Full wwPDB EM Validation Report ⓘ

Nov 18, 2026 – 06:30 pm GMT

PDB ID	:	30CI / pdb_000030ci
EMDB ID	:	EMD-57603
Title	:	Leishmania cytochrome bc1 complex with GNF5885
Authors	:	Srinivas, H.
Deposited on	:	2026-04-20
Resolution	:	2.80 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 ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

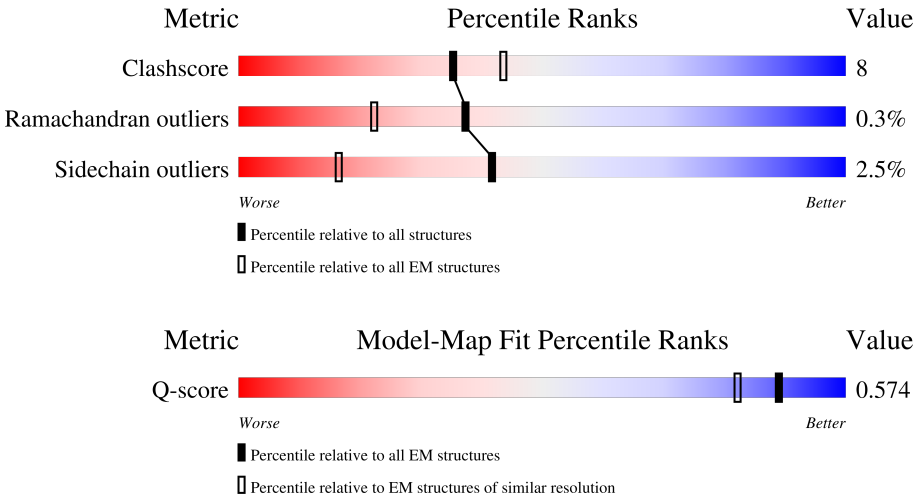
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.2
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data 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

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

The reported resolution of this entry is 2.80 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	11806 (2.30 - 3.30)

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	A	490	76% 22%
1	M	490	77% 22%
2	B	371	80% 18%
2	N	371	76% 22%

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Mol	Chain	Length	Quality of chain
3	C	258	8% 84% 15%
3	O	258	8% 84% 14%
4	D	297	5% 40% 9% 51%
4	P	297	5% 39% 9% 51%
5	E	202	76% 19%
5	Q	202	72% 22%
6	F	70	50% 79% 20%
6	R	70	50% 77% 21%
7	G	467	5% 69% 18% 11%
7	S	467	5% 70% 18% 11%
8	H	119	10% 73% 15% 11%
8	T	119	10% 72% 16% 11%
9	J	147	55% 5% 39%
9	X	147	56% 5% 39%
10	K	85	11% 39% 6% 55%
10	Y	85	11% 38% 7% 55%
11	I	67	6% 63% 27% 9%
11	W	67	6% 63% 27% 9%

2 Entry composition (i)

There are 14 unique types of molecules in this entry. The entry contains 36534 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 Mitochondrial processing peptide beta subunit, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	490	Total	C	N	O	S	0	0
			3839	2411	679	727	22		
1	M	490	Total	C	N	O	S	0	0
			3839	2411	679	727	22		

- Molecule 2 is a protein called Cytochrome b.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	370	Total	C	N	O	S	0	0
			3150	2211	446	461	32		
2	N	370	Total	C	N	O	S	0	0
			3150	2211	446	461	32		

- Molecule 3 is a protein called Cytochrome c1, heme protein, mitochondrial, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	256	Total	C	N	O	S	0	0
			2100	1348	366	377	9		
3	O	256	Total	C	N	O	S	0	0
			2100	1348	366	377	9		

- Molecule 4 is a protein called Rieske iron-sulfur protein, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	145	Total	C	N	O	S	0	0
			1148	735	188	219	6		
4	P	145	Total	C	N	O	S	0	0
			1148	735	188	219	6		

- Molecule 5 is a protein called Ubiquinol-cytochrome c reductase complex 14 kDa protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	193	Total	C	N	O	S	0	0
			1643	1070	290	272	11		
5	Q	193	Total	C	N	O	S	0	0
			1643	1070	290	272	11		

- Molecule 6 is a protein called Ubiquinol-cytochrome-c reductase-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	69	Total	C	N	O	S	0	0
			547	348	88	105	6		
6	R	69	Total	C	N	O	S	0	0
			547	348	88	105	6		

- Molecule 7 is a protein called Mitochondrial processing peptidase alpha subunit, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	414	Total	C	N	O	S	0	0
			3242	2037	572	611	22		
7	S	414	Total	C	N	O	S	0	0
			3242	2037	572	611	22		

- Molecule 8 is a protein called cytochrome bc1 complex.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	106	Total	C	N	O	S	0	0
			909	592	158	156	3		
8	T	106	Total	C	N	O	S	0	0
			909	592	158	156	3		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
H	65	ASN	MET	conflict	UNP A0A640KRZ1
T	65	ASN	MET	conflict	UNP A0A640KRZ1

- Molecule 9 is a protein called cytochrome bc1 complex.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	J	89	Total	C	N	O	S	0	0
			711	466	121	114	10		
9	X	89	Total	C	N	O	S	0	0
			711	466	121	114	10		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
J	84	ASP	ASN	conflict	UNP A0A640KPN1
X	84	ASP	ASN	conflict	UNP A0A640KPN1

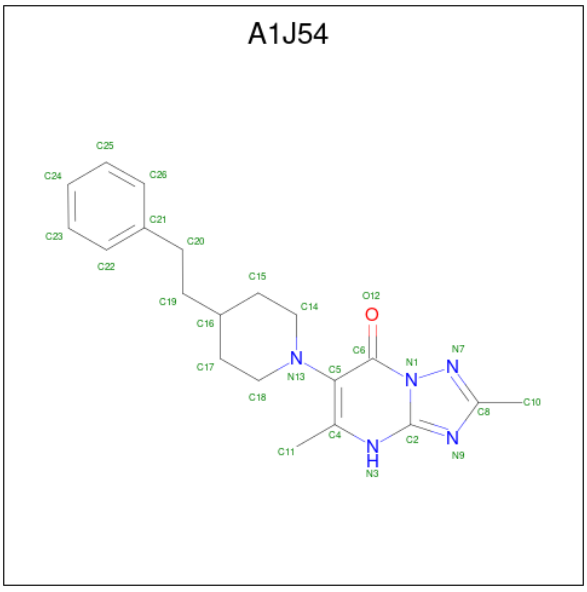
- Molecule 10 is a protein called cytochrome bc1 complex.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	K	38	Total	C	N	O	S	0	0
			297	203	44	49	1		
10	Y	38	Total	C	N	O	S	0	0
			297	203	44	49	1		

- Molecule 11 is a protein called cytochrome bc1 complex.

Mol	Chain	Residues	Atoms				AltConf	Trace
11	W	61	Total	C	N	O	0	0
			526	354	89	83		
11	I	61	Total	C	N	O	0	0
			526	354	89	83		

- Molecule 12 is 2,5-dimethyl-6-[4-(2-phenylethyl)piperidin-1-yl]-4H-[1,2,4]triazolo[1,5-a]pyrimidin-7-one (CCD ID: A1J54) (formula: $C_{20}H_{25}N_5O$).



Mol	Chain	Residues	Atoms				AltConf
12	B	1	Total	C	N	O	0
			26	20	5	1	

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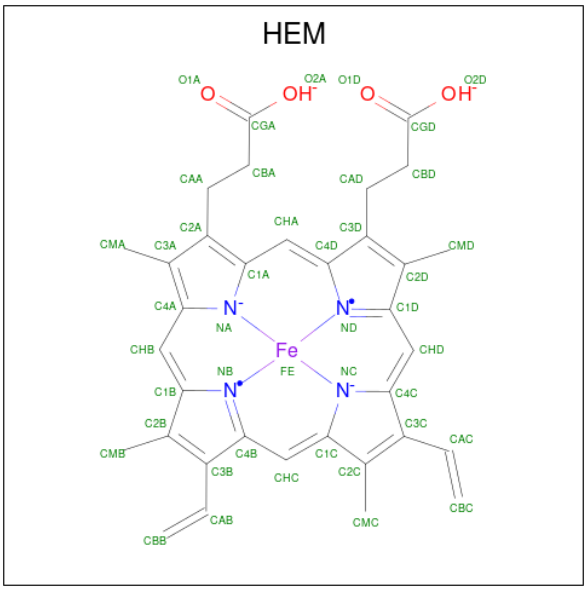
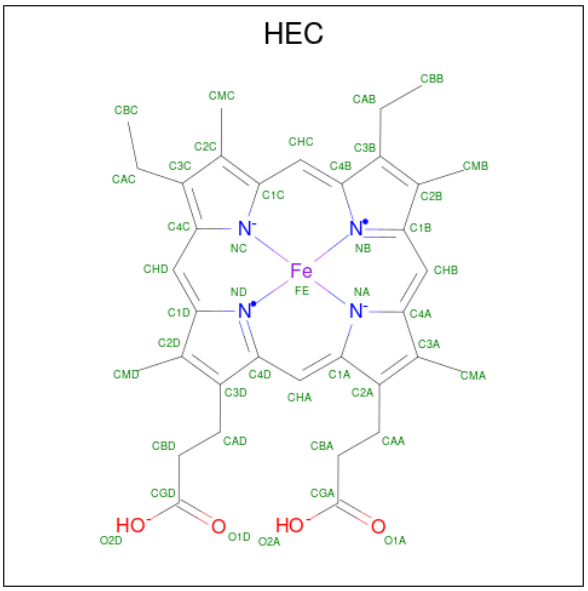
Mol	Chain	Residues	Atoms				AltConf
12	N	1	Total	C	N	O	0
			26	20	5	1	

- Molecule 13 is PROTOPORPHYRIN IX CONTAINING FE (CCD ID: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



Mol	Chain	Residues	Atoms					AltConf
13	B	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
13	B	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
13	N	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
13	N	1	Total	C	Fe	N	O	0
			43	34	1	4	4	

- Molecule 14 is HEME C (CCD ID: HEC) (formula: $C_{34}H_{36}FeN_4O_4$) (labeled as "Ligand of Interest" by depositor).



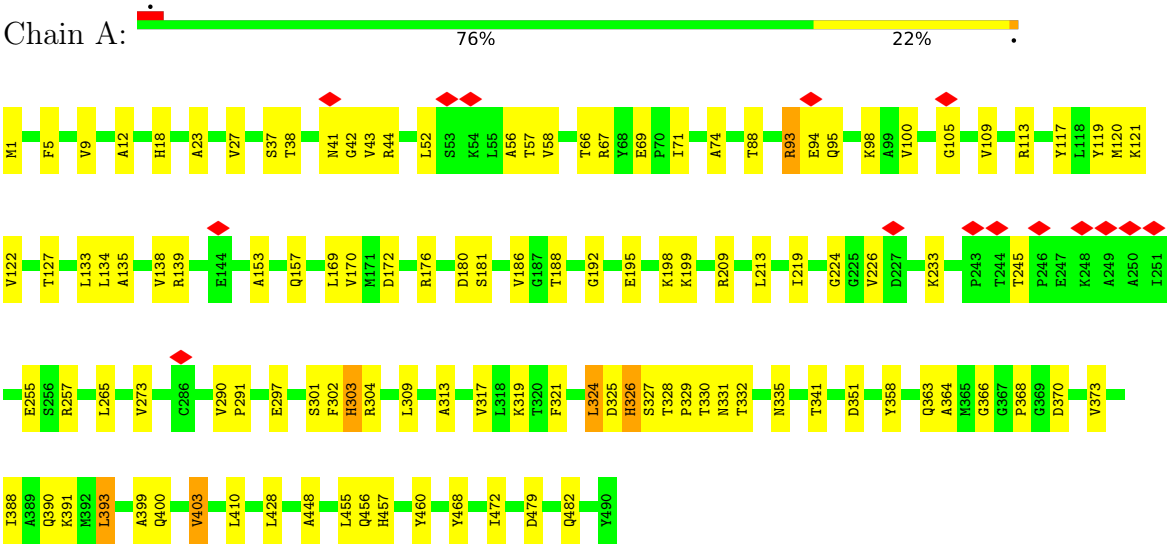
Mol	Chain	Residues	Atoms					AltConf
14	C	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
14	O	1	Total	C	Fe	N	O	0
			43	34	1	4	4	

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.

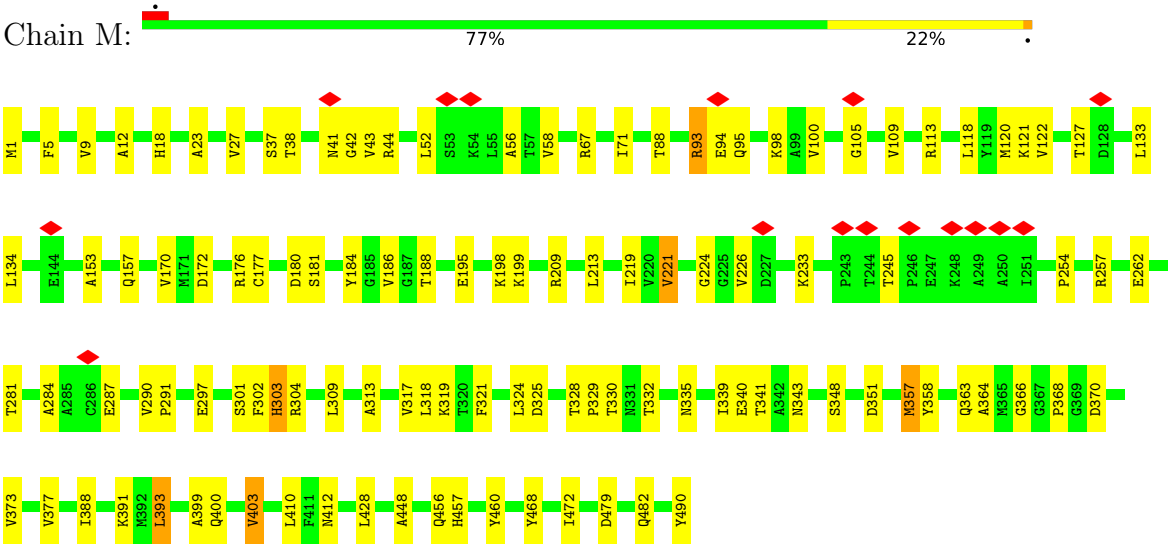
• Molecule 1: Mitochondrial processing peptide beta subunit, putative

Chain A:



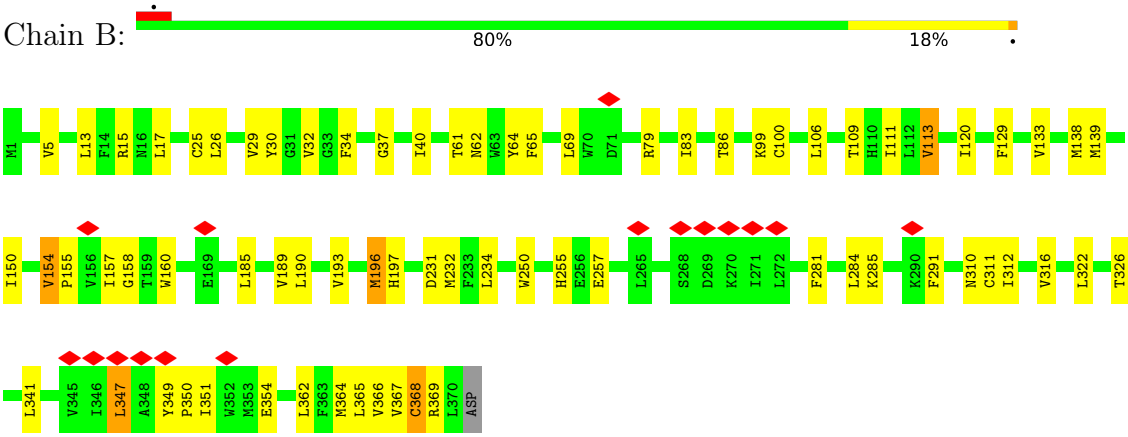
• Molecule 1: Mitochondrial processing peptide beta subunit, putative

Chain M:



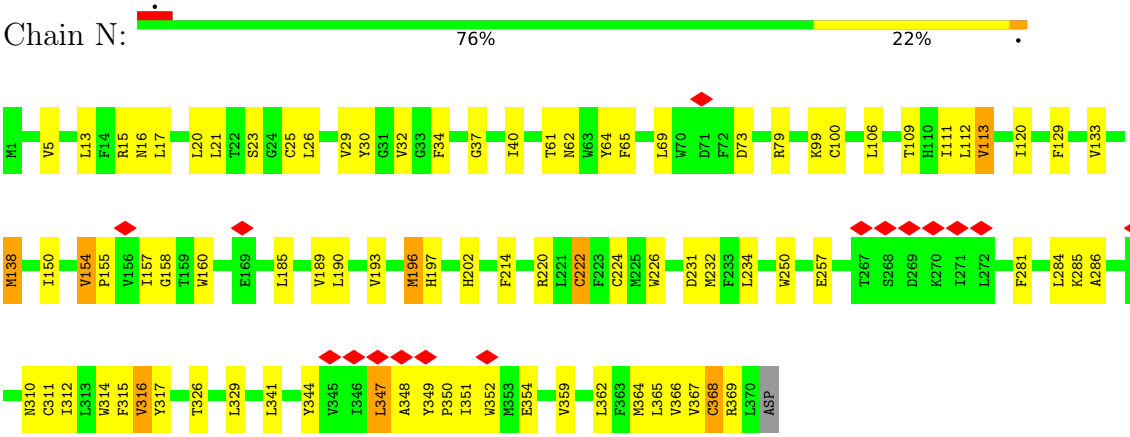
• Molecule 2: Cytochrome b

Chain B:



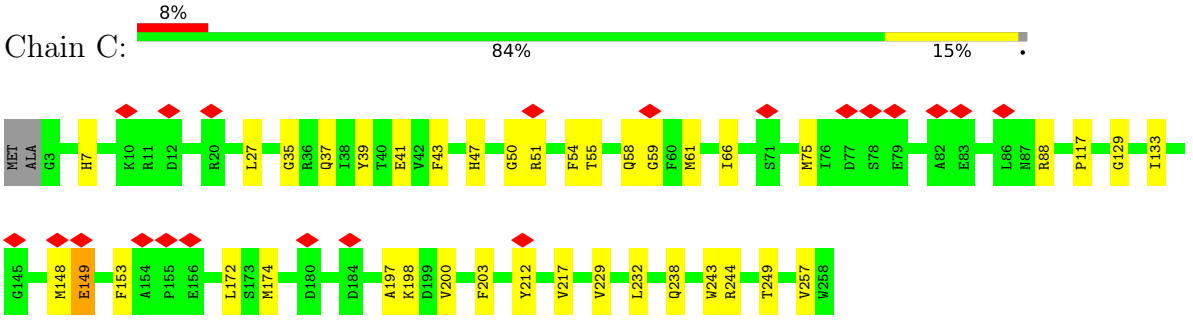
• Molecule 2: Cytochrome b

Chain N:



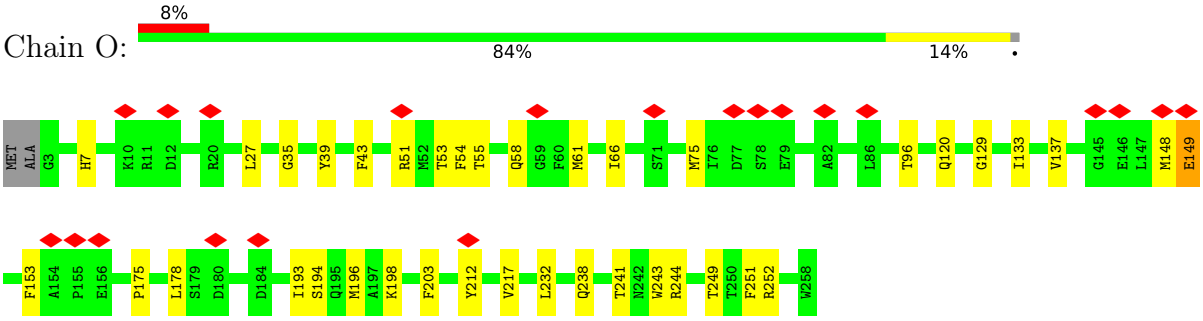
• Molecule 3: Cytochrome c1, heme protein, mitochondrial, putative

Chain C:



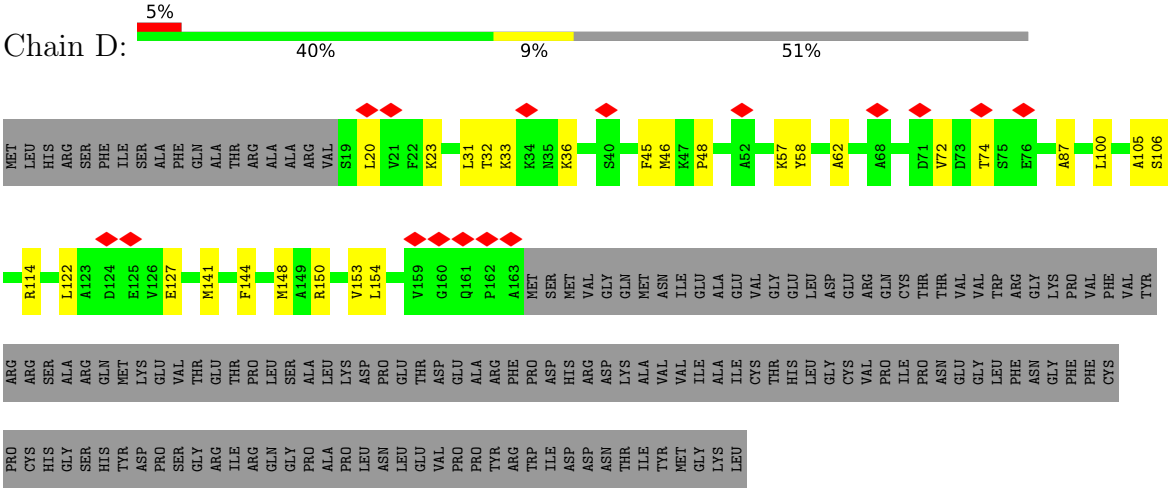
• Molecule 3: Cytochrome c1, heme protein, mitochondrial, putative

Chain O:



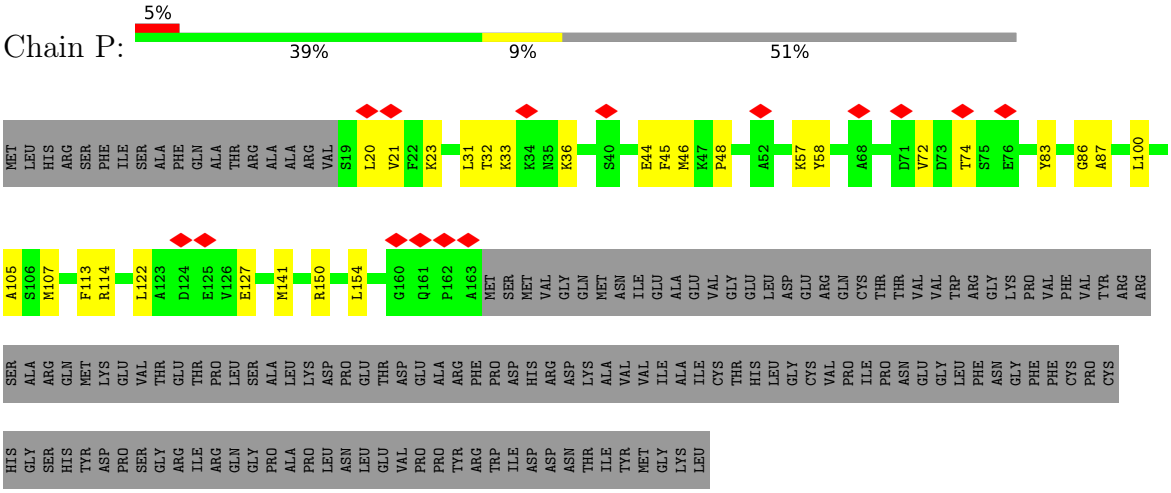
• Molecule 4: Rieske iron-sulfur protein, putative

Chain D:



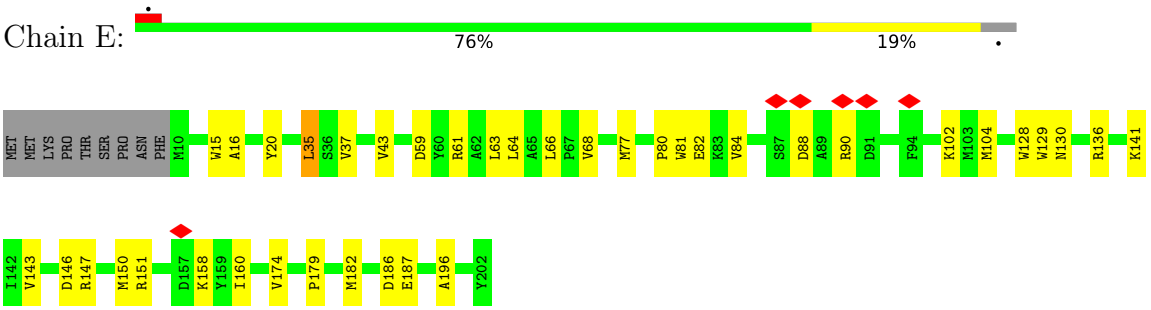
• Molecule 4: Rieske iron-sulfur protein, putative

Chain P:



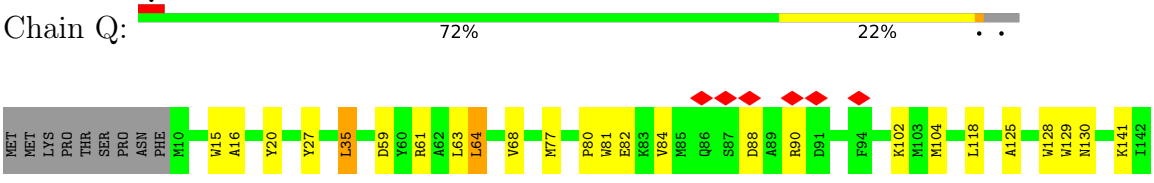
• Molecule 5: Ubiquinol-cytochrome c reductase complex 14 kDa protein

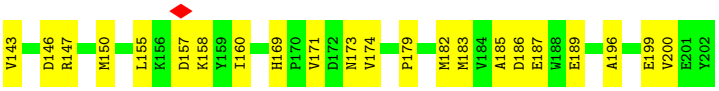
Chain E:



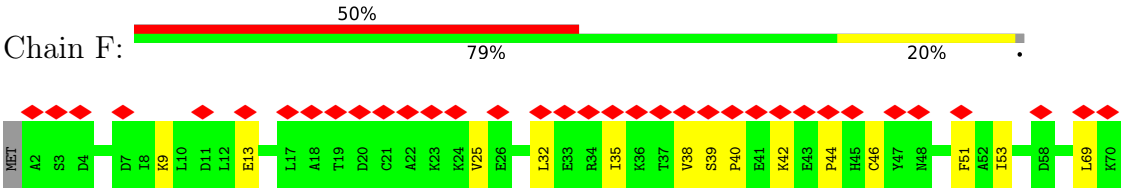
• Molecule 5: Ubiquinol-cytochrome c reductase complex 14 kDa protein

Chain Q:

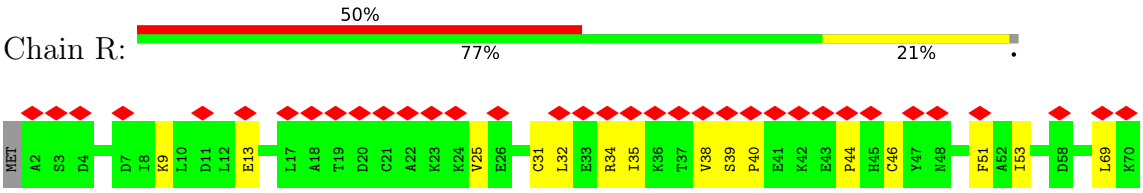




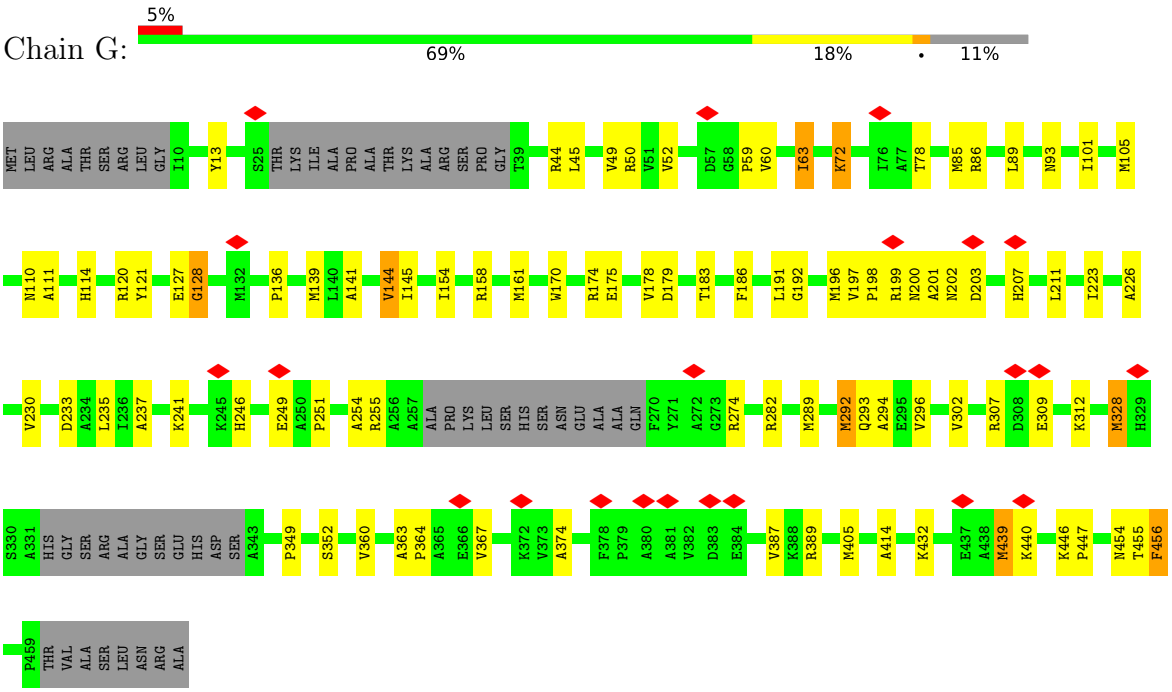
• Molecule 6: Ubiquinol-cytochrome-c reductase-like protein



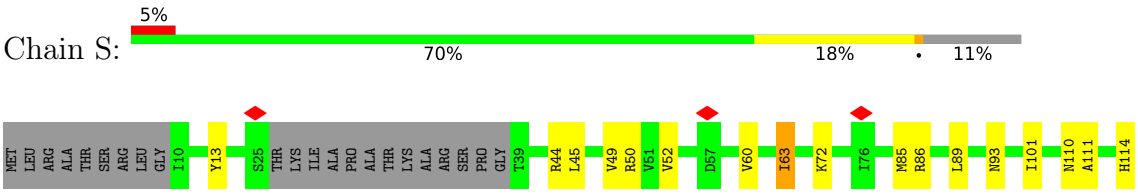
• Molecule 6: Ubiquinol-cytochrome-c reductase-like protein

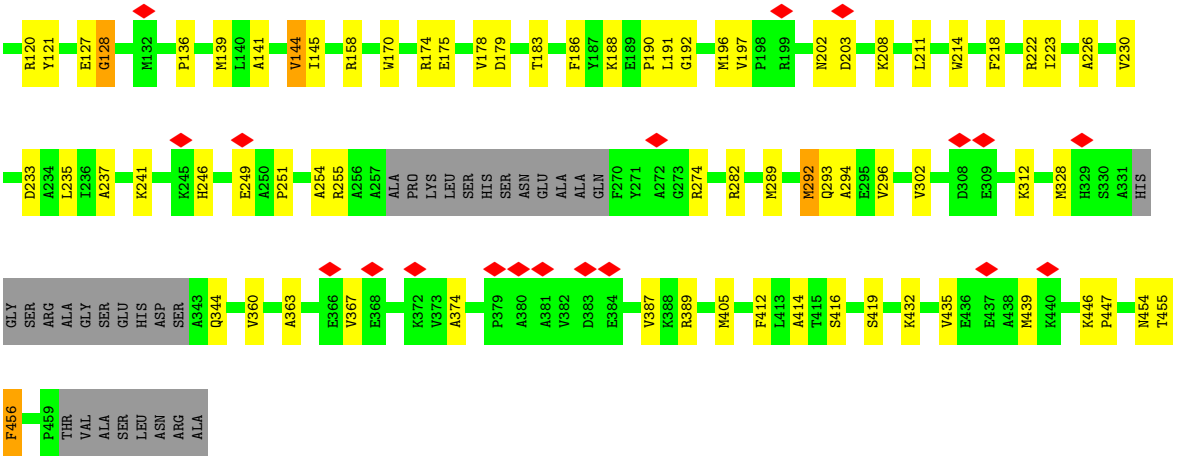


• Molecule 7: Mitochondrial processing peptidase alpha subunit, putative



• Molecule 7: Mitochondrial processing peptidase alpha subunit, putative

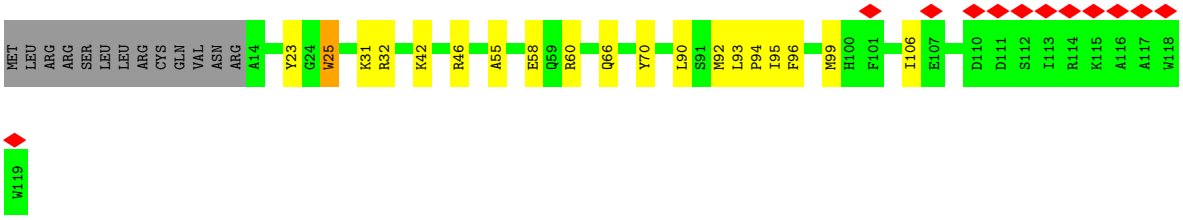




• Molecule 8: cytochrome bc1 complex

Chain H:

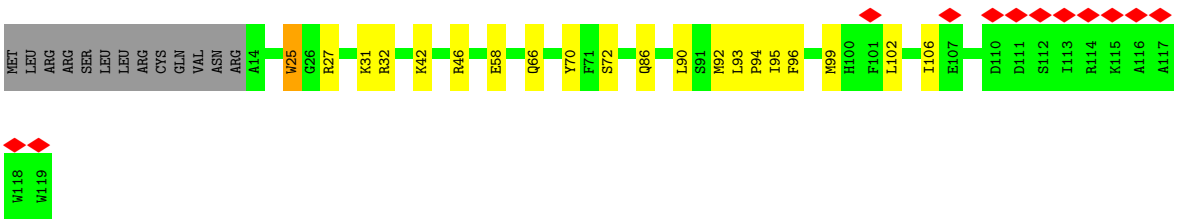




• Molecule 8: cytochrome bc1 complex

Chain T:

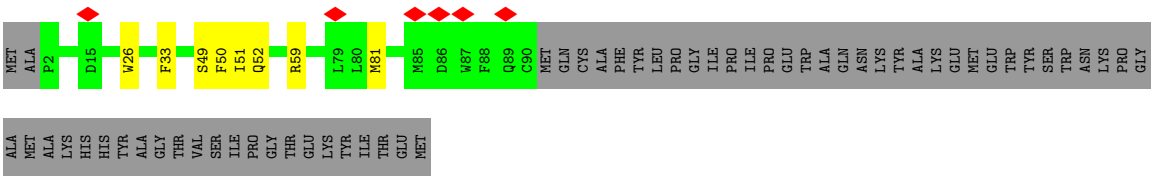




• Molecule 9: cytochrome bc1 complex

Chain J:

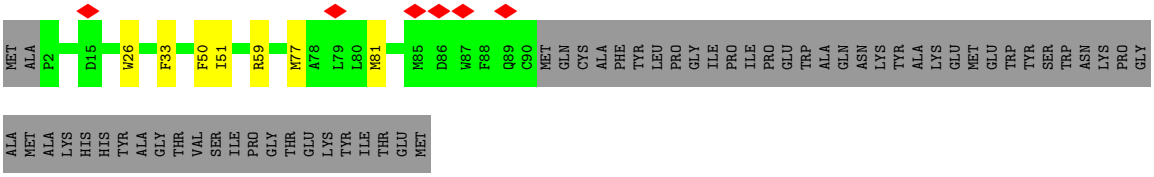




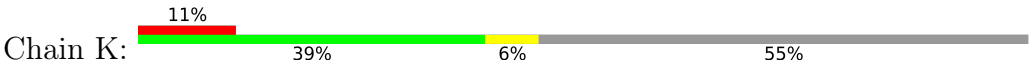
• Molecule 9: cytochrome bc1 complex

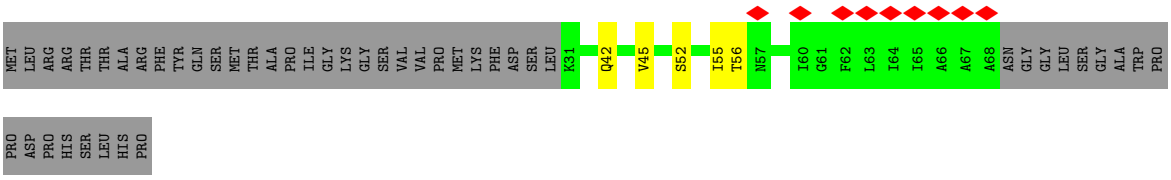
Chain X:



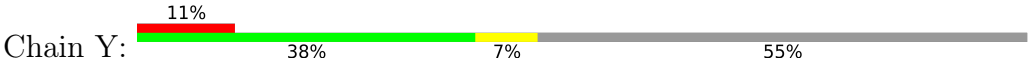


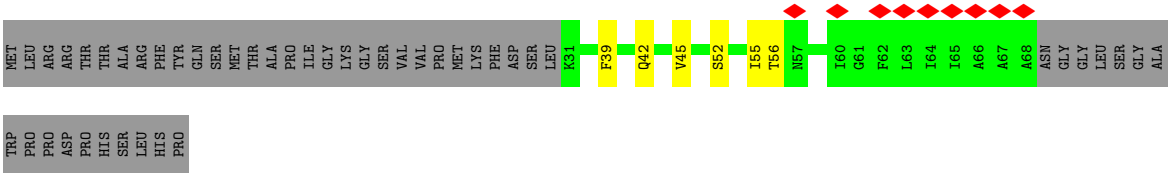
• Molecule 10: cytochrome bc1 complex





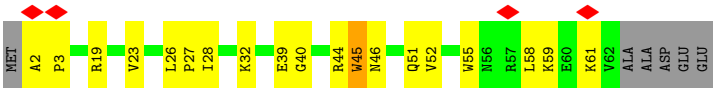
• Molecule 10: cytochrome bc1 complex





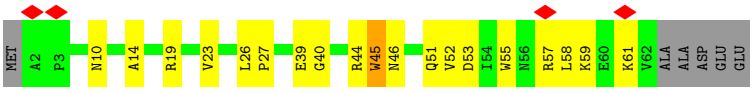
• Molecule 11: cytochrome bc1 complex





• Molecule 11: cytochrome bc1 complex





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	200000	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	8000	Depositor
Maximum defocus (nm)	20000	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	25.231	Depositor
Minimum map value	-15.977	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	1.000	Depositor
Recommended contour level	4.5	Depositor
Map size (Å)	301.0, 301.0, 301.0	wwPDB
Map dimensions	350, 350, 350	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.86, 0.86, 0.86	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: A1J54, HEM, HEC

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|>5$	RMSZ	#$\|Z\|>5$
1	A	0.14	0/3925	0.44	2/5326 (0.0%)
1	M	0.14	0/3925	0.41	0/5326
2	B	0.14	0/3272	0.37	0/4458
2	N	0.14	0/3272	0.38	1/4458 (0.0%)
3	C	0.13	0/2173	0.35	0/2959
3	O	0.13	0/2173	0.34	0/2959
4	D	0.12	0/1177	0.34	0/1599
4	P	0.12	0/1177	0.35	0/1599
5	E	0.14	0/1701	0.34	0/2299
5	Q	0.13	0/1701	0.35	0/2299
6	F	0.12	0/559	0.28	0/759
6	R	0.12	0/559	0.28	0/759
7	G	0.14	0/3318	0.43	1/4496 (0.0%)
7	S	0.14	0/3318	0.43	1/4496 (0.0%)
8	H	0.11	0/942	0.33	0/1275
8	T	0.12	0/942	0.37	0/1275
9	J	0.13	0/736	0.36	0/996
9	X	0.13	0/736	0.35	0/996
10	K	0.15	0/306	0.27	0/417
10	Y	0.15	0/306	0.28	0/417
11	I	0.21	0/545	0.56	0/742
11	W	0.20	0/545	0.54	0/742
All	All	0.14	0/37308	0.39	5/50652 (0.0%)

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	A	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
1	M	0	1
All	All	0	2

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	324	LEU	CA-C-N	6.33	133.63	121.54
1	A	324	LEU	C-N-CA	6.33	133.63	121.54
7	G	128	GLY	N-CA-C	6.13	119.07	112.33
2	N	112	LEU	N-CA-C	-5.68	108.14	114.62
7	S	128	GLY	N-CA-C	5.09	119.07	112.25

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	301	SER	Peptide
1	M	301	SER	Peptide

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3839	0	3745	75	0
1	M	3839	0	3745	75	0
2	B	3150	0	3194	54	0
2	N	3150	0	3192	62	0
3	C	2100	0	1997	34	0
3	O	2100	0	1997	32	0
4	D	1148	0	1125	19	0
4	P	1148	0	1125	19	0
5	E	1643	0	1575	31	0
5	Q	1643	0	1575	38	0
6	F	547	0	542	9	0
6	R	547	0	542	9	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	G	3242	0	3131	62	0
7	S	3242	0	3131	58	0
8	H	909	0	861	22	0
8	T	909	0	861	22	0
9	J	711	0	690	5	0
9	X	711	0	690	6	0
10	K	297	0	305	4	0
10	Y	297	0	305	5	0
11	I	526	0	520	15	0
11	W	526	0	520	12	0
12	B	26	0	0	0	0
12	N	26	0	0	1	0
13	B	86	0	60	6	0
13	N	86	0	60	7	0
14	C	43	0	32	2	0
14	O	43	0	32	5	0
All	All	36534	0	35552	572	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 (572) 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)
7:S:72:LYS:HD3	7:S:120:ARG:HH12	1.38	0.88
2:N:13:LEU:O	2:N:17:LEU:HB2	1.78	0.83
1:A:105:GLY:HA2	1:A:121:LYS:O	1.79	0.82
1:A:18:HIS:HB3	1:A:403:VAL:HG12	1.62	0.82
1:M:105:GLY:HA2	1:M:121:LYS:O	1.79	0.81
1:M:18:HIS:HB3	1:M:403:VAL:HG12	1.62	0.80
2:N:367:VAL:HG12	2:N:368:CYS:H	1.46	0.80
2:N:222:CYS:HB3	2:N:224:CYS:H	1.47	0.79
2:B:367:VAL:HG12	2:B:368:CYS:H	1.46	0.78
2:B:13:LEU:O	2:B:17:LEU:HB2	1.83	0.78
1:M:37:SER:O	1:M:44:ARG:HA	1.86	0.76
1:A:37:SER:O	1:A:44:ARG:HA	1.86	0.75
1:A:328:THR:HB	1:A:329:PRO:HA	1.67	0.75
7:S:226:ALA:HB2	7:S:414:ALA:HB2	1.70	0.73
3:O:43:PHE:HD2	14:O:301:HEC:HBB2	1.52	0.73
1:M:181:SER:HA	4:P:114:ARG:HD2	1.71	0.72
2:N:111:ILE:HD12	2:N:111:ILE:O	1.91	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:H:90:LEU:HD11	10:K:42:GLN:HB3	1.74	0.70
2:B:111:ILE:HD12	2:B:111:ILE:O	1.92	0.70
8:T:90:LEU:HD11	10:Y:42:GLN:HB3	1.73	0.70
5:E:77:MET:HG3	5:E:179:PRO:HG3	1.75	0.69
11:I:52:VAL:HA	11:I:55:TRP:HD1	1.58	0.68
2:B:329:LEU:HD22	8:H:92:MET:HB2	1.76	0.67
4:D:32:THR:HG22	4:D:33:LYS:H	1.59	0.67
1:A:332:THR:HG22	8:T:46:ARG:HH11	1.58	0.67
11:W:52:VAL:HA	11:W:55:TRP:HD1	1.59	0.66
13:B:403:HEM:HBC2	13:B:403:HEM:HHD	1.78	0.66
1:A:257:ARG:HH21	8:H:66:GLN:HB3	1.59	0.66
1:M:257:ARG:HH21	8:T:66:GLN:HB3	1.60	0.66
13:N:403:HEM:HBC2	13:N:403:HEM:HHD	1.78	0.66
7:S:296:VAL:HB	7:S:367:VAL:HG21	1.78	0.65
2:B:354:GLU:HG3	8:H:106:ILE:HD13	1.79	0.65
5:Q:77:MET:HG3	5:Q:179:PRO:HG3	1.78	0.65
7:G:226:ALA:HB2	7:G:414:ALA:HB2	1.78	0.64
2:N:354:GLU:HG3	8:T:106:ILE:HD13	1.80	0.64
7:S:296:VAL:HG13	7:S:455:THR:HG22	1.80	0.64
1:A:38:THR:HG23	1:A:42:GLY:HA2	1.80	0.64
1:M:105:GLY:CA	1:M:121:LYS:O	2.46	0.63
1:M:388:ILE:HG23	1:M:393:LEU:HD23	1.81	0.63
1:A:363:GLN:HB2	8:H:42:LYS:HD3	1.81	0.63
2:B:25:CYS:HB2	3:C:244:ARG:HH21	1.64	0.63
2:N:64:TYR:HD1	3:O:51:ARG:HD2	1.63	0.63
2:N:311:CYS:HA	5:Q:15:TRP:HA	1.80	0.63
13:N:403:HEM:HMB1	13:N:403:HEM:HBB2	1.82	0.62
4:P:107:MET:HE1	5:Q:160:ILE:HG21	1.81	0.62
2:B:311:CYS:HA	5:E:15:TRP:HA	1.81	0.62
5:E:59:ASP:HB2	7:S:251:PRO:HB2	1.81	0.62
1:M:328:THR:HB	1:M:329:PRO:HA	1.80	0.61
1:A:468:TYR:HB3	1:A:472:ILE:HG21	1.81	0.61
1:M:38:THR:HG23	1:M:42:GLY:HA2	1.82	0.61
1:A:105:GLY:CA	1:A:121:LYS:O	2.49	0.61
5:Q:104:MET:HE3	5:Q:104:MET:HA	1.83	0.61
7:G:101:ILE:HG23	7:G:139:MET:HE1	1.84	0.60
2:B:64:TYR:HD1	3:C:51:ARG:HD2	1.66	0.60
1:M:370:ASP:HB3	2:N:15:ARG:HD3	1.84	0.60
7:S:101:ILE:HG23	7:S:139:MET:HE1	1.82	0.60
13:B:403:HEM:HMB1	13:B:403:HEM:HBB2	1.82	0.60
7:G:63:ILE:HD11	7:G:230:VAL:HG11	1.84	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:H:25:TRP:H	1:M:341:THR:HG21	1.66	0.60
1:A:399:ALA:O	1:A:403:VAL:HG13	2.02	0.60
2:N:61:THR:HG22	2:N:62:ASN:H	1.67	0.60
2:N:329:LEU:HD22	8:T:92:MET:HB2	1.84	0.59
1:A:388:ILE:HG23	1:A:393:LEU:HD23	1.84	0.59
7:G:207:HIS:CD2	5:Q:64:LEU:HD21	2.37	0.59
7:G:296:VAL:HB	7:G:367:VAL:HG21	1.83	0.59
8:T:95:ILE:O	8:T:99:MET:HG3	2.03	0.59
5:E:104:MET:HE3	5:E:104:MET:HA	1.83	0.59
4:D:105:ALA:HA	5:E:151:ARG:HD3	1.83	0.59
5:Q:81:TRP:HA	5:Q:84:VAL:HG22	1.85	0.59
1:A:370:ASP:HB3	2:B:15:ARG:HD3	1.84	0.59
3:C:88:ARG:HG2	3:C:88:ARG:HH11	1.66	0.59
1:M:118:LEU:HG	1:M:134:LEU:HD22	1.83	0.59
3:C:37:GLN:O	3:C:41:GLU:HG2	2.03	0.59
3:C:61:MET:HE2	3:C:66:ILE:HG22	1.85	0.59
1:M:363:GLN:HB2	8:T:42:LYS:HD3	1.85	0.59
5:E:81:TRP:HA	5:E:84:VAL:HG22	1.85	0.58
3:O:61:MET:HE2	3:O:66:ILE:HG22	1.85	0.58
4:P:32:THR:HG22	4:P:33:LYS:H	1.68	0.58
7:S:63:ILE:HD11	7:S:230:VAL:HG11	1.84	0.58
7:S:110:ASN:HB3	7:S:128:GLY:HA2	1.85	0.58
11:I:53:ASP:O	11:I:57:ARG:HG2	2.04	0.58
2:B:61:THR:HG22	2:B:62:ASN:H	1.67	0.58
1:M:105:GLY:HA3	1:M:122:VAL:HG12	1.86	0.58
7:G:251:PRO:HB2	5:Q:59:ASP:HB2	1.84	0.58
1:A:341:THR:HG21	8:T:25:TRP:H	1.68	0.58
2:B:32:VAL:HG23	2:B:234:LEU:HD21	1.86	0.58
2:B:106:LEU:HB3	2:B:111:ILE:HG22	1.86	0.57
1:M:321:PHE:HD1	9:X:50:PHE:HB2	1.69	0.57
14:C:501:HEC:HHA	14:C:501:HEC:HBA1	1.85	0.57
7:G:72:LYS:HG2	7:G:120:ARG:HH12	1.69	0.57
1:M:399:ALA:O	1:M:403:VAL:HG13	2.03	0.57
7:G:72:LYS:HG2	7:G:120:ARG:NH1	2.20	0.57
1:M:176:ARG:O	1:M:180:ASP:HB2	2.05	0.57
7:S:446:LYS:HG2	7:S:447:PRO:HD2	1.86	0.57
1:A:364:ALA:HB3	1:A:373:VAL:HG11	1.87	0.56
7:G:292:MET:C	7:G:293:GLN:HG3	2.30	0.56
2:N:222:CYS:HB3	2:N:224:CYS:N	2.18	0.56
1:M:332:THR:O	1:M:366:GLY:HA2	2.05	0.56
2:B:113:VAL:HG12	2:B:197:HIS:CE1	2.39	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:G:110:ASN:HB3	7:G:128:GLY:HA2	1.86	0.56
2:N:32:VAL:HG23	2:N:234:LEU:HD21	1.86	0.56
7:G:199:ARG:HG3	7:G:199:ARG:O	2.05	0.56
8:H:95:ILE:O	8:H:99:MET:HG3	2.04	0.56
1:A:176:ARG:O	1:A:180:ASP:HB2	2.04	0.56
7:G:296:VAL:HG13	7:G:455:THR:HG22	1.88	0.56
2:N:25:CYS:HB2	3:O:244:ARG:HH21	1.71	0.56
3:O:178:LEU:HD22	3:O:196:MET:HE3	1.87	0.56
2:N:154:VAL:HG22	2:N:158:GLY:HA3	1.88	0.56
13:N:402:HEM:HBC2	13:N:402:HEM:HMC1	1.88	0.55
1:A:410:LEU:HG	7:G:60:VAL:HG22	1.88	0.55
4:D:20:LEU:HD13	4:D:23:LYS:HE2	1.89	0.55
5:E:136:ARG:HH22	5:E:187:GLU:CD	2.14	0.55
2:B:5:VAL:HG21	9:J:51:ILE:HD13	1.87	0.55
7:G:446:LYS:HG2	7:G:447:PRO:HD2	1.88	0.55
1:M:58:VAL:HG11	1:M:127:THR:HG23	1.87	0.55
2:N:5:VAL:HG21	9:X:51:ILE:HD13	1.88	0.55
11:I:58:LEU:HA	11:I:61:LYS:HZ2	1.71	0.55
13:B:402:HEM:HBC2	13:B:402:HEM:HMC1	1.88	0.55
7:S:292:MET:C	7:S:293:GLN:HG3	2.32	0.55
3:C:257:VAL:HG12	8:H:55:ALA:HB3	1.88	0.55
5:E:64:LEU:HD12	7:S:211:LEU:HD22	1.88	0.55
11:I:19:ARG:O	11:I:23:VAL:HG13	2.06	0.55
2:N:62:ASN:HA	2:N:65:PHE:HB2	1.89	0.55
2:N:329:LEU:HD21	8:T:96:PHE:HB2	1.89	0.55
2:N:113:VAL:HG12	2:N:197:HIS:CE1	2.41	0.55
2:B:154:VAL:HG22	2:B:158:GLY:HA3	1.88	0.55
1:A:332:THR:O	1:A:366:GLY:HA2	2.07	0.54
2:B:61:THR:HG22	2:B:62:ASN:N	2.22	0.54
7:G:211:LEU:HD22	5:Q:64:LEU:HD13	1.89	0.54
5:E:196:ALA:HB1	1:M:12:ALA:HA	1.88	0.54
7:S:174:ARG:H	7:S:174:ARG:HD3	1.71	0.54
11:W:19:ARG:O	11:W:23:VAL:HG13	2.06	0.54
7:G:49:VAL:HG23	7:G:223:ILE:HB	1.90	0.54
5:Q:185:ALA:O	5:Q:189:GLU:HG2	2.08	0.54
2:N:106:LEU:HB3	2:N:111:ILE:HG22	1.89	0.54
2:B:62:ASN:HA	2:B:65:PHE:HB2	1.89	0.54
13:B:402:HEM:HBB2	13:B:402:HEM:HMB2	1.89	0.54
1:M:120:MET:HE1	1:M:133:LEU:HD23	1.89	0.54
2:B:329:LEU:HD21	8:H:96:PHE:HB2	1.88	0.54
1:M:67:ARG:HH22	1:M:351:ASP:HB2	1.72	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:N:402:HEM:HMB2	13:N:402:HEM:HBB2	1.88	0.54
4:P:45:PHE:O	4:P:46:MET:HE2	2.08	0.54
2:N:61:THR:HG22	2:N:62:ASN:N	2.22	0.54
5:Q:157:ASP:HB3	5:Q:158:LYS:HZ2	1.73	0.54
11:I:26:LEU:HB3	11:I:27:PRO:HD3	1.90	0.54
6:F:35:ILE:HG12	6:F:44:PRO:HB2	1.90	0.53
1:M:302:PHE:HZ	1:M:319:LYS:HB2	1.73	0.53
6:R:35:ILE:HG12	6:R:44:PRO:HB2	1.90	0.53
2:B:109:THR:HG22	2:B:109:THR:O	2.07	0.53
1:A:303:HIS:CG	1:A:304:ARG:N	2.77	0.53
2:N:348:ALA:HA	2:N:352:TRP:HB2	1.90	0.53
7:S:186:PHE:O	7:S:192:GLY:HA3	2.08	0.53
2:B:364:MET:HA	2:B:369:ARG:HB3	1.90	0.53
1:M:364:ALA:HB3	1:M:373:VAL:HG11	1.89	0.53
7:G:174:ARG:H	7:G:174:ARG:HD3	1.71	0.53
7:G:186:PHE:O	7:G:192:GLY:HA3	2.09	0.53
1:M:468:TYR:HB3	1:M:472:ILE:HG21	1.90	0.53
1:M:52:LEU:HD23	1:M:224:GLY:HA2	1.90	0.53
1:M:233:LYS:NZ	1:M:233:LYS:HB3	2.24	0.53
2:N:64:TYR:CD1	3:O:51:ARG:HD2	2.44	0.53
4:P:20:LEU:HD13	4:P:23:LYS:HE2	1.90	0.53
1:M:43:VAL:HG12	1:M:43:VAL:O	2.09	0.53
3:O:54:PHE:HE2	3:O:75:MET:HE1	1.74	0.53
7:S:49:VAL:HG23	7:S:223:ILE:HB	1.91	0.53
4:D:31:LEU:HG	4:D:48:PRO:HG3	1.90	0.52
7:S:387:VAL:HG21	7:S:432:LYS:HG2	1.90	0.52
2:N:20:LEU:HD21	12:N:401:A1J54:C8	2.40	0.52
1:A:324:LEU:HD12	5:Q:128:TRP:CD2	2.45	0.52
1:A:12:ALA:HA	5:Q:196:ALA:HB1	1.91	0.52
1:A:43:VAL:HG12	1:A:43:VAL:O	2.09	0.52
1:M:318:LEU:HD22	1:M:377:VAL:HG13	1.91	0.52
3:O:243:TRP:CE3	3:O:244:ARG:HB2	2.45	0.52
1:M:170:VAL:HG21	1:M:358:TYR:CE1	2.45	0.52
1:M:303:HIS:CG	1:M:304:ARG:N	2.77	0.52
3:O:55:THR:O	3:O:58:GLN:HG2	2.10	0.52
4:P:31:LEU:HG	4:P:48:PRO:HG3	1.91	0.52
7:S:249:GLU:HA	7:S:254:ALA:HB2	1.92	0.52
2:B:312:ILE:HD11	5:E:16:ALA:HB2	1.91	0.52
1:M:98:LYS:HE3	7:S:389:ARG:HD3	1.91	0.52
1:A:257:ARG:NH2	8:H:66:GLN:HB3	2.25	0.51
3:C:243:TRP:CE3	3:C:244:ARG:HB2	2.46	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:170:VAL:HG21	1:A:358:TYR:CE1	2.45	0.51
3:C:55:THR:O	3:C:58:GLN:HG2	2.10	0.51
8:H:92:MET:HA	8:H:95:ILE:HG22	1.92	0.51
5:Q:183:MET:O	5:Q:187:GLU:HG3	2.09	0.51
1:A:330:THR:HG22	1:A:368:PRO:HG3	1.92	0.51
3:C:232:LEU:HB3	4:D:141:MET:HG2	1.93	0.51
3:C:249:THR:HA	8:H:58:GLU:O	2.11	0.51
7:G:249:GLU:HA	7:G:254:ALA:HB2	1.92	0.51
1:A:233:LYS:NZ	1:A:233:LYS:HB3	2.24	0.51
2:B:349:TYR:HB3	2:B:350:PRO:HD3	1.93	0.51
7:G:45:LEU:HB2	7:G:49:VAL:HG12	1.93	0.51
2:N:364:MET:HA	2:N:369:ARG:HB3	1.92	0.51
7:S:179:ASP:O	7:S:183:THR:HG23	2.11	0.51
3:O:153:PHE:CE2	6:R:46:CYS:HB2	2.46	0.50
2:N:29:VAL:HG21	2:N:99:LYS:HG3	1.93	0.50
2:N:316:VAL:HG11	5:Q:182:MET:HE1	1.92	0.50
1:A:120:MET:HE1	1:A:133:LEU:HD23	1.93	0.50
3:C:238:GLN:HG2	8:H:70:TYR:CE1	2.47	0.50
3:O:232:LEU:HB3	4:P:141:MET:HG2	1.93	0.50
7:S:72:LYS:HD3	7:S:120:ARG:NH1	2.15	0.50
7:S:86:ARG:HG2	7:S:114:HIS:O	2.12	0.50
1:A:325:ASP:O	1:A:328:THR:HG23	2.12	0.50
3:C:172:LEU:HG	3:C:174:MET:H	1.77	0.50
1:M:219:ILE:HG22	1:M:221:VAL:HG12	1.93	0.50
1:A:52:LEU:HD23	1:A:224:GLY:HA2	1.93	0.50
7:G:89:LEU:HD23	7:G:144:VAL:HG12	1.94	0.50
7:S:72:LYS:HG3	7:S:190:PRO:HB3	1.93	0.50
6:F:25:VAL:HA	6:F:53:ILE:HD11	1.94	0.50
7:G:179:ASP:O	7:G:183:THR:HG23	2.11	0.50
1:M:330:THR:HG22	1:M:368:PRO:HG3	1.94	0.50
2:N:25:CYS:HB2	3:O:244:ARG:NH2	2.27	0.49
2:B:29:VAL:HG21	2:B:99:LYS:HG3	1.93	0.49
2:B:120:ILE:HG12	2:B:193:VAL:HG23	1.94	0.49
6:R:25:VAL:HA	6:R:53:ILE:HD11	1.93	0.49
3:C:153:PHE:CE2	6:F:46:CYS:HB2	2.46	0.49
4:D:57:LYS:HE2	4:D:58:TYR:CZ	2.48	0.49
2:N:317:TYR:HE2	5:Q:77:MET:HE1	1.76	0.49
7:S:89:LEU:HD23	7:S:144:VAL:HG12	1.95	0.49
2:B:25:CYS:HB2	3:C:244:ARG:NH2	2.26	0.49
2:N:312:ILE:HD11	5:Q:16:ALA:HB2	1.94	0.49
3:O:39:TYR:HD1	3:O:43:PHE:CE1	2.30	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:T:92:MET:HA	8:T:95:ILE:HG22	1.95	0.49
7:G:387:VAL:HG21	7:G:432:LYS:HG2	1.94	0.49
1:M:23:ALA:O	1:M:27:VAL:HG13	2.13	0.49
1:M:257:ARG:NH2	8:T:66:GLN:HB3	2.26	0.49
3:O:129:GLY:O	3:O:133:ILE:HG12	2.13	0.49
5:Q:169:HIS:ND1	5:Q:171:VAL:HG22	2.28	0.49
11:W:40:GLY:O	11:W:44:ARG:HG3	2.13	0.49
11:I:53:ASP:HB3	11:I:57:ARG:HD3	1.93	0.49
3:O:238:GLN:HG2	8:T:70:TYR:CE1	2.48	0.49
1:M:325:ASP:HB2	1:M:328:THR:OG1	2.12	0.49
2:N:120:ILE:HG12	2:N:193:VAL:HG23	1.95	0.49
5:E:63:LEU:HD11	1:M:1:MET:HB3	1.94	0.48
4:P:57:LYS:HE2	4:P:58:TYR:CZ	2.48	0.48
5:Q:158:LYS:HB2	5:Q:160:ILE:HG12	1.94	0.48
9:J:26:TRP:O	9:J:59:ARG:HD2	2.13	0.48
1:M:56:ALA:HB1	1:M:226:VAL:HG13	1.96	0.48
1:M:330:THR:O	1:M:368:PRO:HD3	2.13	0.48
2:N:341:LEU:HD21	2:N:354:GLU:HB3	1.94	0.48
3:C:129:GLY:O	3:C:133:ILE:HG12	2.12	0.48
7:G:86:ARG:HG2	7:G:114:HIS:O	2.12	0.48
2:N:310:ASN:HB3	5:Q:20:TYR:HD2	1.79	0.48
1:A:23:ALA:O	1:A:27:VAL:HG13	2.13	0.48
7:G:158:ARG:O	8:T:32:ARG:HD2	2.14	0.48
1:A:302:PHE:HZ	1:A:319:LYS:HB2	1.78	0.48
2:N:138:MET:HB3	2:N:257:GLU:HB3	1.96	0.48
5:Q:199:GLU:HG2	5:Q:200:VAL:HG23	1.96	0.48
10:Y:52:SER:O	10:Y:56:THR:HG23	2.14	0.48
11:W:26:LEU:HB3	11:W:27:PRO:HD3	1.94	0.48
8:H:32:ARG:HD2	7:S:158:ARG:O	2.13	0.48
13:B:402:HEM:HBC1	2:N:185:LEU:HD11	1.95	0.48
7:S:145:ILE:HG23	7:S:246:HIS:HB2	1.96	0.48
2:B:341:LEU:HD21	2:B:354:GLU:HB3	1.95	0.47
5:E:128:TRP:C	5:E:130:ASN:H	2.22	0.47
1:M:479:ASP:HA	1:M:482:GLN:HG2	1.94	0.47
1:A:105:GLY:HA3	1:A:122:VAL:HG12	1.95	0.47
3:C:7:HIS:H	6:F:51:PHE:HE1	1.61	0.47
7:S:412:PHE:O	7:S:416:SER:HB3	2.14	0.47
1:A:390:GLN:O	1:A:391:LYS:HG2	2.14	0.47
1:A:410:LEU:HD11	7:G:59:PRO:HB2	1.96	0.47
7:G:145:ILE:HG23	7:G:246:HIS:HB2	1.96	0.47
1:M:113:ARG:HH22	1:M:172:ASP:HA	1.79	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:N:61:THR:CG2	2:N:62:ASN:H	2.27	0.47
1:A:58:VAL:HG11	1:A:127:THR:HG23	1.95	0.47
2:B:316:VAL:HG11	5:E:182:MET:HE1	1.94	0.47
2:N:314:TRP:CE3	2:N:315:PHE:HB2	2.49	0.47
2:N:347:LEU:HD23	2:N:351:ILE:HB	1.97	0.47
2:B:64:TYR:CD1	3:C:51:ARG:HD2	2.46	0.47
1:M:209:ARG:O	1:M:213:LEU:HB2	2.14	0.47
1:A:135:ALA:O	1:A:139:ARG:HB2	2.14	0.47
2:B:61:THR:CG2	2:B:62:ASN:H	2.27	0.47
1:M:41:ASN:ND2	1:M:245:THR:HG21	2.30	0.47
1:M:198:LYS:HB2	1:M:198:LYS:HE3	1.77	0.47
9:X:26:TRP:O	9:X:59:ARG:HD2	2.15	0.47
1:A:67:ARG:HH22	1:A:351:ASP:HB2	1.79	0.47
1:A:93:ARG:O	1:A:95:GLN:N	2.48	0.47
1:A:209:ARG:O	1:A:213:LEU:HB2	2.14	0.47
2:B:185:LEU:HD11	13:N:402:HEM:HBC1	1.96	0.47
1:M:93:ARG:O	1:M:95:GLN:N	2.48	0.47
3:O:7:HIS:H	6:R:51:PHE:HE1	1.61	0.47
3:O:43:PHE:CD1	3:O:43:PHE:C	2.93	0.47
3:O:251:PHE:CE2	4:P:105:ALA:HB2	2.50	0.47
7:G:198:PRO:HD2	7:G:201:ALA:HB3	1.95	0.47
1:A:479:ASP:HA	1:A:482:GLN:HG2	1.96	0.47
2:N:157:ILE:O	2:N:160:TRP:HB2	2.15	0.47
2:B:29:VAL:O	2:B:32:VAL:HB	2.15	0.46
2:B:157:ILE:O	2:B:160:TRP:HB2	2.15	0.46
7:S:237:ALA:O	7:S:241:LYS:HG2	2.15	0.46
11:I:40:GLY:O	11:I:44:ARG:HG3	2.13	0.46
1:A:113:ARG:HH22	1:A:172:ASP:HA	1.80	0.46
1:M:184:TYR:HB2	1:M:254:PRO:HD2	1.97	0.46
1:M:410:LEU:HG	7:S:60:VAL:HG22	1.95	0.46
7:G:141:ALA:O	7:G:145:ILE:HG13	2.15	0.46
3:O:43:PHE:CD2	14:O:301:HEC:HBB2	2.41	0.46
4:P:113:PHE:O	4:P:114:ARG:HG2	2.15	0.46
7:S:120:ARG:HB3	7:S:121:TYR:CD2	2.51	0.46
1:A:457:HIS:CG	7:G:13:TYR:HB2	2.51	0.46
7:G:307:ARG:HG3	7:G:349:PRO:HB2	1.97	0.46
3:O:175:PRO:HD2	14:O:301:HEC:HBC2	1.97	0.46
1:A:321:PHE:CE2	1:A:326:HIS:HB3	2.50	0.46
1:A:321:PHE:HD2	9:J:50:PHE:HB2	1.81	0.46
2:B:310:ASN:HB3	5:E:20:TYR:HD2	1.80	0.46
6:R:32:LEU:HD23	6:R:35:ILE:HD12	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:S:111:ALA:HB3	7:S:127:GLU:HB2	1.96	0.46
1:A:41:ASN:ND2	1:A:245:THR:HG21	2.30	0.46
3:O:249:THR:HA	8:T:58:GLU:O	2.15	0.46
11:W:58:LEU:HA	11:W:61:LYS:HZ2	1.81	0.46
1:A:41:ASN:HD21	1:A:245:THR:HG21	1.81	0.46
6:F:32:LEU:HD23	6:F:35:ILE:HD12	1.97	0.46
4:P:23:LYS:HG2	4:P:45:PHE:HB3	1.97	0.46
4:D:87:ALA:HB3	5:E:141:LYS:HE2	1.98	0.46
10:K:52:SER:O	10:K:56:THR:HG23	2.15	0.46
1:A:332:THR:HG22	8:T:46:ARG:NH1	2.29	0.46
10:K:52:SER:O	10:K:55:ILE:HG22	2.16	0.46
1:A:400:GLN:O	1:A:403:VAL:HG22	2.15	0.46
4:D:23:LYS:HG2	4:D:45:PHE:HB3	1.98	0.46
7:G:289:MET:HE3	7:G:293:GLN:NE2	2.31	0.46
1:M:335:ASN:HD21	1:M:364:ALA:HB1	1.81	0.46
2:N:29:VAL:O	2:N:32:VAL:HB	2.15	0.46
14:O:301:HEC:HBA1	14:O:301:HEC:HHA	1.98	0.46
5:Q:128:TRP:C	5:Q:130:ASN:H	2.23	0.46
7:G:241:LYS:N	7:G:241:LYS:HD2	2.31	0.45
3:O:53:THR:HG22	3:O:96:THR:HA	1.97	0.45
10:Y:52:SER:O	10:Y:55:ILE:HG22	2.15	0.45
1:M:339:ILE:O	1:M:340:GLU:HG3	2.16	0.45
1:A:388:ILE:HG22	1:A:455:LEU:HD12	1.99	0.45
4:D:72:VAL:HG13	4:D:74:THR:HG23	1.98	0.45
7:G:251:PRO:O	7:G:255:ARG:HG2	2.17	0.45
3:O:27:LEU:HD12	3:O:212:TYR:HB3	1.99	0.45
7:S:45:LEU:HB2	7:S:49:VAL:HG12	1.97	0.45
11:W:27:PRO:HB2	9:X:81:MET:HE1	1.98	0.45
5:E:80:PRO:O	5:E:84:VAL:HG13	2.16	0.45
1:M:100:VAL:HG22	1:M:133:LEU:HD21	1.97	0.45
1:M:195:GLU:O	1:M:199:LYS:HG2	2.17	0.45
1:M:400:GLN:O	1:M:403:VAL:HG22	2.16	0.45
2:N:129:PHE:O	2:N:133:VAL:HG23	2.16	0.45
4:P:87:ALA:HB3	5:Q:141:LYS:HE2	1.98	0.45
4:P:122:LEU:HD23	4:P:127:GLU:HA	1.98	0.45
2:B:129:PHE:O	2:B:133:VAL:HG23	2.15	0.45
3:C:39:TYR:HD1	3:C:43:PHE:CE2	2.34	0.45
4:D:122:LEU:HD23	4:D:127:GLU:HA	1.98	0.45
4:P:72:VAL:HG13	4:P:74:THR:HG23	1.98	0.45
1:M:457:HIS:CG	7:S:13:TYR:HB2	2.51	0.45
2:N:349:TYR:HB3	2:N:350:PRO:HD3	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:S:435:VAL:O	7:S:439:MET:HG2	2.16	0.45
1:A:181:SER:HA	4:D:114:ARG:HD3	1.98	0.45
4:D:45:PHE:O	4:D:46:MET:HE2	2.17	0.45
7:G:328:MET:HE2	7:G:374:ALA:HB1	1.99	0.45
2:N:34:PHE:CD2	2:N:231:ASP:HB3	2.52	0.45
2:N:69:LEU:HD12	2:N:79:ARG:HD2	1.98	0.45
5:Q:68:VAL:HG21	5:Q:179:PRO:HB2	1.98	0.45
3:C:249:THR:H	4:D:106:SER:HB3	1.81	0.45
2:N:326:THR:HG23	8:T:95:ILE:HG21	1.99	0.45
7:S:251:PRO:O	7:S:255:ARG:HG2	2.16	0.45
1:M:262:GLU:HG3	1:M:468:TYR:HE1	1.82	0.45
3:O:252:ARG:HD3	8:T:58:GLU:CD	2.42	0.45
7:S:363:ALA:O	7:S:367:VAL:HG23	2.16	0.45
2:B:30:TYR:HA	13:B:403:HEM:O1A	2.17	0.44
3:C:27:LEU:HD12	3:C:212:TYR:HB3	1.99	0.44
7:G:85:MET:HE2	7:G:85:MET:HB2	1.79	0.44
7:G:191:LEU:HD23	7:G:191:LEU:HA	1.82	0.44
7:G:309:GLU:HG3	7:G:352:SER:HA	1.99	0.44
7:G:44:ARG:HH11	7:G:50:ARG:HD3	1.82	0.44
7:G:237:ALA:O	7:G:241:LYS:HG2	2.17	0.44
7:G:440:LYS:HB2	7:G:440:LYS:HE2	1.72	0.44
2:B:69:LEU:HD12	2:B:79:ARG:HD2	2.00	0.44
2:B:250:TRP:H	2:B:250:TRP:CD1	2.36	0.44
3:C:54:PHE:HE2	3:C:75:MET:HE1	1.82	0.44
3:C:217:VAL:HG11	11:I:39:GLU:HG3	2.00	0.44
9:J:81:MET:HE1	11:I:27:PRO:HB2	1.99	0.44
2:N:214:PHE:HB3	5:Q:125:ALA:HB3	2.00	0.44
7:S:289:MET:HE3	7:S:293:GLN:NE2	2.33	0.44
1:A:100:VAL:HG22	1:A:133:LEU:HD21	2.00	0.44
8:H:31:LYS:HB2	8:H:31:LYS:HE2	1.60	0.44
7:S:85:MET:HE2	7:S:85:MET:HB2	1.84	0.44
7:S:294:ALA:HB1	7:S:454:ASN:CG	2.43	0.44
11:W:44:ARG:C	11:W:46:ASN:H	2.25	0.44
11:I:59:LYS:N	11:I:59:LYS:HE2	2.32	0.44
2:B:362:LEU:O	2:B:366:VAL:HG22	2.18	0.44
7:G:111:ALA:HB3	7:G:127:GLU:HB2	1.99	0.44
2:N:30:TYR:HA	13:N:403:HEM:O1A	2.18	0.44
3:O:198:LYS:HD3	6:R:69:LEU:HD13	2.00	0.44
7:S:141:ALA:O	7:S:145:ILE:HG13	2.17	0.44
1:A:317:VAL:HA	1:A:321:PHE:HB2	1.99	0.44
3:C:148:MET:HG3	3:C:149:GLU:N	2.33	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:G:363:ALA:O	7:G:367:VAL:HG23	2.18	0.44
7:S:63:ILE:HD13	7:S:235:LEU:HD13	1.99	0.44
11:I:44:ARG:C	11:I:46:ASN:H	2.25	0.44
1:A:134:LEU:O	1:A:138:VAL:HG13	2.18	0.44
3:C:198:LYS:HD3	6:F:69:LEU:HD13	1.99	0.44
5:E:158:LYS:HB2	5:E:160:ILE:HG12	1.99	0.44
3:O:148:MET:HG3	3:O:149:GLU:N	2.33	0.44
5:Q:80:PRO:O	5:Q:84:VAL:HG13	2.18	0.44
1:A:5:PHE:O	1:A:9:VAL:HG22	2.18	0.44
1:A:195:GLU:O	1:A:199:LYS:HG2	2.18	0.44
1:M:219:ILE:HD12	1:M:428:LEU:HG	1.99	0.44
2:N:226:TRP:CZ3	3:O:241:THR:HB	2.53	0.44
3:C:229:VAL:HG21	4:D:148:MET:SD	2.58	0.43
2:N:250:TRP:CD1	2:N:250:TRP:H	2.36	0.43
7:S:44:ARG:HH11	7:S:50:ARG:HD3	1.83	0.43
7:G:120:ARG:HB3	7:G:121:TYR:CD2	2.53	0.43
5:Q:35:LEU:HD23	5:Q:35:LEU:HA	1.79	0.43
11:I:45:TRP:CD1	11:I:45:TRP:C	2.96	0.43
1:A:325:ASP:O	1:A:327:SER:N	2.41	0.43
2:B:367:VAL:HG12	2:B:368:CYS:N	2.24	0.43
7:G:207:HIS:HD2	5:Q:64:LEU:HD11	1.81	0.43
1:A:219:ILE:HD12	1:A:428:LEU:HG	1.99	0.43
2:B:281:PHE:HA	2:B:284:LEU:HD12	2.01	0.43
7:G:174:ARG:O	7:G:178:VAL:HG23	2.18	0.43
1:M:391:LYS:HD3	1:M:490:TYR:CZ	2.54	0.43
2:N:362:LEU:O	2:N:366:VAL:HG22	2.18	0.43
7:S:170:TRP:HA	7:S:282:ARG:HH21	1.84	0.43
2:B:26:LEU:HB3	2:B:30:TYR:CE1	2.53	0.43
5:E:143:VAL:O	5:E:147:ARG:HG3	2.18	0.43
8:H:60:ARG:HE	8:H:60:ARG:HB3	1.66	0.43
1:M:213:LEU:HD23	1:M:213:LEU:HA	1.90	0.43
11:W:55:TRP:O	11:W:59:LYS:HB2	2.19	0.43
5:E:68:VAL:HG21	5:E:179:PRO:HB2	1.99	0.43
7:G:110:ASN:CB	7:G:128:GLY:HA2	2.49	0.43
8:H:46:ARG:NH2	1:M:325:ASP:HB3	2.33	0.43
1:M:290:VAL:HB	1:M:291:PRO:HD3	2.01	0.43
2:N:23:SER:HB3	2:N:26:LEU:HD21	2.00	0.43
2:N:26:LEU:HB3	2:N:30:TYR:CE1	2.53	0.43
3:O:137:VAL:HG11	14:O:301:HEC:CMB	2.49	0.43
3:C:35:GLY:HA3	3:C:203:PHE:HB2	2.00	0.43
2:B:34:PHE:CD2	2:B:231:ASP:HB3	2.54	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:120:ILE:HG23	2:B:190:LEU:HD11	2.00	0.43
7:G:136:PRO:HA	7:G:139:MET:HG3	2.01	0.43
1:M:5:PHE:O	1:M:9:VAL:HG22	2.18	0.43
1:M:341:THR:HB	1:M:343:ASN:HD21	1.84	0.43
1:A:71:ILE:HG13	1:A:188:THR:HG23	2.00	0.43
1:M:41:ASN:HD21	1:M:245:THR:HG21	1.84	0.43
1:A:153:ALA:O	1:A:157:GLN:HG3	2.19	0.42
1:A:297:GLU:HA	1:A:297:GLU:OE2	2.19	0.42
2:B:326:THR:HG23	8:H:95:ILE:HG21	2.00	0.42
2:N:120:ILE:HG23	2:N:190:LEU:HD11	2.00	0.42
7:S:191:LEU:HD23	7:S:191:LEU:HA	1.83	0.42
1:A:456:GLN:HA	1:A:460:TYR:HB3	2.01	0.42
3:C:88:ARG:HG2	3:C:88:ARG:NH1	2.34	0.42
1:M:284:ALA:HA	1:M:348:SER:HB3	2.01	0.42
1:M:456:GLN:HA	1:M:460:TYR:HB3	2.01	0.42
11:W:45:TRP:C	11:W:45:TRP:CD1	2.97	0.42
1:A:313:ALA:O	1:A:317:VAL:HG23	2.19	0.42
7:S:136:PRO:HA	7:S:139:MET:HG3	2.01	0.42
4:D:31:LEU:HD22	5:E:37:VAL:HG13	2.01	0.42
1:M:321:PHE:CD1	9:X:50:PHE:HB2	2.51	0.42
1:A:393:LEU:HD22	1:A:393:LEU:HA	1.78	0.42
2:B:37:GLY:O	2:B:40:ILE:HG22	2.19	0.42
2:B:281:PHE:O	2:B:285:LYS:HG3	2.20	0.42
5:E:61:ARG:HA	7:S:211:LEU:HD21	2.02	0.42
2:N:37:GLY:O	2:N:40:ILE:HG22	2.19	0.42
1:A:290:VAL:HB	1:A:291:PRO:HD3	2.02	0.42
2:B:138:MET:HB3	2:B:257:GLU:HB3	2.00	0.42
2:N:286:ALA:HB2	2:N:359:VAL:HG21	2.02	0.42
3:O:35:GLY:HA3	3:O:203:PHE:HB2	2.02	0.42
5:Q:118:LEU:HG	5:Q:173:ASN:HA	2.02	0.42
6:R:9:LYS:O	6:R:13:GLU:HG2	2.20	0.42
11:I:10:ASN:HA	11:I:14:ALA:HB3	2.02	0.42
2:B:83:ILE:O	2:B:86:THR:HG22	2.20	0.42
2:B:139:MET:HE1	2:B:255:HIS:ND1	2.35	0.42
3:C:43:PHE:CD2	3:C:43:PHE:C	2.98	0.42
5:E:88:ASP:HB2	5:E:90:ARG:HG2	2.01	0.42
1:M:393:LEU:HD12	1:M:448:ALA:HB1	2.02	0.42
7:S:175:GLU:H	7:S:175:GLU:HG2	1.71	0.42
5:E:35:LEU:HD23	5:E:35:LEU:HA	1.85	0.42
3:O:217:VAL:HG11	11:W:39:GLU:HG3	2.00	0.42
1:A:335:ASN:HD21	1:A:364:ALA:HB1	1.85	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:47:HIS:HE1	3:C:117:PRO:HD2	1.84	0.42
7:G:202:ASN:O	7:G:203:ASP:HB2	2.20	0.42
2:N:16:ASN:HB3	2:N:202:HIS:CE1	2.55	0.42
7:S:145:ILE:HG12	7:S:246:HIS:HB2	2.02	0.42
7:S:302:VAL:HG13	7:S:447:PRO:HB3	2.02	0.42
3:C:43:PHE:HB3	14:C:501:HEC:HAB	2.02	0.41
5:E:61:ARG:HE	5:E:61:ARG:HB2	1.72	0.41
6:F:9:LYS:O	6:F:13:GLU:HG2	2.19	0.41
2:N:189:VAL:O	2:N:193:VAL:HG13	2.20	0.41
2:N:281:PHE:HA	2:N:284:LEU:HD12	2.01	0.41
4:P:36:LYS:HB3	4:P:36:LYS:HE2	1.81	0.41
8:T:102:LEU:HD23	8:T:102:LEU:HA	1.94	0.41
9:J:49:SER:HB3	9:J:52:GLN:HB3	2.02	0.41
5:Q:143:VAL:O	5:Q:147:ARG:HG3	2.20	0.41
7:S:202:ASN:O	7:S:203:ASP:HB2	2.19	0.41
1:A:57:THR:HG23	1:A:119:TYR:CD1	2.55	0.41
1:A:98:LYS:HE3	7:G:389:ARG:HD3	2.01	0.41
6:F:39:SER:N	6:F:40:PRO:HD2	2.35	0.41
7:G:63:ILE:HD13	7:G:235:LEU:HD13	2.01	0.41
7:G:170:TRP:HA	7:G:282:ARG:HH21	1.85	0.41
1:M:357:MET:HE2	1:M:357:MET:HB3	1.73	0.41
4:P:150:ARG:HH12	4:P:154:LEU:HD13	1.84	0.41
5:Q:155:LEU:HD23	5:Q:155:LEU:HA	1.94	0.41
7:S:170:TRP:HA	7:S:282:ARG:NH2	2.36	0.41
1:A:1:MET:HB3	5:Q:63:LEU:HD11	2.00	0.41
5:E:128:TRP:O	5:E:129:TRP:CG	2.73	0.41
7:G:302:VAL:HG13	7:G:447:PRO:HB3	2.03	0.41
8:H:23:TYR:HD2	1:M:303:HIS:CD2	2.39	0.41
4:P:23:LYS:HA	4:P:45:PHE:O	2.20	0.41
7:S:188:LYS:HD3	7:S:188:LYS:HA	1.96	0.41
1:A:74:ALA:HB1	1:A:192:GLY:HA2	2.02	0.41
1:A:393:LEU:HD12	1:A:448:ALA:HB1	2.03	0.41
5:E:146:ASP:O	5:E:150:MET:HG2	2.20	0.41
7:G:294:ALA:HB1	7:G:454:ASN:CG	2.46	0.41
7:G:405:MET:HE3	7:G:405:MET:HB3	1.93	0.41
6:R:39:SER:N	6:R:40:PRO:HD2	2.35	0.41
8:T:93:LEU:HB3	8:T:94:PRO:HD3	2.03	0.41
2:B:347:LEU:HD23	2:B:351:ILE:HB	2.02	0.41
7:G:439:MET:H	7:G:439:MET:HG2	1.64	0.41
2:N:281:PHE:O	2:N:285:LYS:HG3	2.21	0.41
5:Q:146:ASP:O	5:Q:150:MET:HG2	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:I:57:ARG:O	11:I:61:LYS:HB3	2.21	0.41
2:B:62:ASN:OD1	2:B:62:ASN:C	2.64	0.41
4:D:36:LYS:HE2	4:D:36:LYS:HB3	1.82	0.41
7:G:170:TRP:HA	7:G:282:ARG:NH2	2.36	0.41
4:P:21:VAL:HG11	5:Q:27:TYR:HE2	1.86	0.41
5:Q:102:LYS:HA	10:Y:45:VAL:HG11	2.03	0.41
7:S:328:MET:HE2	7:S:374:ALA:HB1	2.02	0.41
8:T:27:ARG:HG2	8:T:27:ARG:O	2.21	0.41
8:T:31:LYS:HB2	8:T:31:LYS:HE2	1.59	0.41
1:A:169:LEU:HD12	1:A:169:LEU:HA	1.92	0.41
2:B:155:PRO:HD3	2:B:291:PHE:CE1	2.55	0.41
1:M:71:ILE:HG13	1:M:188:THR:HG23	2.02	0.41
8:T:86:GLN:HG2	10:Y:39:PHE:CE1	2.56	0.41
1:A:198:LYS:HB2	1:A:198:LYS:HE3	1.77	0.41
1:A:265:LEU:HD13	8:H:58:GLU:HG3	2.02	0.41
2:B:189:VAL:O	2:B:193:VAL:HG13	2.20	0.41
3:C:229:VAL:HG22	4:D:144:PHE:HB3	2.03	0.41
7:G:175:GLU:H	7:G:175:GLU:HG2	1.70	0.41
8:H:93:LEU:HB3	8:H:94:PRO:HD3	2.03	0.41
2:N:193:VAL:O	2:N:196:MET:HG2	2.21	0.41
2:N:344:TYR:CD2	2:N:351:ILE:HG21	2.56	0.41
4:P:83:TYR:HB3	4:P:86:GLY:O	2.21	0.41
5:Q:88:ASP:HB2	5:Q:90:ARG:HG2	2.02	0.41
6:R:31:CYS:HA	6:R:34:ARG:HG2	2.03	0.41
6:F:42:LYS:HE2	6:F:42:LYS:HB2	1.96	0.41
7:G:296:VAL:HG23	7:G:364:PRO:HG3	2.03	0.41
8:H:25:TRP:H	1:M:341:THR:CG2	2.32	0.41
1:M:297:GLU:HA	1:M:297:GLU:OE2	2.21	0.41
13:N:403:HEM:HBC2	13:N:403:HEM:CHD	2.48	0.41
3:O:193:ILE:HG13	3:O:194:SER:N	2.36	0.41
5:Q:128:TRP:O	5:Q:129:TRP:CG	2.73	0.41
7:S:405:MET:HE3	7:S:405:MET:HB3	1.94	0.41
11:W:2:ALA:HB3	11:W:3:PRO:HD3	2.03	0.41
3:C:50:GLY:C	3:C:51:ARG:HD3	2.47	0.40
5:E:82:GLU:OE2	5:E:174:VAL:HA	2.20	0.40
7:G:101:ILE:HA	7:G:139:MET:HE2	2.03	0.40
1:M:313:ALA:O	1:M:317:VAL:HG23	2.21	0.40
5:Q:82:GLU:OE2	5:Q:174:VAL:HA	2.20	0.40
7:S:456:PHE:HD1	7:S:456:PHE:HA	1.67	0.40
1:A:56:ALA:HB1	1:A:226:VAL:HG13	2.03	0.40
1:A:255:GLU:H	1:A:255:GLU:HG2	1.61	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:E:66:LEU:HD12	5:E:66:LEU:HA	1.92	0.40
7:G:456:PHE:HD1	7:G:456:PHE:HA	1.66	0.40
3:O:51:ARG:HB2	3:O:120:GLN:OE1	2.20	0.40
7:S:110:ASN:CB	7:S:128:GLY:HA2	2.49	0.40
11:W:28:ILE:O	11:W:32:LYS:HG2	2.22	0.40
9:X:77:MET:HE2	9:X:77:MET:HB2	1.84	0.40
3:C:197:ALA:O	3:C:200:VAL:HG12	2.21	0.40
5:E:102:LYS:HA	10:K:45:VAL:HG11	2.03	0.40
7:G:154:ILE:HD11	7:G:161:MET:HE1	2.03	0.40
7:S:174:ARG:O	7:S:178:VAL:HG23	2.21	0.40
7:S:222:ARG:H	7:S:222:ARG:HG2	1.78	0.40
2:B:193:VAL:O	2:B:196:MET:HG2	2.21	0.40
4:D:62:ALA:HB2	5:E:43:VAL:HG11	2.04	0.40
5:Q:61:ARG:HE	5:Q:61:ARG:HB2	1.73	0.40
3:C:59:GLY:HA3	11:I:51:GLN:HE21	1.86	0.40
4:D:150:ARG:HH12	4:D:154:LEU:HD13	1.86	0.40
5:E:128:TRP:CD2	1:M:324:LEU:HD12	2.56	0.40
1:M:153:ALA:O	1:M:157:GLN:HG3	2.20	0.40
2:N:21:LEU:HD12	2:N:220:ARG:HB3	2.03	0.40
2:N:155:PRO:HD3	2:N:291:PHE:CE1	2.56	0.40
7:S:214:TRP:O	7:S:218:PHE:HB2	2.21	0.40
7:S:241:LYS:N	7:S:241:LYS:HD2	2.36	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	A	488/490 (100%)	437 (90%)	47 (10%)	4 (1%)	16	44
1	M	488/490 (100%)	440 (90%)	45 (9%)	3 (1%)	21	51
2	B	368/371 (99%)	333 (90%)	35 (10%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
2	N	368/371 (99%)	335 (91%)	32 (9%)	1 (0%)	36 66
3	C	254/258 (98%)	229 (90%)	25 (10%)	0	100 100
3	O	254/258 (98%)	229 (90%)	25 (10%)	0	100 100
4	D	143/297 (48%)	121 (85%)	22 (15%)	0	100 100
4	P	143/297 (48%)	120 (84%)	23 (16%)	0	100 100
5	E	191/202 (95%)	180 (94%)	11 (6%)	0	100 100
5	Q	191/202 (95%)	180 (94%)	11 (6%)	0	100 100
6	F	67/70 (96%)	63 (94%)	4 (6%)	0	100 100
6	R	67/70 (96%)	64 (96%)	3 (4%)	0	100 100
7	G	406/467 (87%)	380 (94%)	24 (6%)	2 (0%)	24 55
7	S	406/467 (87%)	382 (94%)	23 (6%)	1 (0%)	43 72
8	H	104/119 (87%)	95 (91%)	8 (8%)	1 (1%)	12 38
8	T	104/119 (87%)	95 (91%)	8 (8%)	1 (1%)	12 38
9	J	87/147 (59%)	77 (88%)	10 (12%)	0	100 100
9	X	87/147 (59%)	77 (88%)	10 (12%)	0	100 100
10	K	36/85 (42%)	36 (100%)	0	0	100 100
10	Y	36/85 (42%)	36 (100%)	0	0	100 100
11	I	59/67 (88%)	56 (95%)	3 (5%)	0	100 100
11	W	59/67 (88%)	56 (95%)	3 (5%)	0	100 100
All	All	4406/5146 (86%)	4021 (91%)	372 (8%)	13 (0%)	37 66

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	94	GLU
1	A	326	HIS
7	G	200	ASN
8	H	25	TRP
1	M	94	GLU
8	T	25	TRP
1	A	93	ARG
1	A	303	HIS
7	G	292	MET
1	M	93	ARG
1	M	303	HIS

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Mol	Chain	Res	Type
7	S	292	MET
2	N	316	VAL

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	408/408 (100%)	397 (97%)	11 (3%)	39	74
1	M	408/408 (100%)	396 (97%)	12 (3%)	37	73
2	B	346/347 (100%)	336 (97%)	10 (3%)	37	73
2	N	346/347 (100%)	333 (96%)	13 (4%)	29	64
3	C	222/223 (100%)	221 (100%)	1 (0%)	81	93
3	O	222/223 (100%)	221 (100%)	1 (0%)	81	93
4	D	122/253 (48%)	120 (98%)	2 (2%)	55	83
4	P	122/253 (48%)	120 (98%)	2 (2%)	55	83
5	E	162/171 (95%)	160 (99%)	2 (1%)	63	87
5	Q	162/171 (95%)	159 (98%)	3 (2%)	50	81
6	F	63/64 (98%)	62 (98%)	1 (2%)	55	83
6	R	63/64 (98%)	62 (98%)	1 (2%)	55	83
7	G	334/373 (90%)	318 (95%)	16 (5%)	23	56
7	S	334/373 (90%)	320 (96%)	14 (4%)	26	61
8	H	92/105 (88%)	92 (100%)	0	100	100
8	T	92/105 (88%)	91 (99%)	1 (1%)	65	87
9	J	72/119 (60%)	71 (99%)	1 (1%)	59	85
9	X	72/119 (60%)	71 (99%)	1 (1%)	59	85
10	K	32/71 (45%)	32 (100%)	0	100	100
10	Y	32/71 (45%)	32 (100%)	0	100	100
11	I	53/57 (93%)	52 (98%)	1 (2%)	50	81
11	W	53/57 (93%)	51 (96%)	2 (4%)	29	64

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	3812/4382 (87%)	3717 (98%)	95 (2%)	42 76

All (95) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	66	THR
1	A	69	GLU
1	A	88	THR
1	A	109	VAL
1	A	117	TYR
1	A	186	VAL
1	A	273	VAL
1	A	309	LEU
1	A	331	ASN
1	A	393	LEU
1	A	403	VAL
2	B	100	CYS
2	B	113	VAL
2	B	150	ILE
2	B	154	VAL
2	B	196	MET
2	B	232	MET
2	B	322	LEU
2	B	347	LEU
2	B	365	LEU
2	B	368	CYS
3	C	149	GLU
4	D	100	LEU
4	D	153	VAL
5	E	35	LEU
5	E	186	ASP
6	F	38	VAL
7	G	52	VAL
7	G	63	ILE
7	G	72	LYS
7	G	78	THR
7	G	93	ASN
7	G	105	MET
7	G	144	VAL
7	G	196	MET
7	G	197	VAL
7	G	233	ASP

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Mol	Chain	Res	Type
7	G	274	ARG
7	G	312	LYS
7	G	328	MET
7	G	360	VAL
7	G	439	MET
7	G	456	PHE
9	J	33	PHE
1	M	88	THR
1	M	109	VAL
1	M	177	CYS
1	M	186	VAL
1	M	221	VAL
1	M	281	THR
1	M	287	GLU
1	M	309	LEU
1	M	357	MET
1	M	393	LEU
1	M	403	VAL
1	M	412	ASN
2	N	73	ASP
2	N	100	CYS
2	N	109	THR
2	N	113	VAL
2	N	138	MET
2	N	150	ILE
2	N	154	VAL
2	N	196	MET
2	N	222	CYS
2	N	232	MET
2	N	347	LEU
2	N	365	LEU
2	N	368	CYS
3	O	149	GLU
4	P	44	GLU
4	P	100	LEU
5	Q	35	LEU
5	Q	64	LEU
5	Q	186	ASP
6	R	38	VAL
7	S	52	VAL
7	S	63	ILE
7	S	93	ASN

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Mol	Chain	Res	Type
7	S	144	VAL
7	S	196	MET
7	S	197	VAL
7	S	208	LYS
7	S	233	ASP
7	S	274	ARG
7	S	312	LYS
7	S	344	GLN
7	S	360	VAL
7	S	419	SER
7	S	456	PHE
8	T	72	SER
11	W	45	TRP
11	W	51	GLN
9	X	33	PHE
11	I	45	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (32) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	267	ASN
1	A	274	ASN
1	A	289	ASN
1	A	412	ASN
2	B	310	ASN
3	C	37	GLN
4	D	24	GLN
5	E	38	GLN
5	E	50	GLN
7	G	22	ASN
7	G	207	HIS
7	G	313	GLN
7	G	445	GLN
8	H	65	ASN
9	J	31	ASN
1	M	115	GLN
1	M	274	ASN
1	M	289	ASN
2	N	202	HIS
2	N	310	ASN
3	O	37	GLN
3	O	85	ASN

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Mol	Chain	Res	Type
4	P	28	ASN
5	Q	38	GLN
5	Q	50	GLN
5	Q	126	HIS
7	S	281	ASN
7	S	313	GLN
8	T	59	GLN
8	T	65	ASN
11	W	50	ASN
11	I	50	ASN

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 oligosaccharides in this entry.

5.6 Ligand geometry

8 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	$\#\|Z\| > 2$
12	A1J54	B	401	-	28,29,29	0.23	0	34,41,41	0.45	0
13	HEM	B	403	2	50,50,50	1.34	6 (12%)	66,82,82	1.31	8 (12%)
13	HEM	N	402	2	50,50,50	1.42	6 (12%)	66,82,82	1.19	8 (12%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
13	HEM	N	403	2	50,50,50	1.35	6 (12%)	66,82,82	1.31	8 (12%)
12	A1J54	N	401	-	28,29,29	0.21	0	34,41,41	0.45	0
14	HEC	C	501	3	50,50,50	1.79	6 (12%)	68,82,82	1.42	6 (8%)
14	HEC	O	301	3	50,50,50	1.75	5 (10%)	68,82,82	1.49	8 (11%)
13	HEM	B	402	2	50,50,50	1.42	6 (12%)	66,82,82	1.18	7 (10%)

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
12	A1J54	B	401	-	-	4/9/19/19	0/4/4/4
13	HEM	B	403	2	-	4/14/54/54	-
13	HEM	N	402	2	-	3/14/54/54	-
13	HEM	N	403	2	-	5/14/54/54	-
12	A1J54	N	401	-	-	2/9/19/19	0/4/4/4
14	HEC	C	501	3	-	4/14/54/54	-
14	HEC	O	301	3	-	5/14/54/54	-
13	HEM	B	402	2	-	3/14/54/54	-

All (35) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
14	C	501	HEC	C3D-C2D	8.06	1.53	1.36
14	O	301	HEC	C3D-C2D	8.05	1.53	1.36
14	C	501	HEC	FE-ND	4.30	2.08	1.94
14	O	301	HEC	FE-ND	4.03	2.07	1.94
14	O	301	HEC	FE-NB	3.77	2.06	1.94
14	C	501	HEC	FE-NB	3.74	2.06	1.94
13	B	402	HEM	FE-NA	3.45	2.06	1.95
13	N	402	HEM	FE-NA	3.44	2.06	1.95
14	C	501	HEC	FE-NA	3.42	2.06	1.95
13	B	402	HEM	FE-ND	3.41	2.05	1.94
13	N	402	HEM	FE-ND	3.38	2.05	1.94
13	N	403	HEM	FE-NC	3.20	2.06	1.95
13	B	402	HEM	FE-NB	3.18	2.04	1.94
13	N	402	HEM	FE-NB	3.15	2.04	1.94
13	B	403	HEM	FE-NC	3.12	2.05	1.95

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
14	C	501	HEC	FE-NC	3.04	2.05	1.95
13	N	402	HEM	CAB-C3B	3.02	1.55	1.47
13	B	402	HEM	CAB-C3B	3.02	1.55	1.47
13	N	403	HEM	FE-NB	3.00	2.04	1.94
13	B	402	HEM	CAC-C3C	2.99	1.55	1.47
13	N	402	HEM	CAC-C3C	2.99	1.55	1.47
13	B	402	HEM	FE-NC	2.98	2.05	1.95
13	B	403	HEM	CAB-C3B	2.96	1.55	1.47
13	N	403	HEM	CAB-C3B	2.96	1.55	1.47
14	O	301	HEC	FE-NA	2.96	2.05	1.95
13	N	402	HEM	FE-NC	2.95	2.05	1.95
13	B	403	HEM	FE-NB	2.94	2.04	1.94
13	N	403	HEM	FE-NA	2.83	2.04	1.95
13	N	403	HEM	CAC-C3C	2.83	1.55	1.47
13	B	403	HEM	CAC-C3C	2.82	1.55	1.47
13	B	403	HEM	FE-NA	2.74	2.04	1.95
14	O	301	HEC	FE-NC	2.66	2.04	1.95
13	B	403	HEM	FE-ND	2.58	2.02	1.94
13	N	403	HEM	FE-ND	2.55	2.02	1.94
14	C	501	HEC	CMC-C2C	2.00	1.55	1.50

All (45) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
14	O	301	HEC	C1D-ND-C4D	6.45	111.74	105.07
14	C	501	HEC	C1D-ND-C4D	6.34	111.62	105.07
13	N	403	HEM	C4D-ND-C1D	2.99	108.16	105.07
13	B	403	HEM	C4D-ND-C1D	2.98	108.15	105.07
13	B	403	HEM	C4C-NC-C1C	2.90	108.19	105.35
14	O	301	HEC	C4C-NC-C1C	2.88	108.17	105.35
14	O	301	HEC	C4B-NB-C1B	2.86	108.03	105.07
13	N	403	HEM	C4C-NC-C1C	2.86	108.15	105.35
13	N	402	HEM	C4A-NA-C1A	2.81	108.10	105.35
13	B	402	HEM	C4A-NA-C1A	2.80	108.09	105.35
13	N	403	HEM	C4A-NA-C1A	2.76	108.05	105.35
13	B	403	HEM	C4A-NA-C1A	2.75	108.05	105.35
13	N	402	HEM	C4D-ND-C1D	2.73	107.89	105.07
14	O	301	HEC	C4A-NA-C1A	2.72	108.01	105.35
13	B	402	HEM	C4D-ND-C1D	2.72	107.88	105.07
13	N	402	HEM	C1B-NB-C4B	2.70	107.86	105.07
13	B	402	HEM	C1B-NB-C4B	2.70	107.86	105.07
13	B	403	HEM	C1B-NB-C4B	2.65	107.81	105.07

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
13	N	403	HEM	C1B-NB-C4B	2.63	107.79	105.07
14	C	501	HEC	C4A-NA-C1A	2.61	107.90	105.35
14	C	501	HEC	C4C-NC-C1C	2.60	107.89	105.35
14	C	501	HEC	C4B-NB-C1B	2.53	107.69	105.07
14	O	301	HEC	C2A-C1A-NA	-2.50	107.89	110.32
13	B	403	HEM	CAA-CBA-CGA	-2.45	108.33	113.60
13	N	402	HEM	C4C-NC-C1C	2.45	107.75	105.35
13	B	402	HEM	C4C-NC-C1C	2.44	107.74	105.35
13	N	403	HEM	CAA-CBA-CGA	-2.42	108.40	113.60
14	O	301	HEC	CAB-C3B-C4B	2.42	127.95	124.81
14	C	501	HEC	C2A-C1A-NA	-2.37	108.02	110.32
13	N	403	HEM	C3D-C4D-ND	-2.24	107.67	110.17
13	B	403	HEM	C3D-C4D-ND	-2.22	107.69	110.17
13	N	403	HEM	C3B-C2B-C1B	2.18	108.10	106.49
13	N	403	HEM	CAD-CBD-CGD	-2.17	108.94	113.60
13	B	403	HEM	CAD-CBD-CGD	-2.16	108.96	113.60
13	B	403	HEM	C3B-C2B-C1B	2.15	108.08	106.49
13	B	402	HEM	C3B-C2B-C1B	2.13	108.07	106.49
13	N	402	HEM	C3B-C2B-C1B	2.13	108.07	106.49
14	C	501	HEC	CAA-C2A-C3A	-2.12	123.93	127.88
14	O	301	HEC	C3B-C4B-NB	-2.09	107.84	110.17
14	O	301	HEC	CAA-CBA-CGA	-2.07	109.15	113.60
13	N	402	HEM	C2A-C1A-NA	-2.07	107.84	110.15
13	B	402	HEM	C2A-C1A-NA	-2.06	107.84	110.15
13	N	402	HEM	CAD-CBD-CGD	-2.03	109.24	113.60
13	B	402	HEM	CAD-CBD-CGD	-2.02	109.25	113.60
13	N	402	HEM	C3D-C4D-ND	-2.00	107.93	110.17

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
13	B	402	HEM	C3D-CAD-CBD-CGD
13	N	402	HEM	C3D-CAD-CBD-CGD
14	C	501	HEC	C1A-C2A-CAA-CBA
14	C	501	HEC	C3A-C2A-CAA-CBA
14	O	301	HEC	C1A-C2A-CAA-CBA
14	O	301	HEC	C2B-C3B-CAB-CBB
13	B	403	HEM	C4C-C3C-CAC-CBC
13	N	403	HEM	C4C-C3C-CAC-CBC
12	B	401	A1J54	C6-C5-N13-C14
14	O	301	HEC	C3A-C2A-CAA-CBA

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Mol	Chain	Res	Type	Atoms
14	C	501	HEC	C2C-C3C-CAC-CBC
13	B	402	HEM	C1A-C2A-CAA-CBA
13	N	402	HEM	C1A-C2A-CAA-CBA
12	B	401	A1J54	C19-C20-C21-C26
12	N	401	A1J54	C19-C20-C21-C22
12	B	401	A1J54	C19-C20-C21-C22
12	N	401	A1J54	C19-C20-C21-C26
14	C	501	HEC	C4C-C3C-CAC-CBC
13	N	403	HEM	CAD-CBD-CGD-O2D
13	B	403	HEM	CAA-CBA-CGA-O1A
12	B	401	A1J54	C4-C5-N13-C14
13	N	403	HEM	CAA-CBA-CGA-O1A
14	O	301	HEC	C2C-C3C-CAC-CBC
13	N	403	HEM	CAD-CBD-CGD-O1D
13	N	403	HEM	CAA-CBA-CGA-O2A
13	B	403	HEM	CAA-CBA-CGA-O2A
14	O	301	HEC	C4C-C3C-CAC-CBC
13	B	402	HEM	C3A-C2A-CAA-CBA
13	N	402	HEM	C3A-C2A-CAA-CBA
13	B	403	HEM	CAD-CBD-CGD-O2D

There are no ring outliers.

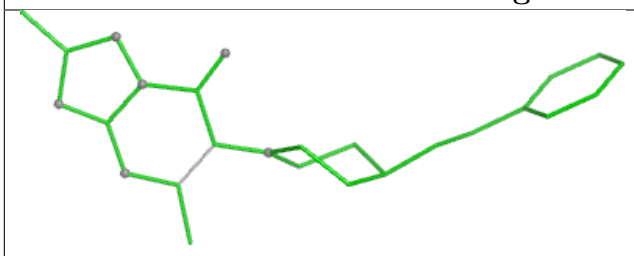
7 monomers are involved in 21 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
13	B	403	HEM	3	0
13	N	402	HEM	3	0
13	N	403	HEM	4	0
12	N	401	A1J54	1	0
14	C	501	HEC	2	0
14	O	301	HEC	5	0
13	B	402	HEM	3	0

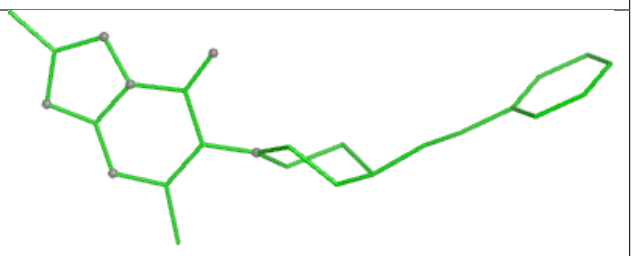
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

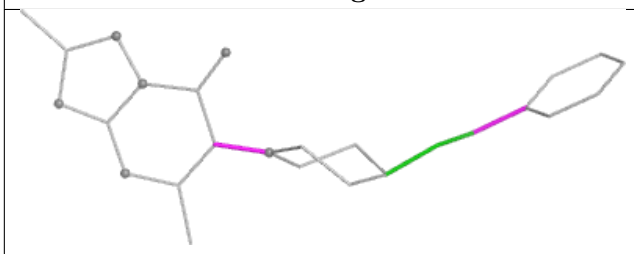
Ligand A1J54 B 401



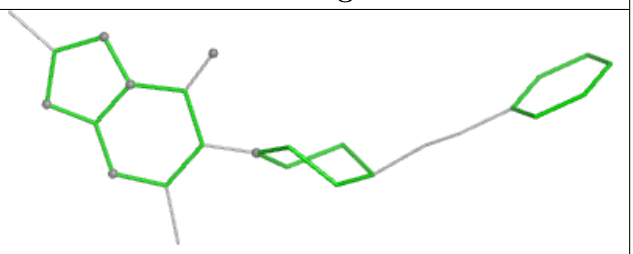
Bond lengths



Bond angles

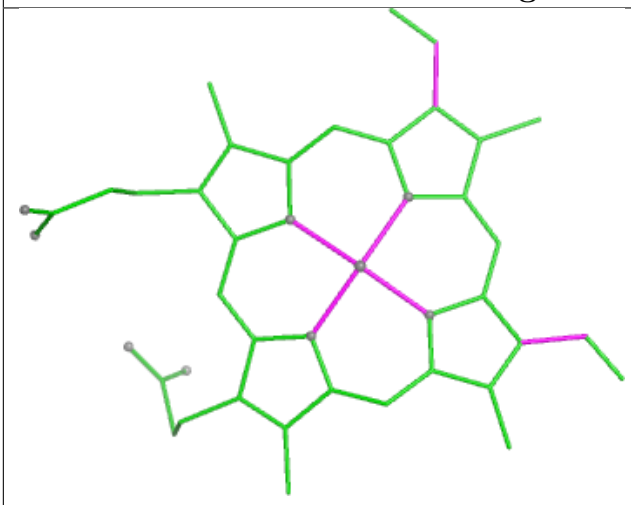


Torsions

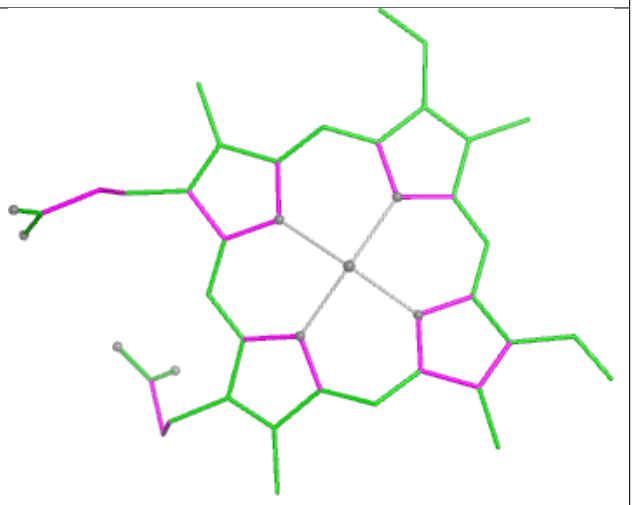


Rings

Ligand HEM B 403



Bond lengths



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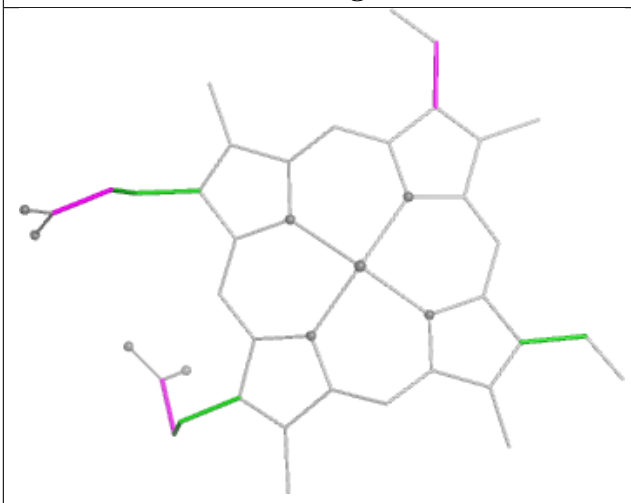
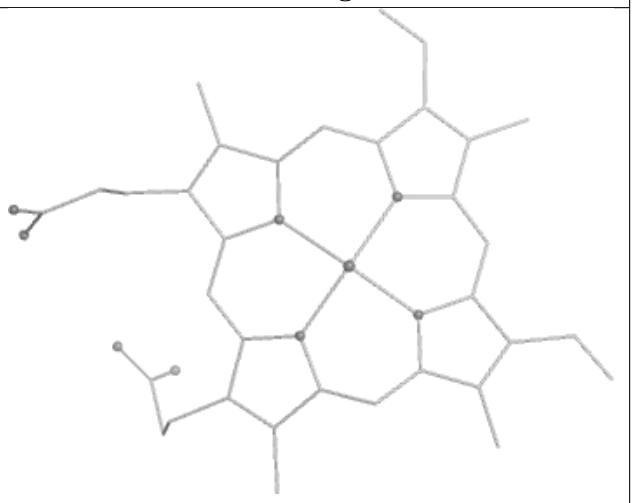
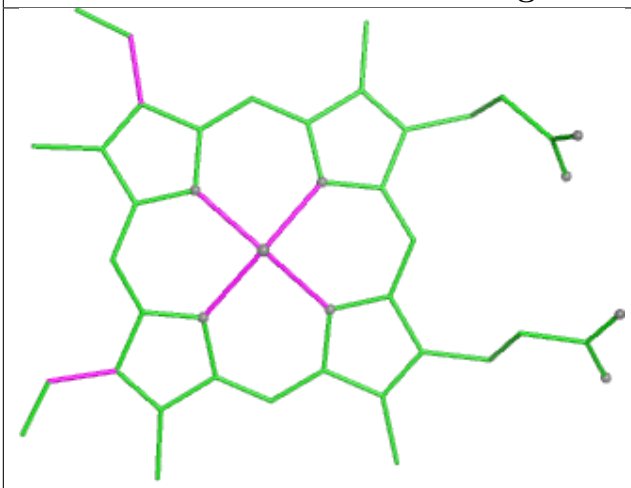


Torsions

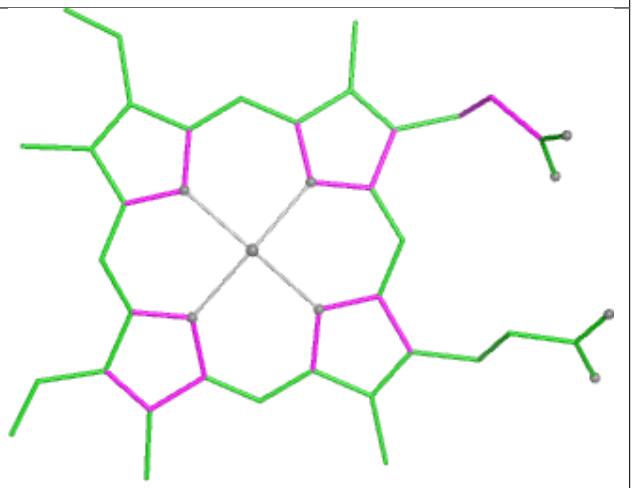


Rings

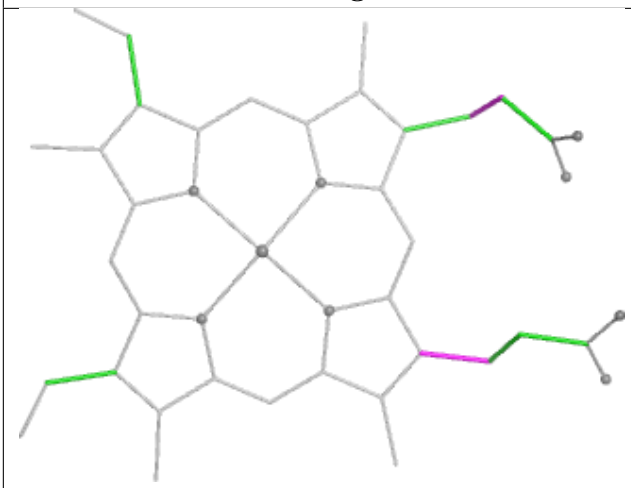
Ligand HEM N 402



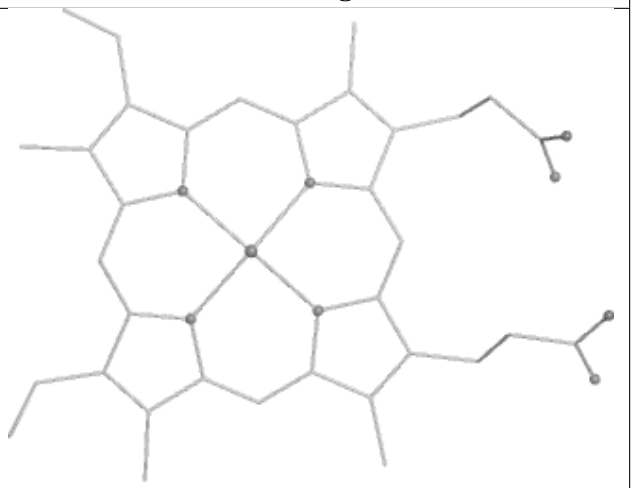
Bond lengths



Bond angles

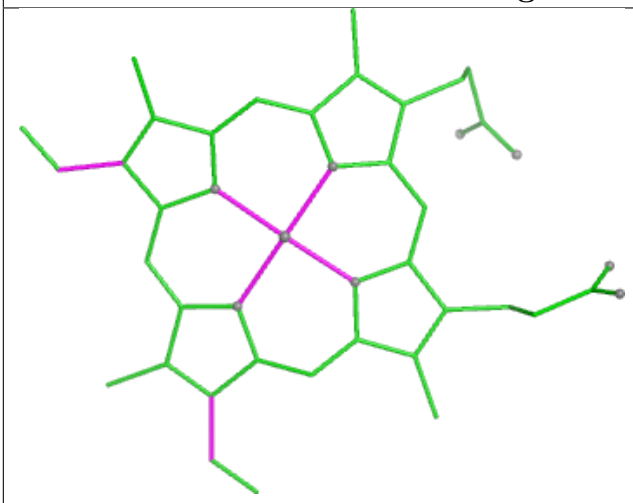


Torsions

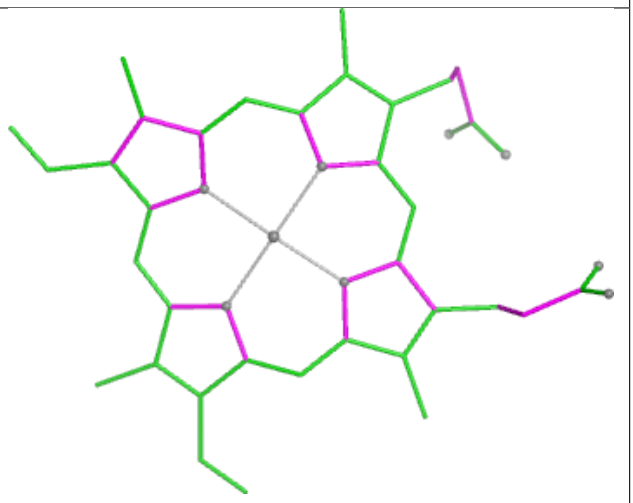


Rings

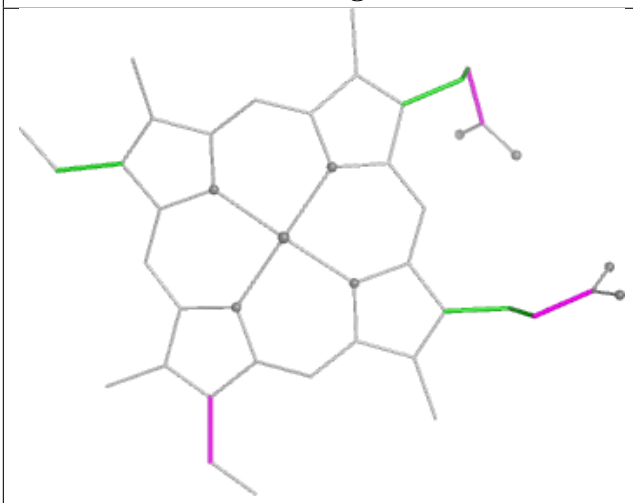
Ligand HEM N 403



Bond lengths



Bond angles



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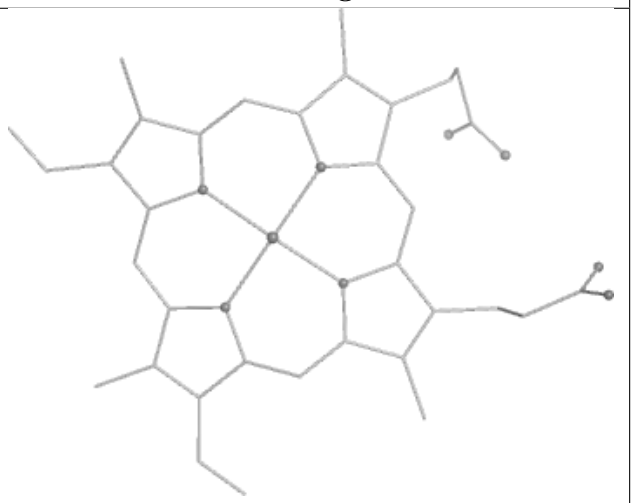
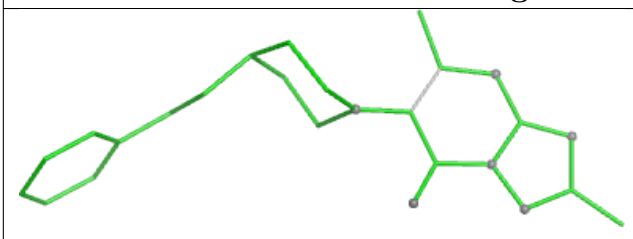
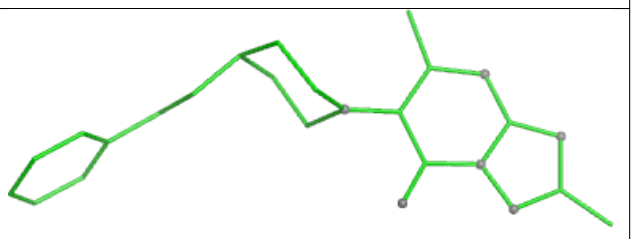


Rings

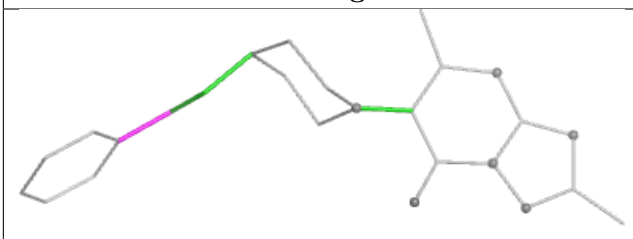
Ligand A1J54 N 401



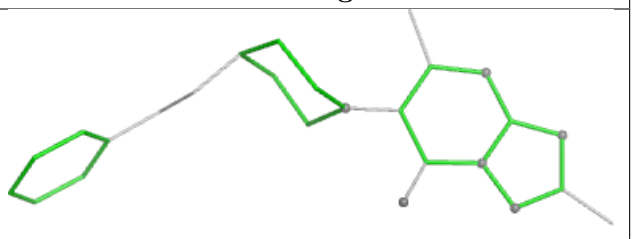
Bond lengths



Bond angles

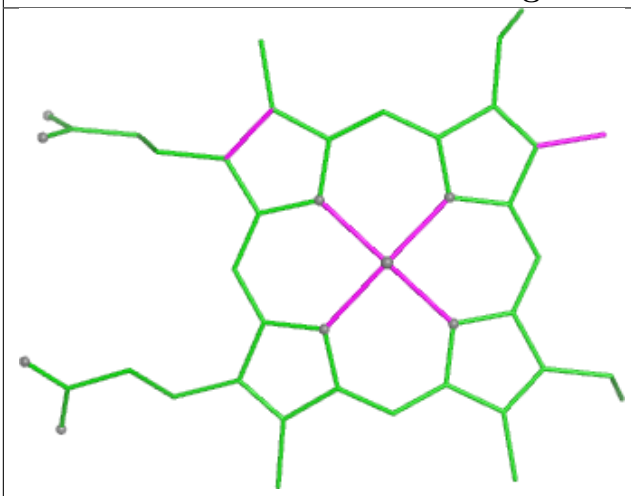


Torsions



Rings

Ligand HEC C 501



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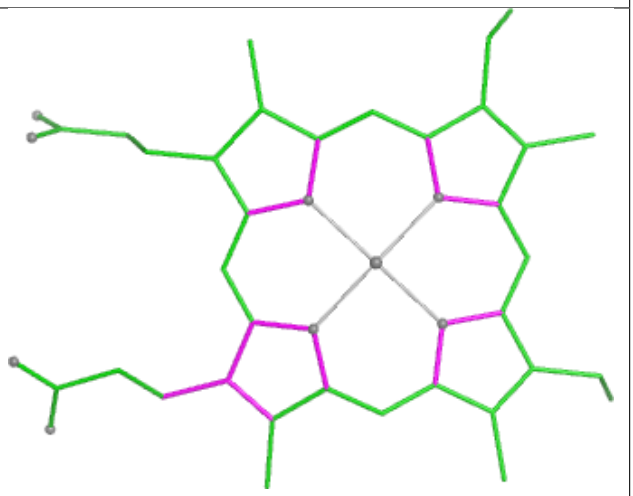

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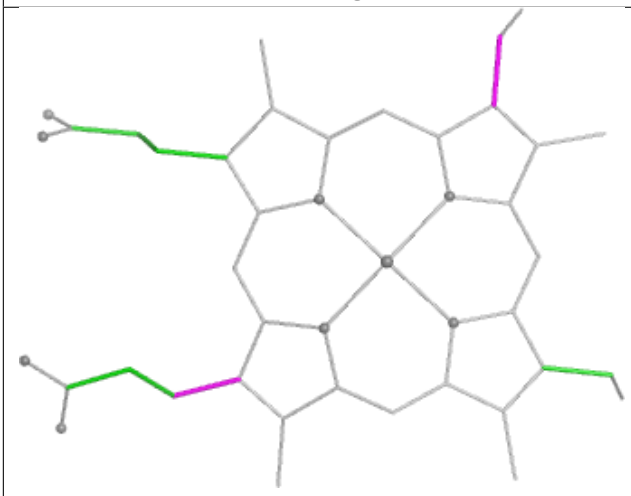

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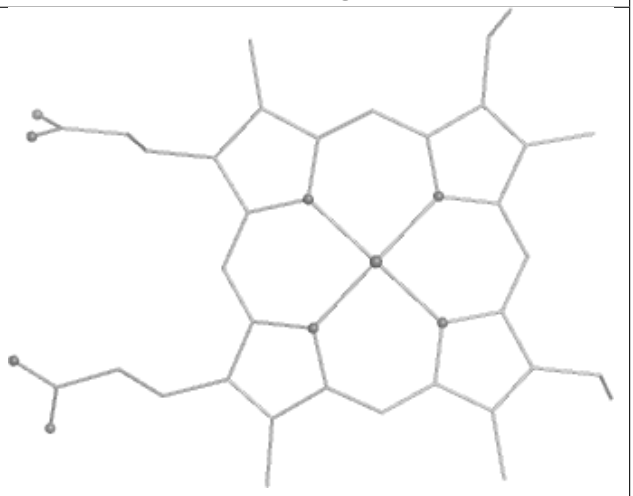
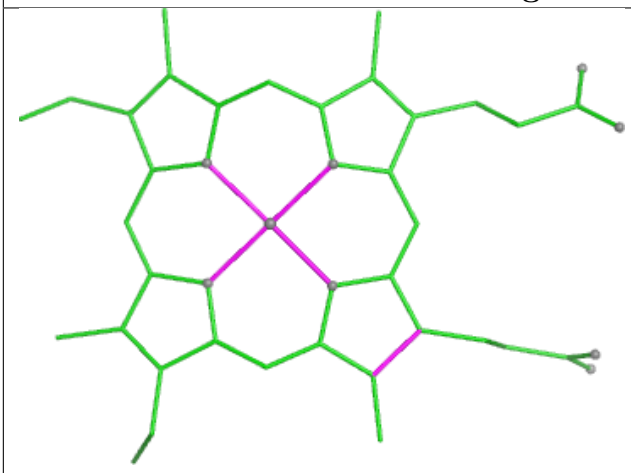
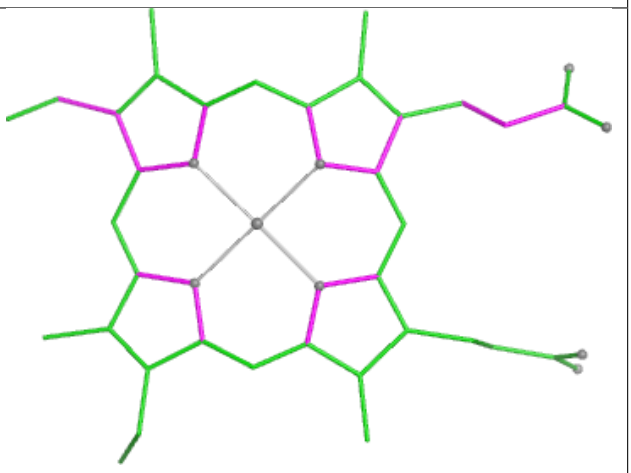


Rings

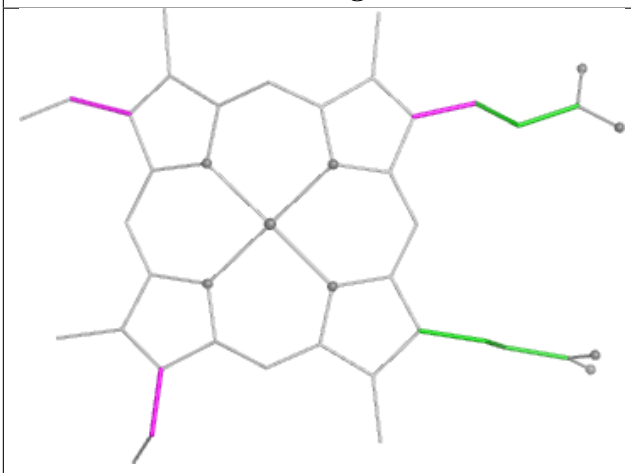
Ligand HEC O 301



Bond lengths



Bond angles



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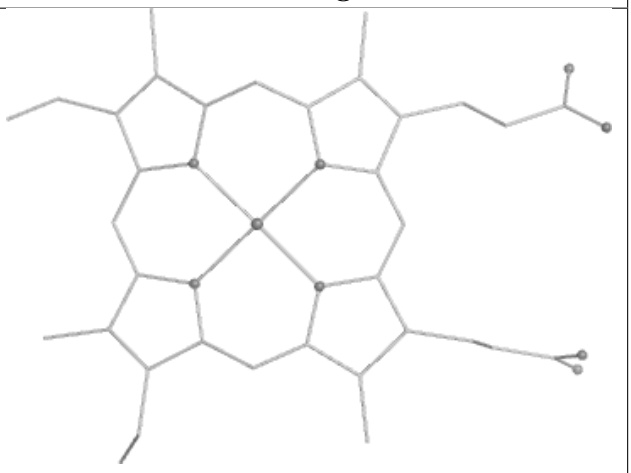
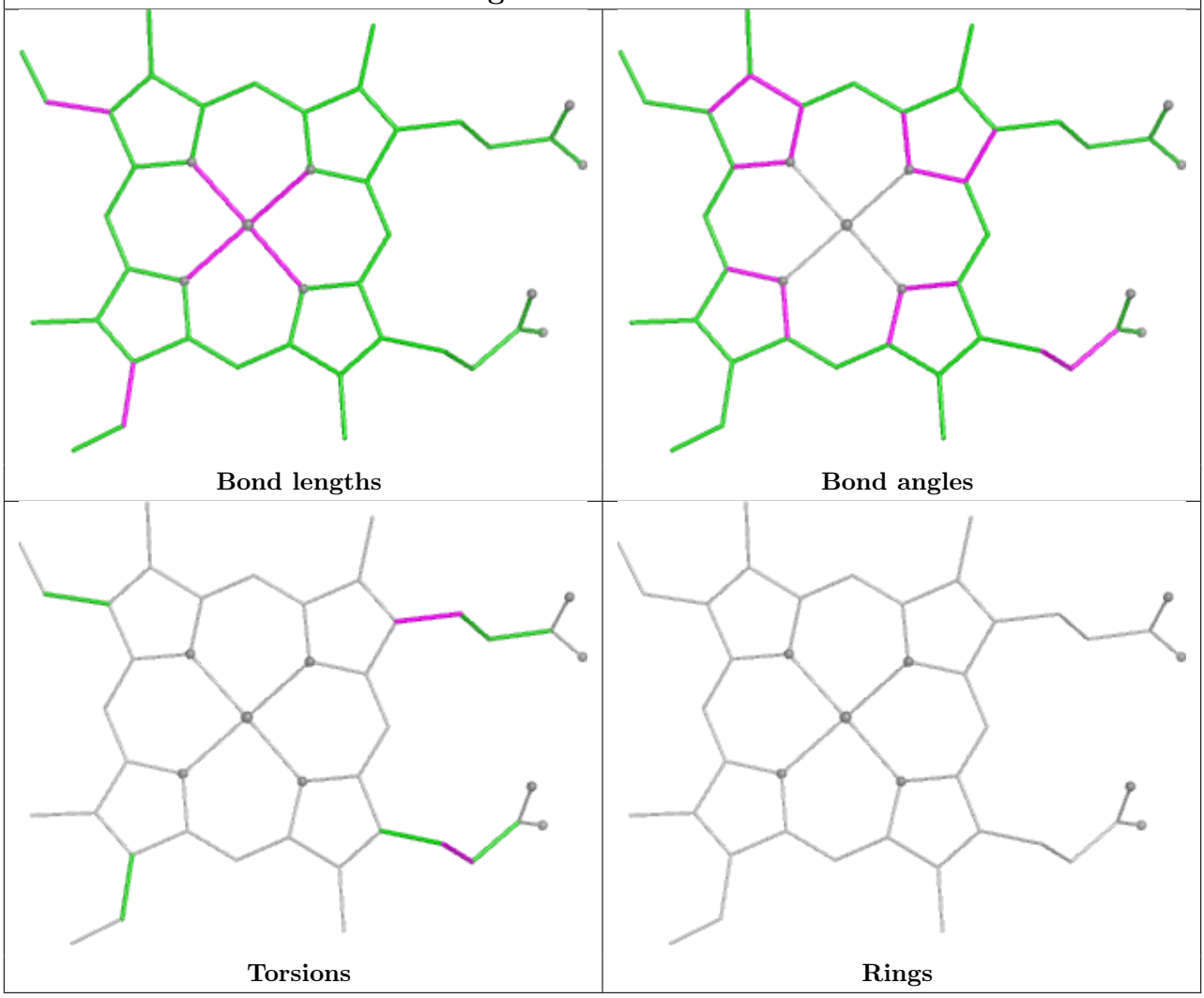


Rings

Ligand HEM B 402



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.

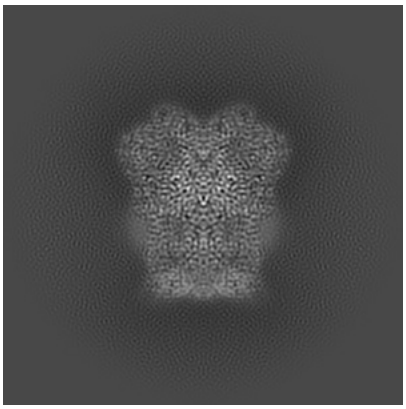
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-57603. These allow visual inspection of the internal detail of the map and identification of artifacts.

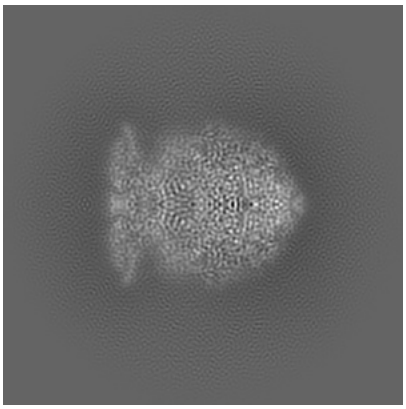
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

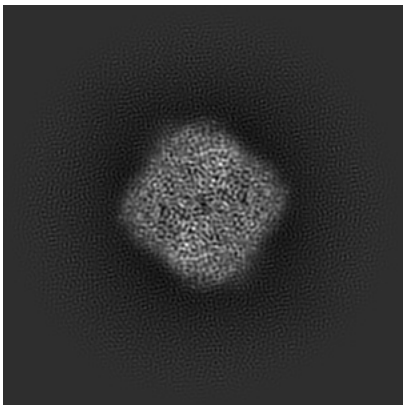
6.1.1 Primary map



X

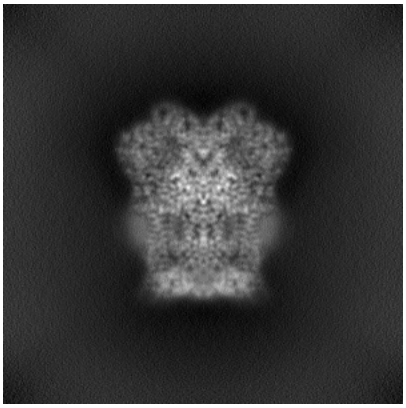


Y

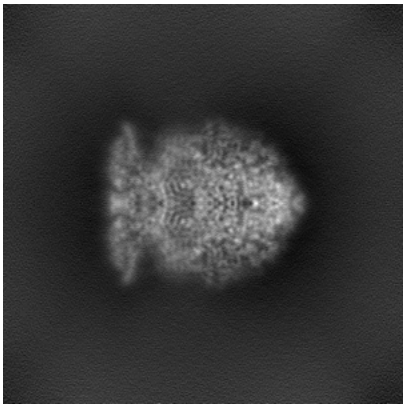


Z

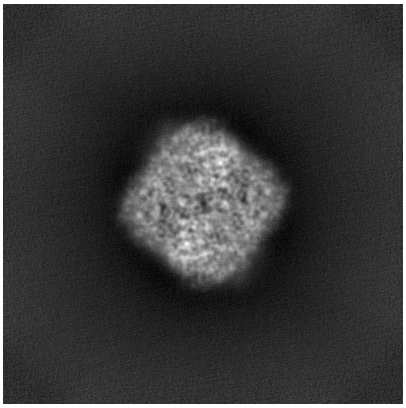
6.1.2 Raw map



X



Y

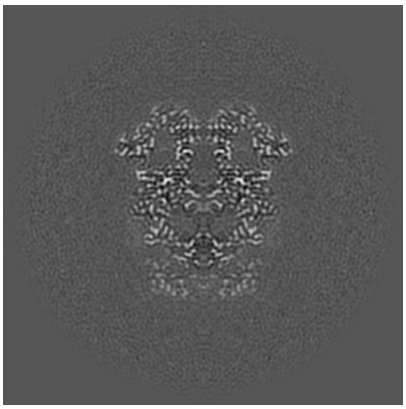


Z

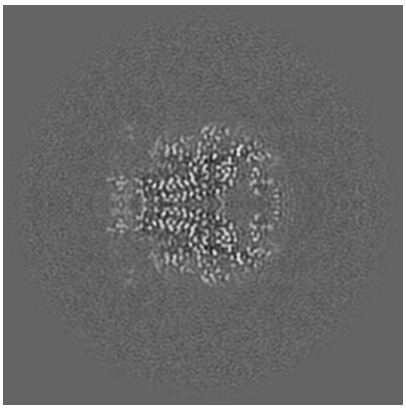
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

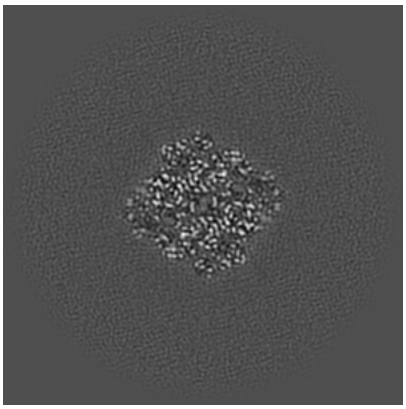
6.2.1 Primary map



X Index: 175

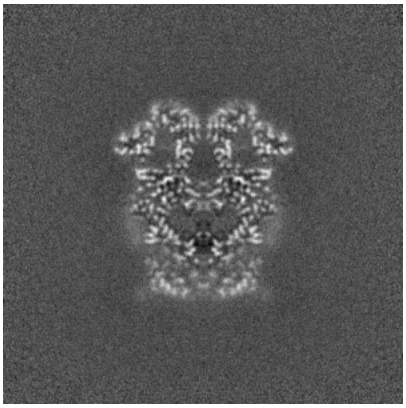


Y Index: 175

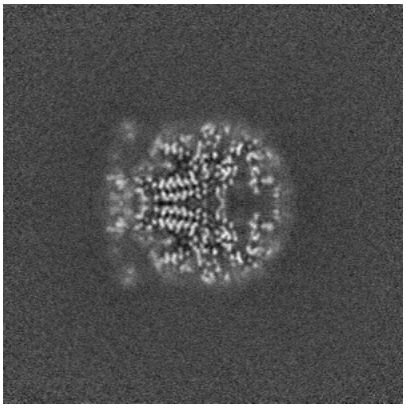


Z Index: 175

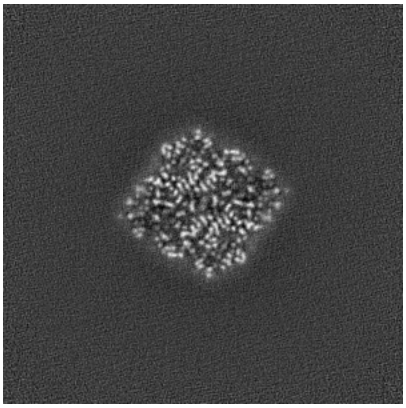
6.2.2 Raw map



X Index: 175



Y Index: 175

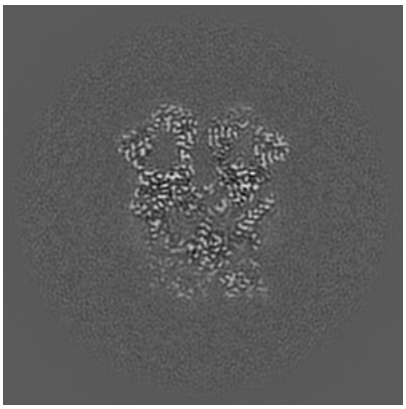


Z Index: 175

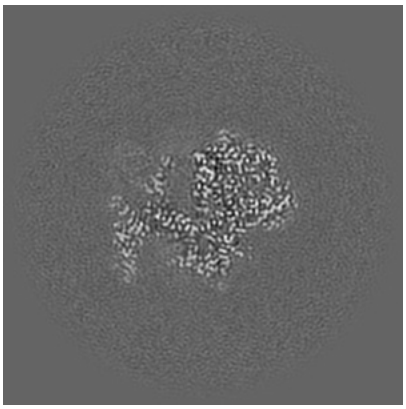
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

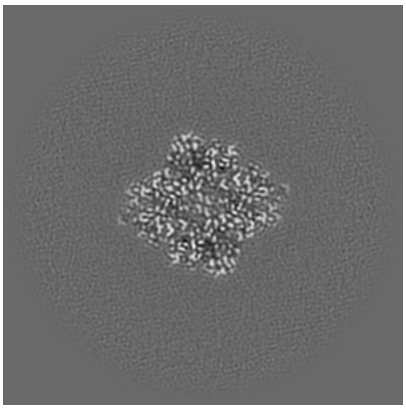
6.3.1 Primary map



X Index: 179

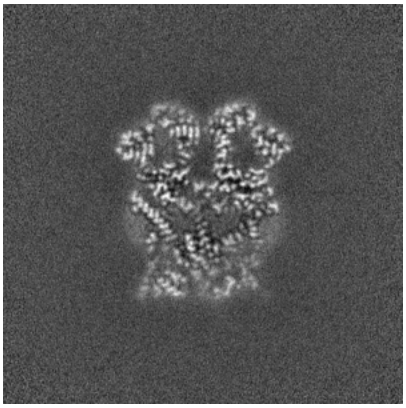


Y Index: 158

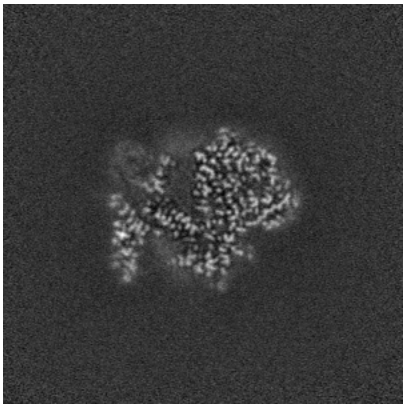


Z Index: 189

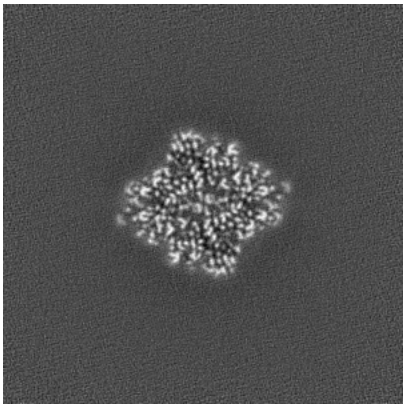
6.3.2 Raw map



X Index: 172



Y Index: 158

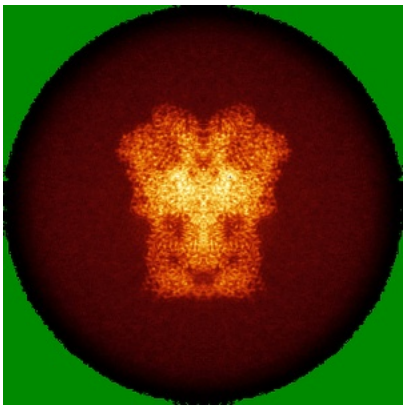


Z Index: 189

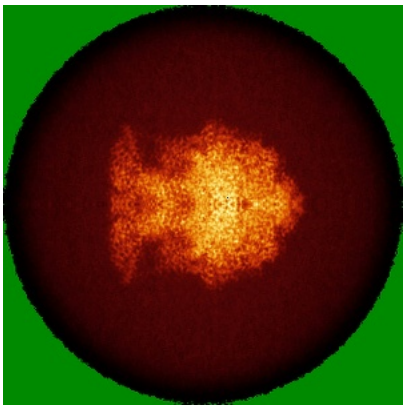
The images above show the largest variance slices of the map in three orthogonal directions.

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

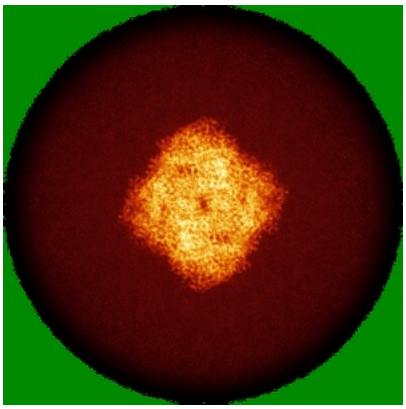
6.4.1 Primary map



X

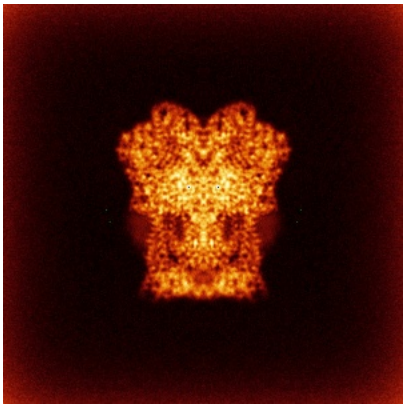


Y

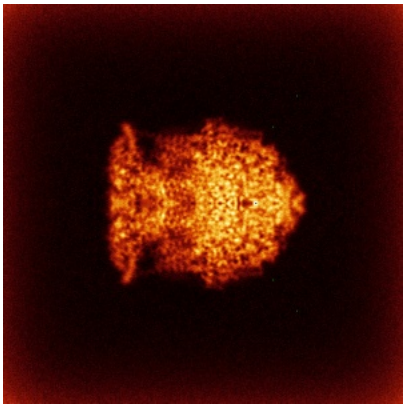


Z

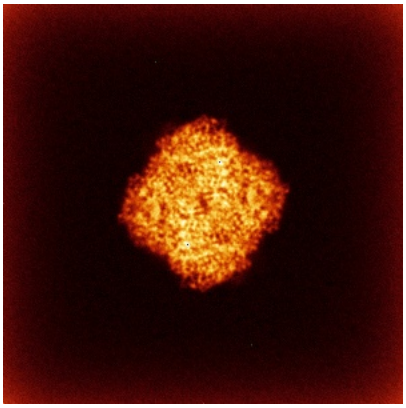
6.4.2 Raw map



X



Y

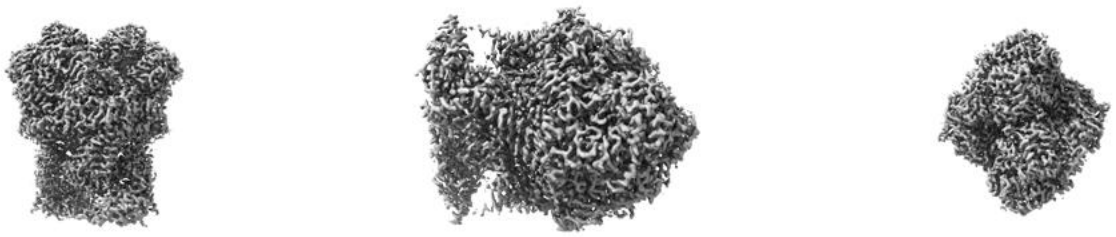


Z

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)

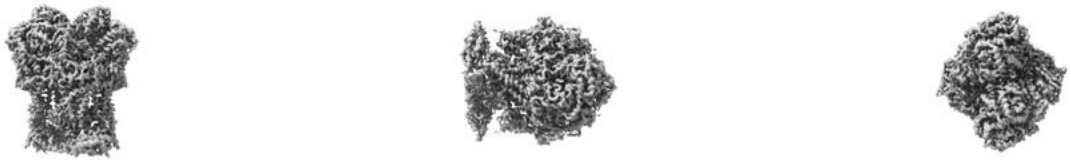
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 4.5. 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.

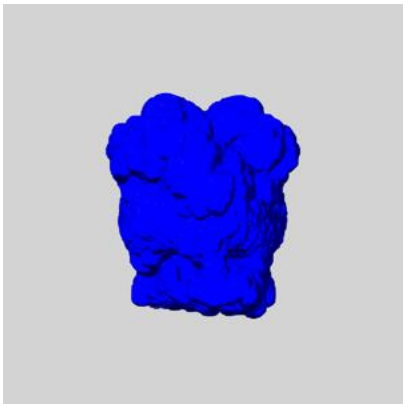
6.6 Mask visualisation (i)

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

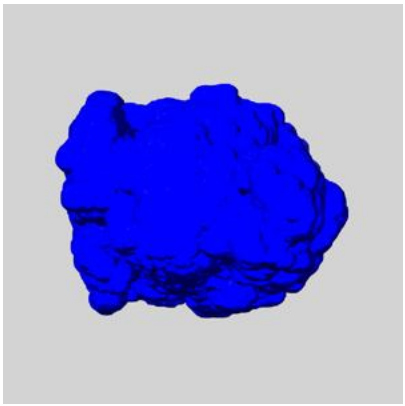
A mask typically either:

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

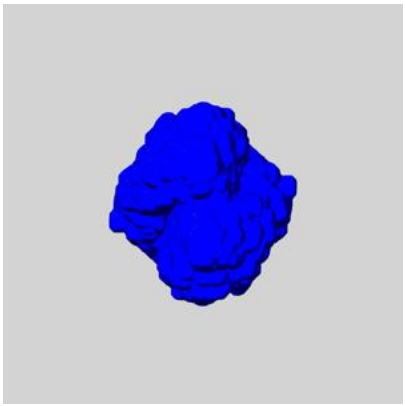
6.6.1 emd_57603_msk_1.map (i)



X



Y

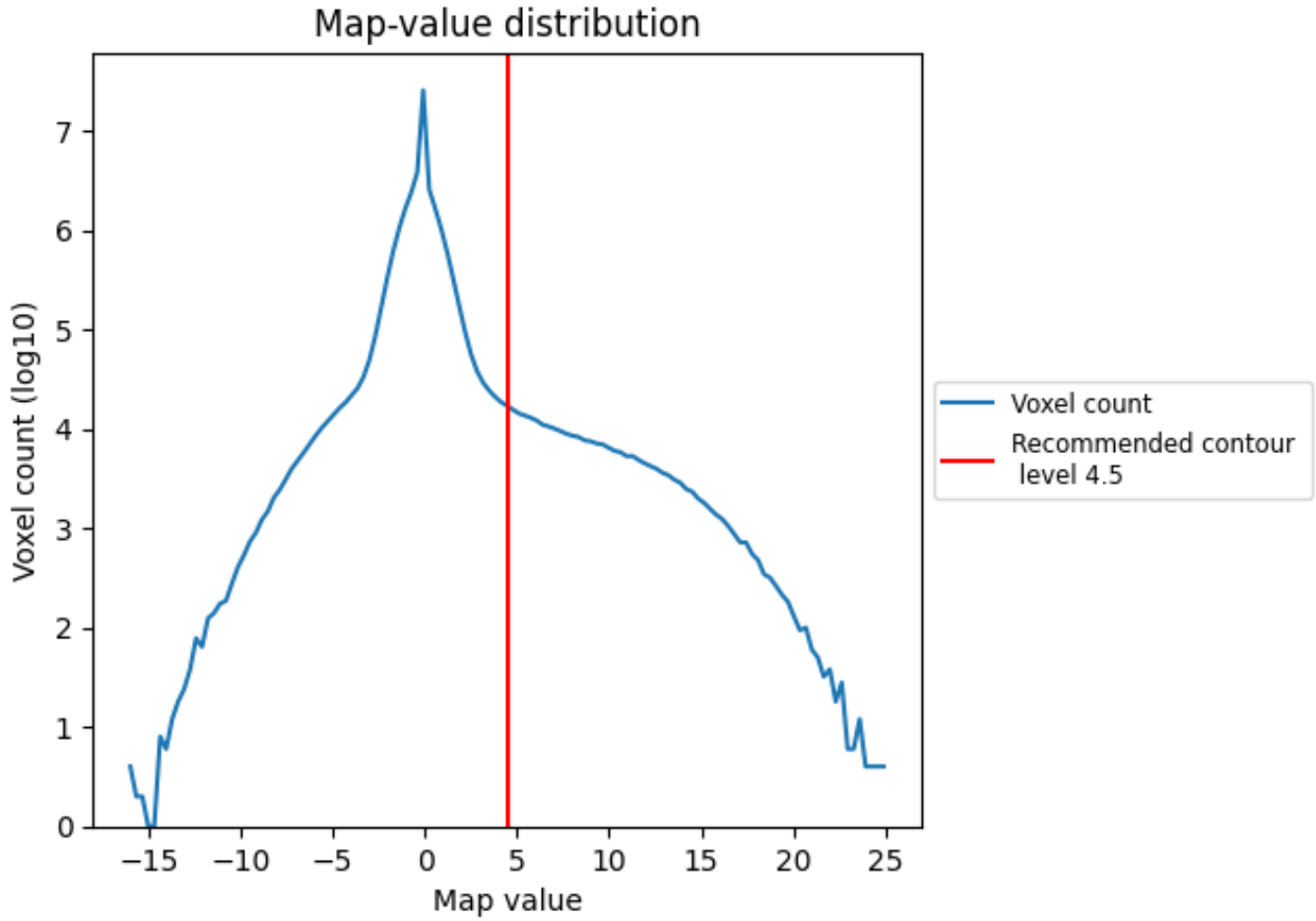


Z

7 Map analysis

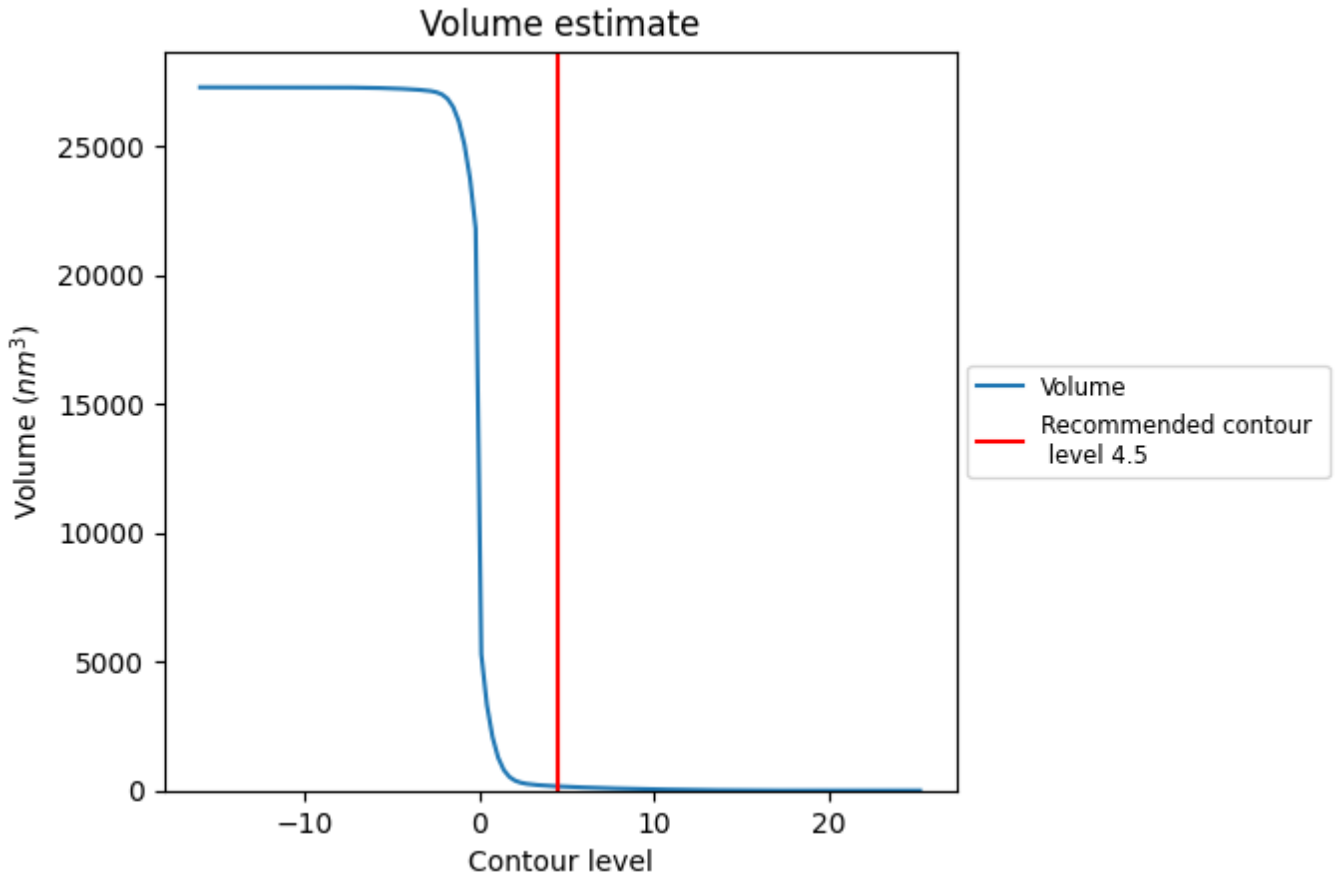
This section contains the results of statistical analysis of the map.

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.

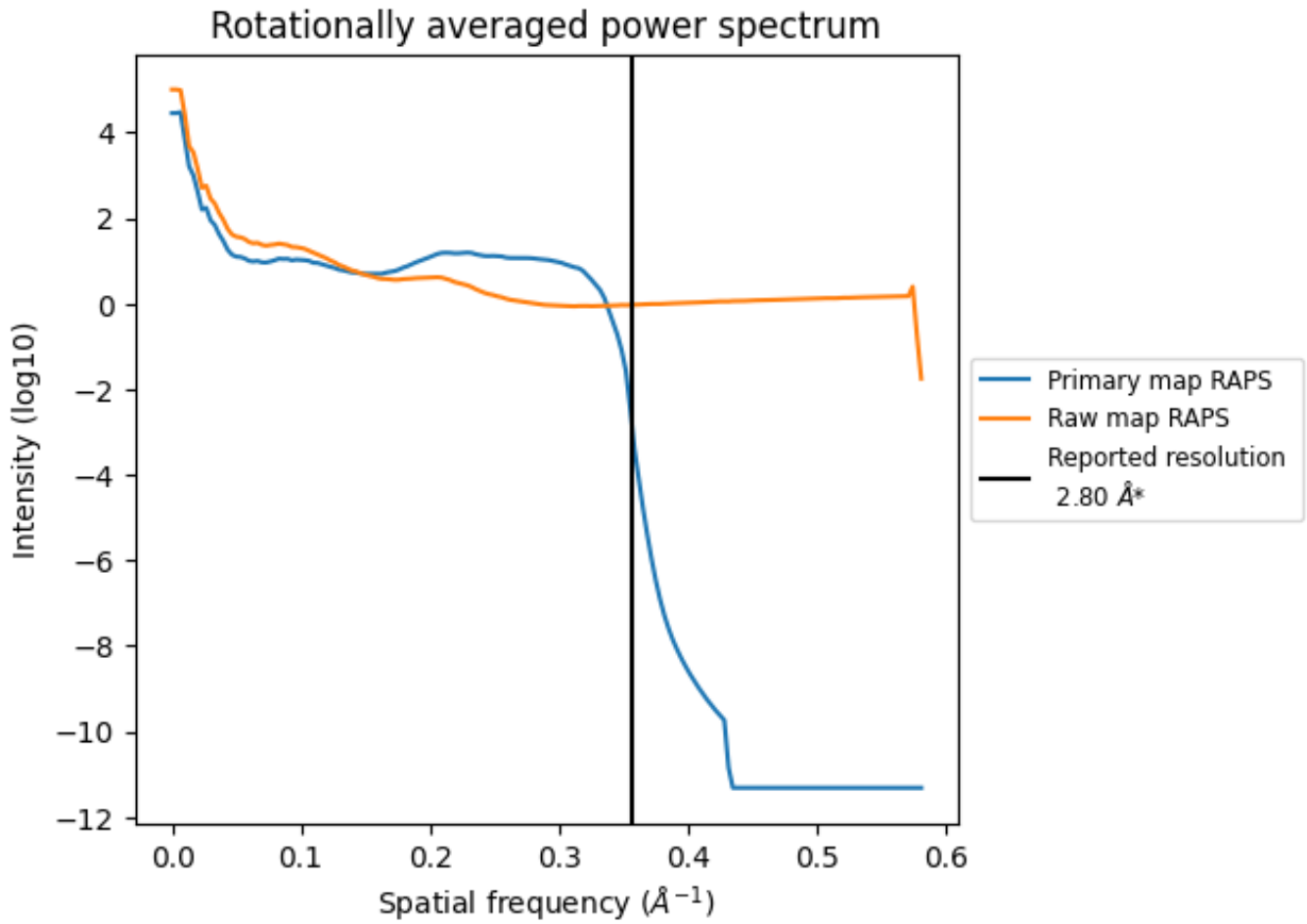
7.2 Volume estimate (i)



The volume at the recommended contour level is 164 nm^3; this corresponds to an approximate mass of 148 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)

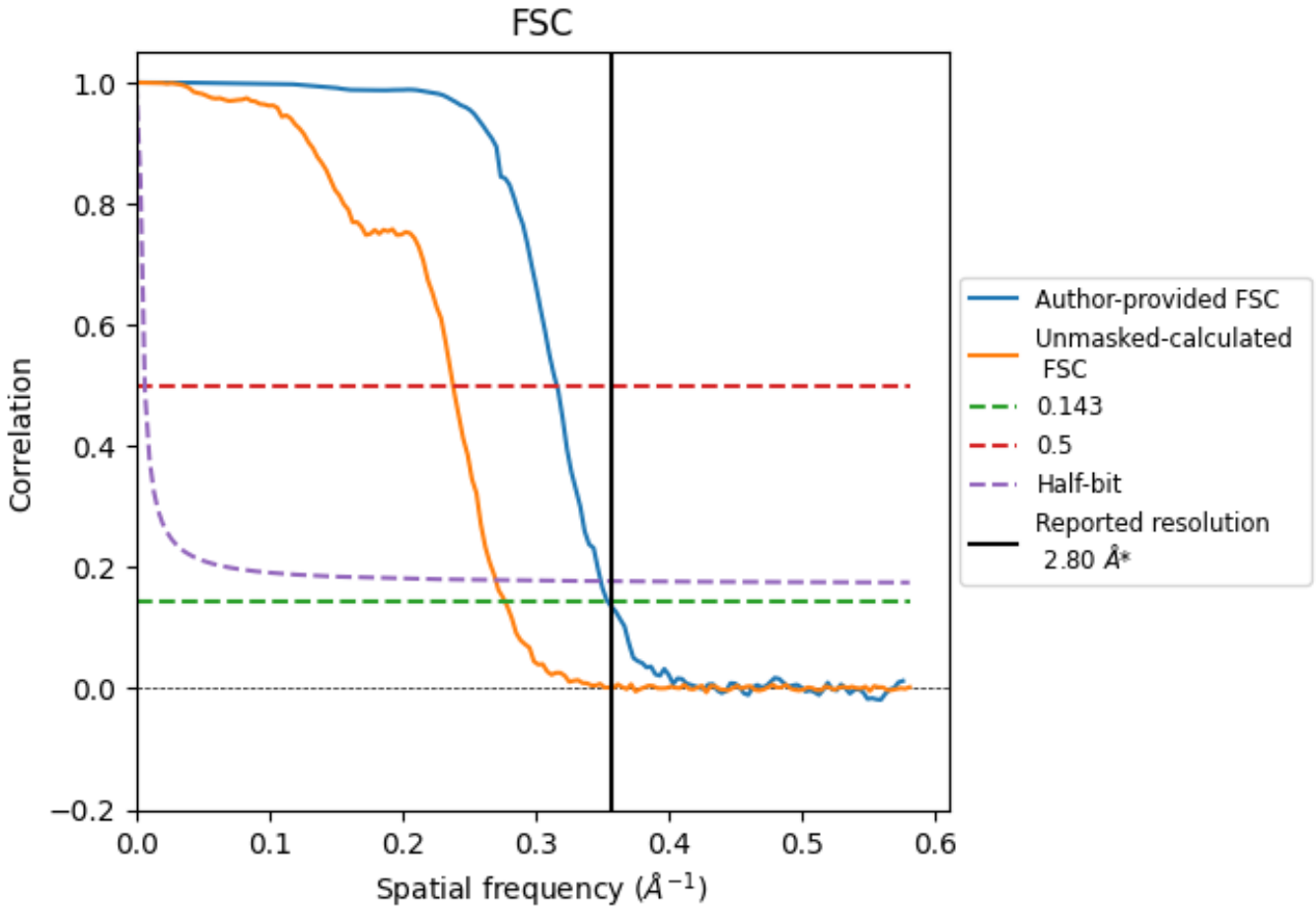


*Reported resolution corresponds to spatial frequency of 0.357 Å^{-1}

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 0.357 Å^{-1}

8.2 Resolution estimates (i)

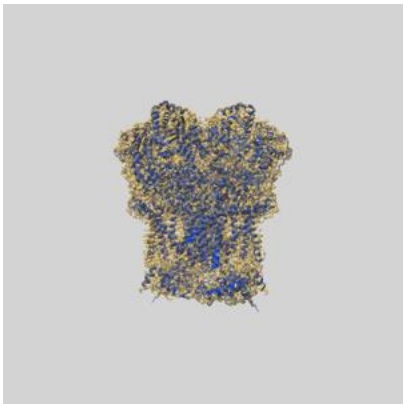
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.80	-	-
Author-provided FSC curve	2.82	3.16	2.86
Unmasked-calculated*	3.61	4.20	3.70

*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 3.61 differs from the reported value 2.8 by more than 10 %

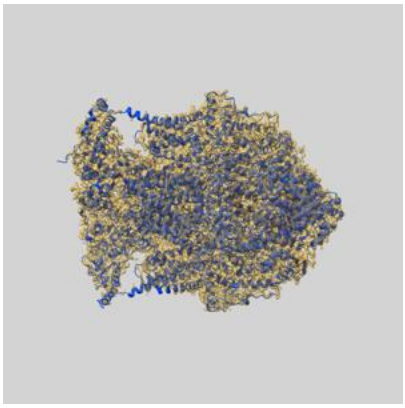
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-57603 and PDB model 30CI. Per-residue inclusion information can be found in section 3 on page 9.

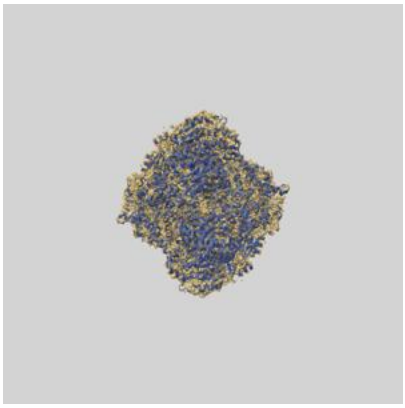
9.1 Map-model overlay



X



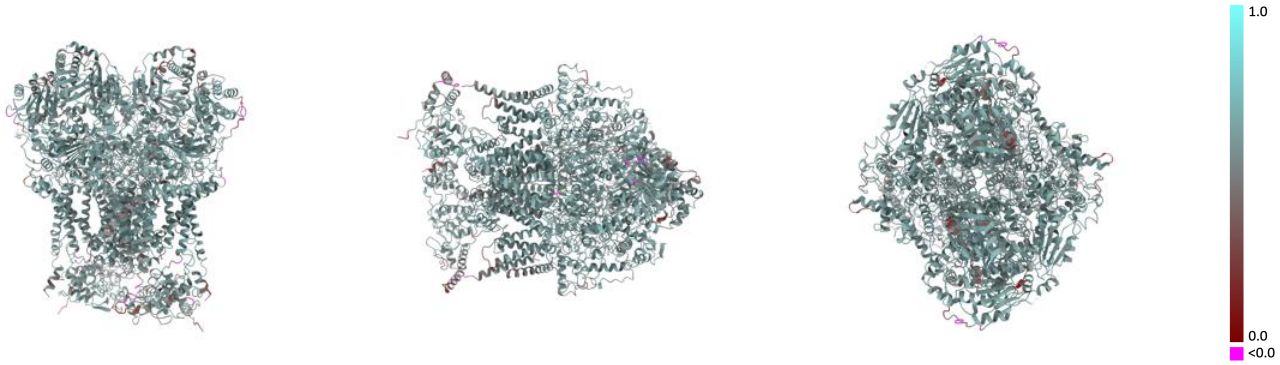
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 4.5 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.

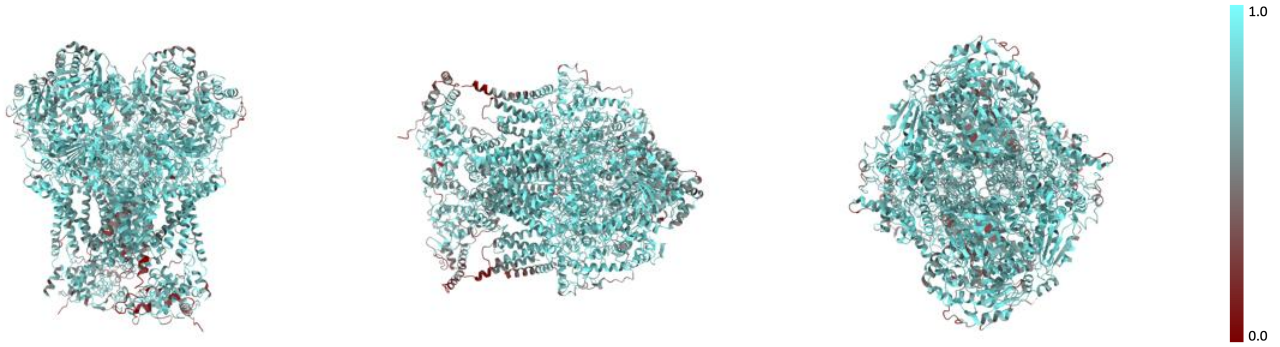
9.2 Q-score mapped to coordinate model (i)



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.

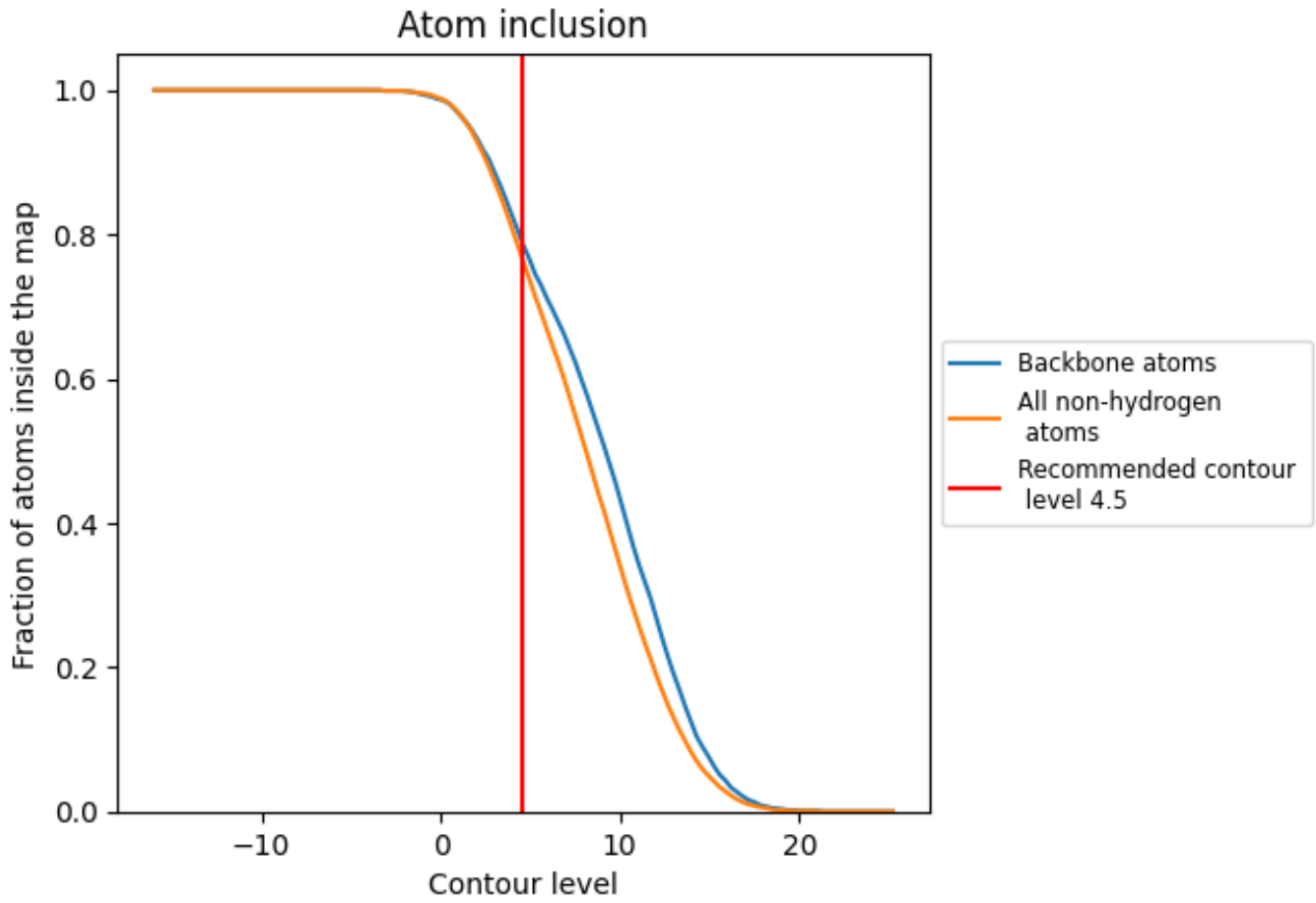
9.3 Atom inclusion mapped to coordinate model (i)



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 (4.5).

9.4 Atom inclusion (i)



At the recommended contour level, 79% of all backbone atoms, 77% 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 (4.5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7700	0.5740
A	0.8070	0.5790
B	0.7940	0.5860
C	0.7470	0.5720
D	0.7260	0.5530
E	0.8600	0.6070
F	0.4030	0.4060
G	0.7610	0.5750
H	0.7300	0.5730
I	0.7710	0.5600
J	0.8130	0.5960
K	0.6240	0.5490
M	0.8110	0.5820
N	0.7970	0.5860
O	0.7490	0.5710
P	0.7240	0.5520
Q	0.8560	0.6070
R	0.4030	0.4070
S	0.7620	0.5740
T	0.7260	0.5740
W	0.7690	0.5640
X	0.8160	0.5980
Y	0.6270	0.5510

