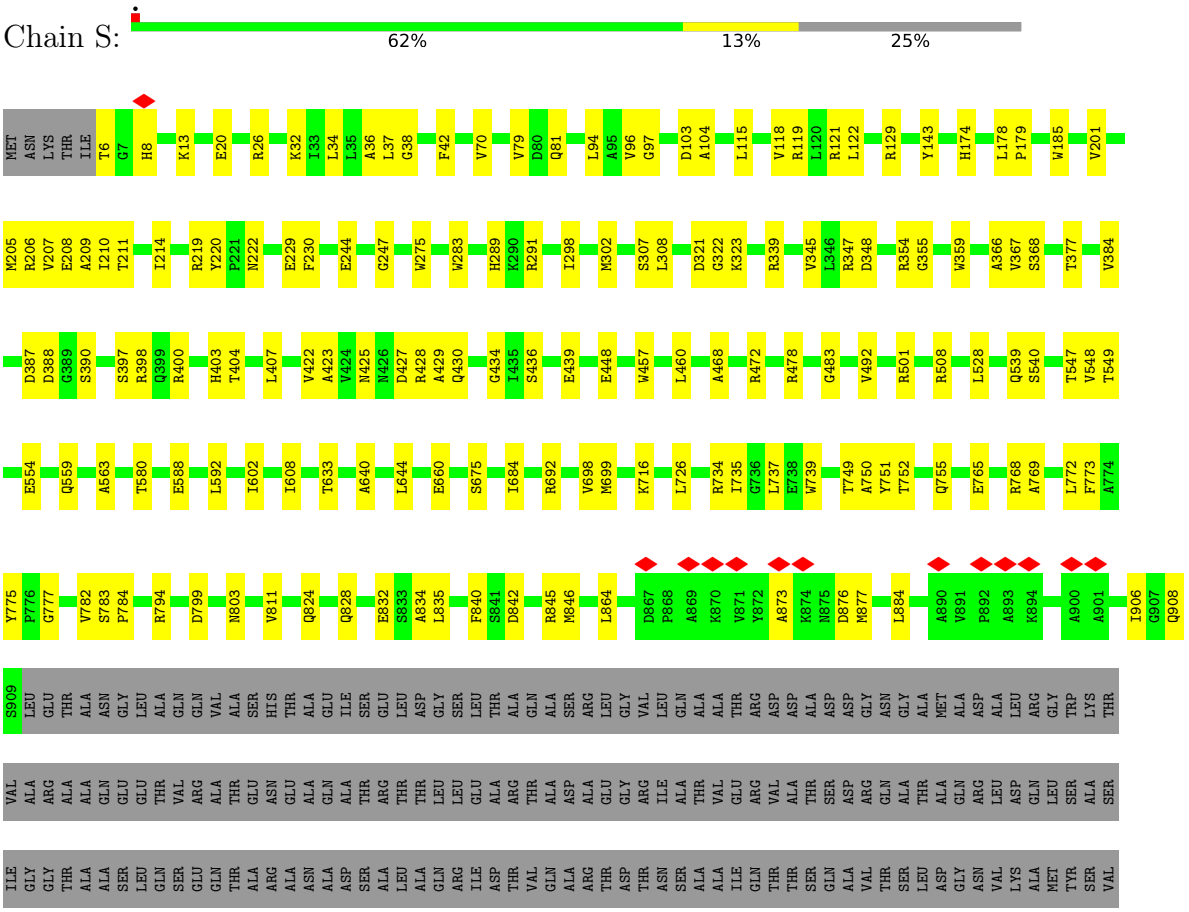
• Molecule 5: Probable bacteriophage protein

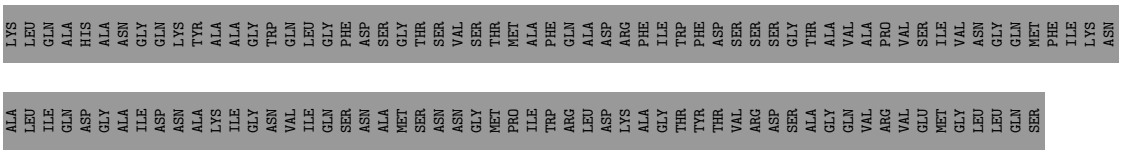
Chain a:



• Molecule 6: Probable bacteriophage protein

Chain S:

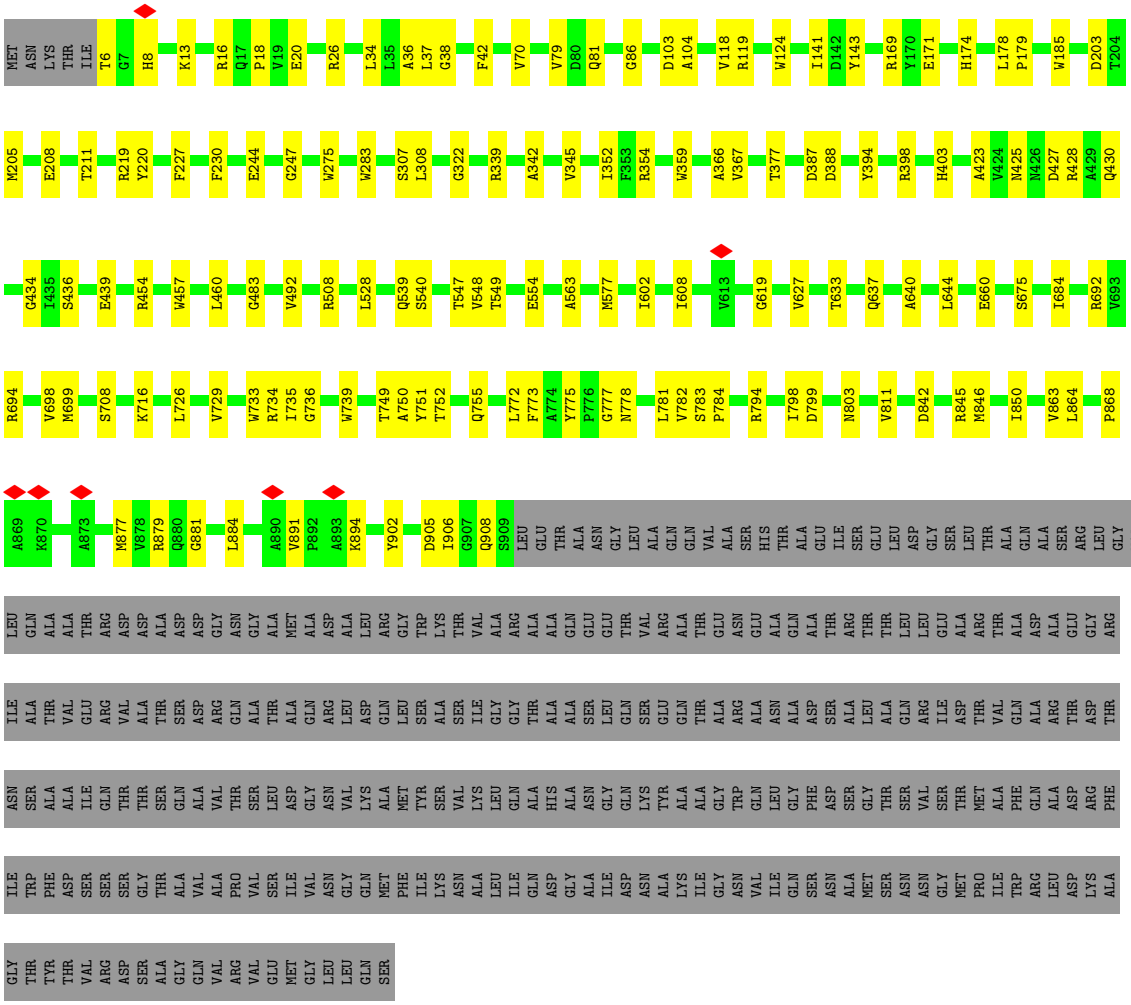




• Molecule 6: Probable bacteriophage protein

Chain T:

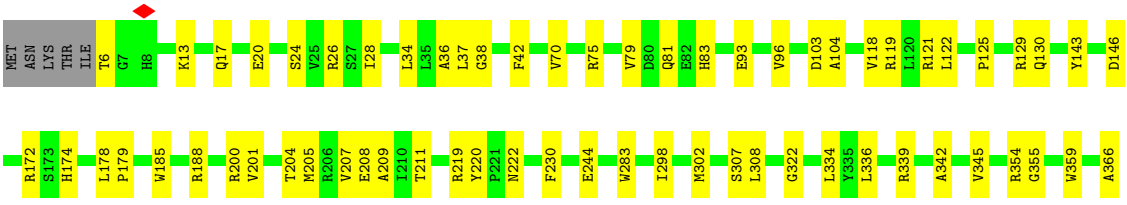


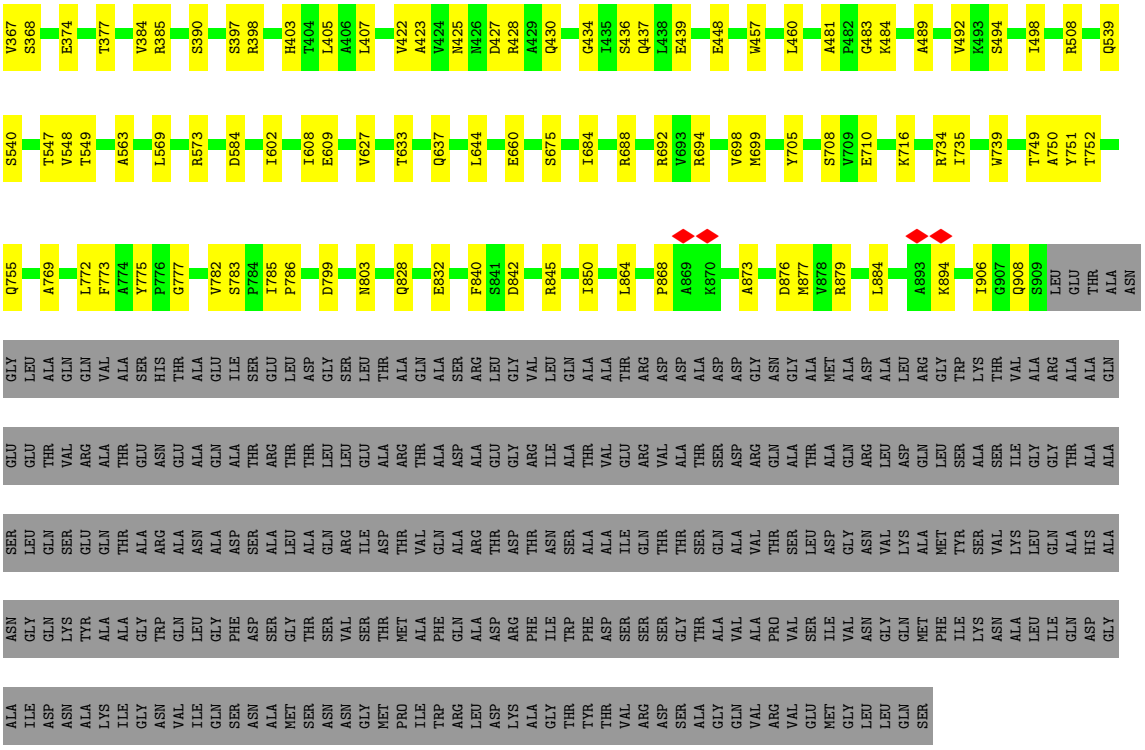


• Molecule 6: Probable bacteriophage protein

Chain X:






V367 S368 E374 T377 V384 R385 S390 S397 R398 H403 T404 L405 A406 L407 V422 A423 V424 N425 N426 D427 R428 A429 Q430 G434 I435 S436 Q437 L438 E439 E448 W457 L460 A481 P482 G483 K484 A489 V492 K493 S494 I498 R508 Q539
S540 T547 V548 T549 A563 L569 R573 D584 I602 I608 E609 V627 T633 Q637 L644 E660 S675 I684 R688 R692 V693 R694 V698 M699 Y705 S708 V709 E710 K716 R734 I735 W739 T749 A750 Y751 T752
Q755 A769 L772 F773 A774 Y775 P776 G777 V782 S783 P784 I785 P786 D799 N803 Q828 E832 F840 S841 D842 R845 I850 L864 P868 A869 K870 A873 D876 M877 V878 R879 L884 A893 K894 I906 G907 Q908 S909 LEU GLU THR ALA ASN
GLY LEU ALA GLN GLN VAL ALA SER HIS THR ALA GLU ILE SER GLU LEU ASP GLY SER LEU THR ALA GLN ALA SER ARG LEU GLY VAL LEU GLN ALA ALA THR ARG ASP ASP ALA ASP ASP GLY ASN GLY ALA MET ALA ASP ALA LEU ARG GLY TRP LYS THR VAL ALA VAL THR ARG
GLU GLU THR VAL ARG ALA THR GLU ASN GLU ALA GLN ALA THR ARG THR THR LEU LEU GLU ALA ARG THR ALA ASP ALA GLU GLY GLY ARG ILE ALA THR VAL GLU ARG VAL ALA THR SER ASP ARG GLN ALA THR ALA GLN ARG LEU ASP GLN LEU SER ALA SER ILE GLY GLY THR ALA ALA
SER LEU GLN SER GLU GLN THR ALA ARG ALA ASN ALA ASP SER ALA LEU ALA GLN ARG ILE ASP THR VAL GLN ALA ARG THR ASP THR ASN SER ALA ALA ILE GLN THR THR SER GLN ALA VAL THR SER LEU ASP GLY ASN VAL LYS ALA MET TYR SER VAL LYS LEU GLN ALA HIS ALA
ASN GLY GLN LYS TYR ALA ALA GLY TRP GLN LEU LEU GLY PHE ASP SER GLY THR SER VAL SER THR MET ALA PHE GLN ALA ASP ARG PHE ILE TRP PHE ASP SER SER SER GLY THR ALA VAL ALA PRO VAL SER ILE VAL ASN GLY GLN MET PHE ILE LYS ASN ALA LEU ILE GLN ASP GLY
ALA ILE ASP ASN ALA LYS ILE GLY ASN VAL ILE GLN SER ASN ALA MET SER ASN ASN GLY MET PRO ILE TRP ARG LEU ASP LYS ALA GLY THR TYR THR VAL ARG ASP SER ALA GLY GLN VAL ARG VAL GLU MET GLY LEU LEU GLN SER

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	106266	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	60.0	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	10500	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.080	Depositor
Minimum map value	-0.017	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.006	Depositor
Map size (Å)	425.486, 425.486, 425.486	wwPDB
Map dimensions	380, 380, 380	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.1197, 1.1197, 1.1197	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SF4

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	B	0.11	0/1261	0.30	0/1722
1	G	0.10	0/1261	0.29	0/1722
1	H	0.10	0/1261	0.33	0/1722
1	M	0.10	0/1261	0.30	0/1722
1	O	0.10	0/1261	0.32	0/1722
1	P	0.10	0/1261	0.30	0/1722
2	C	0.09	0/247	0.21	0/333
2	Q	0.10	0/247	0.22	0/333
2	R	0.10	0/247	0.24	0/333
3	D	0.09	0/899	0.23	0/1220
3	F	0.09	0/899	0.25	0/1220
3	I	0.10	0/899	0.27	0/1220
3	J	0.09	0/899	0.24	0/1220
3	V	0.10	0/899	0.25	0/1220
3	W	0.09	0/899	0.23	0/1220
4	E	0.10	0/1813	0.26	0/2464
4	K	0.10	0/1813	0.27	0/2464
4	U	0.11	0/1813	0.27	0/2464
5	L	0.11	0/538	0.26	0/727
5	N	0.12	0/538	0.26	0/727
5	a	0.10	0/538	0.25	0/727
6	S	0.10	0/7161	0.26	0/9744
6	T	0.10	0/7161	0.26	0/9744
6	X	0.10	0/7161	0.26	0/9744
All	All	0.10	0/42237	0.27	0/57456

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	B	1230	0	1197	34	0
1	G	1230	0	1197	39	0
1	H	1230	0	1197	42	0
1	M	1230	0	1197	49	0
1	O	1230	0	1197	41	0
1	P	1230	0	1197	47	0
2	C	245	0	247	4	0
2	Q	245	0	247	5	0
2	R	245	0	247	5	0
3	D	878	0	848	14	0
3	F	878	0	848	12	0
3	I	878	0	848	16	0
3	J	878	0	848	19	0
3	V	878	0	848	14	0
3	W	878	0	848	13	0
4	E	1769	0	1650	28	0
4	K	1769	0	1650	31	0
4	U	1769	0	1650	25	0
5	L	528	0	540	14	0
5	N	528	0	540	18	0
5	a	528	0	540	13	0
6	S	7004	0	6827	120	0
6	T	7004	0	6827	97	0
6	X	7004	0	6827	114	0
7	E	8	0	0	0	0
7	K	8	0	0	1	0
7	U	8	0	0	0	0
All	All	41310	0	40062	662	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.

All (662) 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)
4:E:70:PRO:HG2	4:E:145:LEU:HB2	1.68	0.74
4:K:70:PRO:HG2	4:K:145:LEU:HB2	1.69	0.74
6:T:528:LEU:HD12	6:T:554:GLU:HB2	1.70	0.73
4:E:2:THR:N	4:E:105:TYR:HH	1.86	0.72
4:E:200:ARG:O	4:E:211:ARG:NH2	2.23	0.72
1:P:99:GLY:HA2	1:P:123:ARG:HH12	1.53	0.72
4:U:70:PRO:HG2	4:U:145:LEU:HB2	1.71	0.72
6:T:423:ALA:HB3	4:U:164:LEU:HD12	1.73	0.71
6:S:528:LEU:HD12	6:S:554:GLU:HB2	1.72	0.70
5:N:194:ILE:HG21	6:S:698:VAL:HG11	1.74	0.70
1:M:15:PRO:O	1:M:81:ARG:NH2	2.24	0.69
6:T:905:ASP:O	6:T:908:GLN:NE2	2.24	0.69
1:P:15:PRO:O	1:P:81:ARG:NH2	2.25	0.69
1:H:70:ILE:HB	1:H:147:THR:HB	1.75	0.69
6:S:580:THR:HB	6:S:588:GLU:HB2	1.74	0.69
6:S:539:GLN:HE22	6:S:549:THR:HA	1.57	0.68
1:B:66:ALA:HB3	1:B:151:ILE:HB	1.76	0.68
4:E:21:LEU:HB2	4:E:31:LEU:HB2	1.76	0.68
4:K:164:LEU:HD12	6:X:423:ALA:HB3	1.76	0.67
6:S:472:ARG:NE	6:S:588:GLU:OE2	2.26	0.67
3:D:89:GLN:O	3:I:21:GLN:NE2	2.28	0.67
4:U:200:ARG:O	4:U:211:ARG:NH2	2.27	0.67
6:X:698:VAL:HG11	5:a:194:ILE:HG21	1.74	0.67
1:G:61:ARG:NH2	1:M:86:SER:O	2.28	0.67
6:S:121:ARG:HB3	6:S:209:ALA:HB3	1.76	0.67
6:S:783:SER:OG	6:T:734:ARG:NE	2.28	0.66
4:E:152:GLN:OE1	6:S:398:ARG:NH2	2.28	0.66
6:S:749:THR:HA	6:S:799:ASP:HA	1.77	0.66
1:M:124:THR:HG23	1:M:161:PRO:HA	1.78	0.66
3:F:21:GLN:NE2	3:J:89:GLN:O	2.29	0.66
1:G:76:LEU:HD23	1:G:78:SER:H	1.61	0.66
6:X:749:THR:HA	6:X:799:ASP:HA	1.76	0.66
6:X:79:VAL:O	6:X:219:ARG:NH2	2.29	0.65
1:P:127:THR:HB	1:P:158:LYS:HB2	1.77	0.65
1:G:66:ALA:HB3	1:G:151:ILE:HB	1.77	0.65
6:X:119:ARG:HB2	6:X:211:THR:HB	1.79	0.65
1:B:96:TRP:NE1	1:B:130:GLY:O	2.28	0.65
6:T:79:VAL:O	6:T:219:ARG:NH2	2.29	0.65
1:B:29:GLU:HB2	1:B:76:LEU:HD11	1.77	0.65
1:M:51:ASP:OD2	1:M:55:LYS:NZ	2.30	0.65
1:B:93:SER:HA	1:B:131:TYR:HB3	1.80	0.64
1:M:48:CYS:SG	1:M:55:LYS:NZ	2.66	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:S:79:VAL:O	6:S:219:ARG:NH2	2.31	0.64
6:S:298:ILE:HG13	6:S:302:MET:HE2	1.77	0.64
1:H:121:PRO:HB3	1:H:163:SER:HB2	1.80	0.64
6:X:750:ALA:HA	6:X:775:TYR:HB2	1.78	0.64
3:V:21:GLN:NE2	3:W:89:GLN:O	2.30	0.64
4:K:21:LEU:HB2	4:K:31:LEU:HB2	1.80	0.64
6:T:749:THR:HA	6:T:799:ASP:HA	1.78	0.64
1:M:100:TRP:H	1:M:123:ARG:HH22	1.45	0.63
1:O:96:TRP:NE1	1:O:130:GLY:O	2.29	0.63
6:S:640:ALA:HB3	6:T:637:GLN:HE22	1.63	0.63
1:H:106:VAL:HB	1:H:123:ARG:HE	1.64	0.63
1:P:88:LYS:HB3	1:P:92:THR:HG21	1.80	0.63
6:X:539:GLN:HE22	6:X:549:THR:HA	1.62	0.63
1:G:31:VAL:HG21	1:G:70:ILE:HD13	1.80	0.63
1:H:43:GLN:OE1	1:P:152:GLN:NE2	2.28	0.63
1:G:54:ARG:NH2	1:M:42:ASP:OD2	2.31	0.62
1:O:51:ASP:OD2	1:O:55:LYS:NZ	2.32	0.62
1:H:125:TRP:HB2	1:H:160:THR:HB	1.80	0.62
6:S:835:LEU:HA	6:X:828:GLN:HE22	1.65	0.62
1:B:60:LEU:HG	3:J:97:GLY:HA2	1.81	0.62
4:K:152:GLN:OE1	6:X:398:ARG:NH2	2.32	0.62
1:M:29:GLU:HB2	1:M:76:LEU:HD11	1.82	0.62
4:E:173:TYR:OH	4:E:211:ARG:NH1	2.32	0.62
5:L:152:ARG:NH2	5:a:158:ALA:O	2.28	0.62
6:S:750:ALA:HA	6:S:775:TYR:HB2	1.82	0.62
6:T:6:THR:HG21	4:U:229:VAL:HG11	1.82	0.62
6:S:877:MET:HE1	6:S:906:ILE:HD11	1.81	0.62
5:L:194:ILE:HG21	6:T:698:VAL:HG11	1.82	0.61
6:T:169:ARG:NH2	6:T:171:GLU:OE2	2.31	0.61
6:X:121:ARG:HB3	6:X:209:ALA:HB3	1.81	0.61
4:U:2:THR:N	4:U:105:TYR:HH	1.98	0.61
1:G:65:GLN:NE2	1:G:152:GLN:OE1	2.33	0.61
3:J:24:ARG:NH2	3:J:38:ASP:OD1	2.33	0.61
6:S:403:HIS:HA	6:S:436:SER:HB2	1.82	0.61
1:H:124:THR:HG23	1:H:161:PRO:HA	1.82	0.61
6:X:842:ASP:OD1	6:X:845:ARG:NH2	2.34	0.61
1:O:31:VAL:HG21	1:O:70:ILE:HD13	1.82	0.60
6:S:345:VAL:HB	4:U:156:ILE:HG13	1.82	0.60
4:E:156:ILE:HG13	6:X:345:VAL:HB	1.83	0.60
4:K:156:ILE:HG13	6:T:345:VAL:HB	1.82	0.60
1:P:76:LEU:HD23	1:P:78:SER:H	1.67	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:23:VAL:HG22	3:V:89:GLN:HE22	1.65	0.60
6:T:339:ARG:NH2	6:X:439:GLU:OE2	2.34	0.60
1:G:67:THR:HG22	1:G:150:THR:HG22	1.83	0.60
1:P:60:LEU:HG	3:W:97:GLY:HA2	1.83	0.60
1:B:15:PRO:O	1:B:81:ARG:NH2	2.34	0.60
6:S:633:THR:HG21	6:S:716:LYS:HB3	1.84	0.60
1:H:76:LEU:HD23	1:H:78:SER:H	1.67	0.60
1:H:96:TRP:NE1	1:H:130:GLY:O	2.34	0.60
1:O:66:ALA:HB3	1:O:151:ILE:HB	1.84	0.60
1:O:103:GLY:O	1:O:123:ARG:NH1	2.35	0.59
4:E:229:VAL:HG11	6:S:6:THR:HG21	1.83	0.59
6:S:716:LYS:NZ	6:S:799:ASP:OD2	2.34	0.59
1:B:2:SER:HB2	1:G:144:LEU:HD21	1.83	0.59
3:D:12:SER:OG	3:D:14:ASP:OD1	2.19	0.59
1:H:106:VAL:O	1:H:123:ARG:NH2	2.32	0.59
1:M:65:GLN:OE1	1:M:152:GLN:NE2	2.35	0.59
1:P:98:ILE:HD13	1:P:126:PHE:HD2	1.68	0.59
1:H:48:CYS:SG	1:H:55:LYS:NZ	2.68	0.58
6:S:118:VAL:HG23	6:S:178:LEU:HD11	1.84	0.58
1:G:2:SER:HB2	1:M:144:LEU:HD21	1.84	0.58
1:M:125:TRP:HB2	1:M:160:THR:HB	1.84	0.58
1:P:66:ALA:HB3	1:P:151:ILE:HB	1.84	0.58
1:G:15:PRO:O	1:G:81:ARG:NH2	2.37	0.58
1:G:60:LEU:HG	3:I:97:GLY:HA2	1.85	0.58
1:P:134:ASP:OD2	1:P:150:THR:OG1	2.20	0.58
4:K:201:CYS:HA	4:K:211:ARG:HH12	1.68	0.58
6:S:179:PRO:O	6:S:185:TRP:NE1	2.30	0.58
1:P:11:TYR:HE2	1:P:107:LYS:HG3	1.67	0.58
6:S:755:GLN:OE1	6:S:794:ARG:NH2	2.36	0.58
6:S:842:ASP:OD1	6:S:845:ARG:NH2	2.35	0.58
6:T:70:VAL:HG22	6:T:230:PHE:HB3	1.85	0.58
1:B:46:ASP:OD2	3:J:51:ARG:NH1	2.37	0.58
1:P:31:VAL:HG21	1:P:70:ILE:HD13	1.86	0.58
6:S:884:LEU:HD12	6:T:877:MET:HE2	1.85	0.58
6:T:34:LEU:HB3	5:a:191:SER:HB3	1.86	0.58
6:T:842:ASP:OD1	6:T:845:ARG:NH2	2.37	0.58
1:B:74:PRO:HB2	1:O:161:PRO:HB3	1.85	0.57
6:X:755:GLN:HG2	6:X:769:ALA:HA	1.85	0.57
1:G:51:ASP:OD2	1:G:55:LYS:NZ	2.35	0.57
6:S:478:ARG:NH2	4:U:100:GLU:OE1	2.37	0.57
1:B:127:THR:HB	1:B:158:LYS:HB2	1.87	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:134:ASP:OD2	1:H:150:THR:OG1	2.22	0.57
5:L:158:ALA:O	5:N:152:ARG:NH2	2.31	0.57
5:a:168:ASN:ND2	5:a:186:GLY:O	2.37	0.57
6:S:339:ARG:NH2	6:T:439:GLU:OE2	2.37	0.57
6:T:750:ALA:HA	6:T:775:TYR:HB2	1.86	0.57
6:S:539:GLN:OE1	6:S:539:GLN:N	2.37	0.57
1:P:96:TRP:NE1	1:P:130:GLY:O	2.28	0.56
1:P:124:THR:HG23	1:P:161:PRO:HA	1.87	0.56
6:X:799:ASP:OD2	6:X:803:ASN:ND2	2.37	0.56
1:H:61:ARG:NH2	1:P:86:SER:O	2.39	0.56
1:M:76:LEU:HD23	1:M:78:SER:H	1.69	0.56
5:N:191:SER:HB3	6:X:34:LEU:HB3	1.88	0.56
1:O:132:VAL:HB	1:O:151:ILE:HG12	1.87	0.56
6:S:206:ARG:NH1	6:S:208:GLU:OE2	2.37	0.56
6:S:828:GLN:HE21	6:S:832:GLU:HG3	1.71	0.56
6:T:141:ILE:HD11	6:T:203:ASP:HB2	1.87	0.56
6:T:640:ALA:HB3	6:X:637:GLN:HE22	1.71	0.56
6:T:734:ARG:HD2	6:T:781:LEU:HD11	1.86	0.56
4:U:20:ASP:HB2	4:U:97:ILE:HB	1.86	0.56
6:X:298:ILE:HG13	6:X:302:MET:HE3	1.87	0.56
6:S:384:VAL:HB	6:S:472:ARG:HB2	1.87	0.56
6:T:539:GLN:N	6:T:539:GLN:OE1	2.38	0.56
4:K:132:GLN:HB3	6:X:398:ARG:HA	1.87	0.56
6:S:540:SER:OG	6:S:547:THR:N	2.36	0.56
1:B:54:ARG:NH2	1:G:42:ASP:OD2	2.34	0.56
6:T:118:VAL:HG23	6:T:178:LEU:HD11	1.88	0.56
4:U:21:LEU:HB2	4:U:31:LEU:HB2	1.87	0.56
1:H:66:ALA:O	1:H:151:ILE:N	2.35	0.56
4:K:199:ASP:O	4:K:200:ARG:NH1	2.39	0.56
5:L:168:ASN:ND2	5:L:186:GLY:O	2.39	0.56
6:T:864:LEU:HD13	6:X:864:LEU:HD21	1.88	0.55
1:B:48:CYS:SG	1:B:55:LYS:NZ	2.67	0.55
1:G:134:ASP:OD2	1:G:150:THR:OG1	2.25	0.55
5:N:168:ASN:ND2	5:N:186:GLY:O	2.40	0.55
1:G:43:GLN:OE1	1:M:152:GLN:NE2	2.40	0.55
1:H:3:ILE:HD11	1:H:100:TRP:HE3	1.72	0.55
1:B:86:SER:O	1:O:61:ARG:NH2	2.40	0.55
4:E:132:GLN:HB3	6:S:398:ARG:HA	1.87	0.55
4:K:157:PRO:HB2	5:a:175:PRO:HB2	1.87	0.55
6:X:118:VAL:HG23	6:X:178:LEU:HD11	1.88	0.55
6:S:81:GLN:NE2	6:S:220:TYR:O	2.40	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:86:VAL:HG12	3:D:109:GLN:HA	1.88	0.55
4:E:76:ASN:ND2	4:E:82:SER:OG	2.32	0.55
1:H:70:ILE:HG13	1:H:135:PHE:HE1	1.72	0.55
1:O:29:GLU:HB2	1:O:76:LEU:HD11	1.88	0.55
1:O:66:ALA:O	1:O:151:ILE:N	2.32	0.55
6:T:799:ASP:OD2	6:T:803:ASN:ND2	2.37	0.55
6:T:879:ARG:NH1	6:T:881:GLY:O	2.38	0.55
6:X:179:PRO:O	6:X:185:TRP:NE1	2.32	0.55
1:P:13:LEU:HD13	1:P:117:PHE:HE1	1.70	0.55
4:E:157:PRO:HB2	5:N:175:PRO:HB2	1.88	0.54
3:F:12:SER:OG	3:F:14:ASP:OD1	2.24	0.54
1:H:8:THR:HG22	1:H:100:TRP:HA	1.89	0.54
6:S:26:ARG:HB2	6:T:675:SER:HB3	1.90	0.54
6:S:824:GLN:HE22	6:X:786:PRO:HB3	1.72	0.54
6:X:539:GLN:HG2	6:X:539:GLN:O	2.07	0.54
1:H:51:ASP:OD2	1:H:55:LYS:NZ	2.33	0.54
4:U:156:ILE:HB	4:U:157:PRO:HD3	1.89	0.54
6:T:179:PRO:O	6:T:185:TRP:NE1	2.35	0.54
6:T:644:LEU:HB2	6:T:684:ILE:HD13	1.90	0.54
6:X:644:LEU:HB2	6:X:684:ILE:HD13	1.87	0.54
1:O:3:ILE:HD11	1:O:100:TRP:HE3	1.73	0.54
6:S:834:ALA:O	6:X:828:GLN:NE2	2.40	0.54
1:H:13:LEU:HD11	1:H:25:VAL:HG22	1.89	0.54
1:P:29:GLU:HB2	1:P:76:LEU:HD11	1.89	0.54
1:P:123:ARG:HD3	1:P:125:TRP:CZ2	2.43	0.54
6:T:13:LYS:HA	6:T:699:MET:HE3	1.88	0.54
6:T:751:TYR:HA	6:T:773:PHE:O	2.08	0.54
6:X:122:LEU:HD22	6:X:207:VAL:HG22	1.90	0.54
3:D:51:ARG:NH1	1:M:46:ASP:OD2	2.40	0.54
1:G:66:ALA:O	1:G:151:ILE:N	2.34	0.54
6:S:119:ARG:HB3	6:S:211:THR:HB	1.89	0.54
6:S:208:GLU:OE1	6:S:208:GLU:N	2.40	0.54
6:X:405:LEU:HD23	6:X:437:GLN:HG2	1.90	0.54
1:B:98:ILE:HD13	1:B:126:PHE:HD2	1.73	0.53
6:T:425:ASN:OD1	6:T:430:GLN:NE2	2.41	0.53
4:K:160:GLN:OE1	6:T:339:ARG:NH1	2.41	0.53
1:O:124:THR:HG23	1:O:161:PRO:HA	1.91	0.53
2:R:582:GLN:OE1	2:R:586:MET:HE1	2.07	0.53
6:X:751:TYR:HA	6:X:773:PHE:O	2.08	0.53
1:B:31:VAL:HG21	1:B:70:ILE:HD13	1.91	0.53
1:H:42:ASP:OD2	1:M:54:ARG:NH2	2.35	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:O:93:SER:HA	1:O:131:TYR:HB3	1.90	0.53
1:G:70:ILE:N	1:G:147:THR:O	2.42	0.53
1:G:124:THR:HG23	1:G:161:PRO:HA	1.90	0.53
1:B:3:ILE:HD11	1:B:100:TRP:HE3	1.74	0.53
4:E:156:ILE:HG12	6:X:342:ALA:HA	1.91	0.53
1:G:96:TRP:NE1	1:G:130:GLY:O	2.39	0.53
6:S:751:TYR:HA	6:S:773:PHE:O	2.09	0.53
6:T:81:GLN:NE2	6:T:220:TYR:O	2.42	0.53
6:X:633:THR:HG21	6:X:716:LYS:HB3	1.91	0.53
5:L:185:ILE:HD11	6:S:37:LEU:HD13	1.91	0.53
6:S:644:LEU:HB2	6:S:684:ILE:HD13	1.91	0.53
6:T:119:ARG:HB2	6:T:211:THR:HB	1.90	0.53
1:G:38:GLY:O	1:G:153:ARG:NH2	2.42	0.52
1:O:72:ALA:HA	1:O:79:HIS:HD2	1.74	0.52
6:S:877:MET:HE2	6:X:906:ILE:HD11	1.91	0.52
3:V:12:SER:OG	3:V:14:ASP:OD1	2.24	0.52
6:X:508:ARG:NH1	6:X:548:VAL:O	2.43	0.52
3:F:38:ASP:OD2	6:X:385:ARG:NH2	2.41	0.52
1:H:95:LYS:HB3	1:H:117:PHE:HE2	1.74	0.52
4:K:156:ILE:HG12	6:T:342:ALA:HA	1.92	0.52
6:T:755:GLN:OE1	6:T:794:ARG:NH2	2.39	0.52
1:B:76:LEU:HD23	1:B:78:SER:H	1.75	0.52
1:M:88:LYS:HG3	1:M:92:THR:HG21	1.91	0.52
1:O:100:TRP:O	1:O:123:ARG:NE	2.42	0.52
6:T:633:THR:HG21	6:T:716:LYS:HB3	1.90	0.52
6:T:891:VAL:HG22	6:T:902:TYR:HB3	1.91	0.52
1:B:42:ASP:OD2	1:O:54:ARG:NH2	2.42	0.52
1:G:49:LEU:HD23	3:I:13:ILE:HD13	1.91	0.52
6:T:492:VAL:HG11	4:U:138:SER:HA	1.91	0.52
3:D:68:HIS:CE1	3:D:74:PHE:HB3	2.45	0.52
5:N:156:GLU:HG3	6:S:8:HIS:HB2	1.92	0.52
1:O:134:ASP:OD2	1:O:150:THR:OG1	2.27	0.52
4:E:199:ASP:O	4:E:200:ARG:NH1	2.42	0.52
4:K:20:ASP:HB2	4:K:97:ILE:HB	1.92	0.52
1:O:88:LYS:HB3	1:O:92:THR:HG21	1.90	0.52
1:P:125:TRP:HB2	1:P:160:THR:HB	1.92	0.52
1:O:26:LEU:HD21	1:O:78:SER:HB2	1.92	0.52
6:S:122:LEU:HD22	6:S:207:VAL:HG22	1.91	0.51
6:S:508:ARG:NH1	6:S:548:VAL:O	2.43	0.51
6:T:387:ASP:OD1	6:T:388:ASP:N	2.43	0.51
5:L:139:MET:SD	5:L:140:GLN:NE2	2.82	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:34:PHE:HD1	1:M:68:LEU:HD13	1.75	0.51
5:N:158:ALA:O	5:a:152:ARG:NH2	2.33	0.51
1:G:46:ASP:HB3	3:I:52:THR:HB	1.92	0.51
1:H:122:ALA:O	1:H:162:LYS:NZ	2.40	0.51
1:G:97:ALA:HB1	1:G:125:TRP:HZ3	1.76	0.51
5:N:185:ILE:HD11	6:X:37:LEU:HD13	1.93	0.51
6:S:439:GLU:OE2	6:X:339:ARG:NH2	2.43	0.51
6:S:675:SER:HB3	6:X:26:ARG:HB2	1.93	0.51
4:U:199:ASP:O	4:U:200:ARG:NH1	2.42	0.51
1:O:70:ILE:N	1:O:147:THR:O	2.41	0.51
6:X:70:VAL:HG22	6:X:230:PHE:HB3	1.91	0.51
1:B:59:GLY:O	3:J:98:ASN:ND2	2.44	0.51
1:O:93:SER:OG	1:O:129:GLU:OE2	2.19	0.51
6:S:70:VAL:HG22	6:S:230:PHE:HB3	1.93	0.51
6:T:26:ARG:HB2	6:X:675:SER:HB3	1.93	0.51
6:T:508:ARG:NH1	6:T:548:VAL:O	2.44	0.51
6:T:540:SER:OG	6:T:547:THR:N	2.40	0.51
6:X:540:SER:OG	6:X:547:THR:N	2.38	0.51
6:X:868:PRO:O	6:X:894:LYS:N	2.40	0.51
3:F:23:VAL:HG22	3:J:89:GLN:HE22	1.75	0.51
1:M:96:TRP:NE1	1:M:130:GLY:O	2.42	0.51
6:T:18:PRO:O	6:T:694:ARG:NH2	2.43	0.51
6:S:799:ASP:OD2	6:S:803:ASN:ND2	2.38	0.51
6:S:94:LEU:HB2	6:S:210:ILE:HG23	1.92	0.50
3:J:12:SER:OG	3:J:14:ASP:OD1	2.20	0.50
6:S:765:GLU:O	6:S:768:ARG:NH2	2.44	0.50
3:J:86:VAL:HG12	3:J:109:GLN:HA	1.94	0.50
1:B:13:LEU:HD21	1:B:25:VAL:HG22	1.93	0.50
4:K:7:ASP:OD1	4:K:102:TYR:OH	2.26	0.50
4:E:160:GLN:NE2	5:N:173:GLY:O	2.44	0.50
4:U:174:ARG:NH2	4:U:199:ASP:OD2	2.34	0.50
4:K:76:ASN:ND2	4:K:82:SER:OG	2.37	0.50
6:S:122:LEU:HD13	6:S:205:MET:HE3	1.94	0.50
6:T:627:VAL:HG12	6:T:708:SER:HB3	1.94	0.50
4:E:164:LEU:HD12	6:S:423:ALA:HB3	1.93	0.50
1:H:46:ASP:HB3	3:V:52:THR:HB	1.93	0.50
6:T:735:ILE:H	6:T:782:VAL:HG12	1.76	0.49
3:I:89:GLN:HE22	3:J:23:VAL:HG12	1.77	0.49
1:M:106:VAL:HB	1:M:123:ARG:HD2	1.94	0.49
6:S:908:GLN:HE22	6:X:908:GLN:N	2.10	0.49
4:E:20:ASP:HB2	4:E:97:ILE:HB	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:O:76:LEU:HD23	1:O:78:SER:H	1.77	0.49
1:P:117:PHE:HE2	1:P:127:THR:HG23	1.77	0.49
1:P:119:LEU:HD12	1:P:125:TRP:CG	2.47	0.49
6:S:873:ALA:N	6:S:876:ASP:OD2	2.45	0.49
6:T:394:TYR:HB2	4:U:136:GLU:HG2	1.94	0.49
6:X:367:VAL:HG11	6:X:483:GLY:HA3	1.93	0.49
1:B:124:THR:HG23	1:B:161:PRO:HA	1.94	0.49
1:H:70:ILE:HG13	1:H:135:PHE:CE1	2.47	0.49
1:P:42:ASP:OD1	1:P:43:GLN:N	2.44	0.49
1:M:119:LEU:HD12	1:M:125:TRP:CG	2.47	0.49
6:S:726:LEU:HD13	6:S:739:TRP:HB3	1.94	0.49
6:T:460:LEU:HD12	6:T:602:ILE:HG13	1.95	0.49
6:X:13:LYS:HA	6:X:699:MET:HE3	1.94	0.49
6:X:93:GLU:OE2	6:X:121:ARG:NH2	2.35	0.49
1:B:49:LEU:HD23	3:J:13:ILE:HD13	1.94	0.49
1:H:127:THR:HB	1:H:158:LYS:HB2	1.93	0.49
2:Q:597:GLN:HG3	2:Q:600:ARG:HH21	1.76	0.49
6:S:20:GLU:O	6:S:26:ARG:NH2	2.45	0.49
6:S:143:TYR:OH	6:S:174:HIS:NE2	2.40	0.49
4:U:72:LEU:HD22	4:U:96:LEU:HD22	1.95	0.49
3:V:40:LEU:H	3:V:40:LEU:HD23	1.77	0.49
6:X:208:GLU:HG2	6:X:208:GLU:O	2.12	0.49
4:E:138:SER:HA	6:S:492:VAL:HG11	1.94	0.49
2:Q:582:GLN:OE1	2:Q:586:MET:HE1	2.13	0.49
6:X:129:ARG:HG3	6:X:201:VAL:HG22	1.95	0.49
1:M:81:ARG:HH11	1:M:84:GLN:HE21	1.61	0.49
6:X:660:GLU:OE2	6:X:705:TYR:OH	2.29	0.49
1:P:46:ASP:OD2	3:W:51:ARG:NH1	2.46	0.49
6:S:460:LEU:HD12	6:S:602:ILE:HG13	1.95	0.49
6:T:660:GLU:OE1	6:T:692:ARG:NH2	2.39	0.49
6:T:846:MET:O	6:T:850:ILE:HG12	2.12	0.49
6:X:873:ALA:N	6:X:876:ASP:OD2	2.45	0.49
1:O:144:LEU:HD21	1:P:2:SER:HB2	1.93	0.49
5:L:175:PRO:HB2	4:U:157:PRO:HB2	1.94	0.48
6:S:367:VAL:HG11	6:S:483:GLY:HA3	1.95	0.48
6:S:734:ARG:NE	6:X:783:SER:OG	2.44	0.48
6:T:20:GLU:O	6:T:26:ARG:NH2	2.46	0.48
6:T:377:THR:HG21	6:T:563:ALA:HB2	1.95	0.48
4:U:136:GLU:HB2	4:U:141:VAL:HG22	1.94	0.48
6:X:735:ILE:H	6:X:782:VAL:HG12	1.78	0.48
4:E:219:SER:OG	6:X:219:ARG:NH1	2.47	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:L:191:SER:HB3	6:S:34:LEU:HB3	1.95	0.48
1:P:48:CYS:SG	1:P:55:LYS:NZ	2.74	0.48
3:W:70:GLY:HA2	3:W:88:ALA:O	2.13	0.48
6:X:143:TYR:OH	6:X:174:HIS:NE2	2.39	0.48
2:C:582:GLN:OE1	2:C:586:MET:HE1	2.14	0.48
1:H:70:ILE:N	1:H:147:THR:O	2.47	0.48
5:L:156:GLU:HG3	6:T:8:HIS:HB2	1.95	0.48
6:S:219:ARG:NH1	4:U:219:SER:OG	2.46	0.48
6:T:37:LEU:HD13	5:a:185:ILE:HD11	1.94	0.48
1:B:44:ILE:O	1:B:57:LYS:N	2.46	0.48
1:G:97:ALA:HB1	1:G:125:TRP:CZ3	2.48	0.48
4:K:200:ARG:O	4:K:211:ARG:NH2	2.36	0.48
4:E:131:GLU:OE2	6:S:400:ARG:NE	2.46	0.48
6:X:688:ARG:NH2	6:X:710:GLU:OE1	2.47	0.48
1:G:34:PHE:HB3	1:M:139:PHE:HD2	1.79	0.48
1:O:139:PHE:HD2	1:P:34:PHE:HB3	1.79	0.48
6:T:884:LEU:HD12	6:X:877:MET:HE2	1.95	0.48
3:W:68:HIS:CE1	3:W:74:PHE:HB3	2.48	0.48
6:X:660:GLU:OE1	6:X:692:ARG:NH2	2.42	0.48
6:X:81:GLN:NE2	6:X:220:TYR:O	2.47	0.48
6:S:425:ASN:OD1	6:S:430:GLN:NE2	2.47	0.48
3:W:86:VAL:HG12	3:W:109:GLN:HA	1.96	0.47
1:O:48:CYS:SG	1:O:55:LYS:NZ	2.69	0.47
1:P:13:LEU:HD13	1:P:117:PHE:CE1	2.48	0.47
6:T:367:VAL:HG11	6:T:483:GLY:HA3	1.95	0.47
3:D:97:GLY:HA2	1:M:60:LEU:HG	1.96	0.47
4:E:160:GLN:HG3	6:S:407:LEU:HD11	1.96	0.47
1:P:11:TYR:CE2	1:P:107:LYS:HG3	2.49	0.47
6:S:289:HIS:HE1	6:S:291:ARG:HG2	1.80	0.47
6:X:397:SER:HB3	5:a:138:VAL:HG23	1.97	0.47
1:M:134:ASP:HB3	1:M:150:THR:H	1.80	0.47
5:N:190:ILE:HD13	6:X:36:ALA:HB2	1.97	0.47
6:T:403:HIS:HA	6:T:436:SER:HB2	1.97	0.47
6:X:38:GLY:HA3	6:X:42:PHE:CZ	2.49	0.47
1:H:67:THR:HG22	1:H:150:THR:HG22	1.96	0.47
1:B:132:VAL:HB	1:B:151:ILE:HG12	1.97	0.47
1:P:13:LEU:HA	1:P:24:THR:O	2.15	0.47
6:S:739:TRP:NE1	6:S:752:THR:HG21	2.30	0.47
3:W:24:ARG:NH1	6:X:584:ASP:OD2	2.48	0.47
6:X:430:GLN:HA	6:X:434:GLY:O	2.15	0.47
6:X:460:LEU:HD12	6:X:602:ILE:HG13	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:S:735:ILE:H	6:S:782:VAL:HG12	1.79	0.47
6:S:755:GLN:HG2	6:S:769:ALA:HA	1.97	0.47
1:G:84:GLN:O	1:G:88:LYS:HG3	2.15	0.47
5:N:141:MET:HG2	6:S:592:LEU:HD11	1.97	0.47
6:S:38:GLY:HA3	6:S:42:PHE:CZ	2.50	0.47
6:S:726:LEU:HG	6:S:811:VAL:HG11	1.96	0.47
6:T:38:GLY:HA3	6:T:42:PHE:CZ	2.50	0.47
6:T:726:LEU:HG	6:T:811:VAL:HG11	1.97	0.47
6:T:868:PRO:O	6:T:894:LYS:N	2.47	0.47
3:D:80:THR:OG1	3:D:82:GLU:OE1	2.27	0.46
1:O:74:PRO:HB2	1:P:161:PRO:HB3	1.96	0.46
4:E:177:ASP:OD1	6:X:222:ASN:ND2	2.49	0.46
1:G:34:PHE:HD1	1:G:68:LEU:HB3	1.79	0.46
6:S:539:GLN:HG2	6:S:539:GLN:O	2.16	0.46
6:T:244:GLU:HB2	5:a:184:ARG:HG3	1.97	0.46
6:T:783:SER:OG	6:X:734:ARG:NE	2.45	0.46
6:X:739:TRP:NE1	6:X:752:THR:HG21	2.30	0.46
1:H:86:SER:O	1:M:61:ARG:NH2	2.47	0.46
1:P:106:VAL:HB	1:P:123:ARG:HD2	1.97	0.46
6:S:347:ARG:NH1	6:S:348:ASP:OD1	2.48	0.46
3:W:91:TRP:HB2	3:W:103:LEU:HD11	1.98	0.46
6:X:425:ASN:OD1	6:X:430:GLN:NE2	2.48	0.46
6:S:32:LYS:HG2	6:S:229:GLU:OE1	2.15	0.46
1:B:34:PHE:HD1	1:B:68:LEU:HB3	1.81	0.46
3:J:70:GLY:HA2	3:J:88:ALA:O	2.15	0.46
1:O:111:SER:N	1:O:116:ASP:O	2.48	0.46
6:T:143:TYR:OH	6:T:174:HIS:NE2	2.39	0.46
3:V:68:HIS:CE1	3:V:74:PHE:HB3	2.50	0.46
3:D:70:GLY:HA2	3:D:88:ALA:O	2.16	0.46
4:E:149:PRO:HG3	6:X:359:TRP:HB2	1.96	0.46
3:J:68:HIS:CE1	3:J:74:PHE:HB3	2.50	0.46
6:T:307:SER:OG	6:T:366:ALA:O	2.29	0.46
6:X:403:HIS:HA	6:X:436:SER:HB2	1.98	0.46
4:E:148:PRO:N	4:E:149:PRO:HD2	2.31	0.46
1:P:66:ALA:O	1:P:150:THR:HA	2.16	0.46
3:W:95:PRO:HB3	3:W:101:PHE:CE2	2.51	0.46
3:I:86:VAL:HG12	3:I:109:GLN:HA	1.98	0.46
1:P:34:PHE:HD1	1:P:68:LEU:HB3	1.81	0.46
6:T:726:LEU:HD13	6:T:739:TRP:HB3	1.98	0.46
6:T:739:TRP:NE1	6:T:752:THR:HG21	2.30	0.46
1:M:9:GLN:O	1:M:99:GLY:N	2.37	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:123:ARG:HD3	1:M:125:TRP:CZ2	2.51	0.46
6:S:430:GLN:HA	6:S:434:GLY:O	2.16	0.46
6:X:584:ASP:OD1	6:X:584:ASP:N	2.48	0.46
6:S:846:MET:SD	6:X:850:ILE:HG13	2.56	0.46
1:B:76:LEU:HD22	1:B:79:HIS:ND1	2.31	0.45
1:H:3:ILE:HD11	1:H:100:TRP:CE3	2.51	0.45
1:H:46:ASP:N	1:H:46:ASP:OD1	2.48	0.45
3:J:4:LEU:HD11	3:J:85:ARG:HH21	1.81	0.45
4:K:138:SER:HA	6:X:492:VAL:HG11	1.97	0.45
6:S:660:GLU:OE1	6:S:692:ARG:NH2	2.39	0.45
6:X:143:TYR:CG	6:X:205:MET:HE1	2.51	0.45
6:X:427:ASP:OD1	6:X:428:ARG:N	2.49	0.45
1:H:49:LEU:HD23	3:V:13:ILE:HD13	1.97	0.45
1:O:41:ALA:HA	1:O:61:ARG:HA	1.98	0.45
6:S:501:ARG:NH1	6:S:559:GLN:O	2.50	0.45
1:M:123:ARG:HA	1:M:162:LYS:NZ	2.31	0.45
6:S:222:ASN:ND2	4:U:177:ASP:OD1	2.49	0.45
6:X:75:ARG:NH2	6:X:83:HIS:O	2.50	0.45
6:X:354:ARG:HD2	6:X:457:TRP:CE2	2.51	0.45
1:M:99:GLY:HA2	1:M:123:ARG:HH12	1.80	0.45
1:P:123:ARG:HA	1:P:162:LYS:NZ	2.32	0.45
1:G:103:GLY:HA3	1:G:123:ARG:HG3	1.99	0.45
3:I:12:SER:OG	3:I:14:ASP:OD1	2.22	0.45
2:Q:605:VAL:HG22	2:R:599:LEU:HD21	1.99	0.45
6:S:247:GLY:H	6:S:275:TRP:HE1	1.65	0.45
6:T:863:VAL:HG13	6:T:864:LEU:HG	1.99	0.45
4:E:174:ARG:NH2	4:E:199:ASP:OD2	2.33	0.45
1:M:13:LEU:HD21	1:M:110:VAL:HG22	1.98	0.45
6:S:354:ARG:HD2	6:S:457:TRP:CE2	2.51	0.45
3:F:86:VAL:HG12	3:F:109:GLN:HA	1.98	0.45
4:K:149:PRO:HG3	6:T:359:TRP:HB2	1.98	0.45
5:N:182:LYS:HE2	6:X:244:GLU:HG2	1.98	0.45
2:Q:601:PRO:HA	2:Q:606:TRP:CD2	2.51	0.45
6:S:427:ASP:OD1	6:S:428:ARG:N	2.50	0.45
6:S:737:LEU:HD23	6:S:737:LEU:HA	1.88	0.45
6:T:430:GLN:HA	6:T:434:GLY:O	2.17	0.45
6:X:832:GLU:HG2	6:X:840:PHE:CZ	2.51	0.45
3:I:5:GLU:OE2	3:I:67:ARG:NH1	2.49	0.44
1:O:9:GLN:NE2	1:O:123:ARG:HH22	2.15	0.44
6:S:289:HIS:CE1	6:S:291:ARG:HG2	2.51	0.44
6:T:283:TRP:CE3	6:T:308:LEU:HD11	2.52	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:95:LYS:HB3	1:H:117:PHE:CE2	2.52	0.44
6:S:377:THR:HG21	6:S:563:ALA:HB2	1.98	0.44
3:D:43:LEU:HD22	3:V:66:LYS:HG3	1.99	0.44
3:F:33:SER:O	3:J:112:ASN:ND2	2.36	0.44
1:O:42:ASP:HB3	1:O:59:GLY:HA3	1.99	0.44
6:X:539:GLN:OE1	6:X:539:GLN:N	2.50	0.44
3:D:21:GLN:O	3:V:89:GLN:NE2	2.50	0.44
1:G:44:ILE:O	1:G:57:LYS:N	2.50	0.44
3:I:10:ASP:O	3:I:51:ARG:NH1	2.45	0.44
1:M:111:SER:N	1:M:116:ASP:O	2.49	0.44
6:T:36:ALA:HB2	5:a:190:ILE:HD13	1.99	0.44
3:F:52:THR:HB	1:O:46:ASP:HB3	1.98	0.44
1:H:152:GLN:OE1	1:M:43:GLN:NE2	2.50	0.44
2:Q:583:LEU:HA	2:Q:586:MET:HE2	1.99	0.44
3:W:26:VAL:HB	6:X:384:VAL:HG22	1.99	0.44
5:a:179:LEU:HD22	5:a:185:ILE:HD13	1.98	0.44
3:D:26:VAL:HB	6:S:384:VAL:HG22	1.99	0.44
6:T:427:ASP:OD1	6:T:428:ARG:N	2.50	0.44
6:X:20:GLU:O	6:X:26:ARG:NH2	2.50	0.44
6:X:130:GLN:HB3	6:X:200:ARG:HG3	2.00	0.44
6:S:129:ARG:HG3	6:S:201:VAL:HG22	1.99	0.44
6:S:143:TYR:CG	6:S:205:MET:HE1	2.53	0.44
6:S:832:GLU:HG2	6:S:840:PHE:CZ	2.52	0.44
6:T:354:ARG:HD2	6:T:457:TRP:CE2	2.52	0.44
1:G:125:TRP:HB2	1:G:160:THR:OG1	2.18	0.44
1:H:100:TRP:HZ2	1:H:126:PHE:HB2	1.83	0.44
1:P:119:LEU:HD12	1:P:125:TRP:CD1	2.52	0.44
6:S:103:ASP:OD1	6:S:104:ALA:N	2.51	0.44
4:E:157:PRO:HG2	6:X:339:ARG:HG3	1.99	0.44
1:H:31:VAL:HG11	1:H:68:LEU:HD21	1.99	0.44
4:K:156:ILE:O	4:K:158:ALA:N	2.51	0.44
5:L:190:ILE:HD13	6:S:36:ALA:HB2	1.99	0.44
1:M:93:SER:HA	1:M:131:TYR:HB3	2.00	0.44
1:M:97:ALA:HB1	1:M:125:TRP:CZ3	2.52	0.44
5:N:129:ALA:O	5:N:132:SER:OG	2.35	0.44
4:U:195:ASP:HB3	4:U:198:LEU:HG	1.99	0.44
1:M:44:ILE:O	1:M:57:LYS:N	2.51	0.43
1:P:51:ASP:OD2	1:P:55:LYS:NZ	2.31	0.43
6:T:244:GLU:OE2	5:a:182:LYS:NZ	2.51	0.43
4:K:174:ARG:NH2	4:K:199:ASP:OD2	2.34	0.43
6:S:784:PRO:HD2	6:T:734:ARG:HD3	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:137:ASN:HB2	6:S:390:SER:HB2	2.00	0.43
1:H:66:ALA:HB3	1:H:151:ILE:HB	2.00	0.43
1:O:3:ILE:HD11	1:O:100:TRP:CE3	2.52	0.43
1:B:61:ARG:NH2	1:G:86:SER:O	2.49	0.43
3:J:82:GLU:OE1	3:J:82:GLU:N	2.51	0.43
4:K:148:PRO:N	4:K:149:PRO:HD2	2.33	0.43
1:O:9:GLN:HE22	1:O:123:ARG:HH22	1.66	0.43
1:P:12:ALA:C	1:P:13:LEU:HD12	2.43	0.43
6:S:387:ASP:OD1	6:S:387:ASP:N	2.51	0.43
3:V:14:ASP:OD1	3:V:14:ASP:N	2.51	0.43
6:X:877:MET:HE1	6:X:906:ILE:HG21	2.00	0.43
1:B:3:ILE:HD11	1:B:100:TRP:CE3	2.53	0.43
3:D:13:ILE:HD13	1:M:49:LEU:HD23	1.99	0.43
4:K:204:ARG:HD2	6:X:609:GLU:HB2	2.00	0.43
1:M:125:TRP:O	1:M:160:THR:N	2.46	0.43
2:R:583:LEU:HA	2:R:586:MET:HE2	2.00	0.43
6:T:729:VAL:N	6:T:736:GLY:O	2.43	0.43
6:T:247:GLY:H	6:T:275:TRP:HE1	1.66	0.43
4:U:194:ASP:OD1	4:U:194:ASP:N	2.50	0.43
6:X:307:SER:OG	6:X:366:ALA:O	2.28	0.43
1:P:97:ALA:HB1	1:P:125:TRP:CZ3	2.54	0.43
6:S:864:LEU:HD13	6:T:864:LEU:HD21	1.99	0.43
6:X:103:ASP:OD1	6:X:104:ALA:N	2.52	0.43
3:F:21:GLN:HE21	3:J:90:GLY:HA2	1.84	0.43
4:K:54:LEU:HD23	4:K:74:VAL:HA	2.01	0.43
1:M:31:VAL:HG21	1:M:70:ILE:HD13	2.00	0.43
6:S:799:ASP:OD1	6:S:803:ASN:N	2.51	0.43
4:U:148:PRO:N	4:U:149:PRO:HD2	2.33	0.43
3:V:42:ASN:OD1	3:V:42:ASN:N	2.49	0.43
6:X:489:ALA:HB1	6:X:498:ILE:HG13	2.00	0.43
6:X:735:ILE:HG13	6:X:785:ILE:HD11	2.00	0.43
1:B:121:PRO:HB3	1:B:163:SER:HB2	2.01	0.43
5:L:184:ARG:HG3	6:S:244:GLU:HB2	2.01	0.43
1:M:11:TYR:HB2	1:M:97:ALA:HB3	1.99	0.43
1:M:125:TRP:N	1:M:160:THR:O	2.42	0.43
1:P:117:PHE:CE2	1:P:127:THR:HG23	2.52	0.43
6:S:13:LYS:HA	6:S:699:MET:HE3	2.01	0.43
1:H:70:ILE:HG23	1:H:79:HIS:HD2	1.84	0.43
3:J:78:LEU:HD12	3:J:82:GLU:HB2	1.99	0.43
3:J:95:PRO:HB3	3:J:101:PHE:CE2	2.54	0.43
4:K:136:GLU:HG3	4:K:141:VAL:HG22	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:85:LEU:HD12	1:M:88:LYS:HD3	2.00	0.43
6:S:359:TRP:HB2	4:U:149:PRO:HG3	2.00	0.43
1:G:152:GLN:NE2	1:G:153:ARG:O	2.42	0.42
6:S:96:VAL:O	6:S:208:GLU:HA	2.19	0.42
6:S:355:GLY:HA2	6:S:368:SER:HA	2.00	0.42
3:V:86:VAL:HG12	3:V:109:GLN:HA	2.01	0.42
6:X:627:VAL:HG12	6:X:708:SER:HB3	2.01	0.42
1:B:70:ILE:N	1:B:147:THR:O	2.46	0.42
2:C:583:LEU:HA	2:C:586:MET:HE2	2.01	0.42
1:M:103:GLY:HA3	1:M:123:ARG:HB2	2.00	0.42
6:T:103:ASP:OD1	6:T:104:ALA:N	2.52	0.42
6:T:322:GLY:HA3	6:T:608:ILE:HG12	2.00	0.42
6:T:877:MET:HE1	6:T:906:ILE:HD11	2.01	0.42
6:X:125:PRO:HD2	6:X:204:THR:O	2.19	0.42
6:X:879:ARG:HB2	6:X:884:LEU:HD23	2.01	0.42
1:H:103:GLY:HA3	1:H:123:ARG:HB2	2.02	0.42
4:K:208:CYS:HB2	7:K:301:SF4:S1	2.58	0.42
5:L:181:GLY:O	6:S:247:GLY:N	2.52	0.42
1:M:66:ALA:HB3	1:M:151:ILE:HB	2.01	0.42
1:P:81:ARG:HA	1:P:84:GLN:NE2	2.34	0.42
6:S:422:VAL:HG11	6:S:448:GLU:HG3	2.01	0.42
1:H:44:ILE:O	1:H:57:LYS:N	2.49	0.42
4:K:229:VAL:HG11	6:X:6:THR:HG21	2.01	0.42
1:M:100:TRP:HZ2	1:M:126:PHE:HB2	1.84	0.42
1:O:13:LEU:O	1:O:94:VAL:HB	2.19	0.42
6:T:169:ARG:HH21	6:T:208:GLU:CD	2.26	0.42
6:T:398:ARG:HA	4:U:132:GLN:HB3	2.00	0.42
1:B:98:ILE:HD11	1:B:128:PHE:HE2	1.84	0.42
4:E:45:GLN:NE2	4:E:123:GLU:OE2	2.43	0.42
3:I:68:HIS:NE2	3:I:74:PHE:HB3	2.35	0.42
1:O:76:LEU:HD22	1:O:79:HIS:ND1	2.34	0.42
2:R:601:PRO:HA	2:R:606:TRP:CD2	2.55	0.42
6:S:115:LEU:HD23	6:S:214:ILE:HG13	2.01	0.42
1:G:103:GLY:O	1:G:123:ARG:HD3	2.19	0.42
4:K:160:GLN:HG3	6:X:407:LEU:HD11	2.01	0.42
1:M:100:TRP:H	1:M:123:ARG:NH2	2.16	0.42
5:N:138:VAL:HG23	6:S:397:SER:HB3	2.01	0.42
6:S:772:LEU:O	6:T:777:GLY:HA2	2.19	0.42
6:X:377:THR:HG21	6:X:563:ALA:HB2	2.02	0.42
1:H:76:LEU:HD22	1:H:79:HIS:ND1	2.34	0.42
3:I:36:LEU:HD23	3:I:36:LEU:HA	1.93	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:I:48:GLN:HA	3:I:106:THR:HA	2.01	0.42
5:L:128:THR:O	5:L:131:VAL:HG22	2.19	0.42
5:N:197:GLU:OE2	6:X:28:ILE:HG12	2.19	0.42
1:P:44:ILE:O	1:P:57:LYS:N	2.52	0.42
6:S:97:GLY:HA2	6:S:208:GLU:HB3	2.01	0.42
6:T:16:ARG:NH2	6:T:619:GLY:O	2.51	0.42
5:N:128:THR:O	5:N:131:VAL:HG22	2.20	0.42
1:P:70:ILE:N	1:P:147:THR:O	2.47	0.42
6:T:352:ILE:HA	6:T:454:ARG:NH2	2.35	0.42
6:T:772:LEU:O	6:X:777:GLY:HA2	2.20	0.42
3:D:112:ASN:HD21	3:I:34:GLN:HA	1.85	0.42
1:O:102:ASP:N	1:O:102:ASP:OD1	2.51	0.42
3:F:95:PRO:HB3	3:F:101:PHE:CE2	2.55	0.42
1:G:116:ASP:OD1	1:G:117:PHE:N	2.51	0.42
4:K:6:ASP:O	4:K:9:THR:OG1	2.36	0.42
6:T:577:MET:HE3	6:T:577:MET:HB3	1.85	0.42
6:T:750:ALA:N	6:T:798:ILE:O	2.35	0.42
4:K:31:LEU:HD12	4:K:33:PHE:CZ	2.55	0.41
4:K:195:ASP:HB3	4:K:198:LEU:HG	2.02	0.41
6:S:283:TRP:CE3	6:S:308:LEU:HD11	2.55	0.41
1:B:161:PRO:HB3	1:G:74:PRO:HB2	2.02	0.41
6:T:539:GLN:HE22	6:T:549:THR:HA	1.85	0.41
4:E:7:ASP:OD1	4:E:102:TYR:OH	2.23	0.41
4:K:219:SER:OG	6:T:219:ARG:NH1	2.53	0.41
5:N:179:LEU:HD22	5:N:185:ILE:HD13	2.03	0.41
6:S:751:TYR:O	6:S:751:TYR:CG	2.74	0.41
6:T:86:GLY:HA3	6:T:227:PHE:CE2	2.55	0.41
6:X:884:LEU:HB2	6:X:906:ILE:HD13	2.02	0.41
6:X:692:ARG:HG2	6:X:705:TYR:CD1	2.55	0.41
5:a:128:THR:O	5:a:131:VAL:HG22	2.20	0.41
1:B:79:HIS:O	1:B:82:LEU:HG	2.20	0.41
6:T:799:ASP:OD1	6:T:803:ASN:N	2.54	0.41
1:B:100:TRP:O	1:B:123:ARG:NH2	2.48	0.41
1:G:38:GLY:N	1:G:153:ARG:HH22	2.18	0.41
6:S:322:GLY:HA3	6:S:608:ILE:HG12	2.03	0.41
3:V:10:ASP:O	3:V:51:ARG:NH1	2.46	0.41
6:X:146:ASP:OD2	6:X:188:ARG:NH2	2.44	0.41
6:X:283:TRP:CE3	6:X:308:LEU:HD11	2.56	0.41
6:X:481:ALA:HB3	6:X:484:LYS:HE2	2.02	0.41
1:M:66:ALA:O	1:M:150:THR:HA	2.21	0.41
1:O:46:ASP:N	1:O:46:ASP:OD1	2.54	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:O:139:PHE:CD2	1:P:34:PHE:HB3	2.55	0.41
1:P:122:ALA:HA	1:P:164:ALA:HB3	2.01	0.41
1:P:123:ARG:HD3	1:P:125:TRP:CE2	2.56	0.41
6:X:494:SER:HB2	6:X:569:LEU:HD21	2.03	0.41
6:X:751:TYR:CG	6:X:751:TYR:O	2.74	0.41
2:C:608:MET:HE3	2:C:608:MET:HB3	2.00	0.41
3:F:97:GLY:HA2	1:O:60:LEU:HG	2.02	0.41
1:H:125:TRP:O	1:H:160:THR:N	2.39	0.41
3:I:68:HIS:O	3:I:72:ARG:HG2	2.21	0.41
3:J:47:TRP:CH2	3:J:79:PRO:HG2	2.56	0.41
4:K:137:ASN:HB2	6:X:390:SER:HB2	2.02	0.41
6:X:17:GLN:HG3	6:X:694:ARG:NH1	2.35	0.41
1:G:47:PRO:O	3:I:13:ILE:HG12	2.21	0.41
1:H:119:LEU:HD12	1:H:125:TRP:CG	2.56	0.41
1:M:58:LYS:HD3	1:M:58:LYS:HA	1.85	0.41
1:O:34:PHE:HD1	1:O:68:LEU:HB3	1.84	0.41
6:S:777:GLY:HA2	6:X:772:LEU:O	2.21	0.41
6:T:124:TRP:HE1	6:T:205:MET:HE2	1.86	0.41
3:W:78:LEU:HD12	3:W:82:GLU:HB2	2.02	0.41
6:X:422:VAL:HG11	6:X:448:GLU:HG3	2.02	0.41
1:H:159:TRP:HZ3	1:P:80:VAL:HG23	1.86	0.41
1:P:98:ILE:HD11	1:P:128:PHE:CE2	2.56	0.41
3:F:36:LEU:HD23	3:F:36:LEU:HA	1.88	0.40
5:N:134:LEU:HD11	6:S:468:ALA:HB3	2.03	0.40
6:X:24:SER:O	6:X:172:ARG:NH2	2.54	0.40
6:X:322:GLY:HA3	6:X:608:ILE:HG12	2.02	0.40
1:G:34:PHE:HB3	1:M:139:PHE:CD2	2.56	0.40
1:M:111:SER:HA	1:M:118:VAL:HG23	2.03	0.40
6:S:321:ASP:OD2	6:S:323:LYS:NZ	2.51	0.40
6:S:404:THR:HG22	6:S:429:ALA:HB1	2.02	0.40
6:T:733:TRP:O	6:T:784:PRO:HA	2.21	0.40
6:X:96:VAL:O	6:X:208:GLU:HA	2.21	0.40
6:X:355:GLY:HA2	6:X:368:SER:HA	2.03	0.40
6:X:374:GLU:OE2	6:X:573:ARG:NE	2.54	0.40
2:C:599:LEU:HD21	2:R:605:VAL:HG22	2.03	0.40
1:G:48:CYS:SG	1:G:55:LYS:NZ	2.71	0.40
6:S:388:ASP:OD1	6:S:388:ASP:N	2.51	0.40
6:T:739:TRP:CE2	6:T:778:ASN:HA	2.57	0.40
3:V:47:TRP:CH2	3:V:79:PRO:HG2	2.57	0.40
3:I:19:ALA:HB1	3:I:43:LEU:HD11	2.03	0.40
5:L:175:PRO:CB	4:U:157:PRO:HB2	2.51	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:O:103:GLY:HA3	1:O:123:ARG:HD3	2.03	0.40
6:S:307:SER:OG	6:S:366:ALA:O	2.31	0.40
3:F:95:PRO:HD2	3:W:15:SER:O	2.22	0.40
3:W:14:ASP:OD1	3:W:14:ASP:N	2.51	0.40
6:X:334:LEU:HD21	6:X:336:LEU:HD21	2.04	0.40

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	B	161/164 (98%)	152 (94%)	9 (6%)	0	100	100
1	G	161/164 (98%)	150 (93%)	11 (7%)	0	100	100
1	H	161/164 (98%)	152 (94%)	9 (6%)	0	100	100
1	M	161/164 (98%)	152 (94%)	9 (6%)	0	100	100
1	O	161/164 (98%)	150 (93%)	11 (7%)	0	100	100
1	P	161/164 (98%)	153 (95%)	8 (5%)	0	100	100
2	C	31/611 (5%)	31 (100%)	0	0	100	100
2	Q	31/611 (5%)	31 (100%)	0	0	100	100
2	R	31/611 (5%)	31 (100%)	0	0	100	100
3	D	108/113 (96%)	105 (97%)	3 (3%)	0	100	100
3	F	108/113 (96%)	101 (94%)	7 (6%)	0	100	100
3	I	108/113 (96%)	101 (94%)	7 (6%)	0	100	100
3	J	108/113 (96%)	104 (96%)	4 (4%)	0	100	100
3	V	108/113 (96%)	103 (95%)	5 (5%)	0	100	100
3	W	108/113 (96%)	106 (98%)	2 (2%)	0	100	100
4	E	228/231 (99%)	223 (98%)	5 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	K	228/231 (99%)	223 (98%)	5 (2%)	0	100	100
4	U	228/231 (99%)	223 (98%)	5 (2%)	0	100	100
5	L	72/200 (36%)	70 (97%)	2 (3%)	0	100	100
5	N	72/200 (36%)	70 (97%)	2 (3%)	0	100	100
5	a	72/200 (36%)	70 (97%)	2 (3%)	0	100	100
6	S	902/1204 (75%)	866 (96%)	36 (4%)	0	100	100
6	T	902/1204 (75%)	868 (96%)	34 (4%)	0	100	100
6	X	902/1204 (75%)	857 (95%)	45 (5%)	0	100	100
All	All	5313/8400 (63%)	5092 (96%)	221 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	B	133/134 (99%)	133 (100%)	0	100	100
1	G	133/134 (99%)	133 (100%)	0	100	100
1	H	133/134 (99%)	133 (100%)	0	100	100
1	M	133/134 (99%)	133 (100%)	0	100	100
1	O	133/134 (99%)	133 (100%)	0	100	100
1	P	133/134 (99%)	133 (100%)	0	100	100
2	C	24/445 (5%)	24 (100%)	0	100	100
2	Q	24/445 (5%)	24 (100%)	0	100	100
2	R	24/445 (5%)	24 (100%)	0	100	100
3	D	91/93 (98%)	91 (100%)	0	100	100
3	F	91/93 (98%)	91 (100%)	0	100	100
3	I	91/93 (98%)	91 (100%)	0	100	100
3	J	91/93 (98%)	91 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	V	91/93 (98%)	91 (100%)	0	100	100
3	W	91/93 (98%)	91 (100%)	0	100	100
4	E	182/183 (100%)	182 (100%)	0	100	100
4	K	182/183 (100%)	182 (100%)	0	100	100
4	U	182/183 (100%)	182 (100%)	0	100	100
5	L	52/153 (34%)	52 (100%)	0	100	100
5	N	52/153 (34%)	52 (100%)	0	100	100
5	a	52/153 (34%)	52 (100%)	0	100	100
6	S	733/959 (76%)	733 (100%)	0	100	100
6	T	733/959 (76%)	733 (100%)	0	100	100
6	X	733/959 (76%)	733 (100%)	0	100	100
All	All	4317/6582 (66%)	4317 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (50) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	43	GLN
2	C	593	ASN
3	D	48	GLN
4	E	155	GLN
3	F	21	GLN
3	F	92	GLN
3	F	108	GLN
1	G	35	ASN
1	G	65	GLN
3	I	21	GLN
3	I	92	GLN
3	J	20	ASN
3	J	89	GLN
4	K	155	GLN
4	K	179	ASN
4	K	191	ASN
5	L	168	ASN
1	M	43	GLN
1	M	65	GLN
1	M	152	GLN

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Mol	Chain	Res	Type
5	N	168	ASN
2	Q	593	ASN
2	R	593	ASN
6	S	92	ASN
6	S	131	GLN
6	S	437	GLN
6	S	497	GLN
6	S	567	ASN
6	S	594	HIS
6	S	828	GLN
6	S	908	GLN
6	T	8	HIS
6	T	131	GLN
6	T	497	GLN
6	T	637	GLN
3	V	21	GLN
3	V	89	GLN
3	V	92	GLN
3	W	21	GLN
3	W	27	GLN
6	X	131	GLN
6	X	333	ASN
6	X	437	GLN
6	X	497	GLN
6	X	637	GLN
6	X	823	ASN
6	X	824	GLN
6	X	828	GLN
5	a	140	GLN
5	a	168	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

3 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	$\#\|Z\| > 2$
7	SF4	E	301	4	0,12,12	-	-	-		
7	SF4	K	301	4	0,12,12	-	-	-		
7	SF4	U	301	4	0,12,12	-	-	-		

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
7	SF4	E	301	4	-	-	0/6/5/5
7	SF4	K	301	4	-	-	0/6/5/5
7	SF4	U	301	4	-	-	0/6/5/5

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

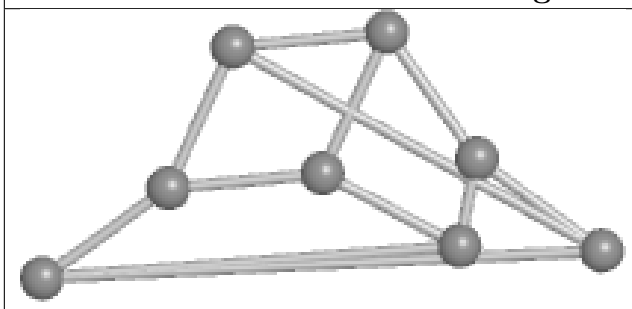
There are no ring outliers.

1 monomer is involved in 1 short contact:

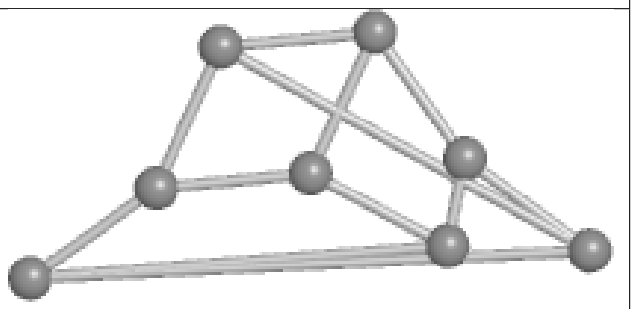
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	K	301	SF4	1	0

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 then 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.

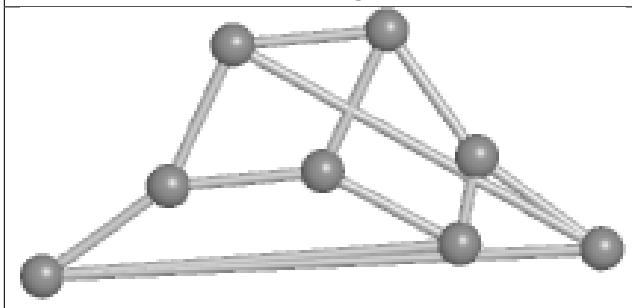
Ligand SF4 E 301



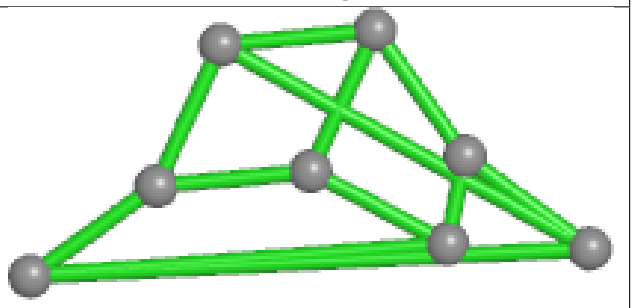
Bond lengths



Bond angles

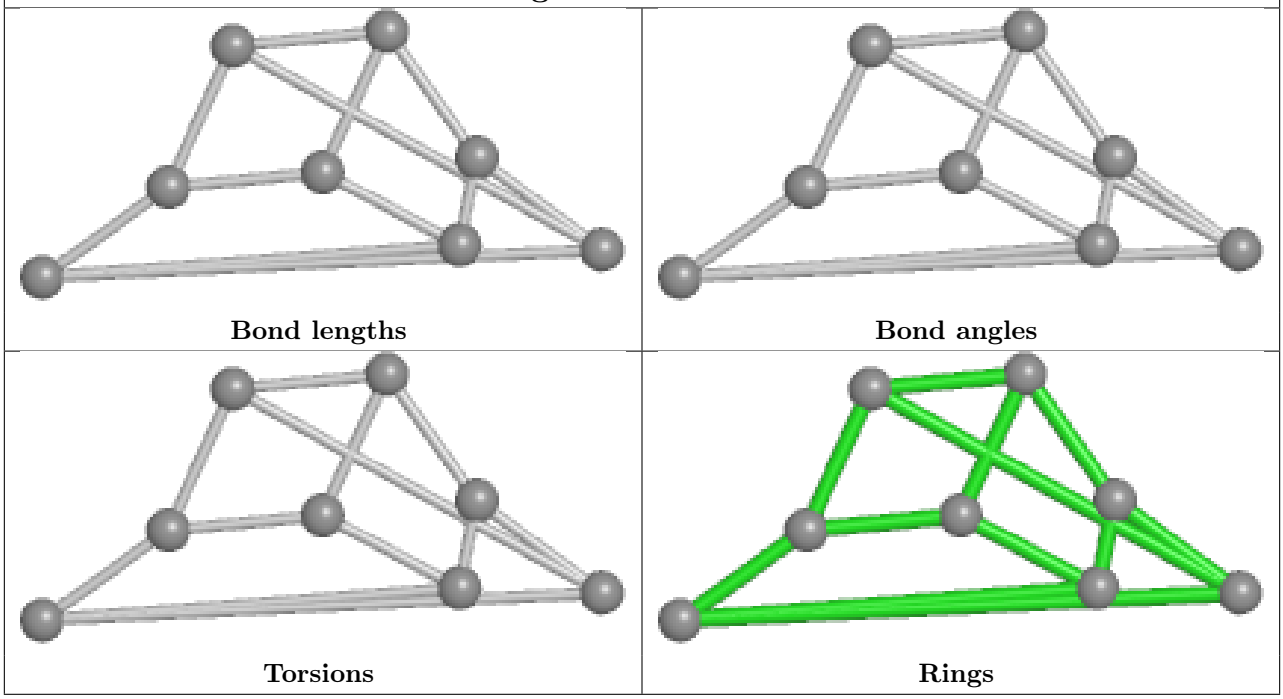


Torsions

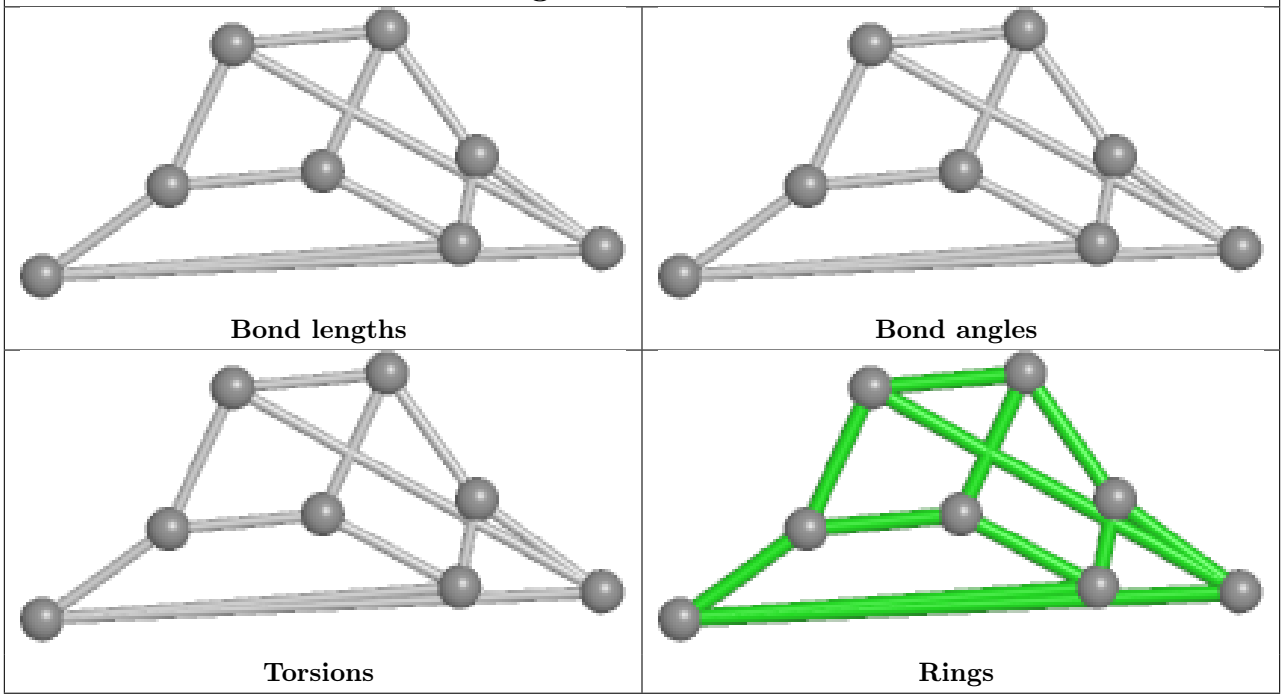


Rings

Ligand SF4 K 301



Ligand SF4 U 301



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.

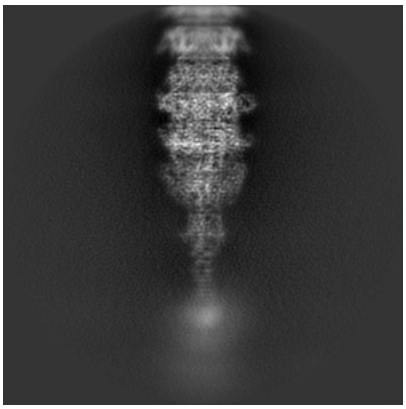
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-69223. These allow visual inspection of the internal detail of the map and identification of artifacts.

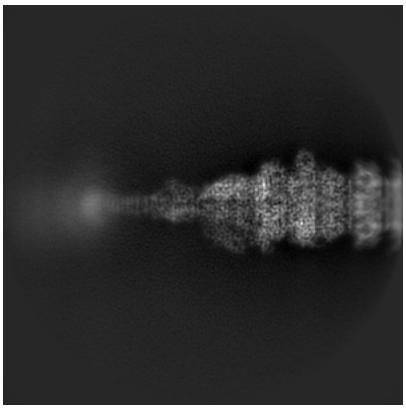
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

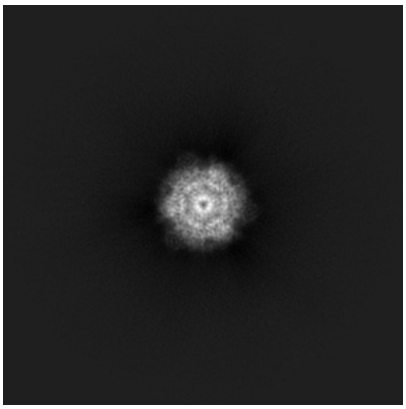
6.1.1 Primary map



X

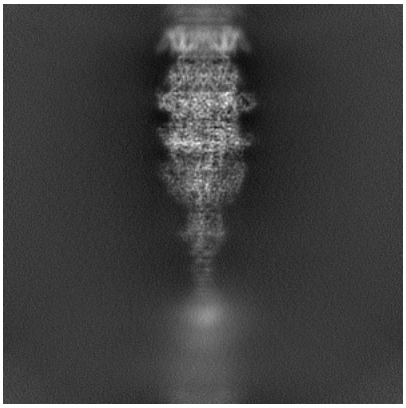


Y

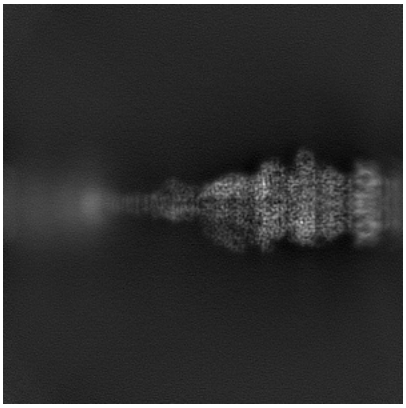


Z

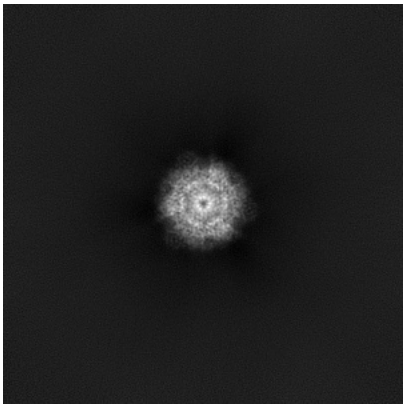
6.1.2 Raw map



X



Y

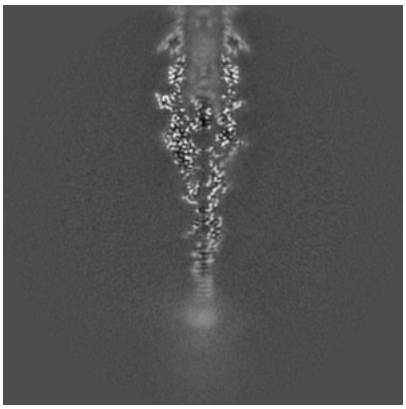


Z

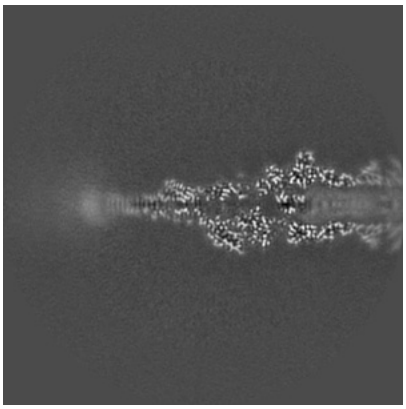
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

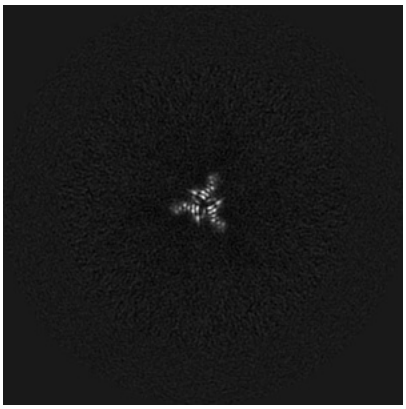
6.2.1 Primary map



X Index: 190

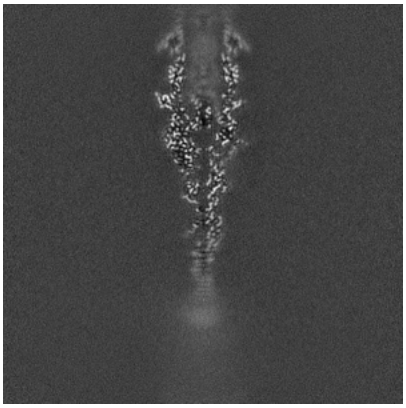


Y Index: 190

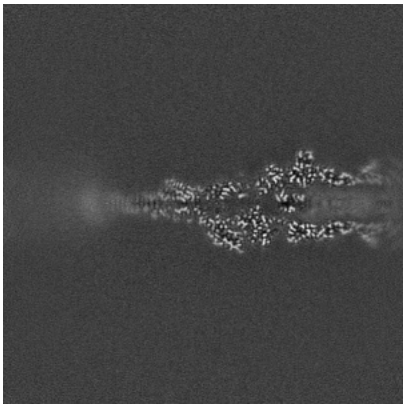


Z Index: 190

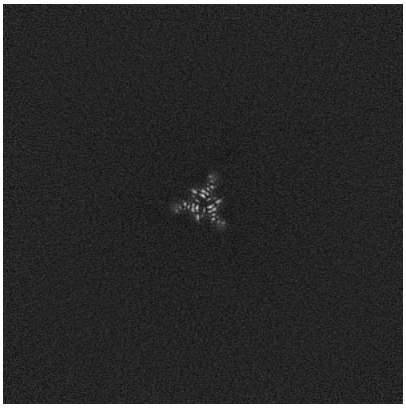
6.2.2 Raw map



X Index: 190



Y Index: 190

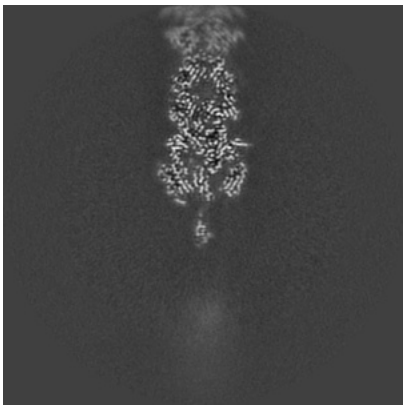


Z Index: 190

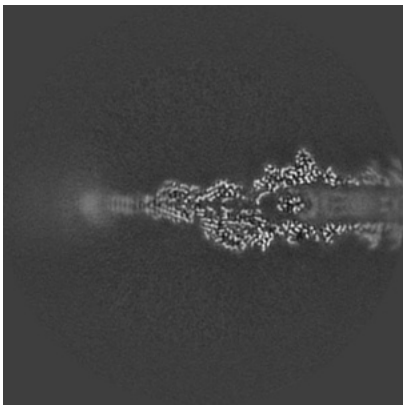
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

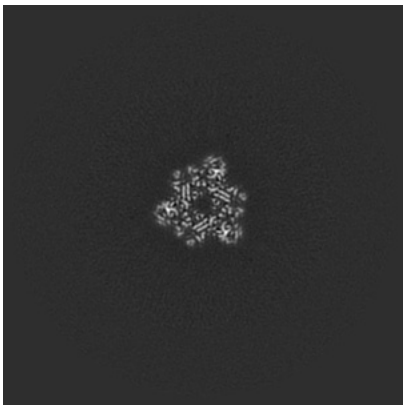
6.3.1 Primary map



X Index: 208

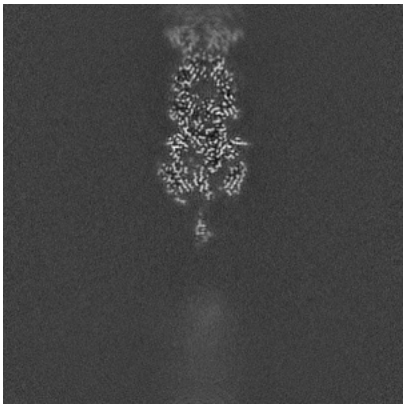


Y Index: 187

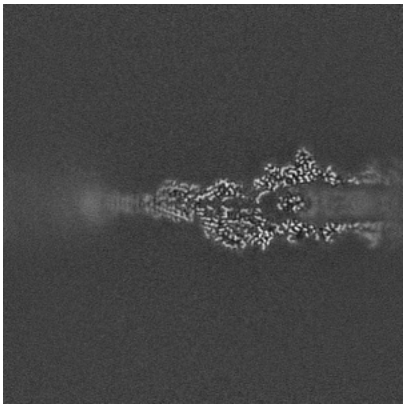


Z Index: 248

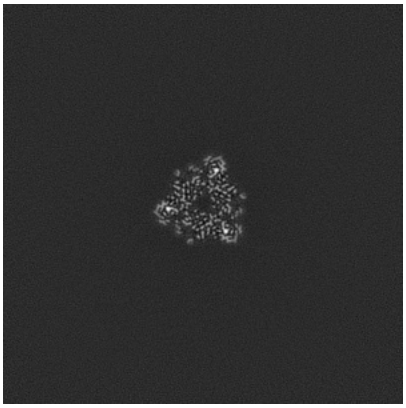
6.3.2 Raw map



X Index: 208



Y Index: 187

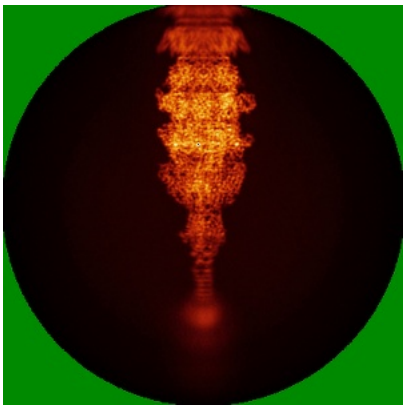


Z Index: 247

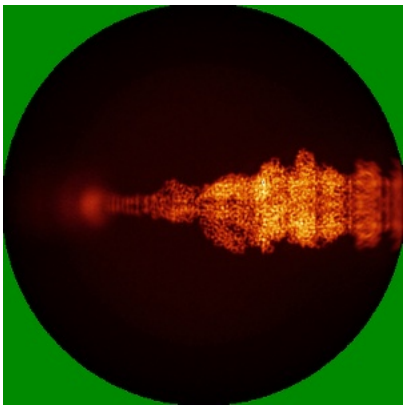
The images above show the largest variance slices of the map in three orthogonal directions.

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

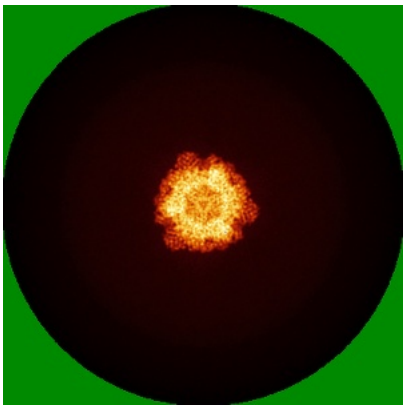
6.4.1 Primary map



X

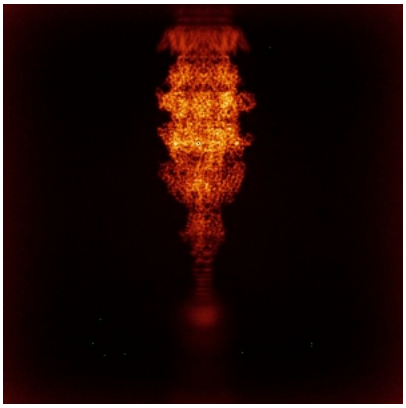


Y

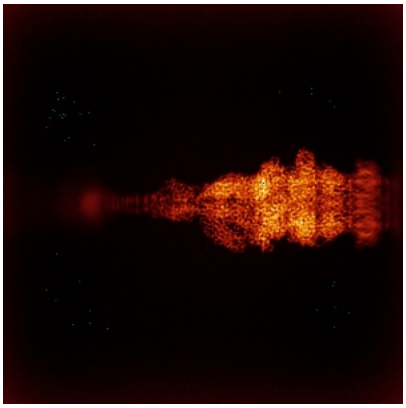


Z

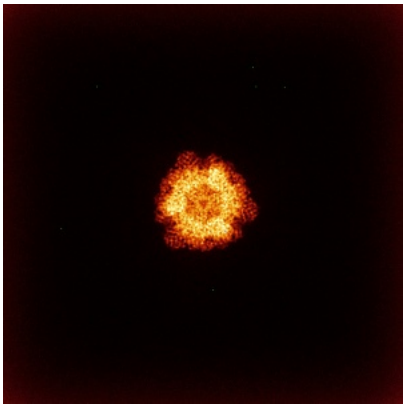
6.4.2 Raw map



X



Y



Z

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

6.5 Orthogonal surface views (i)

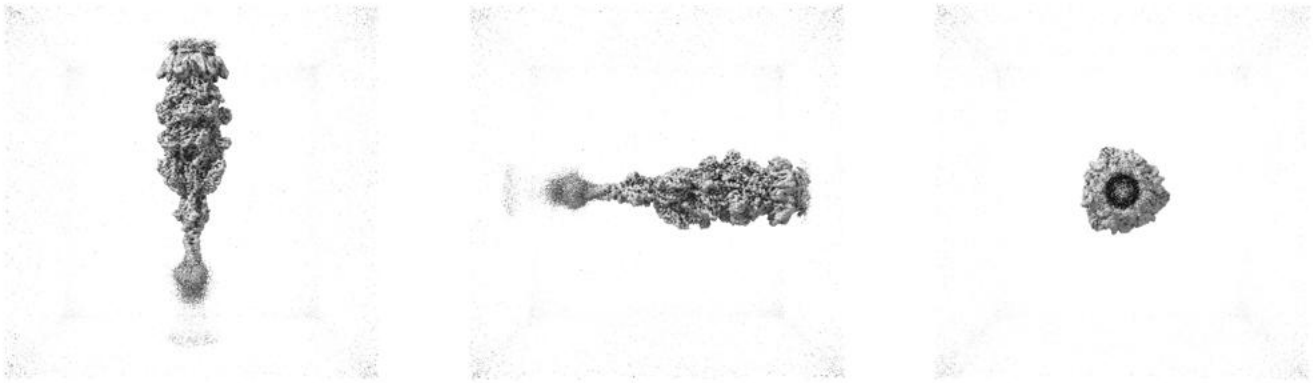
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.006. 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



X Y Z

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.

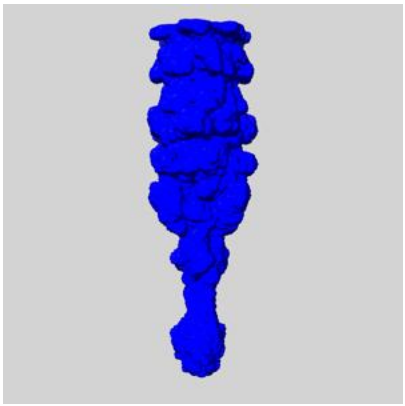
6.6 Mask visualisation (i)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

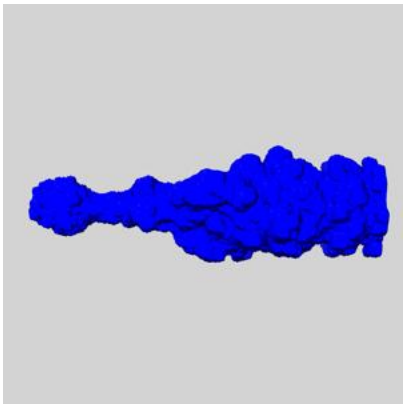
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

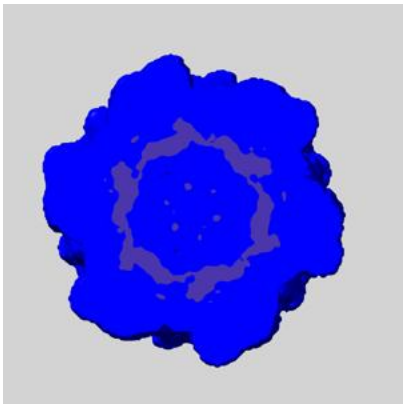
6.6.1 emd_69223_msk_1.map (i)



X



Y

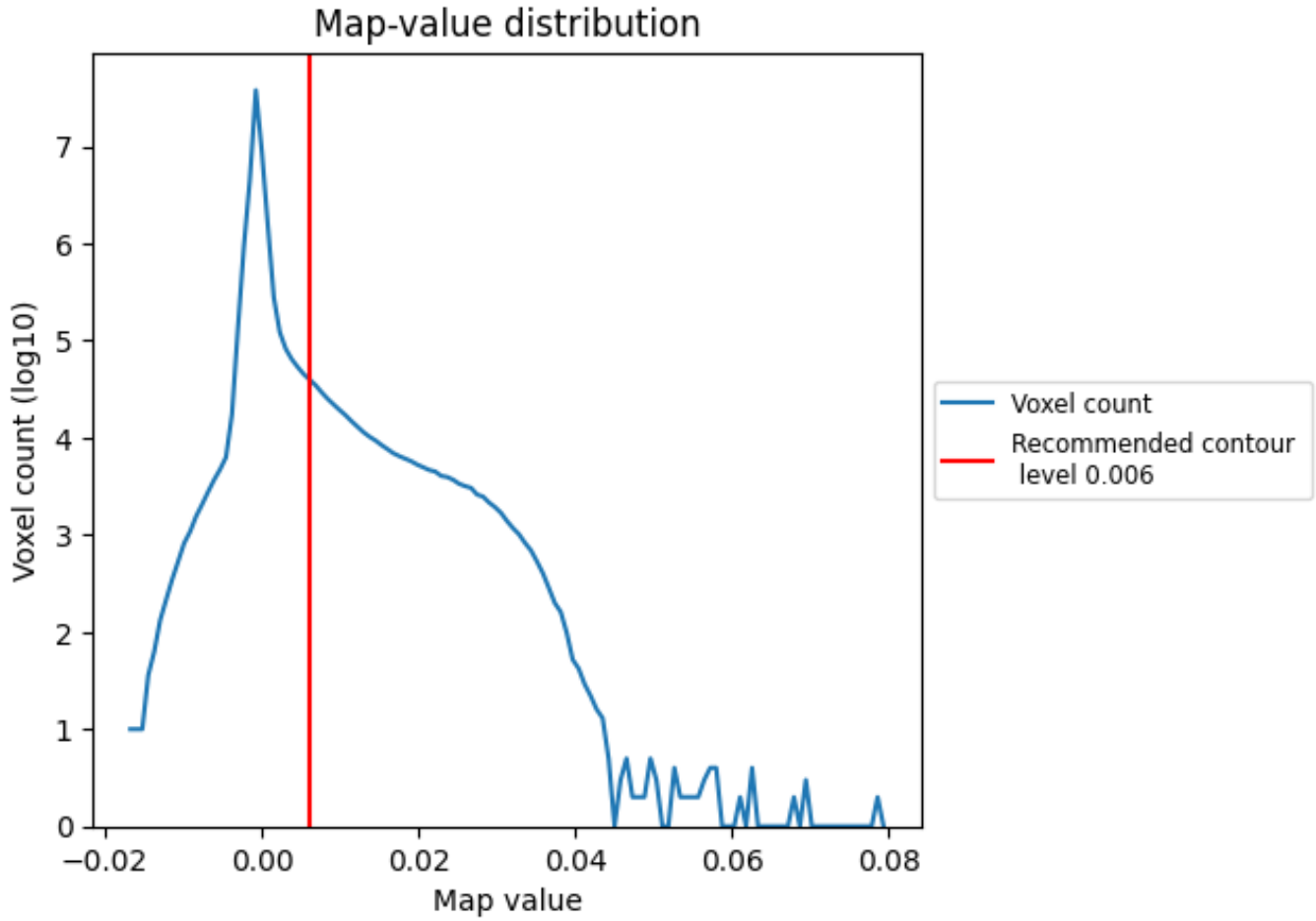


Z

7 Map analysis

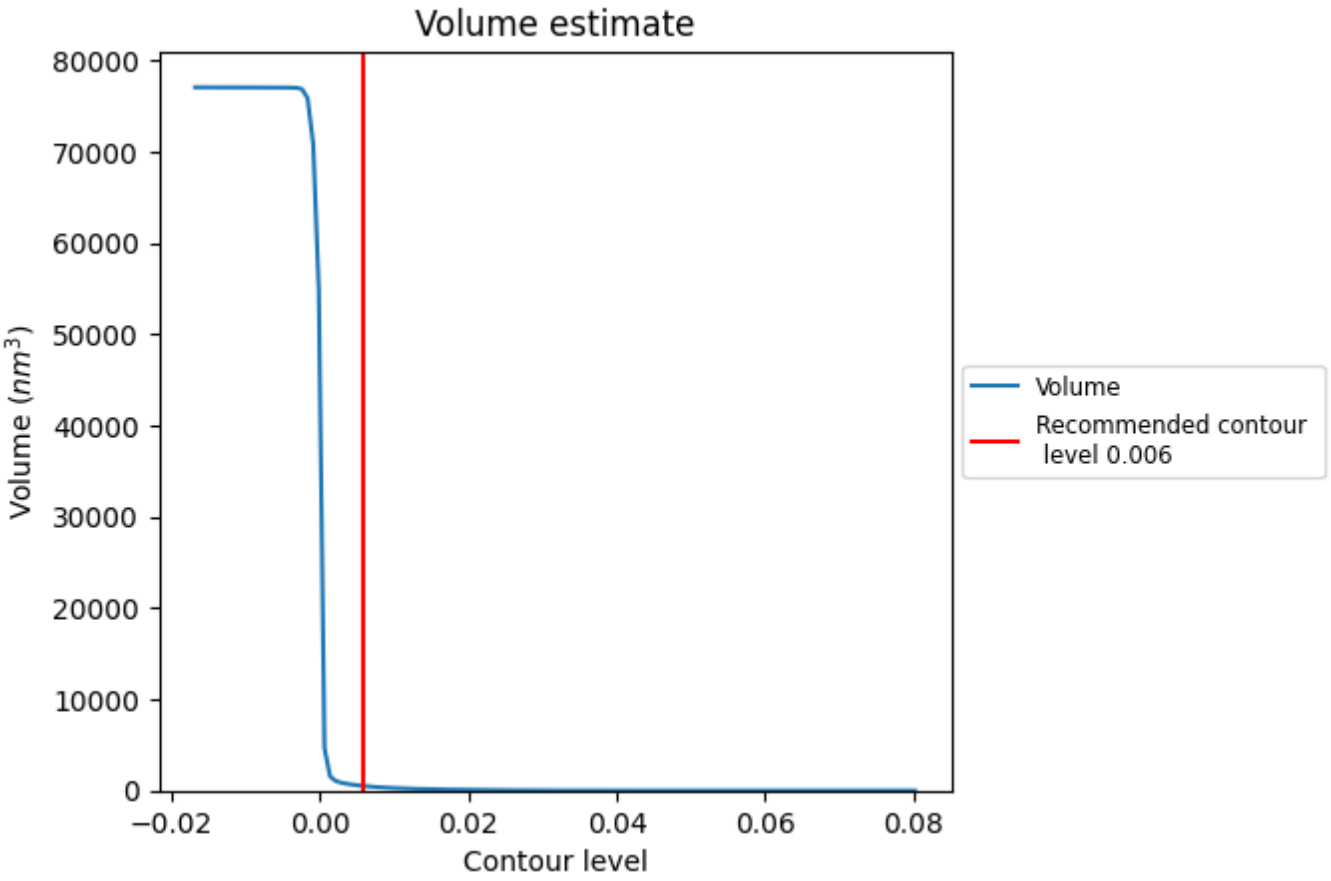
This section contains the results of statistical analysis of the map.

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.

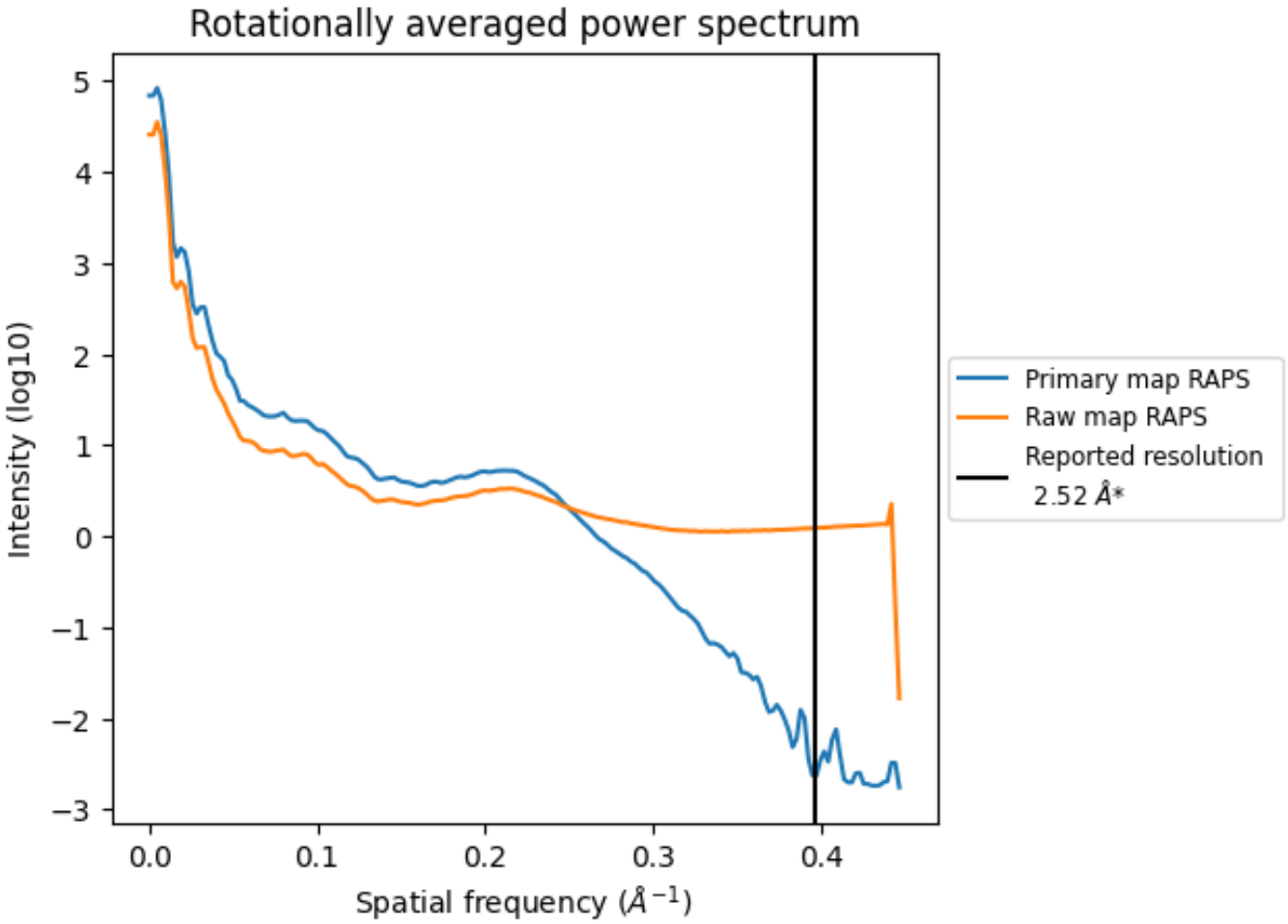
7.2 Volume estimate



The volume at the recommended contour level is 497 nm^3; this corresponds to an approximate mass of 449 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)

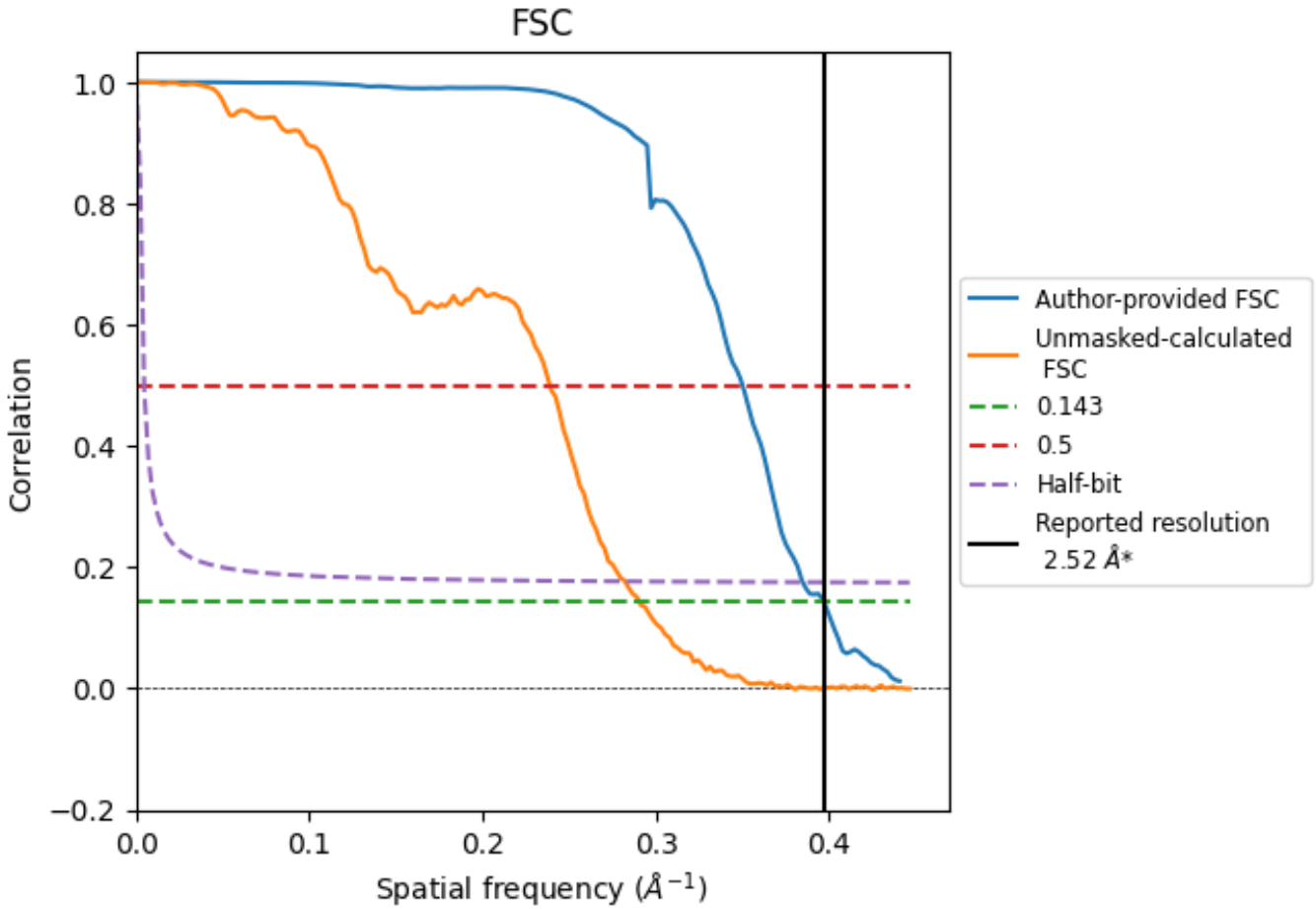


*Reported resolution corresponds to spatial frequency of 0.397 Å^{-1}

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.397 Å^{-1}

8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.52	-	-
Author-provided FSC curve	2.52	2.86	2.60
Unmasked-calculated*	3.44	4.19	3.54

*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 3.44 differs from the reported value 2.52 by more than 10 %

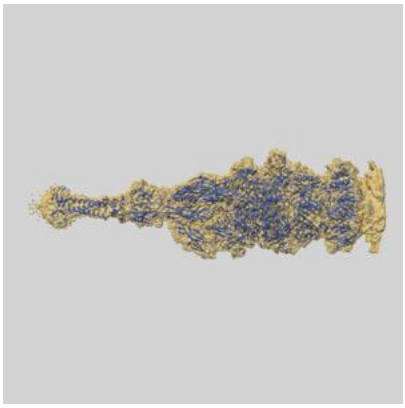
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-69223 and PDB model 23SU. Per-residue inclusion information can be found in section 3 on page 7.

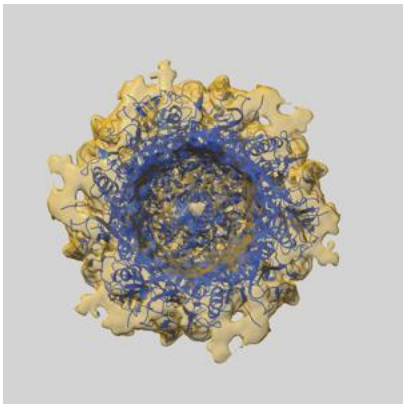
9.1 Map-model overlay



X



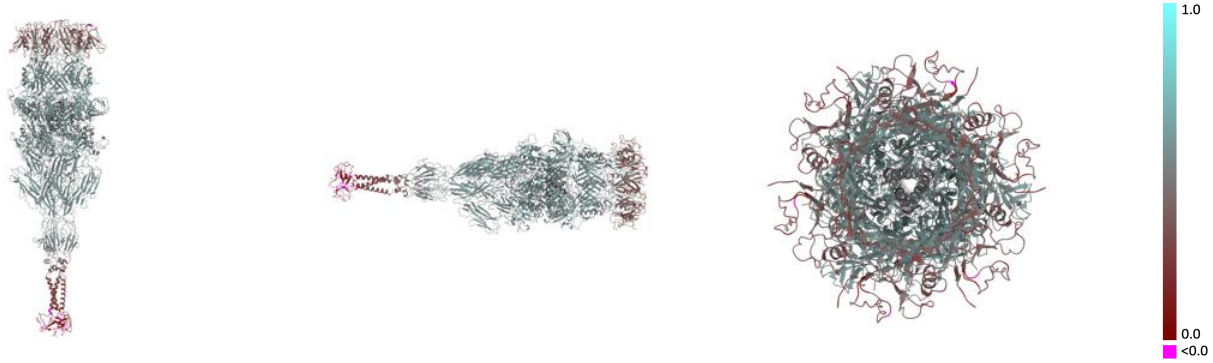
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.006 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.

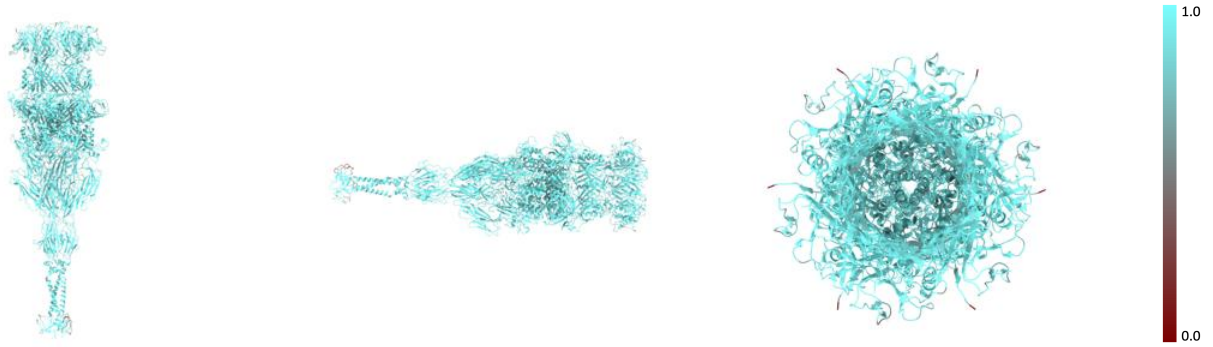
9.2 Q-score mapped to coordinate model (i)



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.

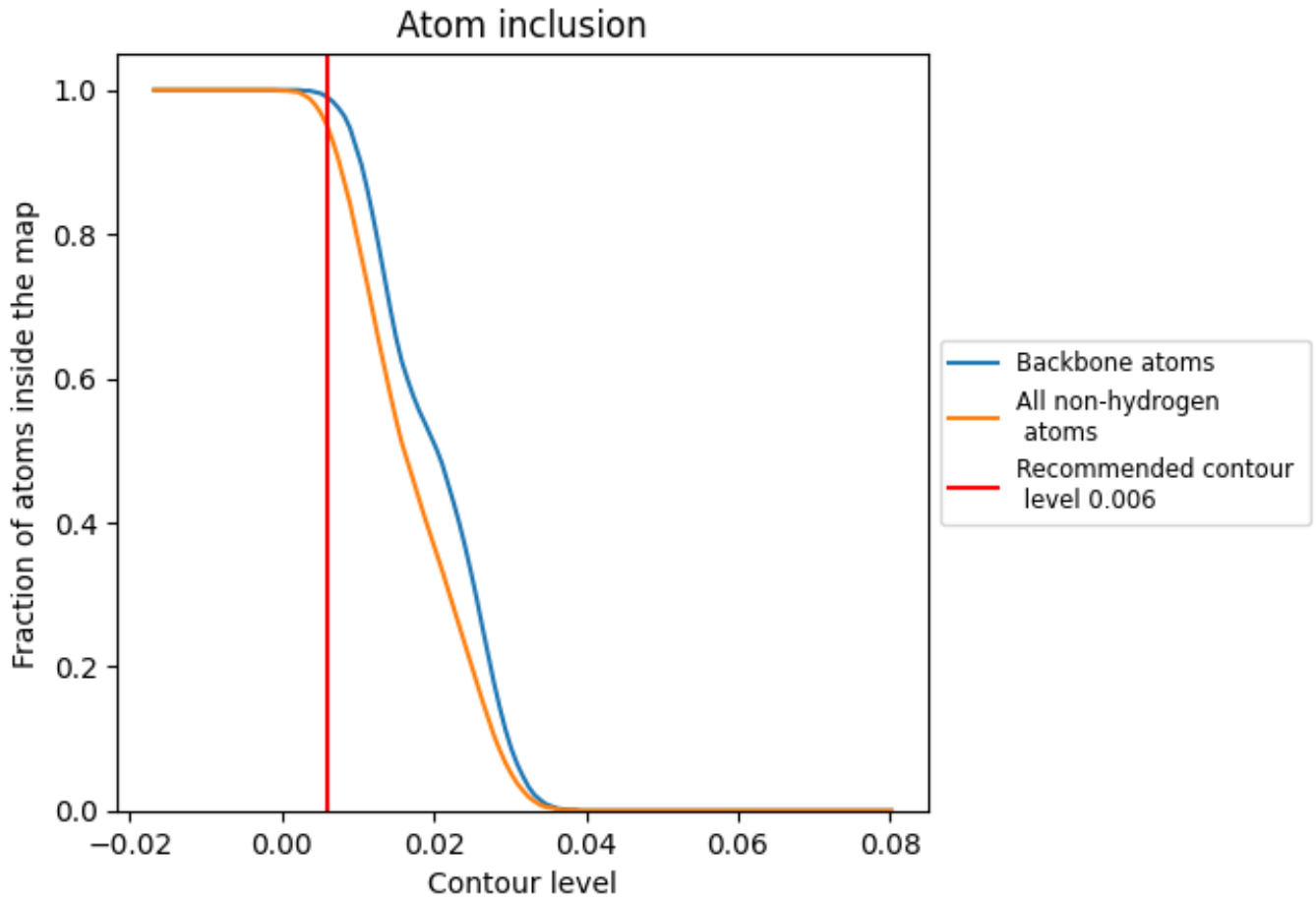
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.006).

9.4 Atom inclusion (i)



At the recommended contour level, 99% of all backbone atoms, 95% 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 (0.006) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9500	0.4960
B	0.8950	0.3720
C	0.9290	0.4980
D	0.9780	0.5580
E	0.9700	0.5520
F	0.9750	0.5510
G	0.9070	0.3700
H	0.9140	0.3720
I	0.9750	0.5500
J	0.9790	0.5550
K	0.9700	0.5520
L	0.9540	0.5430
M	0.8980	0.3730
N	0.9560	0.5500
O	0.9150	0.3740
P	0.8930	0.3690
Q	0.9290	0.4950
R	0.9330	0.4950
S	0.9470	0.5070
T	0.9580	0.5080
U	0.9700	0.5530
V	0.9730	0.5540
W	0.9740	0.5550
X	0.9580	0.5060
a	0.9540	0.5510

