Full wwPDB EM Validation Report ⓘ

Jan 13, 2025 – 05:00 pm GMT

PDB ID	:	9GCS
EMDB ID	:	EMD-51235
Title	:	Rho-ATP-Psu complex II
Authors	:	Gjorgjevikj, D.; Wahl, M.C.; Hilal, T.; Loll, B.
Deposited on	:	2024-08-02
Resolution	:	3.90 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:

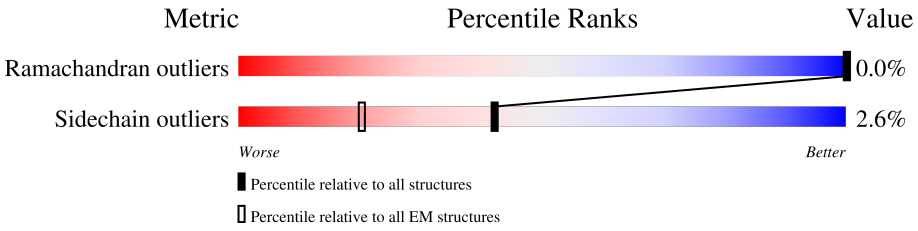
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

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 3.90 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)
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	419	97%
1	C	419	99%
1	D	419	98%
1	E	419	98%
1	F	419	8% 98%
1	G	419	11% 97%
1	J	419	18% 97%
1	K	419	98%
1	L	419	98%

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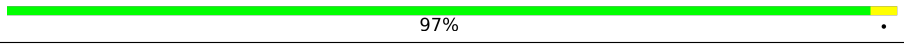
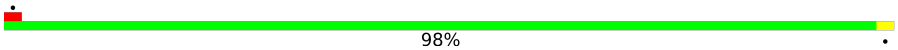
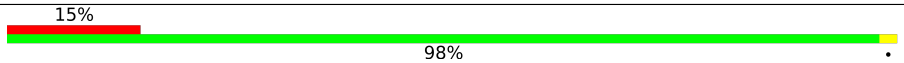
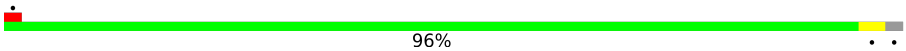
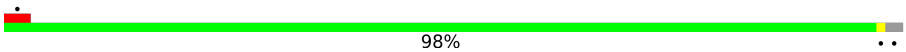
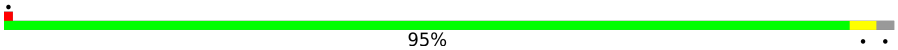
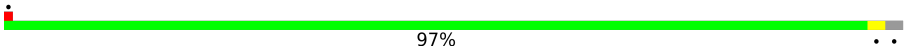
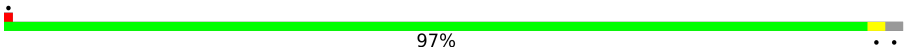
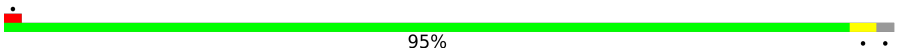
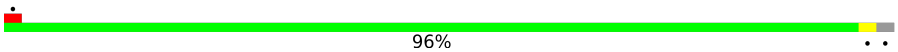
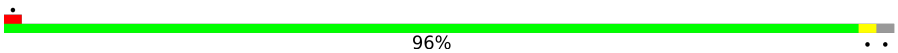
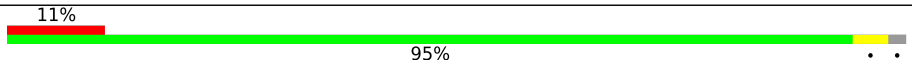
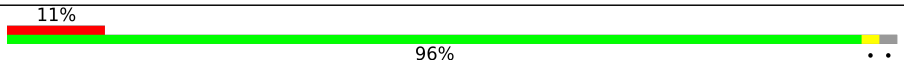
Mol	Chain	Length	Quality of chain
1	M	419	
1	N	419	
1	O	419	
2	c	190	
2	d	190	
2	e	190	
2	f	190	
2	g	190	
2	h	190	
2	i	190	
2	j	190	
2	k	190	
2	l	190	

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 54740 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 Transcription termination factor Rho.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	C	419	Total	C	N	O	S	0	0
			3298	2074	586	621	17		
1	D	419	Total	C	N	O	S	0	0
			3298	2074	586	621	17		
1	E	419	Total	C	N	O	S	0	0
			3298	2074	586	621	17		
1	J	419	Total	C	N	O	S	0	0
			3298	2074	586	621	17		
1	K	419	Total	C	N	O	S	0	0
			3298	2074	586	621	17		
1	L	419	Total	C	N	O	S	0	0
			3298	2074	586	621	17		
1	M	419	Total	C	N	O	S	0	0
			3298	2074	586	621	17		
1	O	419	Total	C	N	O	S	0	0
			3298	2074	586	621	17		
1	B	419	Total	C	N	O	S	0	0
			3298	2074	586	621	17		
1	G	419	Total	C	N	O	S	0	0
			3298	2074	586	621	17		
1	N	419	Total	C	N	O	S	0	0
			3298	2074	586	621	17		
1	F	419	Total	C	N	O	S	0	0
			3298	2074	586	621	17		

- Molecule 2 is a protein called Polarity suppression protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	c	187	Total	C	N	O	S	0	0
			1478	911	279	283	5		
2	d	187	Total	C	N	O	S	0	0
			1478	911	279	283	5		
2	e	187	Total	C	N	O	S	0	0
			1478	911	279	283	5		

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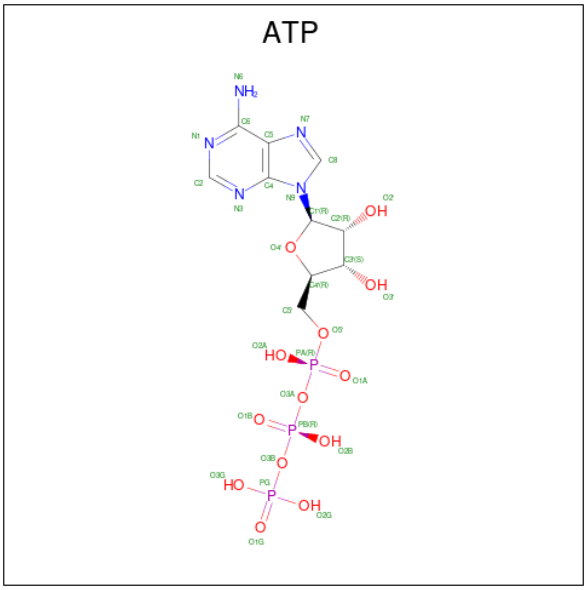
Mol	Chain	Residues	Atoms					AltConf	Trace
2	f	187	Total	C	N	O	S	0	0
			1478	911	279	283	5		
2	g	187	Total	C	N	O	S	0	0
			1478	911	279	283	5		
2	h	187	Total	C	N	O	S	0	0
			1478	911	279	283	5		
2	i	187	Total	C	N	O	S	0	0
			1478	911	279	283	5		
2	j	187	Total	C	N	O	S	0	0
			1478	911	279	283	5		
2	k	187	Total	C	N	O	S	0	0
			1478	911	279	283	5		
2	l	187	Total	C	N	O	S	0	0
			1478	911	279	283	5		

- Molecule 3 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
3	C	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	D	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	E	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	J	1	Total	C	N	O	P	0
			31	10	5	13	3	

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Mol	Chain	Residues	Atoms					AltConf
3	K	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	L	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	M	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	O	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	B	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	G	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	N	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	F	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
4	C	1	Total	Mg	0
			1	1	
4	D	1	Total	Mg	0
			1	1	
4	E	1	Total	Mg	0
			1	1	
4	J	1	Total	Mg	0
			1	1	
4	K	1	Total	Mg	0
			1	1	
4	L	1	Total	Mg	0
			1	1	
4	M	1	Total	Mg	0
			1	1	
4	O	1	Total	Mg	0
			1	1	
4	B	1	Total	Mg	0
			1	1	
4	G	1	Total	Mg	0
			1	1	
4	N	1	Total	Mg	0
			1	1	

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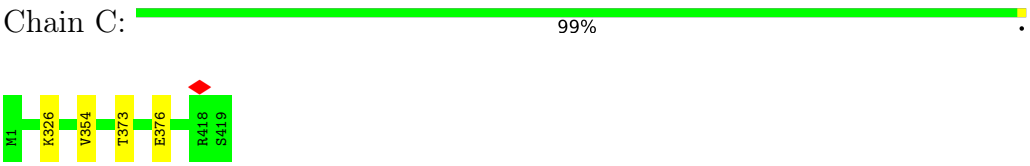
Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
4	F	1	1	1	0

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.

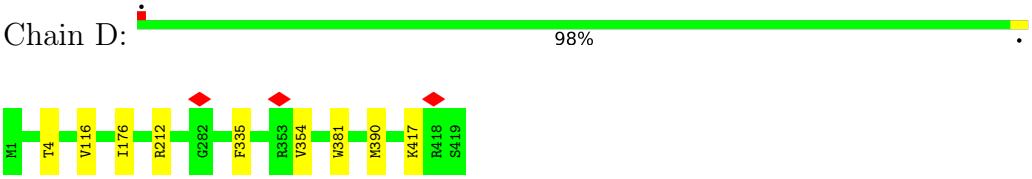
• Molecule 1: Transcription termination factor Rho

Chain C:



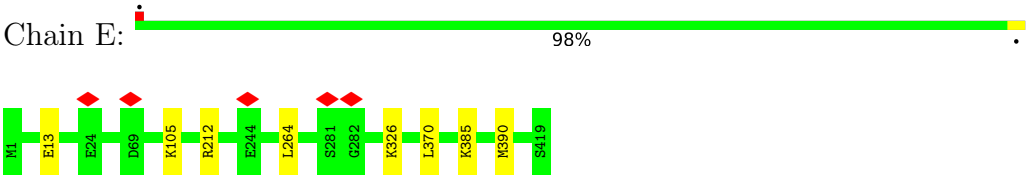
• Molecule 1: Transcription termination factor Rho

Chain D:



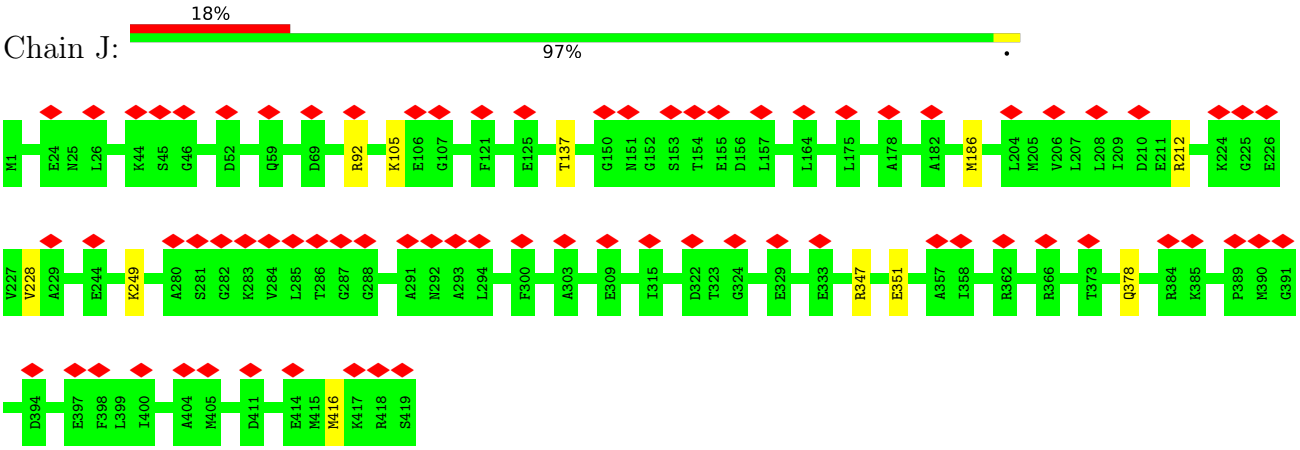
• Molecule 1: Transcription termination factor Rho

Chain E:



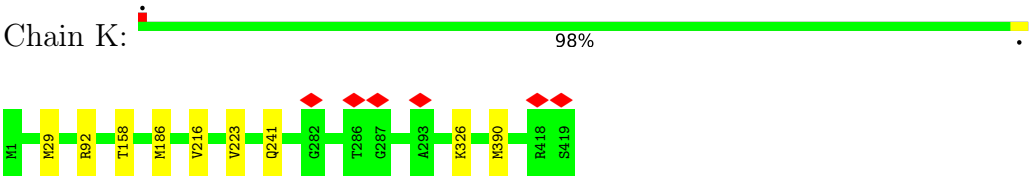
• Molecule 1: Transcription termination factor Rho

Chain J:



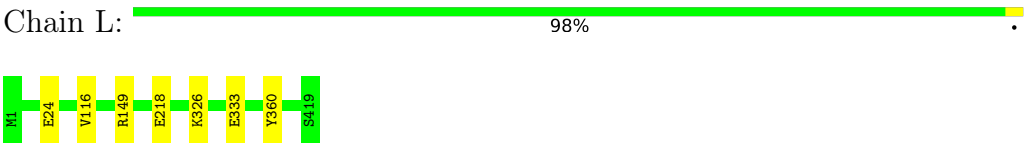
• Molecule 1: Transcription termination factor Rho

Chain K:



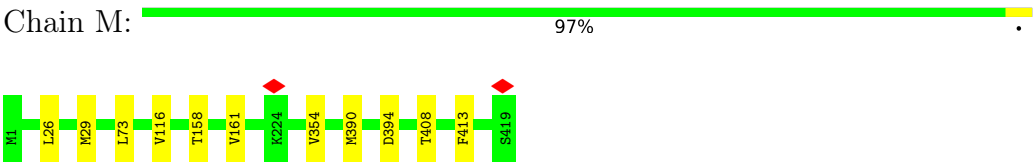
• Molecule 1: Transcription termination factor Rho

Chain L:



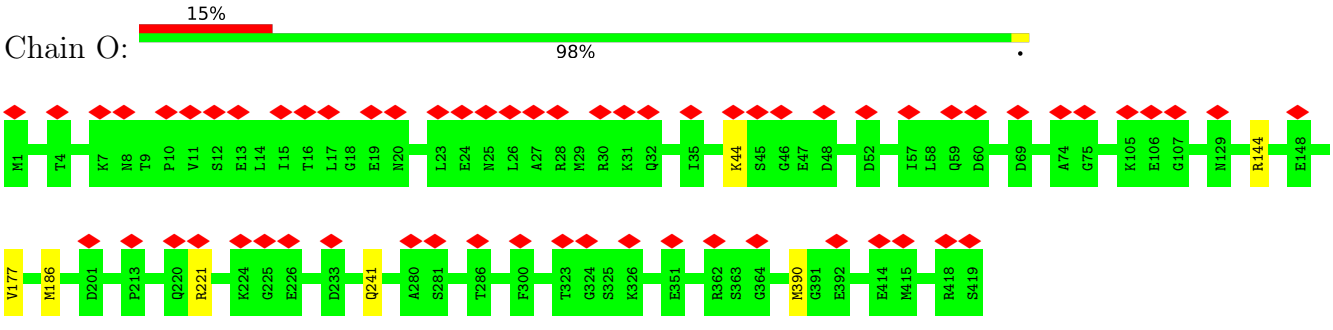
• Molecule 1: Transcription termination factor Rho

Chain M:



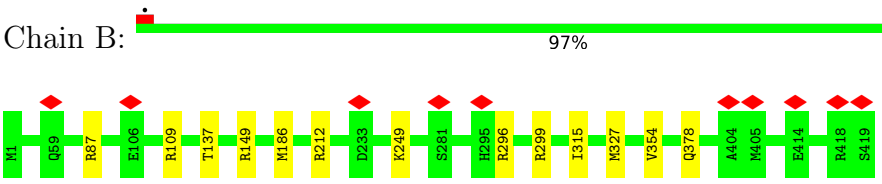
• Molecule 1: Transcription termination factor Rho

Chain O:



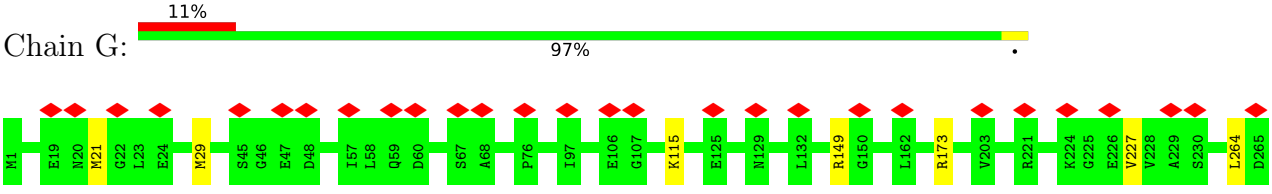
• Molecule 1: Transcription termination factor Rho

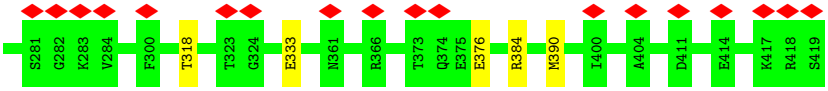
Chain B:



• Molecule 1: Transcription termination factor Rho

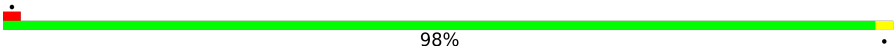
Chain G:

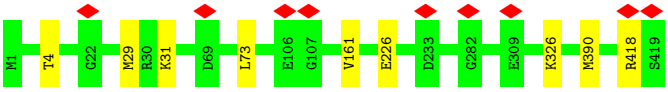




• Molecule 1: Transcription termination factor Rho

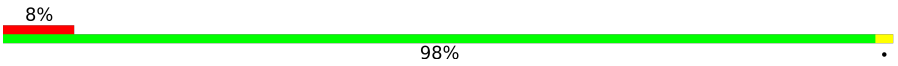
Chain N:

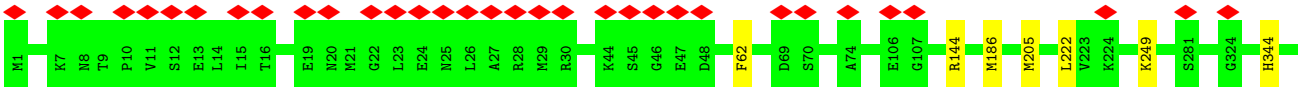


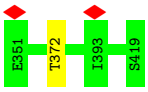


• Molecule 1: Transcription termination factor Rho

Chain F:

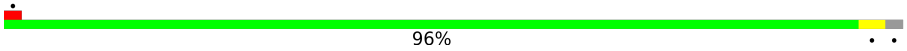


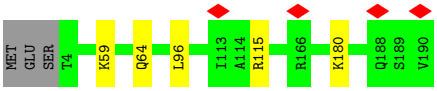




• Molecule 2: Polarity suppression protein

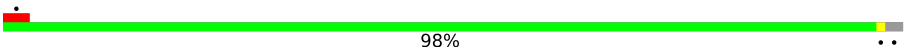
Chain c:

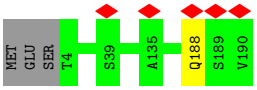




• Molecule 2: Polarity suppression protein

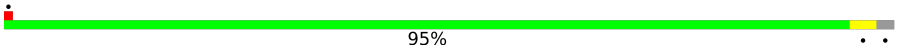
Chain d:

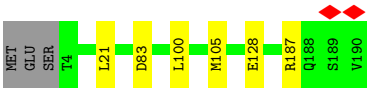




• Molecule 2: Polarity suppression protein

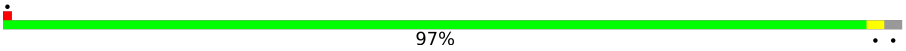
Chain e:

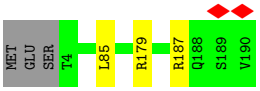




• Molecule 2: Polarity suppression protein

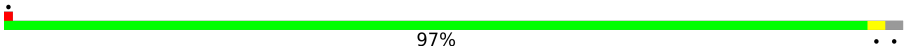
Chain f:

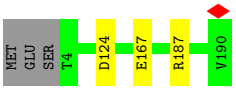




• Molecule 2: Polarity suppression protein

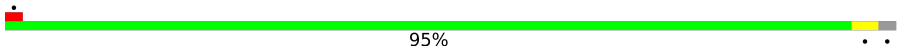
Chain g:





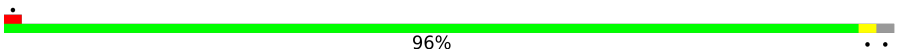
• Molecule 2: Polarity suppression protein

Chain h:



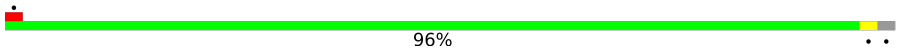
• Molecule 2: Polarity suppression protein

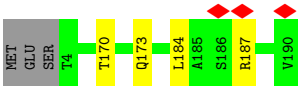
Chain i:



• Molecule 2: Polarity suppression protein

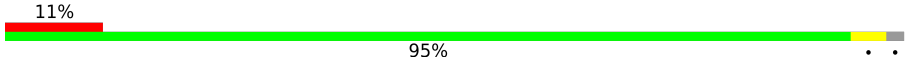
Chain j:

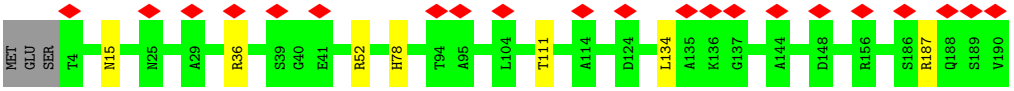




• Molecule 2: Polarity suppression protein

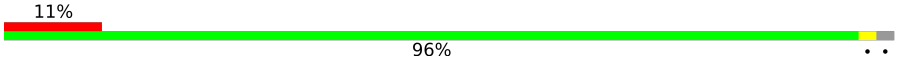
Chain k:

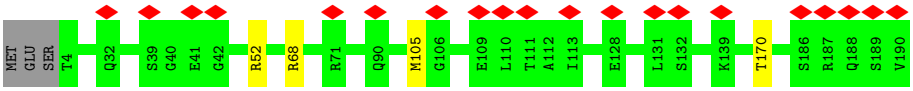




• Molecule 2: Polarity suppression protein

Chain l:





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	17296	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	44	Depositor
Minimum defocus (nm)	900	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	96000	Depositor
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	1.418	Depositor
Minimum map value	0.000	Depositor
Average map value	0.011	Depositor
Map value standard deviation	0.050	Depositor
Recommended contour level	0.22	Depositor
Map size (Å)	366.912, 366.912, 366.912	wwPDB
Map dimensions	448, 448, 448	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.81899995, 0.81899995, 0.81899995	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.24	0/3347	0.50	0/4505
1	C	0.24	0/3347	0.49	0/4505
1	D	0.24	0/3347	0.50	0/4505
1	E	0.24	0/3347	0.50	0/4505
1	F	0.24	0/3347	0.50	0/4505
1	G	0.24	0/3347	0.50	0/4505
1	J	0.24	0/3347	0.50	0/4505
1	K	0.24	0/3347	0.50	0/4505
1	L	0.24	0/3347	0.49	0/4505
1	M	0.24	0/3347	0.50	0/4505
1	N	0.24	0/3347	0.50	0/4505
1	O	0.24	0/3347	0.49	0/4505
2	c	0.23	0/1498	0.50	0/2020
2	d	0.23	0/1498	0.49	0/2020
2	e	0.23	0/1498	0.49	0/2020
2	f	0.23	0/1498	0.48	0/2020
2	g	0.23	0/1498	0.49	0/2020
2	h	0.23	0/1498	0.51	0/2020
2	i	0.23	0/1498	0.49	0/2020
2	j	0.23	0/1498	0.49	0/2020
2	k	0.23	0/1498	0.47	0/2020
2	l	0.23	0/1498	0.50	0/2020
All	All	0.24	0/55144	0.49	0/74260

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)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

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	417/419 (100%)	404 (97%)	12 (3%)	1 (0%)	44	75
1	C	417/419 (100%)	414 (99%)	3 (1%)	0	100	100
1	D	417/419 (100%)	408 (98%)	9 (2%)	0	100	100
1	E	417/419 (100%)	406 (97%)	11 (3%)	0	100	100
1	F	417/419 (100%)	407 (98%)	10 (2%)	0	100	100
1	G	417/419 (100%)	410 (98%)	7 (2%)	0	100	100
1	J	417/419 (100%)	410 (98%)	7 (2%)	0	100	100
1	K	417/419 (100%)	410 (98%)	7 (2%)	0	100	100
1	L	417/419 (100%)	406 (97%)	11 (3%)	0	100	100
1	M	417/419 (100%)	405 (97%)	12 (3%)	0	100	100
1	N	417/419 (100%)	410 (98%)	7 (2%)	0	100	100
1	O	417/419 (100%)	410 (98%)	7 (2%)	0	100	100
2	c	185/190 (97%)	181 (98%)	4 (2%)	0	100	100
2	d	185/190 (97%)	184 (100%)	1 (0%)	0	100	100
2	e	185/190 (97%)	183 (99%)	2 (1%)	0	100	100
2	f	185/190 (97%)	184 (100%)	1 (0%)	0	100	100
2	g	185/190 (97%)	181 (98%)	4 (2%)	0	100	100
2	h	185/190 (97%)	181 (98%)	3 (2%)	1 (0%)	25	60
2	i	185/190 (97%)	181 (98%)	4 (2%)	0	100	100
2	j	185/190 (97%)	178 (96%)	7 (4%)	0	100	100
2	k	185/190 (97%)	183 (99%)	2 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	l	185/190 (97%)	180 (97%)	5 (3%)	0	100	100
All	All	6854/6928 (99%)	6716 (98%)	136 (2%)	2 (0%)	100	100

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	h	108	SER
1	B	354	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	B	359/359 (100%)	347 (97%)	12 (3%)	33	56
1	C	359/359 (100%)	355 (99%)	4 (1%)	70	79
1	D	359/359 (100%)	350 (98%)	9 (2%)	42	62
1	E	359/359 (100%)	351 (98%)	8 (2%)	47	65
1	F	359/359 (100%)	351 (98%)	8 (2%)	47	65
1	G	359/359 (100%)	347 (97%)	12 (3%)	33	56
1	J	359/359 (100%)	348 (97%)	11 (3%)	35	56
1	K	359/359 (100%)	350 (98%)	9 (2%)	42	62
1	L	359/359 (100%)	352 (98%)	7 (2%)	52	70
1	M	359/359 (100%)	348 (97%)	11 (3%)	35	56
1	N	359/359 (100%)	350 (98%)	9 (2%)	42	62
1	O	359/359 (100%)	352 (98%)	7 (2%)	52	70
2	c	153/156 (98%)	148 (97%)	5 (3%)	33	56
2	d	153/156 (98%)	152 (99%)	1 (1%)	81	86
2	e	153/156 (98%)	147 (96%)	6 (4%)	27	51
2	f	153/156 (98%)	150 (98%)	3 (2%)	50	68
2	g	153/156 (98%)	150 (98%)	3 (2%)	50	68

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	h	153/156 (98%)	148 (97%)	5 (3%)	33 56
2	i	153/156 (98%)	149 (97%)	4 (3%)	41 61
2	j	153/156 (98%)	149 (97%)	4 (3%)	41 61
2	k	153/156 (98%)	146 (95%)	7 (5%)	23 47
2	l	153/156 (98%)	149 (97%)	4 (3%)	41 61
All	All	5838/5868 (100%)	5689 (97%)	149 (3%)	42 61

All (149) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	326	LYS
1	C	354	VAL
1	C	373	THR
1	C	376	GLU
1	D	4	THR
1	D	116	VAL
1	D	176	ILE
1	D	212	ARG
1	D	335	PHE
1	D	354	VAL
1	D	381	TRP
1	D	390	MET
1	D	417	LYS
1	E	13	GLU
1	E	105	LYS
1	E	212	ARG
1	E	264	LEU
1	E	326	LYS
1	E	370	LEU
1	E	385	LYS
1	E	390	MET
1	J	92	ARG
1	J	105	LYS
1	J	137	THR
1	J	186	MET
1	J	212	ARG
1	J	228	VAL
1	J	249	LYS
1	J	347	ARG
1	J	351	GLU

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Mol	Chain	Res	Type
1	J	378	GLN
1	J	416	MET
1	K	29	MET
1	K	92	ARG
1	K	158	THR
1	K	186	MET
1	K	216	VAL
1	K	223	VAL
1	K	241	GLN
1	K	326	LYS
1	K	390	MET
1	L	24	GLU
1	L	116	VAL
1	L	149	ARG
1	L	218	GLU
1	L	326	LYS
1	L	333	GLU
1	L	360	TYR
1	M	26	LEU
1	M	29	MET
1	M	73	LEU
1	M	116	VAL
1	M	158	THR
1	M	161	VAL
1	M	354	VAL
1	M	390	MET
1	M	394	ASP
1	M	408	THR
1	M	413	PHE
1	O	44	LYS
1	O	144	ARG
1	O	177	VAL
1	O	186	MET
1	O	221	ARG
1	O	241	GLN
1	O	390	MET
2	c	59	LYS
2	c	64	GLN
2	c	96	LEU
2	c	115	ARG
2	c	180	LYS
2	d	188	GLN

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Mol	Chain	Res	Type
2	e	21	LEU
2	e	83	ASP
2	e	100	LEU
2	e	105	MET
2	e	128	GLU
2	e	187	ARG
2	f	85	LEU
2	f	179	ARG
2	f	187	ARG
2	g	124	ASP
2	g	167	GLU
2	g	187	ARG
2	h	53	ASN
2	h	83	ASP
2	h	100	LEU
2	h	105	MET
2	h	117	CYS
2	i	11	ASP
2	i	25	ASN
2	i	151	THR
2	i	170	THR
2	j	170	THR
2	j	173	GLN
2	j	184	LEU
2	j	187	ARG
2	k	15	ASN
2	k	36	ARG
2	k	52	ARG
2	k	78	HIS
2	k	111	THR
2	k	134	LEU
2	k	187	ARG
2	l	52	ARG
2	l	68	ARG
2	l	105	MET
2	l	170	THR
1	B	87	ARG
1	B	109	ARG
1	B	137	THR
1	B	149	ARG
1	B	186	MET
1	B	212	ARG

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Mol	Chain	Res	Type
1	B	249	LYS
1	B	296	ARG
1	B	299	ARG
1	B	315	ILE
1	B	327	MET
1	B	378	GLN
1	G	21	MET
1	G	29	MET
1	G	115	LYS
1	G	149	ARG
1	G	173	ARG
1	G	227	VAL
1	G	264	LEU
1	G	318	THR
1	G	333	GLU
1	G	376	GLU
1	G	384	ARG
1	G	390	MET
1	N	4	THR
1	N	29	MET
1	N	31	LYS
1	N	73	LEU
1	N	161	VAL
1	N	226	GLU
1	N	326	LYS
1	N	390	MET
1	N	418	ARG
1	F	62	PHE
1	F	144	ARG
1	F	186	MET
1	F	205	MET
1	F	222	LEU
1	F	249	LYS
1	F	344	HIS
1	F	372	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (40) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	8	ASN
1	C	32	GLN
1	D	140	HIS

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Mol	Chain	Res	Type
1	D	401	ASN
1	E	2	ASN
1	E	90	ASN
1	J	241	GLN
1	J	401	ASN
1	K	189	GLN
1	K	199	HIS
1	L	25	ASN
1	L	401	ASN
1	M	172	GLN
2	d	15	ASN
2	d	173	GLN
2	d	174	ASN
2	e	15	ASN
2	e	73	HIS
2	f	15	ASN
2	g	15	ASN
2	g	91	GLN
2	h	15	ASN
2	i	15	ASN
2	j	15	ASN
2	j	73	HIS
2	j	77	GLN
2	k	63	ASN
2	k	116	ASN
1	B	90	ASN
1	B	135	ASN
1	G	32	GLN
1	G	151	ASN
1	G	241	GLN
1	G	306	ASN
1	G	388	HIS
1	G	401	ASN
1	N	241	GLN
1	N	401	ASN
1	F	193	GLN
1	F	401	ASN

5.3.3 RNA

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)

Of 24 ligands modelled in this entry, 12 are monoatomic - leaving 12 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	ATP	O	501	4	26,33,33	0.59	0	31,52,52	0.85	3 (9%)
3	ATP	M	501	4	26,33,33	0.60	0	31,52,52	0.84	3 (9%)
3	ATP	C	501	4	26,33,33	0.59	0	31,52,52	0.85	3 (9%)
3	ATP	N	501	4	26,33,33	0.60	0	31,52,52	0.84	3 (9%)
3	ATP	E	501	4	26,33,33	0.60	0	31,52,52	0.84	3 (9%)
3	ATP	J	501	4	26,33,33	0.58	0	31,52,52	0.83	3 (9%)
3	ATP	B	501	4	26,33,33	0.60	0	31,52,52	0.84	3 (9%)
3	ATP	G	501	4	26,33,33	0.59	0	31,52,52	0.84	3 (9%)
3	ATP	K	501	4	26,33,33	0.59	0	31,52,52	0.83	3 (9%)
3	ATP	D	501	4	26,33,33	0.59	0	31,52,52	0.83	2 (6%)
3	ATP	F	501	4	26,33,33	0.59	0	31,52,52	0.83	3 (9%)
3	ATP	L	501	4	26,33,33	0.59	0	31,52,52	0.84	3 (9%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ATP	O	501	4	-	0/18/38/38	0/3/3/3
3	ATP	M	501	4	-	5/18/38/38	0/3/3/3
3	ATP	C	501	4	-	4/18/38/38	0/3/3/3
3	ATP	N	501	4	-	2/18/38/38	0/3/3/3
3	ATP	E	501	4	-	1/18/38/38	0/3/3/3
3	ATP	J	501	4	-	4/18/38/38	0/3/3/3
3	ATP	B	501	4	-	2/18/38/38	0/3/3/3
3	ATP	G	501	4	-	4/18/38/38	0/3/3/3
3	ATP	K	501	4	-	3/18/38/38	0/3/3/3
3	ATP	D	501	4	-	5/18/38/38	0/3/3/3
3	ATP	F	501	4	-	2/18/38/38	0/3/3/3
3	ATP	L	501	4	-	3/18/38/38	0/3/3/3

There are no bond length outliers.

All (35) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	L	501	ATP	C5-C6-N6	2.32	123.88	120.35
3	N	501	ATP	C5-C6-N6	2.32	123.88	120.35
3	D	501	ATP	C5-C6-N6	2.31	123.86	120.35
3	G	501	ATP	C5-C6-N6	2.31	123.86	120.35
3	F	501	ATP	C5-C6-N6	2.30	123.85	120.35
3	E	501	ATP	C5-C6-N6	2.30	123.84	120.35
3	M	501	ATP	C5-C6-N6	2.29	123.84	120.35
3	C	501	ATP	C5-C6-N6	2.29	123.83	120.35
3	K	501	ATP	C5-C6-N6	2.28	123.82	120.35
3	B	501	ATP	C5-C6-N6	2.28	123.82	120.35
3	J	501	ATP	C5-C6-N6	2.28	123.81	120.35
3	O	501	ATP	C5-C6-N6	2.24	123.76	120.35
3	G	501	ATP	C3'-C2'-C1'	2.23	104.33	100.98
3	C	501	ATP	C3'-C2'-C1'	2.23	104.33	100.98
3	E	501	ATP	C3'-C2'-C1'	2.20	104.29	100.98
3	O	501	ATP	C3'-C2'-C1'	2.18	104.27	100.98
3	J	501	ATP	C3'-C2'-C1'	2.18	104.26	100.98
3	M	501	ATP	C3'-C2'-C1'	2.17	104.25	100.98
3	N	501	ATP	C3'-C2'-C1'	2.17	104.24	100.98
3	F	501	ATP	C3'-C2'-C1'	2.15	104.22	100.98
3	K	501	ATP	C3'-C2'-C1'	2.14	104.20	100.98
3	L	501	ATP	C3'-C2'-C1'	2.13	104.19	100.98
3	B	501	ATP	C3'-C2'-C1'	2.13	104.18	100.98

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	B	501	ATP	PB-O3B-PG	2.09	139.98	132.83
3	N	501	ATP	PB-O3B-PG	2.07	139.94	132.83
3	M	501	ATP	PB-O3B-PG	2.07	139.92	132.83
3	O	501	ATP	PB-O3B-PG	2.07	139.92	132.83
3	G	501	ATP	PB-O3B-PG	2.07	139.92	132.83
3	J	501	ATP	PB-O3B-PG	2.07	139.91	132.83
3	C	501	ATP	PB-O3B-PG	2.07	139.91	132.83
3	F	501	ATP	PB-O3B-PG	2.06	139.91	132.83
3	L	501	ATP	PB-O3B-PG	2.06	139.89	132.83
3	K	501	ATP	PB-O3B-PG	2.06	139.88	132.83
3	D	501	ATP	PB-O3B-PG	2.04	139.83	132.83
3	E	501	ATP	PB-O3B-PG	2.02	139.75	132.83

There are no chirality outliers.

All (35) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	501	ATP	C5'-O5'-PA-O1A
3	D	501	ATP	C5'-O5'-PA-O2A
3	D	501	ATP	C5'-O5'-PA-O3A
3	E	501	ATP	O4'-C4'-C5'-O5'
3	J	501	ATP	C5'-O5'-PA-O3A
3	M	501	ATP	C5'-O5'-PA-O3A
3	G	501	ATP	PB-O3B-PG-O2G
3	N	501	ATP	O4'-C4'-C5'-O5'
3	F	501	ATP	C5'-O5'-PA-O3A
3	C	501	ATP	O4'-C4'-C5'-O5'
3	J	501	ATP	O4'-C4'-C5'-O5'
3	K	501	ATP	O4'-C4'-C5'-O5'
3	L	501	ATP	O4'-C4'-C5'-O5'
3	M	501	ATP	O4'-C4'-C5'-O5'
3	B	501	ATP	O4'-C4'-C5'-O5'
3	G	501	ATP	O4'-C4'-C5'-O5'
3	F	501	ATP	O4'-C4'-C5'-O5'
3	C	501	ATP	C3'-C4'-C5'-O5'
3	D	501	ATP	O4'-C4'-C5'-O5'
3	D	501	ATP	C3'-C4'-C5'-O5'
3	B	501	ATP	C3'-C4'-C5'-O5'
3	G	501	ATP	C3'-C4'-C5'-O5'
3	L	501	ATP	C3'-C4'-C5'-O5'
3	J	501	ATP	C3'-C4'-C5'-O5'
3	N	501	ATP	C5'-O5'-PA-O3A

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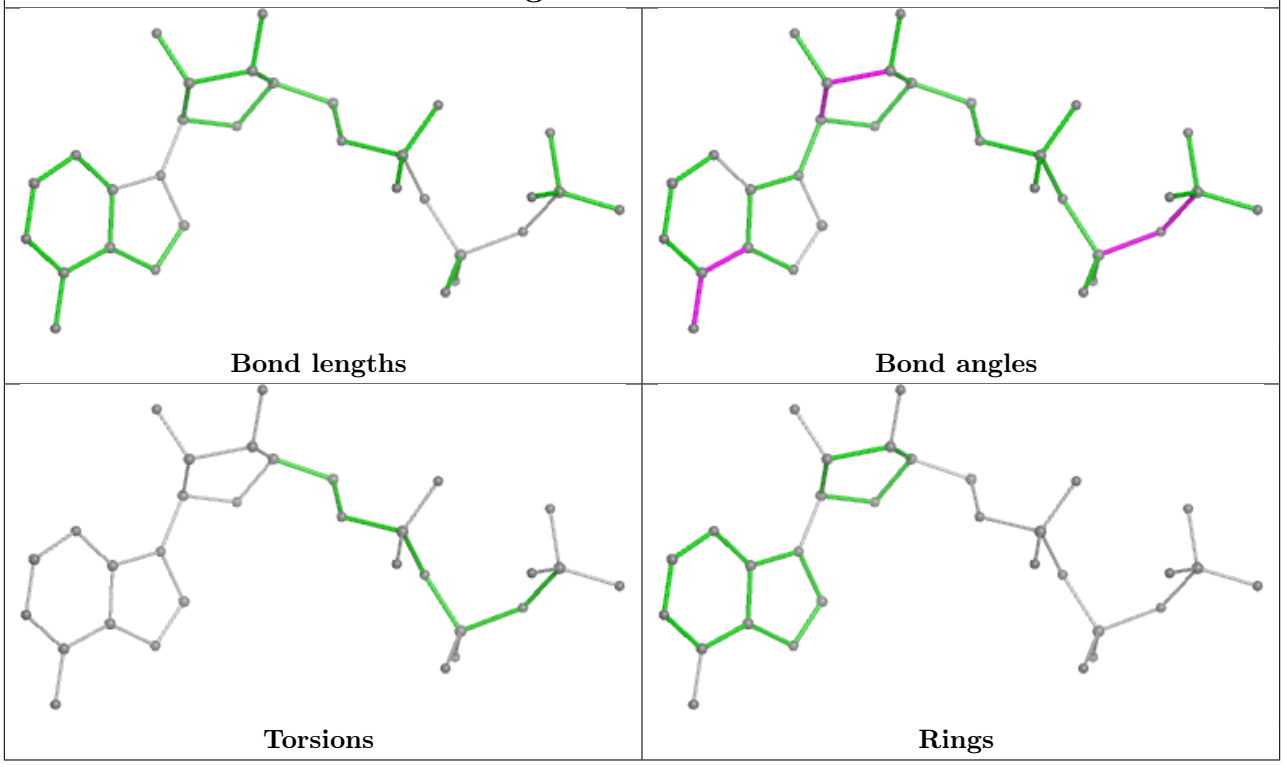
Mol	Chain	Res	Type	Atoms
3	L	501	ATP	PA-O3A-PB-O1B
3	M	501	ATP	C5'-O5'-PA-O1A
3	M	501	ATP	C5'-O5'-PA-O2A
3	K	501	ATP	C3'-C4'-C5'-O5'
3	C	501	ATP	C4'-C5'-O5'-PA
3	M	501	ATP	C3'-C4'-C5'-O5'
3	K	501	ATP	C5'-O5'-PA-O3A
3	C	501	ATP	PA-O3A-PB-O2B
3	J	501	ATP	C5'-O5'-PA-O1A
3	G	501	ATP	PB-O3B-PG-O1G

There are no ring outliers.

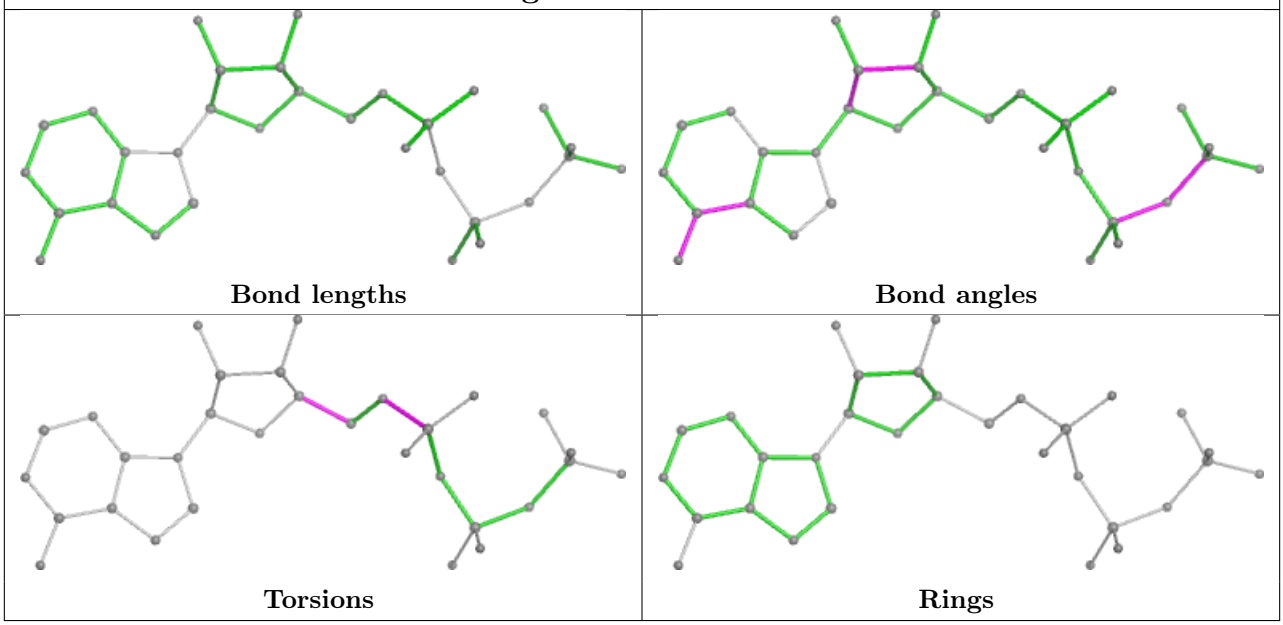
No monomer is involved in short contacts.

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.

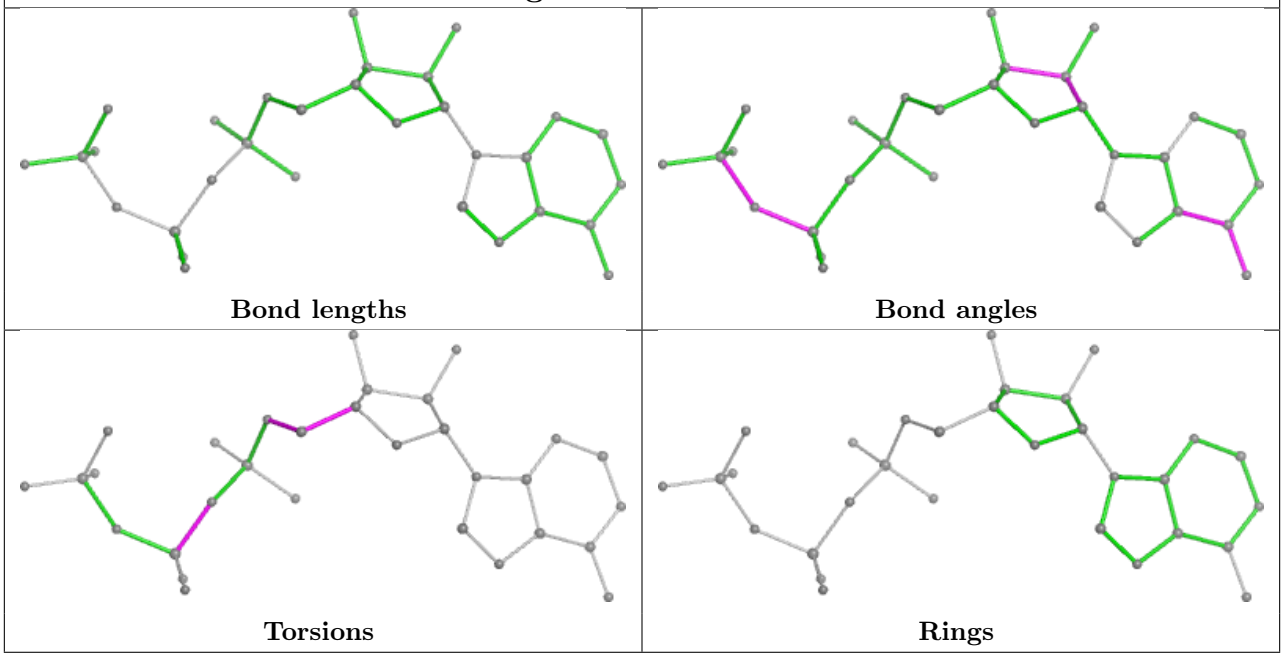
Ligand ATP O 501



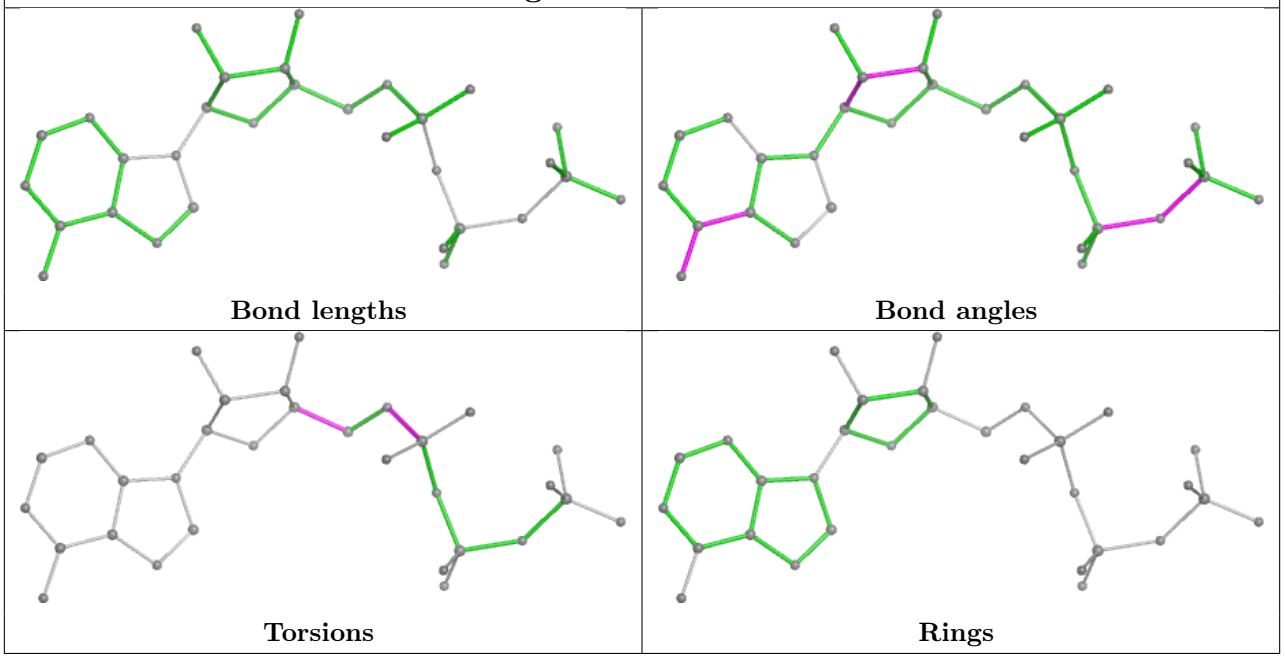
Ligand ATP M 501



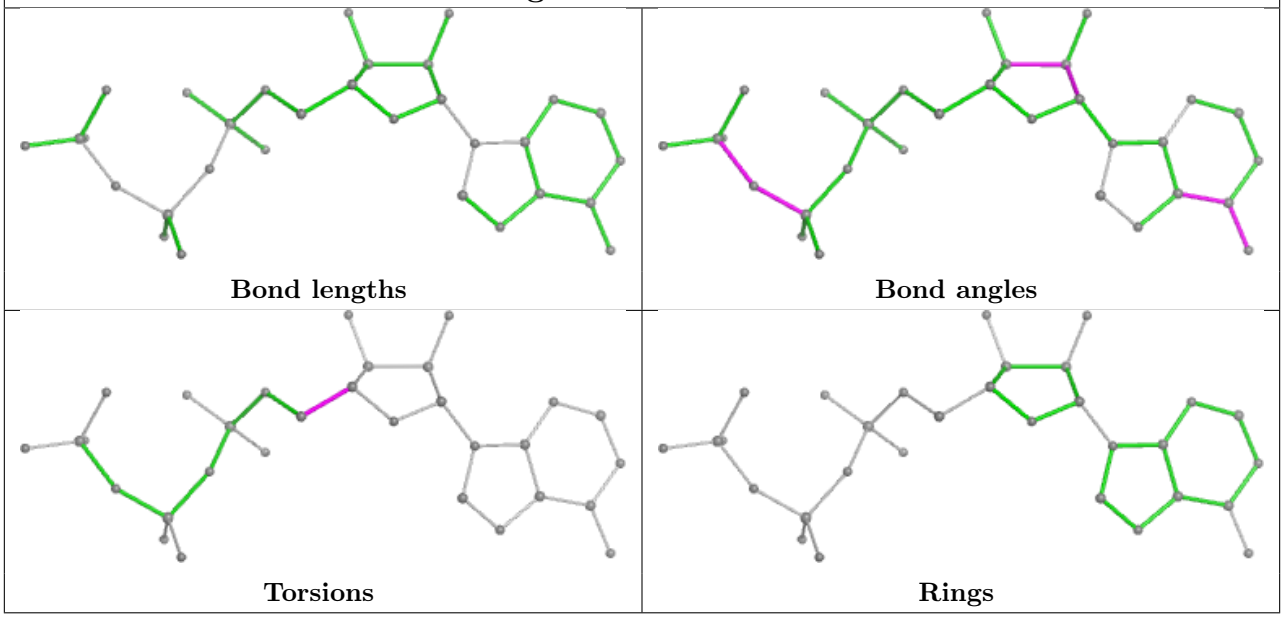
Ligand ATP C 501



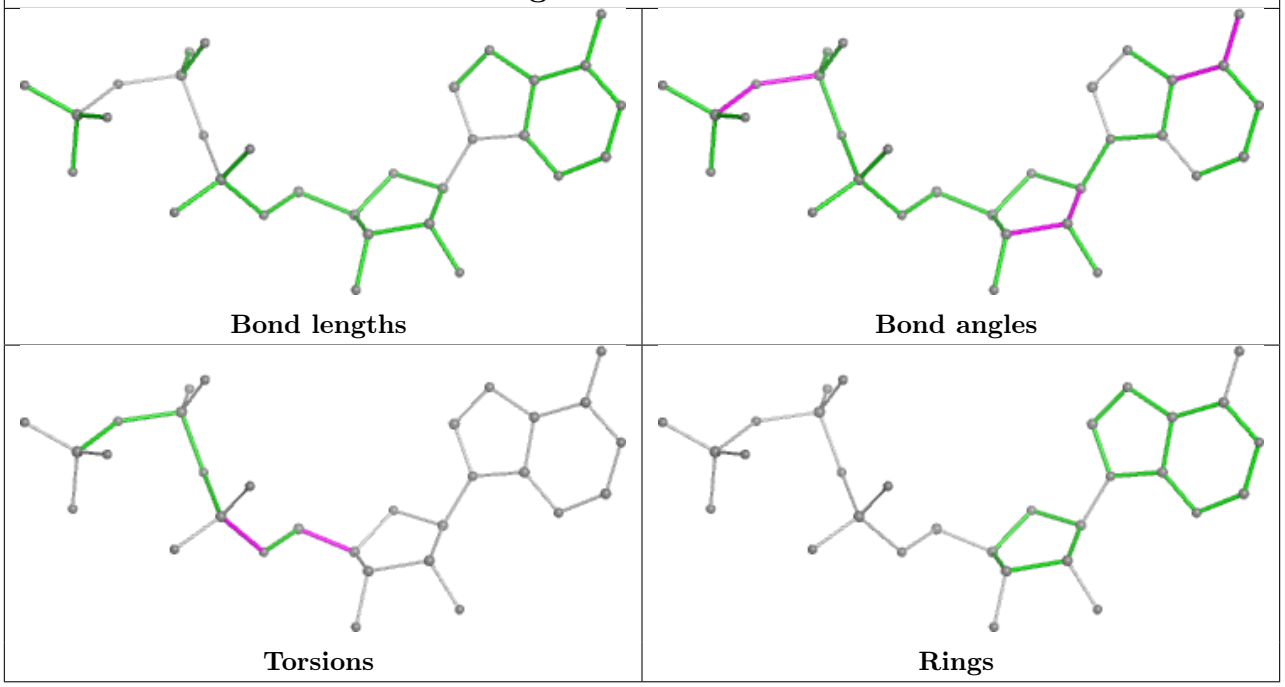
Ligand ATP N 501



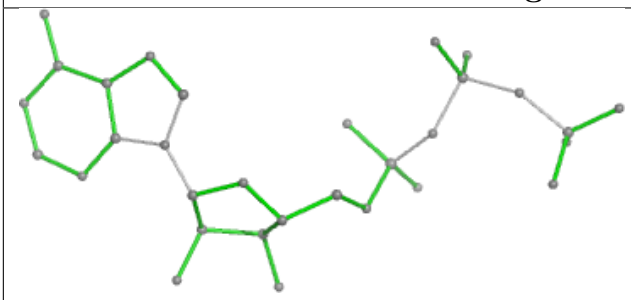
Ligand ATP E 501



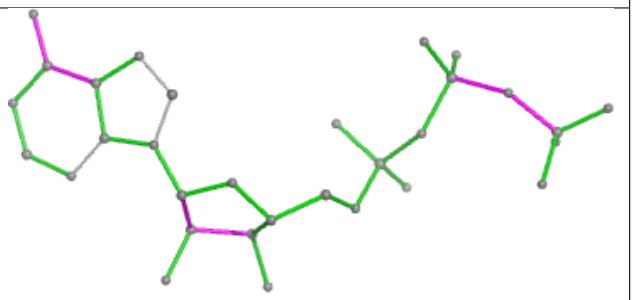
Ligand ATP J 501



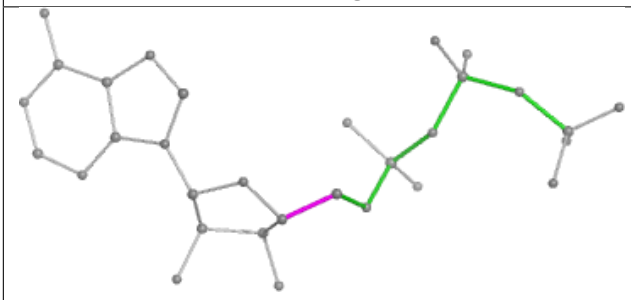
Ligand ATP B 501



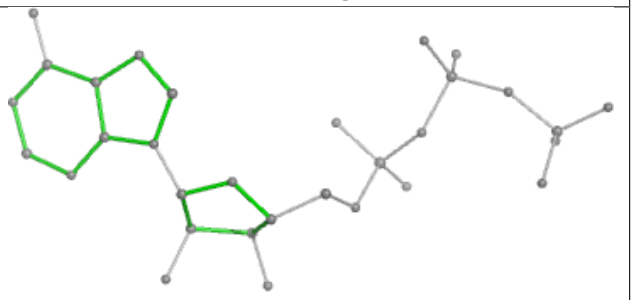
Bond lengths



Bond angles

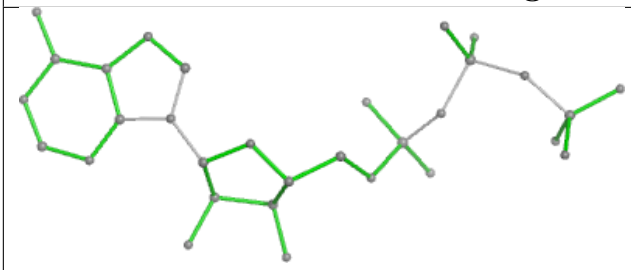


Torsions

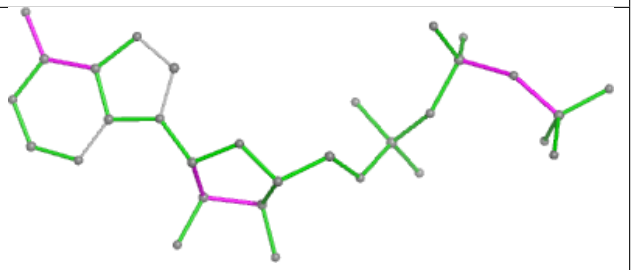


Rings

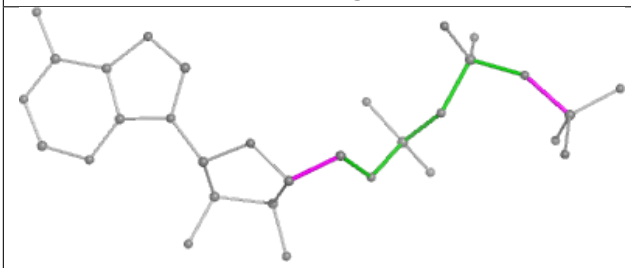
Ligand ATP G 501



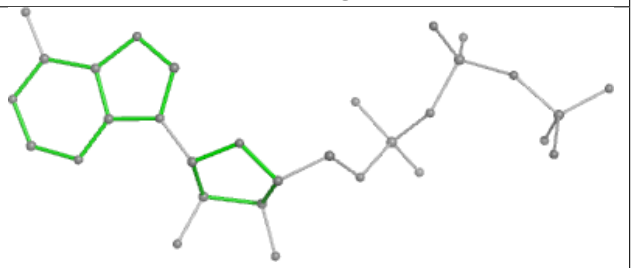
Bond lengths



Bond angles

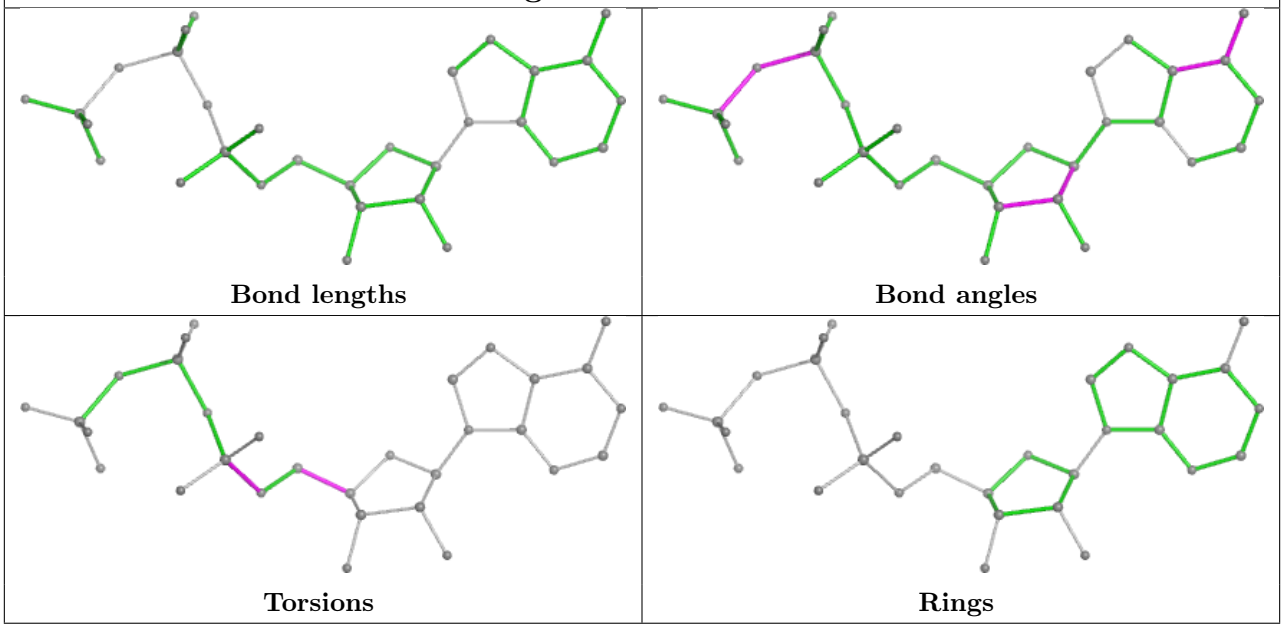


Torsions

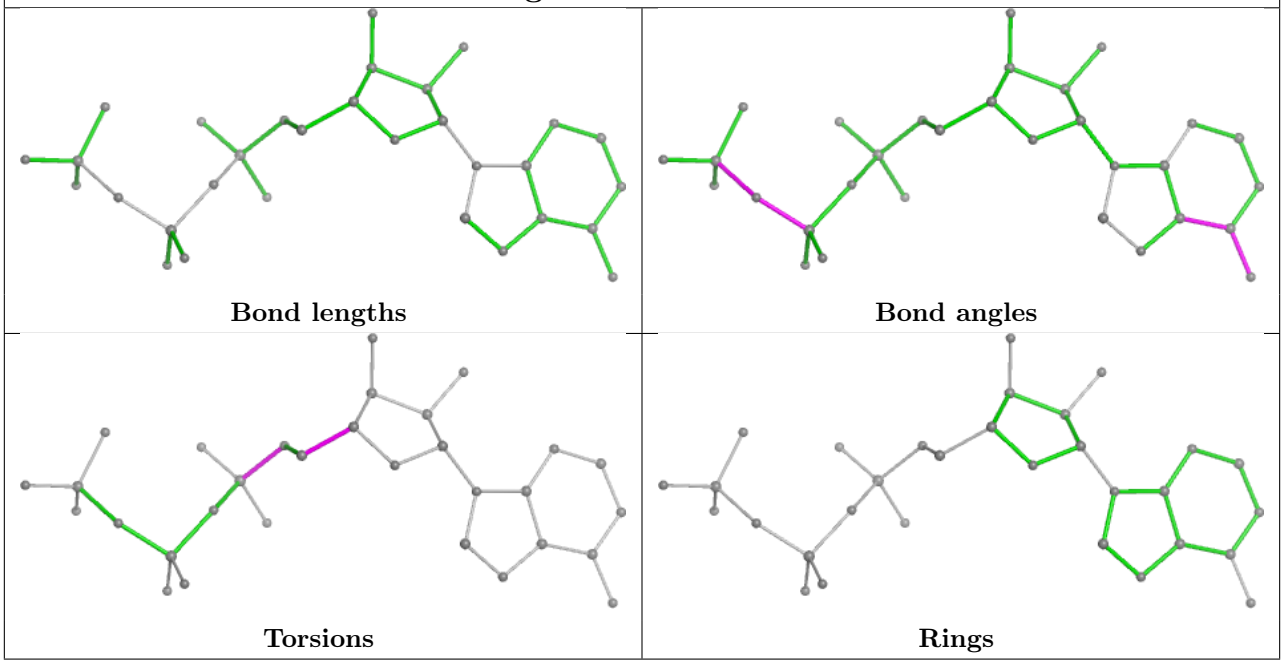


Rings

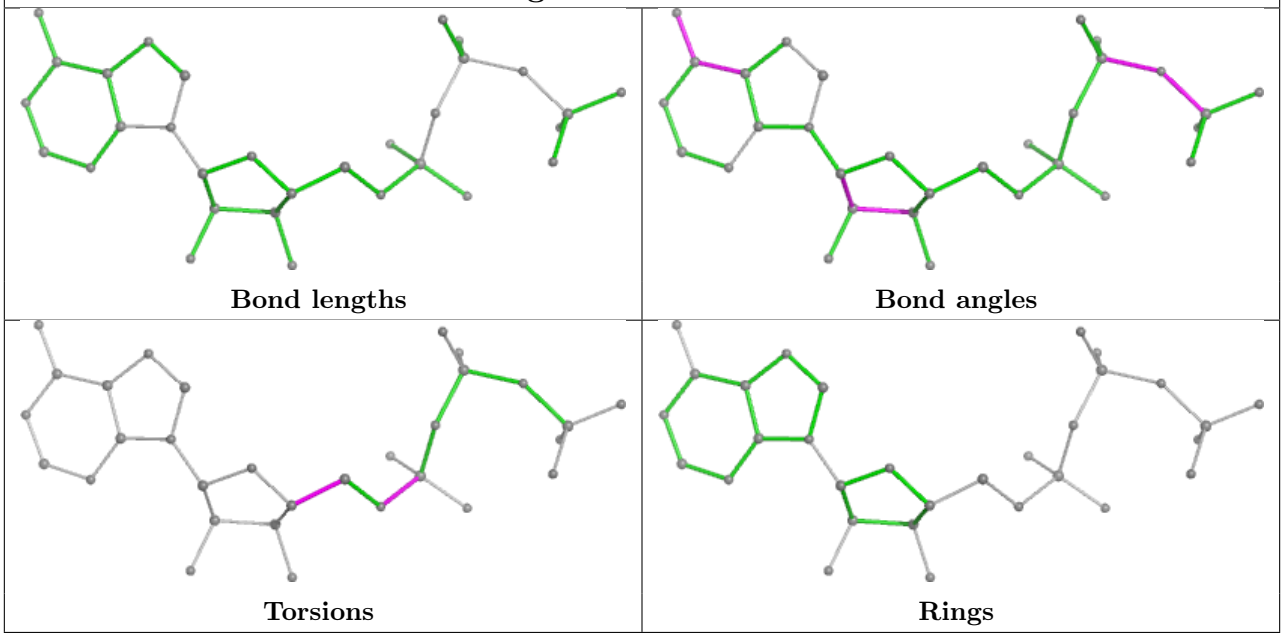
Ligand ATP K 501



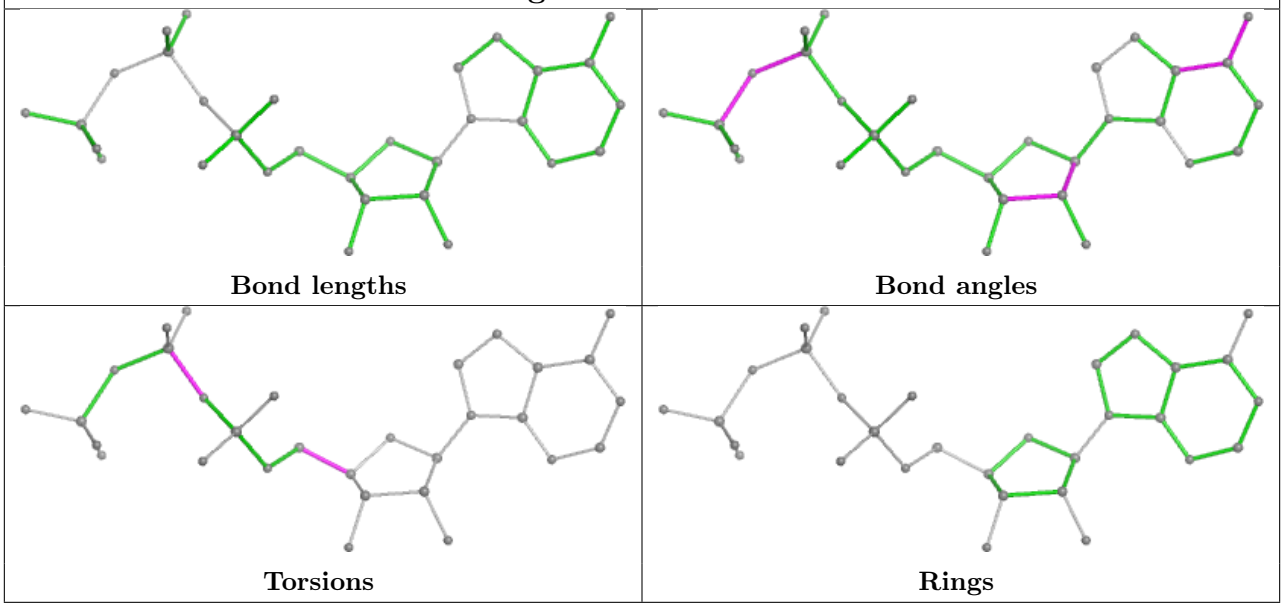
Ligand ATP D 501



Ligand ATP F 501



Ligand ATP L 501



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.

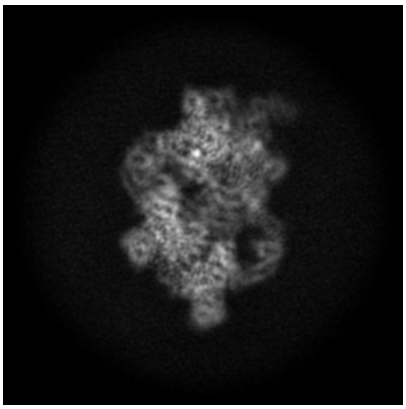
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-51235. These allow visual inspection of the internal detail of the map and identification of artifacts.

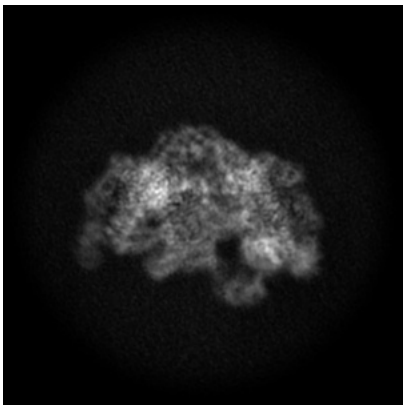
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

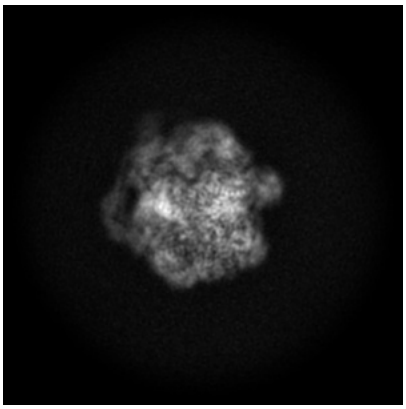
6.1.1 Primary map



X

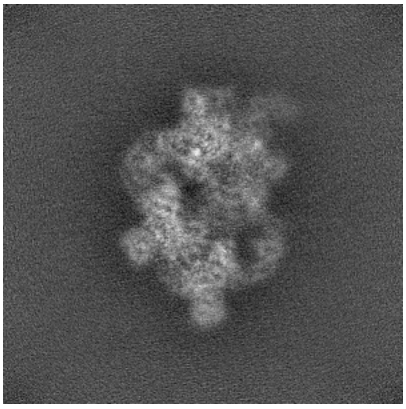


Y

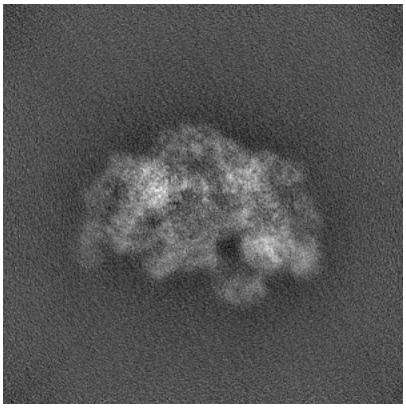


Z

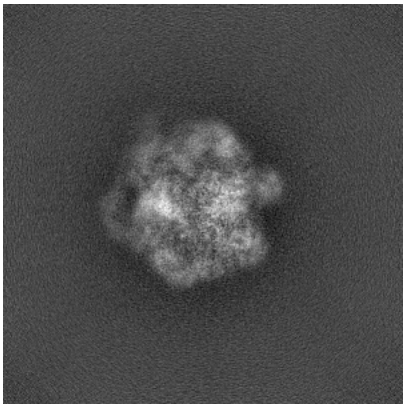
6.1.2 Raw map



X



Y

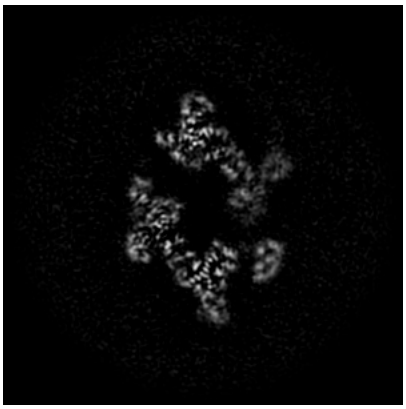


Z

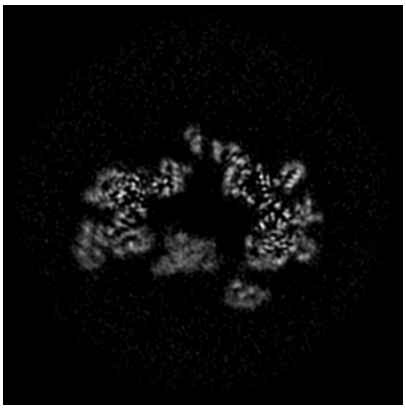
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

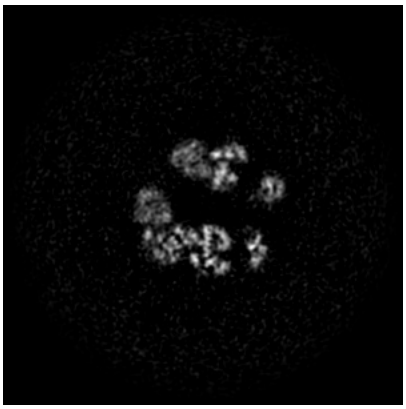
6.2.1 Primary map



X Index: 224

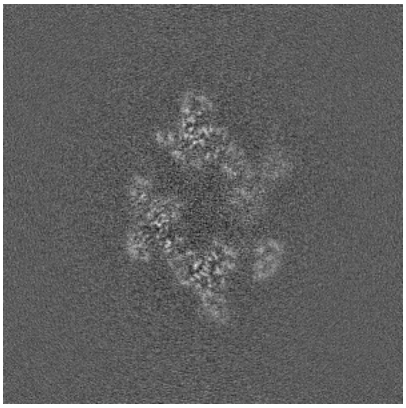


Y Index: 224

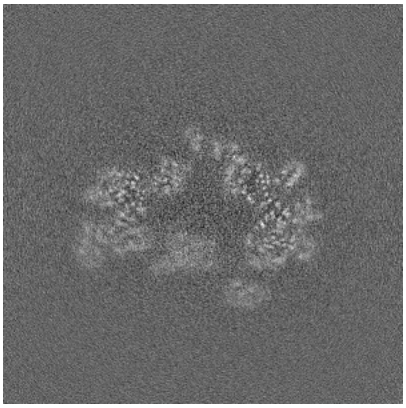


Z Index: 224

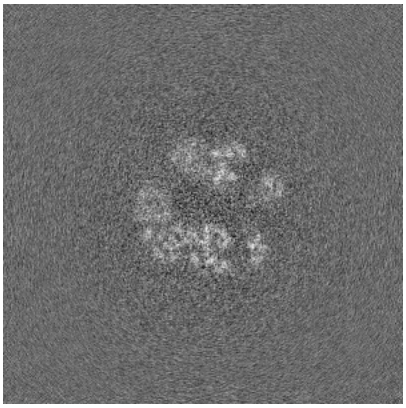
6.2.2 Raw map



X Index: 224



Y Index: 224

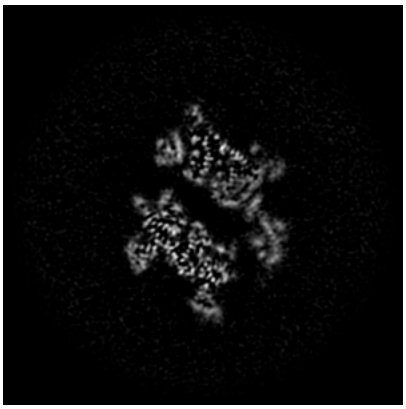


Z Index: 224

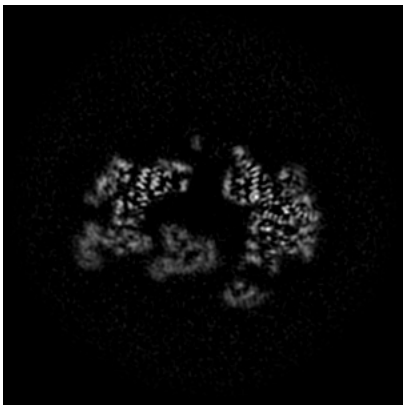
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

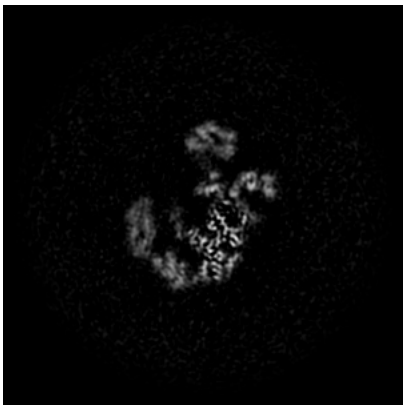
6.3.1 Primary map



X Index: 241

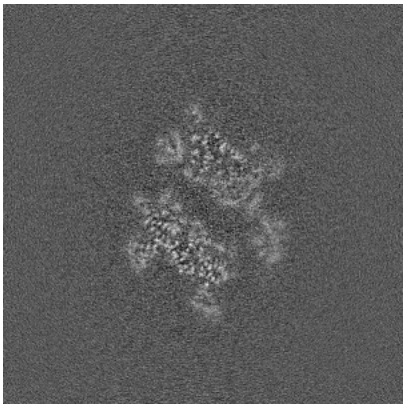


Y Index: 218

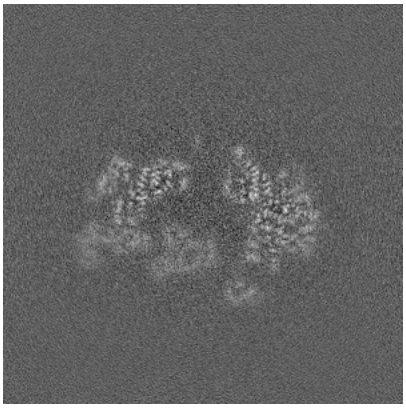


Z Index: 177

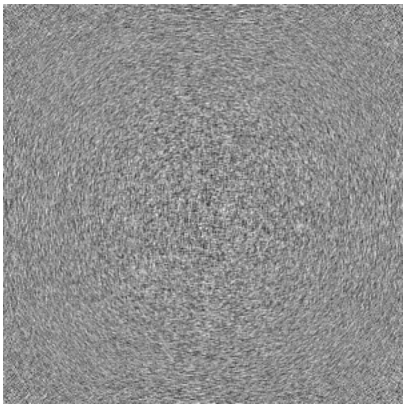
6.3.2 Raw map



X Index: 241



Y Index: 217

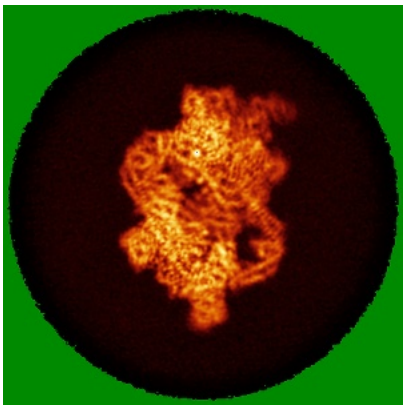


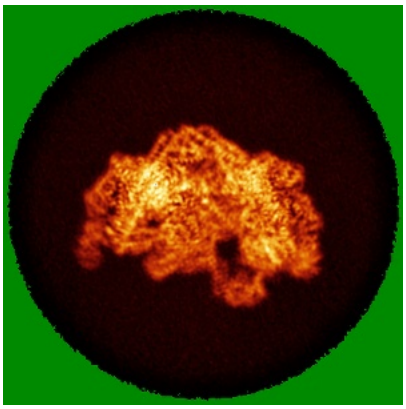
Z Index: 0

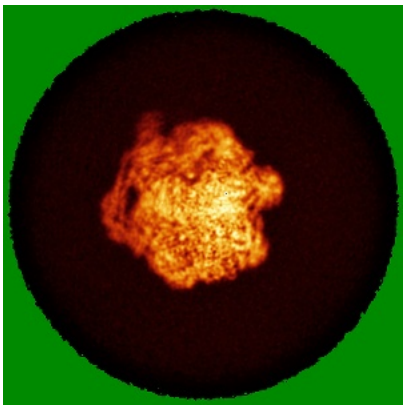
The images above show the largest variance slices of the map in three orthogonal directions.

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

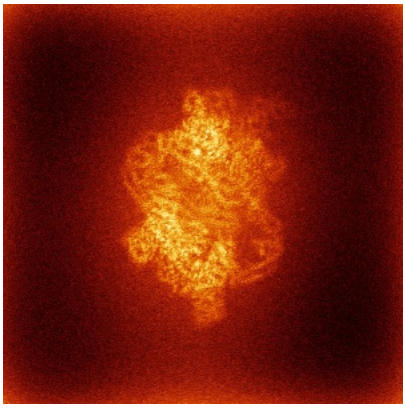
6.4.1 Primary map

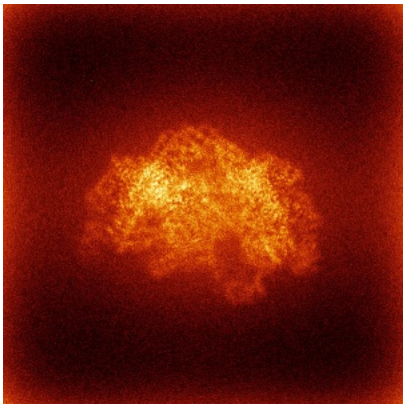

X

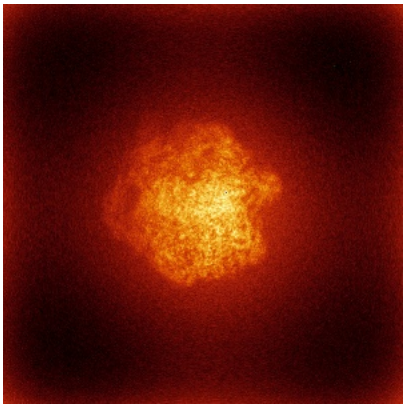

Y


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.

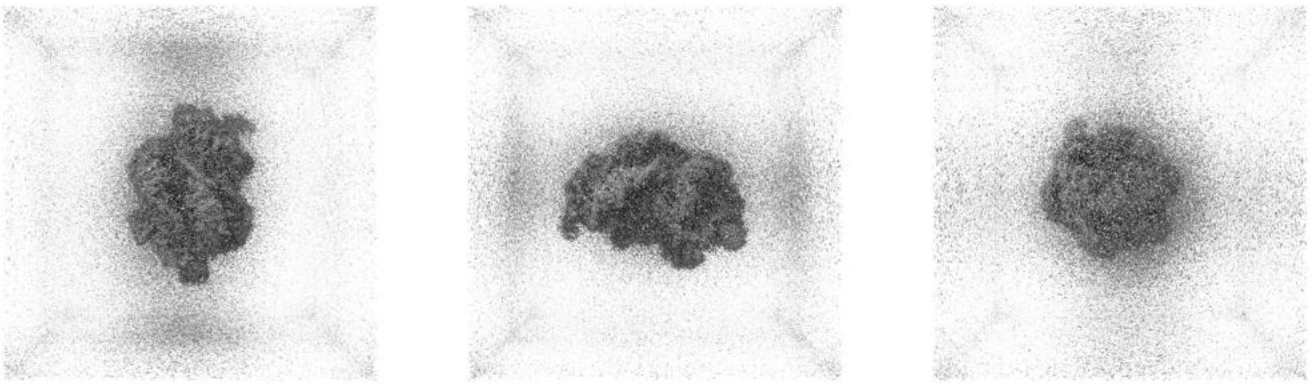
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.22. 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.

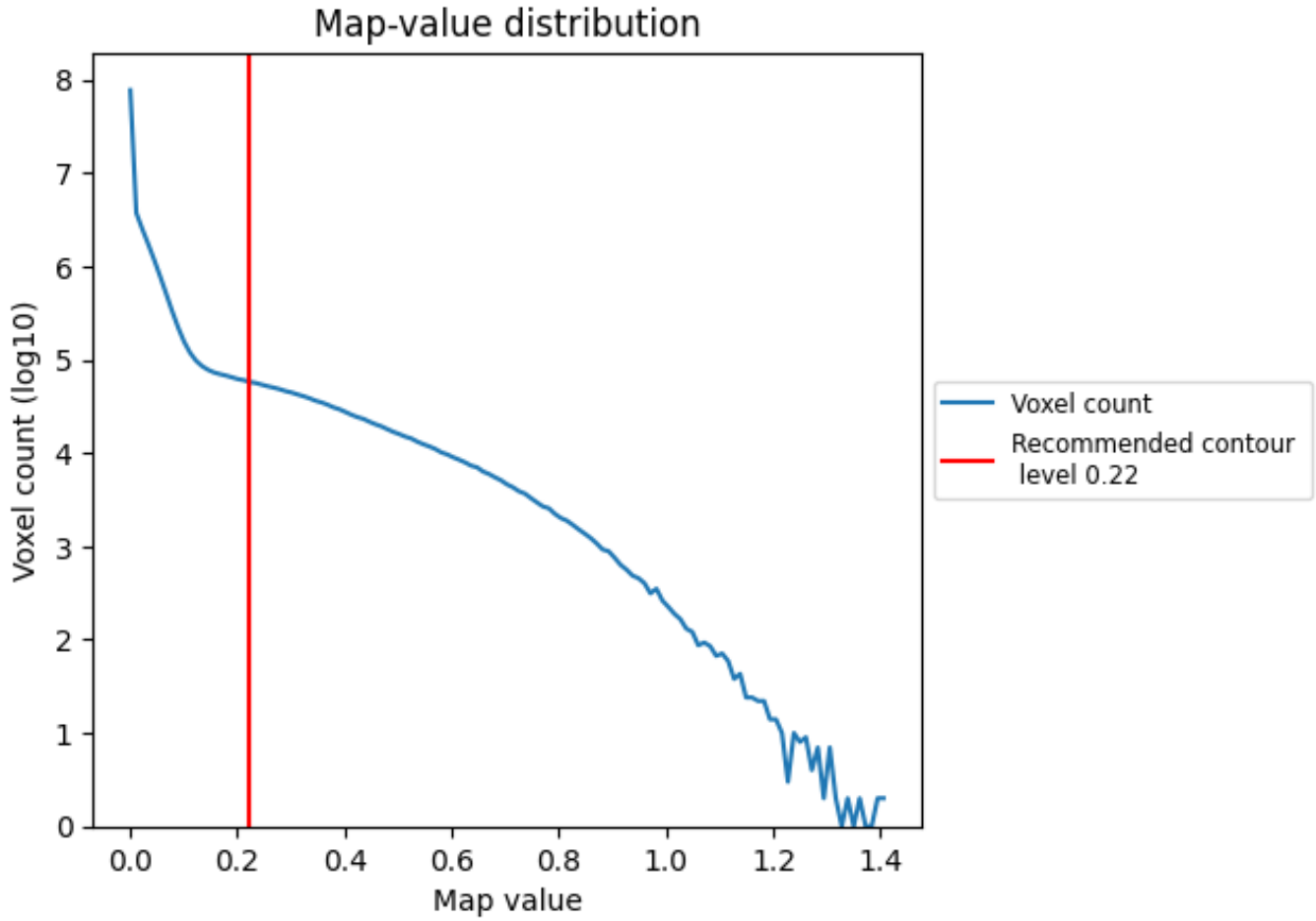
6.6 Mask visualisation (i)

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

7 Map analysis

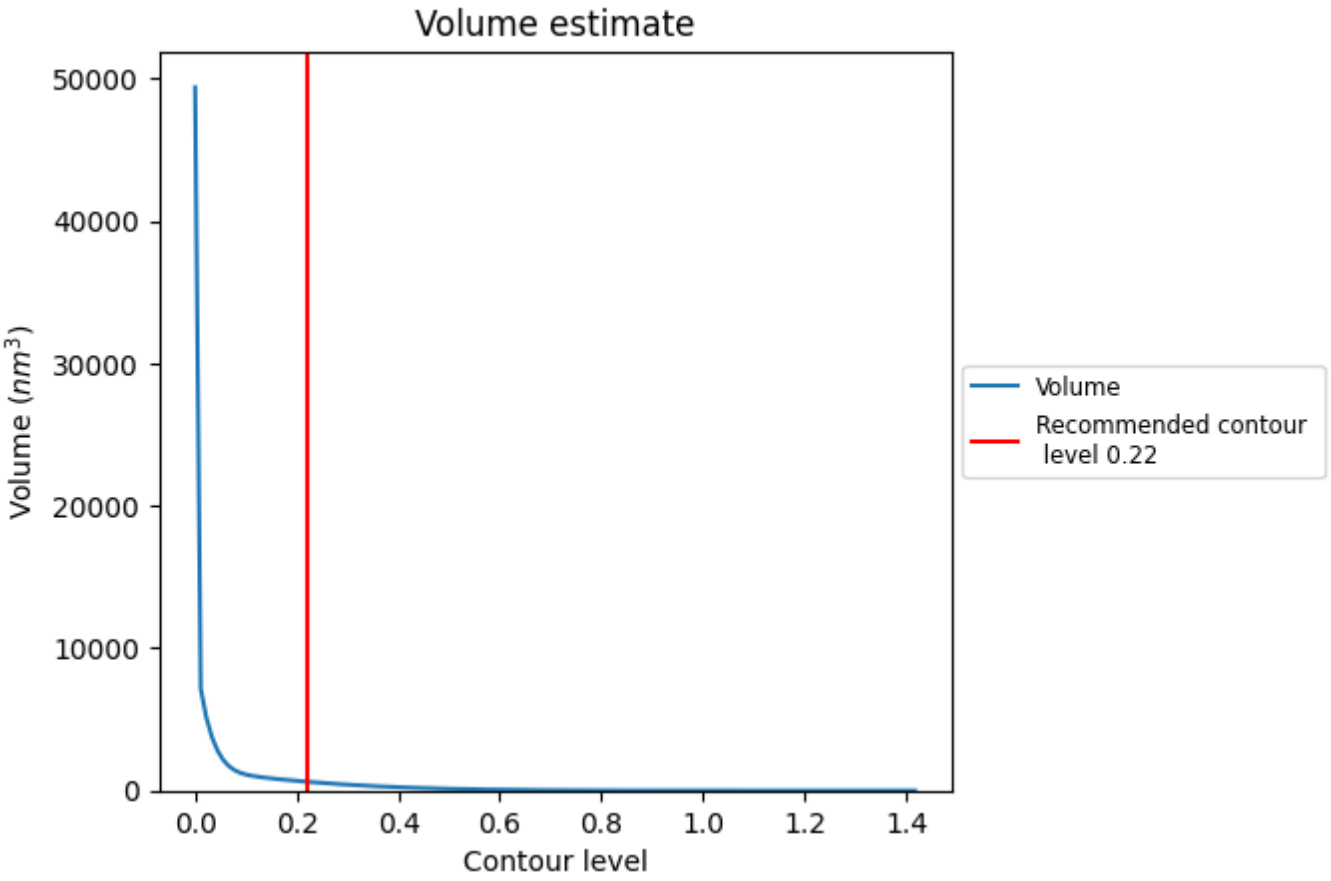
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

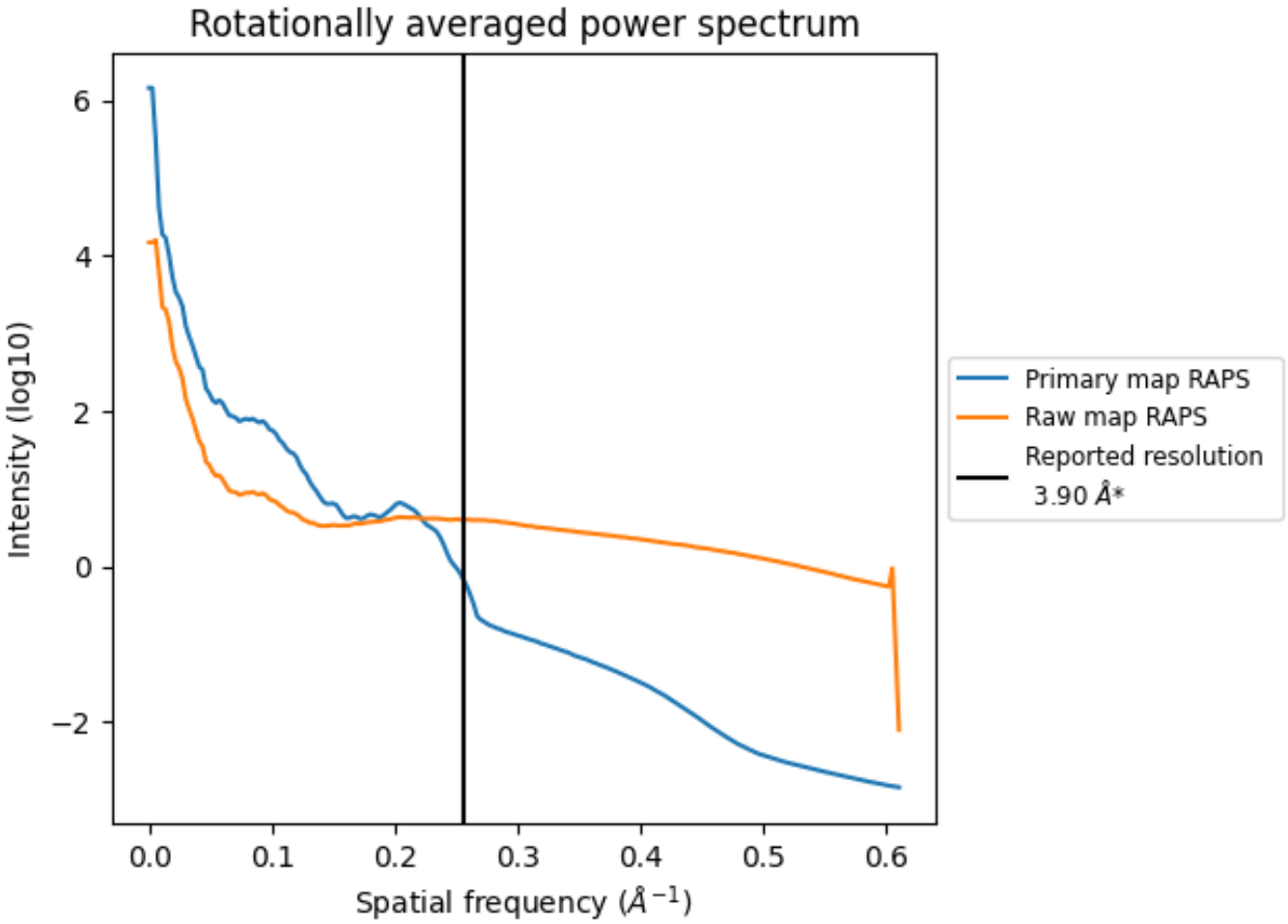
7.2 Volume estimate



The volume at the recommended contour level is 621 nm^3; this corresponds to an approximate mass of 561 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)

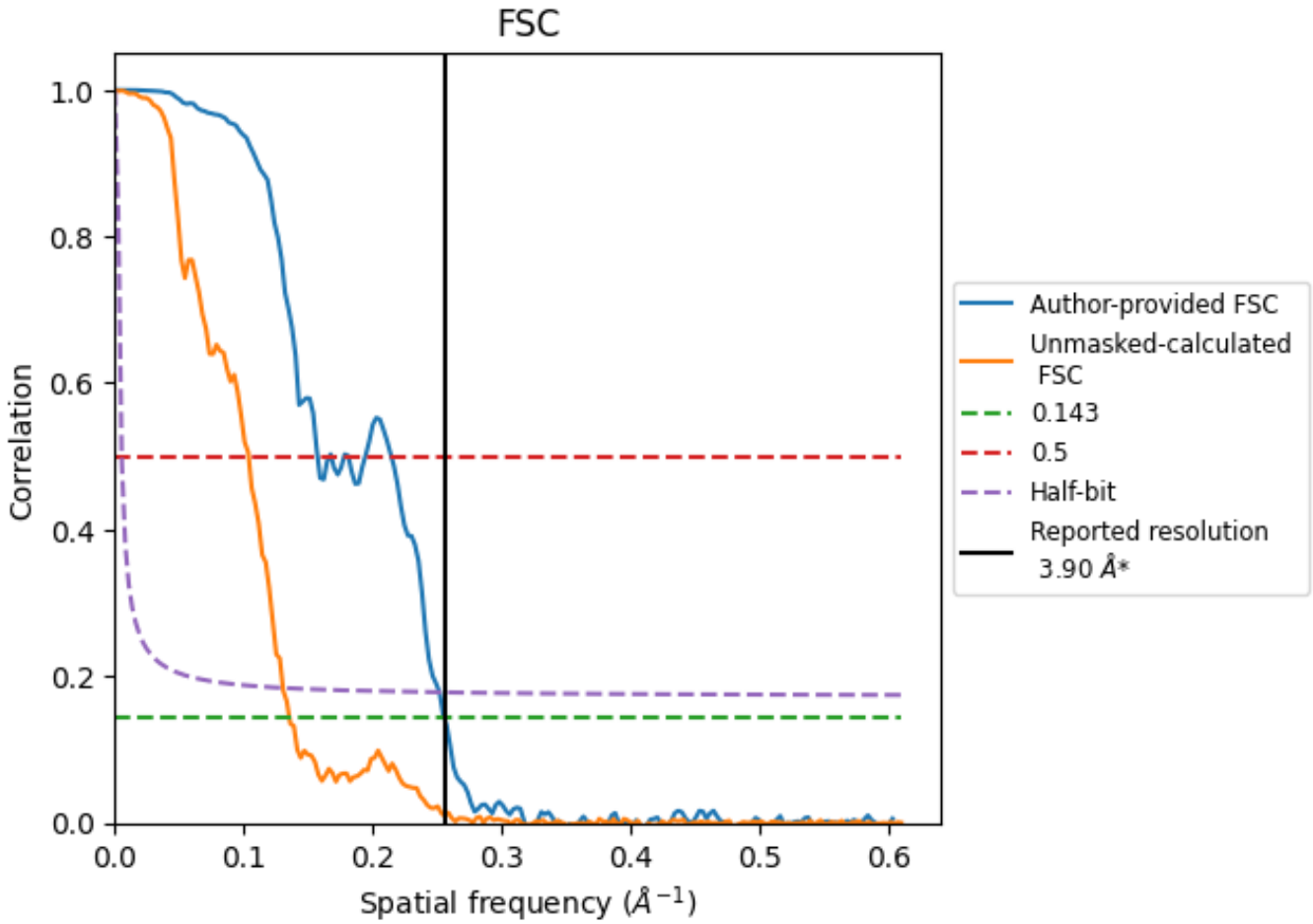


*Reported resolution corresponds to spatial frequency of 0.256 Å^{-1}

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 0.256 Å^{-1}

8.2 Resolution estimates (i)

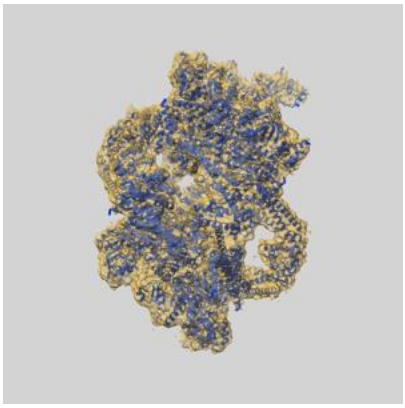
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.90	-	-
Author-provided FSC curve	3.91	6.35	3.97
Unmasked-calculated*	7.37	9.62	7.66

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 7.37 differs from the reported value 3.9 by more than 10 %

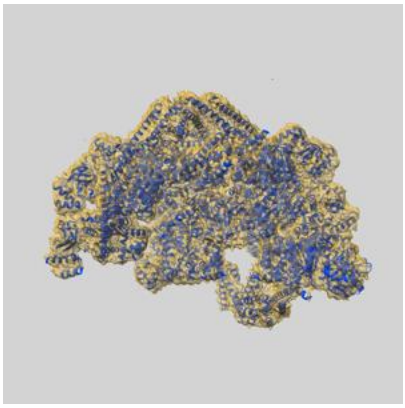
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-51235 and PDB model 9GCS. Per-residue inclusion information can be found in section 3 on page 8.

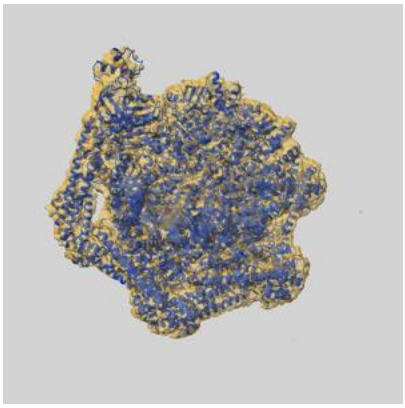
9.1 Map-model overlay



X



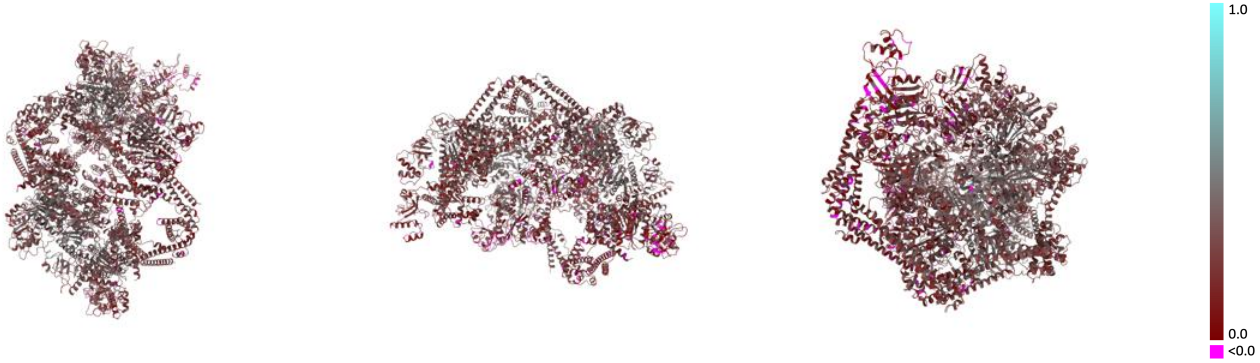
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.22 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.

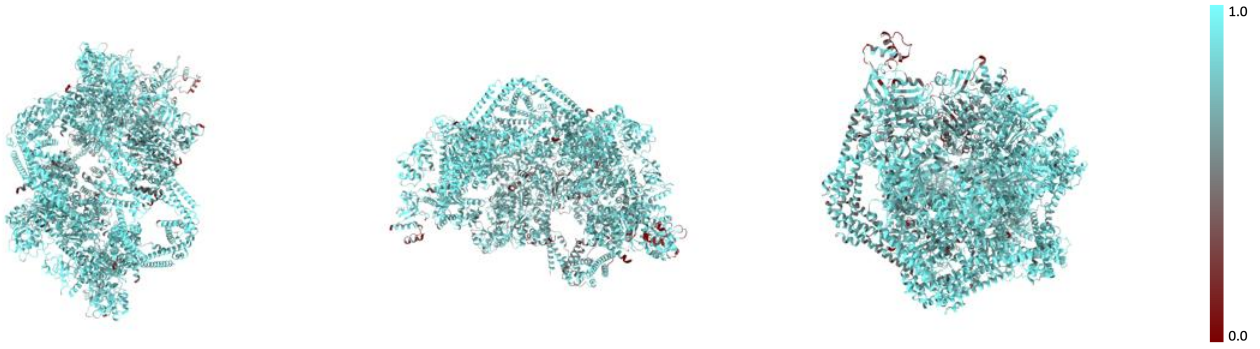
9.2 Q-score mapped to coordinate model (i)



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.

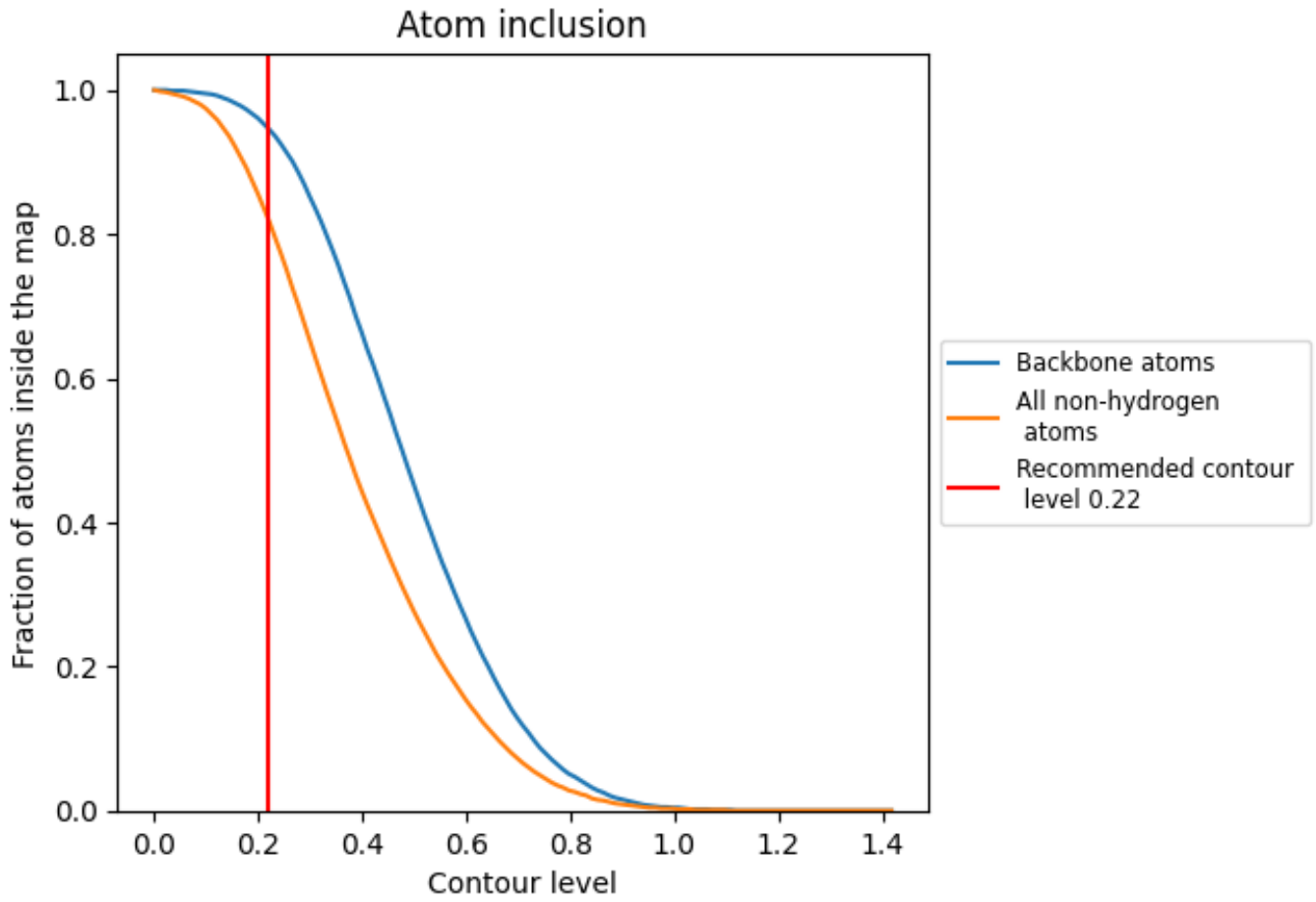
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.22).

9.4 Atom inclusion (i)



At the recommended contour level, 95% of all backbone atoms, 82% 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 (0.22) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8190	0.2760
B	0.8250	0.2780
C	0.8720	0.3590
D	0.8720	0.3660
E	0.8670	0.3260
F	0.7950	0.2260
G	0.7410	0.1810
J	0.6630	0.1850
K	0.8370	0.3160
L	0.8630	0.3570
M	0.8640	0.3460
N	0.8250	0.2820
O	0.7000	0.1700
c	0.8640	0.2270
d	0.8770	0.2530
e	0.8910	0.2920
f	0.8820	0.2840
g	0.8890	0.3000
h	0.8570	0.2780
i	0.8600	0.2680
j	0.8600	0.2670
k	0.7430	0.2100
l	0.7200	0.1920