



## Full wwPDB EM Validation Report ⓘ

Jul 8, 2024 – 01:52 PM JST

PDB ID : 8K23  
EMDB ID : EMD-36826  
Title : ICP1 Csy-dsDNA-Cas1-Cas2/3 complex (fully assembled form) composited structure with C1 symmetry  
Authors : Zhang, L.X.; Feng, Y.  
Deposited on : 2023-07-12  
Resolution : 3.75 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](mailto: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>.

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

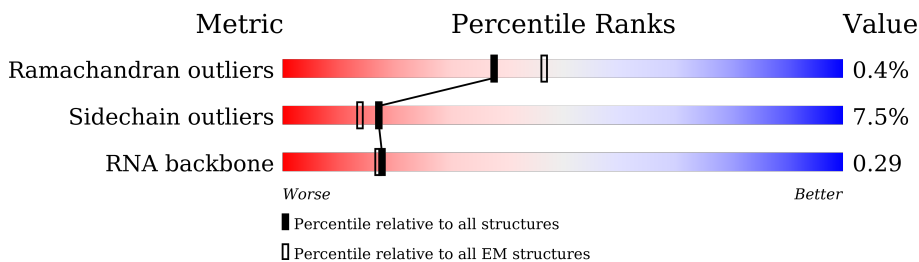
EMDB validation analysis : 0.0.1.dev92  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.37.1

# 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 3.75 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.



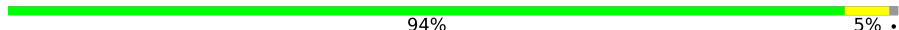
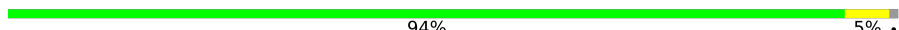

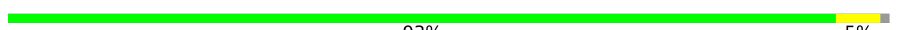








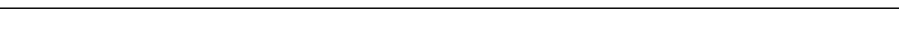
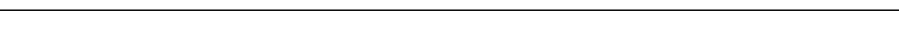
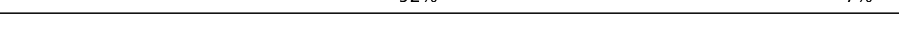


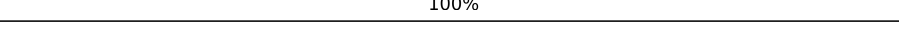

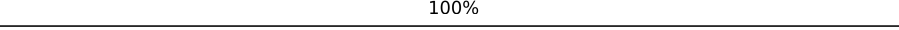

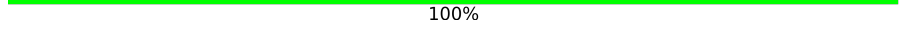

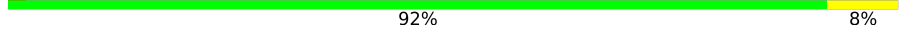
Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	B	177	
1	b	177	
2	C	248	
2	c	248	
3	D	302	
3	E	302	
3	d	302	
3	e	302	

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Mol	Chain	Length	Quality of chain
4	G	306	 94% 5%
4	I	306	 94% 5%
4	J	306	 92% 7%
4	K	306	 93% 5%
4	L	306	 6% 91% 8%
4	M	306	 94% . .
4	g	306	 94% 5%
4	i	306	 94% 5%
4	j	306	 92% 7%
4	k	306	 94% 5%
4	l	306	 6% 91% 8%
4	m	306	 94% . .
5	H	168	 92% 7%
5	h	168	 92% 7%
6	P	60	 38% 62%
6	p	60	 38% 62%
7	Q	43	 100%
7	U	43	 49% 51%
7	q	43	 100%
8	R	31	 100%
8	r	31	 100%
9	A	930	 92% 8%
9	a	930	 92% 8%
10	V	21	 90% 10%

## 2 Entry composition [i](#)

There are 11 unique types of molecules in this entry. The entry contains 67168 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 Csy1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	B	177	Total	C	N	O	S	0	0
			1415	896	235	274	10		
1	b	177	Total	C	N	O	S	0	0
			1415	896	235	274	10		

- Molecule 2 is a protein called Csy2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	C	247	Total	C	N	O	S	0	0
			1903	1214	320	355	14		
2	c	247	Total	C	N	O	S	0	0
			1903	1214	320	355	14		

- Molecule 3 is a protein called Cas1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	D	295	Total	C	N	O	S	2	0
			2316	1480	397	428	11		
3	E	295	Total	C	N	O	S	0	0
			2329	1491	394	431	13		
3	d	295	Total	C	N	O	S	2	0
			2326	1485	399	430	12		
3	e	295	Total	C	N	O	S	0	0
			2324	1489	393	429	13		

- Molecule 4 is a protein called Csy3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	G	302	Total	C	N	O	S	0	0
			2314	1456	392	459	7		
4	I	302	Total	C	N	O	S	0	0
			2298	1447	389	455	7		

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Mol	Chain	Residues	Atoms					AltConf	Trace
4	J	302	Total	C	N	O	S	0	0
			2318	1459	393	459	7		
4	K	302	Total	C	N	O	S	0	0
			2318	1459	393	459	7		
4	L	302	Total	C	N	O	S	0	0
			2307	1450	391	459	7		
4	M	302	Total	C	N	O	S	0	0
			2314	1456	392	459	7		
4	g	302	Total	C	N	O	S	0	0
			2314	1456	392	459	7		
4	i	302	Total	C	N	O	S	0	0
			2298	1447	389	455	7		
4	j	302	Total	C	N	O	S	0	0
			2318	1459	393	459	7		
4	k	302	Total	C	N	O	S	0	0
			2318	1459	393	459	7		
4	l	302	Total	C	N	O	S	0	0
			2307	1450	391	459	7		
4	m	302	Total	C	N	O	S	0	0
			2314	1456	392	459	7		

- Molecule 5 is a protein called Csy4.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	H	165	Total	C	N	O	S	0	0
			1290	818	221	245	6		
5	h	165	Total	C	N	O	S	0	0
			1290	818	221	245	6		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
H	51	ILE	VAL	conflict	UNP F1D5V5
h	51	ILE	VAL	conflict	UNP F1D5V5

- Molecule 6 is a RNA chain called RNA (60-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
6	P	60	Total	C	N	O	P	0	0
			1260	565	210	425	60		
6	p	60	Total	C	N	O	P	0	0
			1260	565	210	425	60		

- Molecule 7 is a DNA chain called DNA (43-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
7	Q	43	Total	C	N	O	P	0	0
			898	425	184	246	43		
7	U	21	Total	C	N	O	P	0	0
			439	209	88	121	21		
7	q	43	Total	C	N	O	P	0	0
			898	425	184	246	43		

- Molecule 8 is a DNA chain called DNA (31-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
8	R	31	Total	C	N	O	P	0	0
			620	299	94	196	31		
8	r	31	Total	C	N	O	P	0	0
			620	299	94	196	31		

- Molecule 9 is a protein called HD Cas3-type domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	A	929	Total	C	N	O	S	0	0
			7259	4620	1242	1363	34		
9	a	929	Total	C	N	O	S	0	0
			7242	4606	1241	1361	34		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	834	LYS	ARG	conflict	UNP F1D5V9
a	834	LYS	ARG	conflict	UNP F1D5V9

- Molecule 10 is a DNA chain called DNA (5'-D(\*AP\*TP\*CP\*TP\*TP\*CP\*CP\*CP\*TP\*AP\*TP\*TP\*TP\*AP\*AP\*AP\*TP\*TP\*GP\*CP\*T)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
10	V	21	Total	C	N	O	P	0	0
			419	205	65	129	20		

- Molecule 11 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn) (labeled as "Ligand of Interest" by depositor).

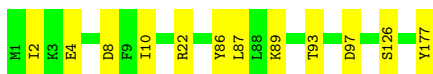
<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>AltConf</b>
11	A	2	Total 2	Mn 2	0
11	a	2	Total 2	Mn 2	0

### 3 Residue-property plots [i](#)

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

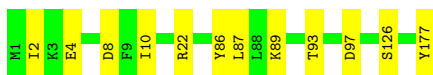
- Molecule 1: Csy1

Chain B:  93% 7%



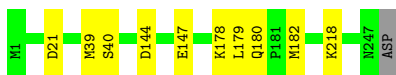
- Molecule 1: Csy1

Chain b:  93% 7%



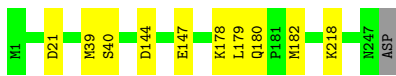
- Molecule 2: Csy2

Chain C:  96% .




- Molecule 2: Csy2

Chain c:  96% .

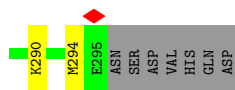


- Molecule 3: Cas1

Chain D:  88% 10% .



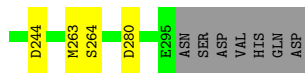
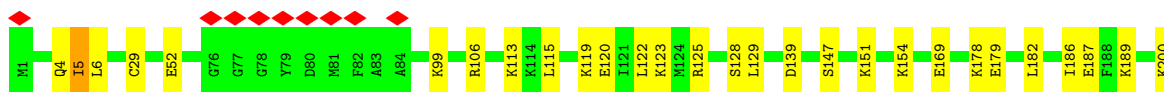
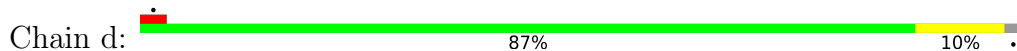




• Molecule 3: Cas1



• Molecule 3: Cas1



• Molecule 3: Cas1



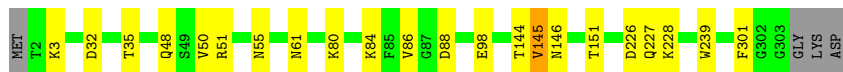
• Molecule 4: Csy3



• Molecule 4: Csy3



• Molecule 4: Csy3

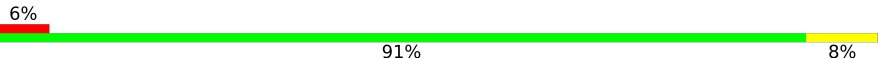


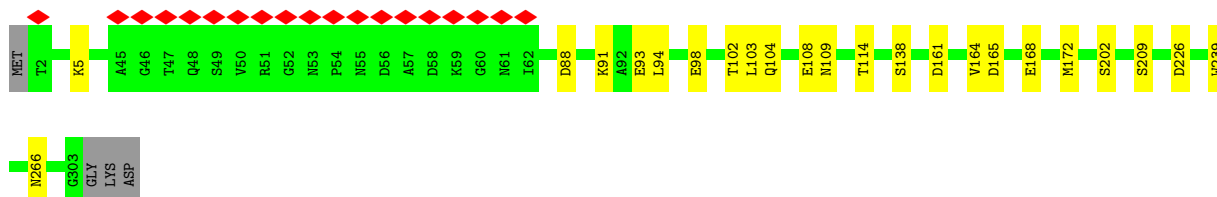
• Molecule 4: Csy3

Chain K:  93% 5%



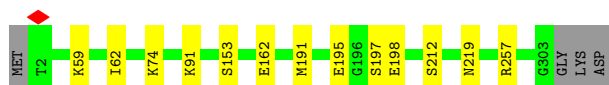
• Molecule 4: Csy3

Chain L:  6% 91% 8%



• Molecule 4: Csy3

Chain M:  94%



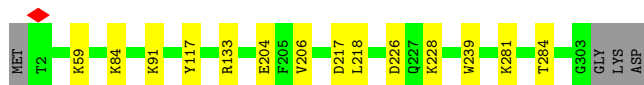
• Molecule 4: Csy3

Chain g:  94% 5%




• Molecule 4: Csy3

Chain i:  94% 5%



• Molecule 4: Csy3

Chain j:  92% 7%

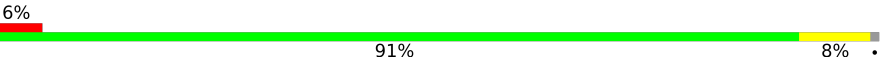


• Molecule 4: Csy3

Chain k:  94% 5%



• Molecule 4: Csy3

Chain l:  6% 91% 8%



• Molecule 4: Csy3

Chain m:  94%




• Molecule 5: Csy4

Chain H:  92% 7%

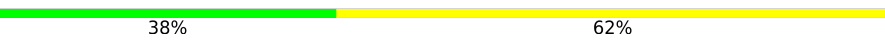


• Molecule 5: Csy4

Chain h:  92% 7%



• Molecule 6: RNA (60-MER)

Chain P:  38% 62%



• Molecule 6: RNA (60-MER)

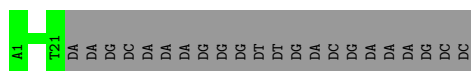
Chain p:  38% 62%



• Molecule 7: DNA (43-MER)



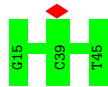
• Molecule 7: DNA (43-MER)



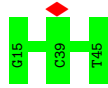
• Molecule 7: DNA (43-MER)



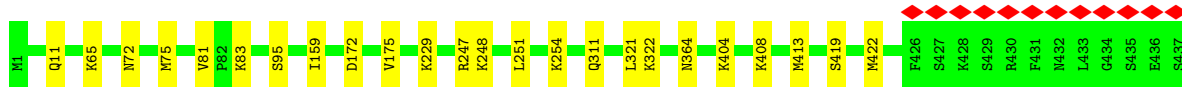
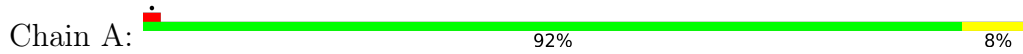
• Molecule 8: DNA (31-MER)

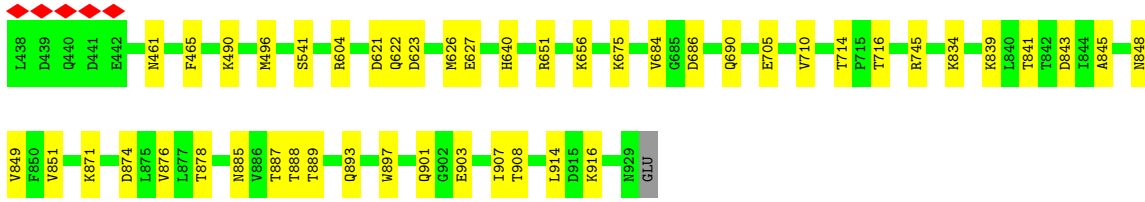


• Molecule 8: DNA (31-MER)

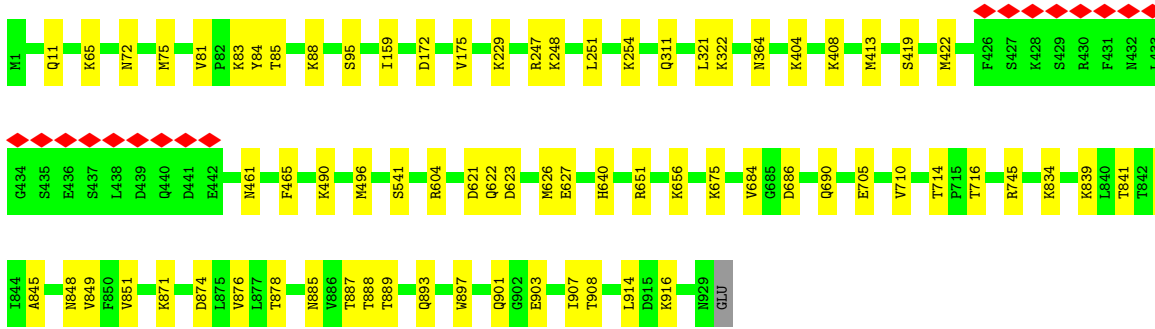
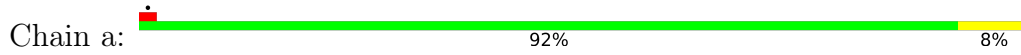


• Molecule 9: HD Cas3-type domain-containing protein

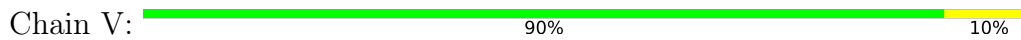




● Molecule 9: HD Cas3-type domain-containing protein



● Molecule 10: DNA (5'-D(\*AP\*TP\*CP\*TP\*TP\*CP\*CP\*CP\*TP\*AP\*TP\*TP\*TP\*AP\*AP\*AP\*TP\*TP\*GP\*CP\*T)-3')



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	132865	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 ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.552	Depositor
Minimum map value	-0.313	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.027	Depositor
Recommended contour level	0.015	Depositor
Map size ( $\text{\AA}$ )	440.0, 440.0, 440.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.1, 1.1, 1.1	Depositor

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

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

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	0.35	0/1448	0.57	0/1956
1	b	0.35	0/1448	0.57	0/1956
2	C	0.36	0/1940	0.62	0/2625
2	c	0.36	0/1940	0.62	0/2625
3	D	0.43	0/2370	0.64	0/3207
3	E	0.32	0/2377	0.62	0/3210
3	d	0.36	0/2380	0.69	0/3219
3	e	0.42	0/2373	0.68	0/3208
4	G	0.37	0/2354	0.63	0/3198
4	I	0.38	0/2338	0.65	0/3180
4	J	0.38	0/2358	0.63	0/3202
4	K	0.38	0/2358	0.62	0/3202
4	L	0.39	0/2347	0.69	0/3190
4	M	0.36	0/2354	0.64	0/3198
4	g	0.37	0/2354	0.63	0/3198
4	i	0.38	0/2338	0.64	0/3180
4	j	0.38	0/2358	0.63	0/3202
4	k	0.38	0/2358	0.62	0/3202
4	l	0.39	0/2347	0.69	0/3190
4	m	0.36	0/2354	0.64	0/3198
5	H	0.39	0/1308	0.72	0/1757
5	h	0.39	0/1308	0.72	0/1757
6	P	0.47	0/1404	0.93	0/2181
6	p	0.47	0/1404	0.94	0/2181
7	Q	0.71	0/1014	0.94	0/1565
7	U	0.72	0/495	0.95	0/763
7	q	0.71	0/1014	0.94	0/1565
8	R	0.68	0/688	1.13	0/1057
8	r	0.68	0/688	1.13	0/1057
9	A	0.36	0/7412	0.63	0/10046
9	a	0.37	0/7393	0.63	0/10022
10	V	1.18	8/466 (1.7%)	1.60	12/716 (1.7%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
All	All	0.41	8/69088 (0.0%)	0.70	12/95013 (0.0%)

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	V	2	DT	N3-C4	-7.57	1.32	1.38
10	V	4	DT	N3-C4	-7.37	1.32	1.38
10	V	2	DT	N1-C6	-7.35	1.33	1.38
10	V	4	DT	N1-C6	-6.72	1.33	1.38
10	V	4	DT	C5-C6	6.72	1.39	1.34
10	V	2	DT	C2-N3	-6.17	1.32	1.37
10	V	2	DT	C5-C6	6.06	1.38	1.34
10	V	4	DT	C2-N3	-5.83	1.33	1.37

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
10	V	4	DT	N1-C2-N3	12.74	122.25	114.60
10	V	4	DT	C2-N3-C4	-11.38	120.37	127.20
10	V	2	DT	N1-C2-N3	11.02	121.21	114.60
10	V	2	DT	C2-N3-C4	-10.79	120.73	127.20
10	V	4	DT	C5-C6-N1	-8.23	118.76	123.70
10	V	2	DT	C5-C6-N1	-8.16	118.81	123.70
10	V	2	DT	N3-C4-C5	6.89	119.34	115.20
10	V	4	DT	N1-C2-O2	-6.42	117.97	123.10
10	V	2	DT	C5-C4-O4	-6.37	120.44	124.90
10	V	4	DT	N3-C4-C5	6.33	119.00	115.20
10	V	2	DT	N3-C2-O2	-5.88	118.77	122.30
10	V	4	DT	C5-C4-O4	-5.58	120.99	124.90

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts

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	175/177 (99%)	165 (94%)	10 (6%)	0	100	100
1	b	175/177 (99%)	165 (94%)	10 (6%)	0	100	100
2	C	245/248 (99%)	225 (92%)	20 (8%)	0	100	100
2	c	245/248 (99%)	225 (92%)	20 (8%)	0	100	100
3	D	295/302 (98%)	278 (94%)	15 (5%)	2 (1%)	22	59
3	E	293/302 (97%)	286 (98%)	7 (2%)	0	100	100
3	d	295/302 (98%)	278 (94%)	16 (5%)	1 (0%)	41	74
3	e	293/302 (97%)	279 (95%)	14 (5%)	0	100	100
4	G	300/306 (98%)	290 (97%)	10 (3%)	0	100	100
4	I	300/306 (98%)	284 (95%)	16 (5%)	0	100	100
4	J	300/306 (98%)	286 (95%)	11 (4%)	3 (1%)	15	52
4	K	300/306 (98%)	286 (95%)	14 (5%)	0	100	100
4	L	300/306 (98%)	285 (95%)	15 (5%)	0	100	100
4	M	300/306 (98%)	286 (95%)	13 (4%)	1 (0%)	41	74
4	g	300/306 (98%)	290 (97%)	10 (3%)	0	100	100
4	i	300/306 (98%)	284 (95%)	16 (5%)	0	100	100
4	j	300/306 (98%)	286 (95%)	11 (4%)	3 (1%)	15	52
4	k	300/306 (98%)	286 (95%)	14 (5%)	0	100	100
4	l	300/306 (98%)	285 (95%)	15 (5%)	0	100	100
4	m	300/306 (98%)	286 (95%)	13 (4%)	1 (0%)	41	74
5	H	163/168 (97%)	148 (91%)	14 (9%)	1 (1%)	25	61
5	h	163/168 (97%)	148 (91%)	14 (9%)	1 (1%)	25	61
9	A	927/930 (100%)	850 (92%)	69 (7%)	8 (1%)	17	54
9	a	927/930 (100%)	846 (91%)	72 (8%)	9 (1%)	15	52
All	All	7796/7926 (98%)	7327 (94%)	439 (6%)	30 (0%)	38	69

All (30) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	M	62	ILE
9	A	159	ILE
9	A	851	VAL
9	a	159	ILE
9	a	851	VAL
4	m	62	ILE
4	J	50	VAL
4	J	145	VAL
4	j	50	VAL
4	j	145	VAL
3	D	294	MET
9	A	11	GLN
9	A	75	MET
9	A	887	THR
9	a	11	GLN
9	a	75	MET
9	a	88	LYS
9	a	887	THR
9	A	95	SER
9	a	95	SER
4	J	98	GLU
4	j	98	GLU
3	D	4	GLN
9	A	845	ALA
9	a	845	ALA
5	H	32	ILE
3	d	5	ILE
5	h	32	ILE
9	A	81	VAL
9	a	81	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.

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	155/156 (99%)	143 (92%)	12 (8%)	13	43
1	b	155/156 (99%)	143 (92%)	12 (8%)	13	43
2	C	208/211 (99%)	198 (95%)	10 (5%)	25	56
2	c	208/211 (99%)	198 (95%)	10 (5%)	25	56
3	D	245/261 (94%)	218 (89%)	27 (11%)	6	29
3	E	247/261 (95%)	234 (95%)	13 (5%)	22	54
3	d	247/261 (95%)	215 (87%)	32 (13%)	4	23
3	e	247/261 (95%)	223 (90%)	24 (10%)	8	34
4	G	246/251 (98%)	231 (94%)	15 (6%)	18	51
4	I	241/251 (96%)	227 (94%)	14 (6%)	20	52
4	J	247/251 (98%)	227 (92%)	20 (8%)	11	41
4	K	247/251 (98%)	231 (94%)	16 (6%)	17	49
4	L	244/251 (97%)	221 (91%)	23 (9%)	8	35
4	M	246/251 (98%)	234 (95%)	12 (5%)	25	55
4	g	246/251 (98%)	231 (94%)	15 (6%)	18	51
4	i	241/251 (96%)	227 (94%)	14 (6%)	20	52
4	j	247/251 (98%)	227 (92%)	20 (8%)	11	41
4	k	247/251 (98%)	232 (94%)	15 (6%)	18	51
4	l	244/251 (97%)	221 (91%)	23 (9%)	8	35
4	m	246/251 (98%)	234 (95%)	12 (5%)	25	55
5	H	148/151 (98%)	138 (93%)	10 (7%)	16	47
5	h	148/151 (98%)	138 (93%)	10 (7%)	16	47
9	A	787/817 (96%)	724 (92%)	63 (8%)	12	42
9	a	783/817 (96%)	718 (92%)	65 (8%)	11	41
All	All	6520/6726 (97%)	6033 (92%)	487 (8%)	17	44

All (487) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	2	ILE
1	B	4	GLU
1	B	8	ASP

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	B	10	ILE
1	B	22	ARG
1	B	86	TYR
1	B	87	LEU
1	B	89	LYS
1	B	93	THR
1	B	97	ASP
1	B	126	SER
1	B	177	TYR
2	C	21	ASP
2	C	39	MET
2	C	40	SER
2	C	144	ASP
2	C	147	GLU
2	C	178	LYS
2	C	179	LEU
2	C	180	GLN
2	C	182	MET
2	C	218	LYS
3	D	3	LYS
3	D	5	ILE
3	D	24	LYS
3	D	29	CYS
3	D	99	LYS
3	D	106	ARG
3	D	122	LEU
3	D	125	ARG
3	D	129	LEU
3	D	151	LYS
3	D	154	LYS
3	D	165	LEU
3	D	166	LEU
3	D	169	GLU
3	D	176	LEU
3	D	177	TYR
3	D	178	LYS
3	D	179	GLU
3	D	183	GLU
3	D	186	ILE
3	D	189	LYS
3	D	194	SER
3	D	222	ILE

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	D	225	SER
3	D	264	SER
3	D	267	GLU
3	D	290	LYS
3	E	10	LYS
3	E	80	ASP
3	E	99	LYS
3	E	101	MET
3	E	107	LEU
3	E	109	LEU
3	E	110	ASP
3	E	124	MET
3	E	125	ARG
3	E	126	VAL
3	E	130	SER
3	E	136	PHE
3	E	278	LYS
4	G	32	ASP
4	G	33	ASN
4	G	48	GLN
4	G	49	SER
4	G	50	VAL
4	G	53	ASN
4	G	56	ASP
4	G	58	ASP
4	G	111	ASP
4	G	156	LEU
4	G	158	ASN
4	G	171	ASP
4	G	210	LYS
4	G	237	ASP
4	G	267	LYS
5	H	1	TYR
5	H	9	VAL
5	H	12	ASP
5	H	14	VAL
5	H	30	LYS
5	H	46	LYS
5	H	50	ASP
5	H	75	PHE
5	H	105	CYS
5	H	109	LYS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
4	I	59	LYS
4	I	84	LYS
4	I	91	LYS
4	I	117	TYR
4	I	133	ARG
4	I	204	GLU
4	I	206	VAL
4	I	217	ASP
4	I	218	LEU
4	I	226	ASP
4	I	228	LYS
4	I	239	TRP
4	I	281	LYS
4	I	284	THR
4	J	3	LYS
4	J	32	ASP
4	J	35	THR
4	J	48	GLN
4	J	51	ARG
4	J	55	ASN
4	J	61	ASN
4	J	80	LYS
4	J	84	LYS
4	J	86	VAL
4	J	88	ASP
4	J	144	THR
4	J	145	VAL
4	J	146	ASN
4	J	151	THR
4	J	226	ASP
4	J	227	GLN
4	J	228	LYS
4	J	239	TRP
4	J	301	PHE
4	K	30	ASP
4	K	32	ASP
4	K	34	THR
4	K	42	LYS
4	K	50	VAL
4	K	53	ASN
4	K	55	ASN
4	K	58	ASP

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
4	K	91	LYS
4	K	131	ARG
4	K	205	PHE
4	K	210	LYS
4	K	212	SER
4	K	218	LEU
4	K	239	TRP
4	K	242	ASP
4	L	5	LYS
4	L	88	ASP
4	L	91	LYS
4	L	93	GLU
4	L	94	LEU
4	L	98	GLU
4	L	102	THR
4	L	103	LEU
4	L	104	GLN
4	L	108	GLU
4	L	109	ASN
4	L	114	THR
4	L	138	SER
4	L	161	ASP
4	L	164	VAL
4	L	165	ASP
4	L	168	GLU
4	L	172	MET
4	L	202	SER
4	L	209	SER
4	L	226	ASP
4	L	239	TRP
4	L	266	ASN
4	M	59	LYS
4	M	74	LYS
4	M	91	LYS
4	M	153	SER
4	M	162	GLU
4	M	191	MET
4	M	195	GLU
4	M	197	SER
4	M	198	GLU
4	M	212	SER
4	M	219	ASN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
4	M	257	ARG
9	A	65	LYS
9	A	72	ASN
9	A	83	LYS
9	A	172	ASP
9	A	175	VAL
9	A	229	LYS
9	A	247	ARG
9	A	248	LYS
9	A	251	LEU
9	A	254	LYS
9	A	311	GLN
9	A	321	LEU
9	A	322	LYS
9	A	364	ASN
9	A	404	LYS
9	A	408	LYS
9	A	413	MET
9	A	419	SER
9	A	422	MET
9	A	461	ASN
9	A	465	PHE
9	A	490	LYS
9	A	496	MET
9	A	541	SER
9	A	604	ARG
9	A	621	ASP
9	A	622	GLN
9	A	623	ASP
9	A	626	MET
9	A	627	GLU
9	A	640	HIS
9	A	651	ARG
9	A	656	LYS
9	A	675	LYS
9	A	684	VAL
9	A	686	ASP
9	A	690	GLN
9	A	705	GLU
9	A	710	VAL
9	A	714	THR
9	A	716	THR

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
9	A	745	ARG
9	A	834	LYS
9	A	839	LYS
9	A	841	THR
9	A	843	ASP
9	A	848	ASN
9	A	849	VAL
9	A	871	LYS
9	A	874	ASP
9	A	876	VAL
9	A	878	THR
9	A	885	ASN
9	A	888	THR
9	A	889	THR
9	A	893	GLN
9	A	897	TRP
9	A	901	GLN
9	A	903	GLU
9	A	907	ILE
9	A	908	THR
9	A	914	LEU
9	A	916	LYS
9	a	65	LYS
9	a	72	ASN
9	a	83	LYS
9	a	84	TYR
9	a	85	THR
9	a	172	ASP
9	a	175	VAL
9	a	229	LYS
9	a	247	ARG
9	a	248	LYS
9	a	251	LEU
9	a	254	LYS
9	a	311	GLN
9	a	321	LEU
9	a	322	LYS
9	a	364	ASN
9	a	404	LYS
9	a	408	LYS
9	a	413	MET
9	a	419	SER

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
9	a	422	MET
9	a	461	ASN
9	a	465	PHE
9	a	490	LYS
9	a	496	MET
9	a	541	SER
9	a	604	ARG
9	a	621	ASP
9	a	622	GLN
9	a	623	ASP
9	a	626	MET
9	a	627	GLU
9	a	640	HIS
9	a	651	ARG
9	a	656	LYS
9	a	675	LYS
9	a	684	VAL
9	a	686	ASP
9	a	690	GLN
9	a	705	GLU
9	a	710	VAL
9	a	714	THR
9	a	716	THR
9	a	745	ARG
9	a	834	LYS
9	a	839	LYS
9	a	841	THR
9	a	843	ASP
9	a	848	ASN
9	a	849	VAL
9	a	871	LYS
9	a	874	ASP
9	a	876	VAL
9	a	878	THR
9	a	885	ASN
9	a	888	THR
9	a	889	THR
9	a	893	GLN
9	a	897	TRP
9	a	901	GLN
9	a	903	GLU
9	a	907	ILE

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
9	a	908	THR
9	a	914	LEU
9	a	916	LYS
1	b	2	ILE
1	b	4	GLU
1	b	8	ASP
1	b	10	ILE
1	b	22	ARG
1	b	86	TYR
1	b	87	LEU
1	b	89	LYS
1	b	93	THR
1	b	97	ASP
1	b	126	SER
1	b	177	TYR
2	c	21	ASP
2	c	39	MET
2	c	40	SER
2	c	144	ASP
2	c	147	GLU
2	c	178	LYS
2	c	179	LEU
2	c	180	GLN
2	c	182	MET
2	c	218	LYS
3	d	4	GLN
3	d	5	ILE
3	d	6	LEU
3	d	29	CYS
3	d	52	GLU
3	d	99	LYS
3	d	106	ARG
3	d	113	LYS
3	d	115	LEU
3	d	119	LYS
3	d	120	GLU
3	d	122	LEU
3	d	123	LYS
3	d	125	ARG
3	d	128	SER
3	d	129	LEU
3	d	139	ASP

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	d	147	SER
3	d	151	LYS
3	d	154	LYS
3	d	169	GLU
3	d	178	LYS
3	d	179	GLU
3	d	182	LEU
3	d	186	ILE
3	d	187	GLU
3	d	189	LYS
3	d	200	LYS
3	d	244	ASP
3	d	263	MET
3	d	264	SER
3	d	280	ASP
3	e	4	GLN
3	e	6	LEU
3	e	13	MET
3	e	31	LEU
3	e	36	ASN
3	e	82	PHE
3	e	90	LEU
3	e	98	THR
3	e	99	LYS
3	e	105	VAL
3	e	106	ARG
3	e	113	LYS
3	e	114	LYS
3	e	115	LEU
3	e	116	SER
3	e	121	ILE
3	e	123	LYS
3	e	124	MET
3	e	125	ARG
3	e	130	SER
3	e	162	PHE
3	e	178	LYS
3	e	200	LYS
3	e	279	ASN
4	g	32	ASP
4	g	33	ASN
4	g	48	GLN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
4	g	49	SER
4	g	50	VAL
4	g	53	ASN
4	g	56	ASP
4	g	58	ASP
4	g	111	ASP
4	g	156	LEU
4	g	158	ASN
4	g	171	ASP
4	g	210	LYS
4	g	237	ASP
4	g	267	LYS
5	h	1	TYR
5	h	9	VAL
5	h	12	ASP
5	h	14	VAL
5	h	30	LYS
5	h	46	LYS
5	h	50	ASP
5	h	75	PHE
5	h	105	CYS
5	h	109	LYS
4	i	59	LYS
4	i	84	LYS
4	i	91	LYS
4	i	117	TYR
4	i	133	ARG
4	i	204	GLU
4	i	206	VAL
4	i	217	ASP
4	i	218	LEU
4	i	226	ASP
4	i	228	LYS
4	i	239	TRP
4	i	281	LYS
4	i	284	THR
4	j	3	LYS
4	j	32	ASP
4	j	35	THR
4	j	48	GLN
4	j	51	ARG
4	j	55	ASN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
4	j	61	ASN
4	j	80	LYS
4	j	84	LYS
4	j	86	VAL
4	j	88	ASP
4	j	144	THR
4	j	145	VAL
4	j	146	ASN
4	j	151	THR
4	j	226	ASP
4	j	227	GLN
4	j	228	LYS
4	j	239	TRP
4	j	301	PHE
4	k	30	ASP
4	k	32	ASP
4	k	42	LYS
4	k	50	VAL
4	k	53	ASN
4	k	55	ASN
4	k	58	ASP
4	k	91	LYS
4	k	131	ARG
4	k	205	PHE
4	k	210	LYS
4	k	212	SER
4	k	218	LEU
4	k	239	TRP
4	k	242	ASP
4	l	5	LYS
4	l	88	ASP
4	l	91	LYS
4	l	93	GLU
4	l	94	LEU
4	l	98	GLU
4	l	102	THR
4	l	103	LEU
4	l	104	GLN
4	l	108	GLU
4	l	109	ASN
4	l	114	THR
4	l	138	SER

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Mol	Chain	Res	Type
4	l	161	ASP
4	l	164	VAL
4	l	165	ASP
4	l	168	GLU
4	l	172	MET
4	l	202	SER
4	l	209	SER
4	l	226	ASP
4	l	239	TRP
4	l	266	ASN
4	m	59	LYS
4	m	74	LYS
4	m	91	LYS
4	m	153	SER
4	m	162	GLU
4	m	191	MET
4	m	195	GLU
4	m	197	SER
4	m	198	GLU
4	m	212	SER
4	m	219	ASN
4	m	257	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	134	HIS
3	D	25	ASN
3	D	36	ASN
3	D	197	ASN
3	D	224	ASN
4	K	53	ASN
4	L	158	ASN
4	M	101	ASN
9	A	264	GLN
9	A	622	GLN
9	A	833	HIS
9	A	872	ASN
9	a	40	GLN
9	a	44	ASN
9	a	264	GLN
9	a	622	GLN

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
9	a	833	HIS
9	a	872	ASN
1	b	134	HIS
3	d	32	HIS
3	e	30	HIS
5	h	77	HIS
4	k	53	ASN
4	l	158	ASN
4	m	101	ASN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
6	P	59/60 (98%)	37 (62%)	3 (5%)
6	p	59/60 (98%)	37 (62%)	0
All	All	118/120 (98%)	74 (62%)	3 (2%)

All (74) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
6	P	-6	U
6	P	-5	U
6	P	-2	A
6	P	0	A
6	P	1	G
6	P	2	U
6	P	3	C
6	P	4	A
6	P	5	A
6	P	6	C
6	P	7	C
6	P	8	C
6	P	9	U
6	P	10	U
6	P	11	U
6	P	12	G
6	P	13	C
6	P	14	U
6	P	16	A
6	P	18	C
6	P	19	U

*Continued on next page...*



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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
6	P	20	U
6	P	22	C
6	P	23	C
6	P	24	U
6	P	25	A
6	P	26	U
6	P	27	U
6	P	28	U
6	P	29	A
6	P	30	A
6	P	31	A
6	P	36	A
6	P	38	C
6	P	41	C
6	P	42	C
6	P	46	U
6	p	-6	U
6	p	-5	U
6	p	-2	A
6	p	0	A
6	p	1	G
6	p	2	U
6	p	3	C
6	p	4	A
6	p	5	A
6	p	6	C
6	p	7	C
6	p	8	C
6	p	9	U
6	p	10	U
6	p	11	U
6	p	12	G
6	p	13	C
6	p	14	U
6	p	16	A
6	p	18	C
6	p	19	U
6	p	20	U
6	p	22	C
6	p	23	C
6	p	24	U
6	p	25	A

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
6	p	26	U
6	p	27	U
6	p	28	U
6	p	29	A
6	p	30	A
6	p	31	A
6	p	36	A
6	p	38	C
6	p	41	C
6	p	42	C
6	p	46	U

All (3) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
6	P	11	U
6	P	22	C
6	P	41	C

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 4 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 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.

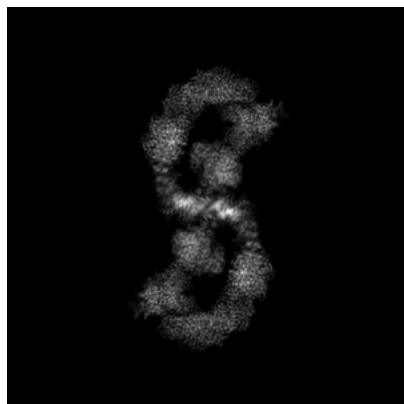
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-36826. These allow visual inspection of the internal detail of the map and identification of artifacts.

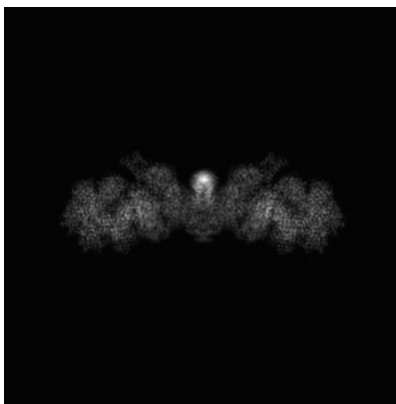
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

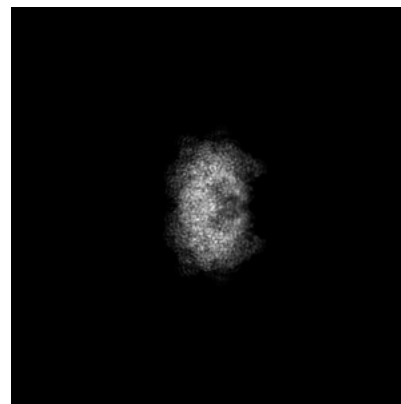
#### 6.1.1 Primary map



X

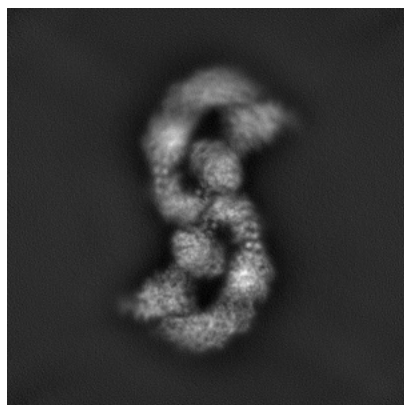


Y

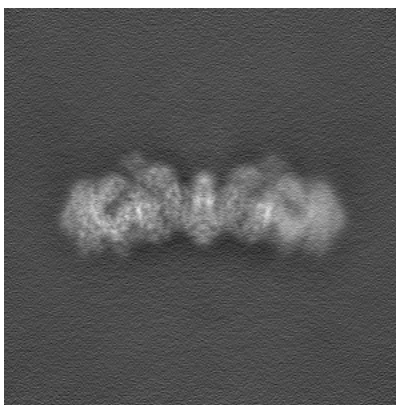


Z

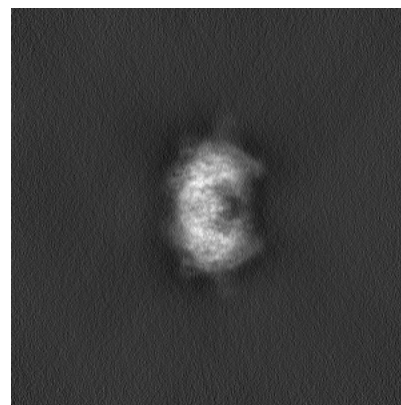
#### 6.1.2 Raw map



X



Y



Z

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

## 6.2 Central slices [i](#)

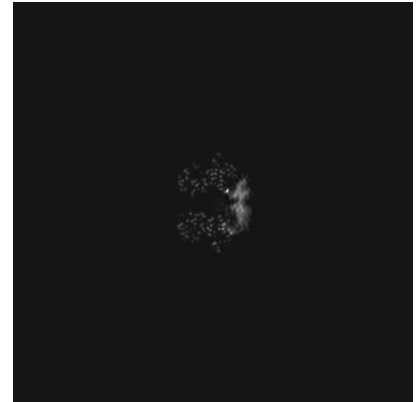
### 6.2.1 Primary map



X Index: 200

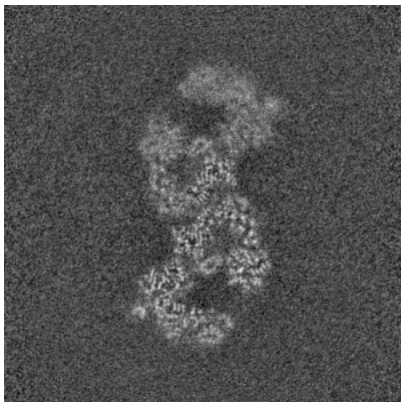


Y Index: 200

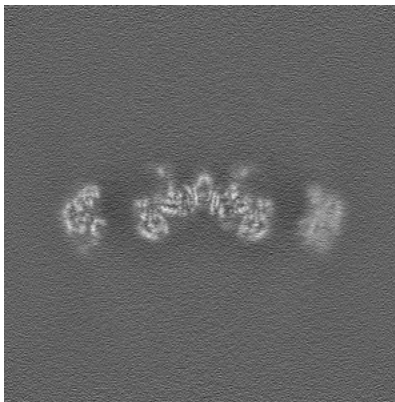


Z Index: 200

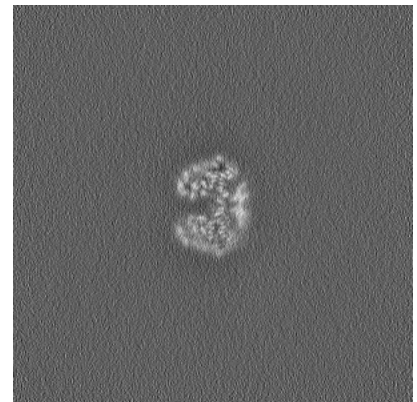
### 6.2.2 Raw map



X Index: 200



Y Index: 200



Z Index: 200

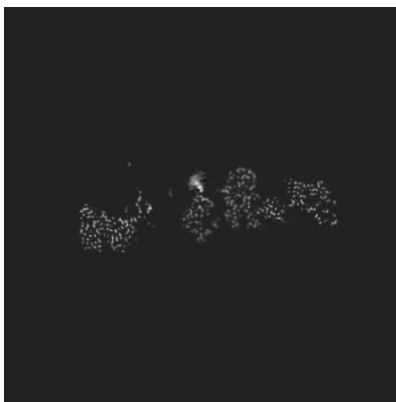
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

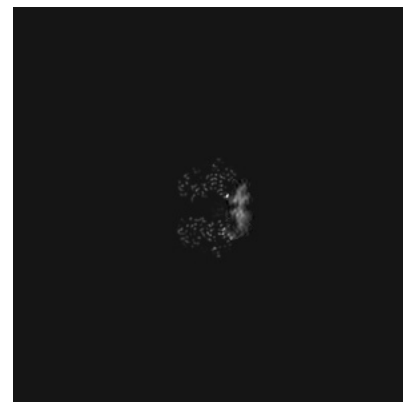
### 6.3.1 Primary map



X Index: 199

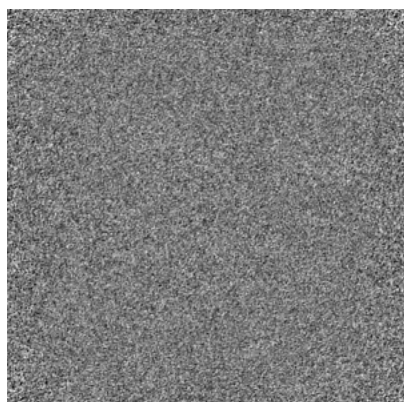


Y Index: 225

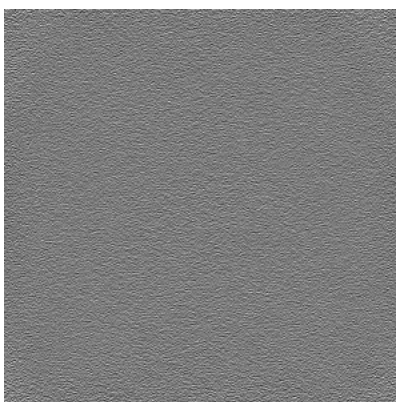


Z Index: 200

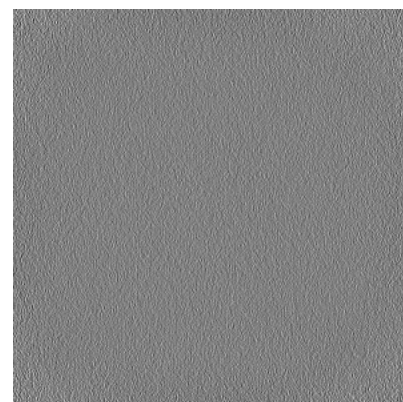
### 6.3.2 Raw map



X Index: 0



Y Index: 0

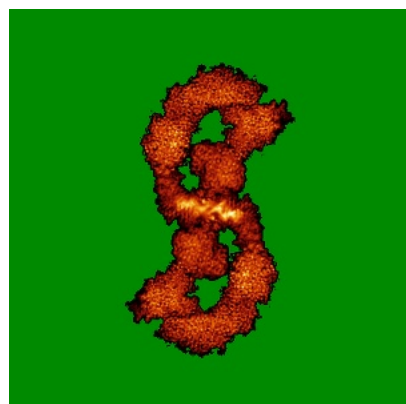


Z Index: 399

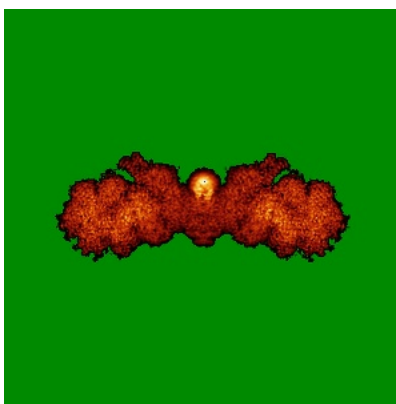
The images above show the largest variance slices of the map in three orthogonal directions.

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

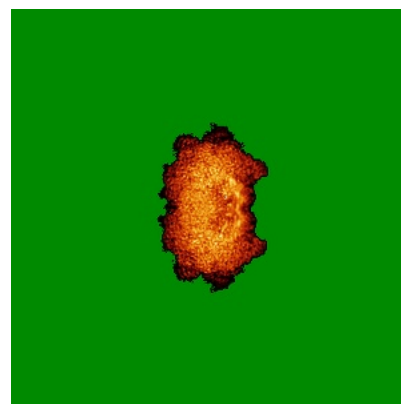
### 6.4.1 Primary map



X

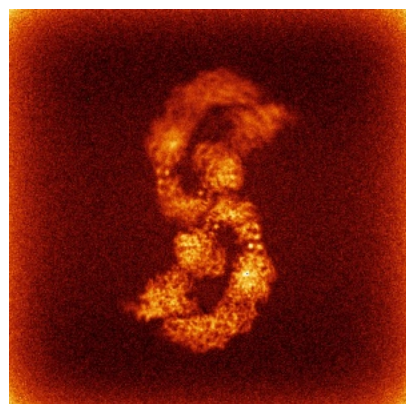


Y

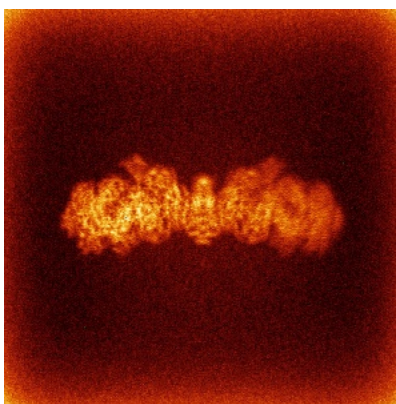


Z

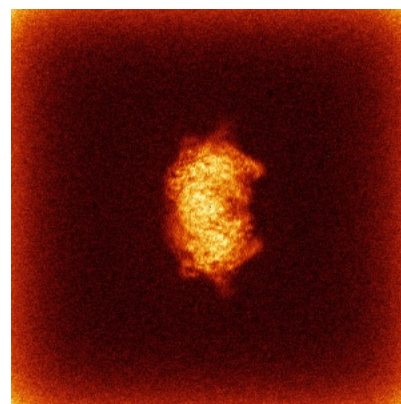
### 6.4.2 Raw map



X



Y

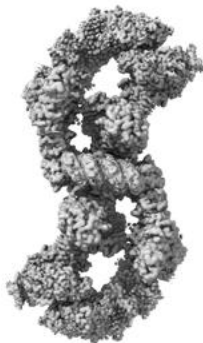


Z

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



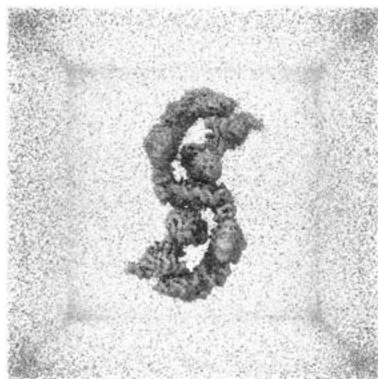
Y



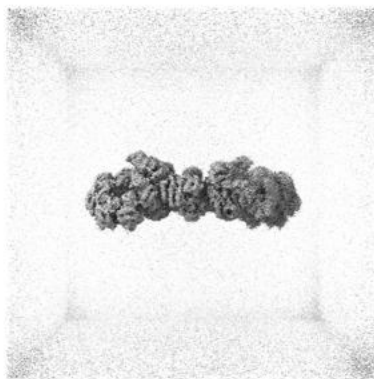
Z

The images above show the 3D surface view of the map at the recommended contour level 0.015. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

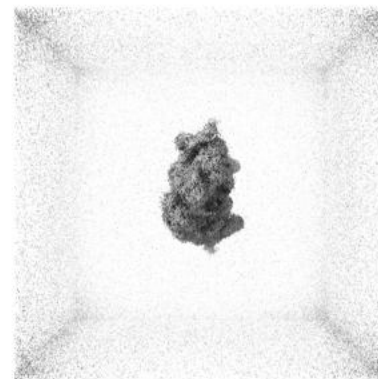
### 6.5.2 Raw map



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](#)

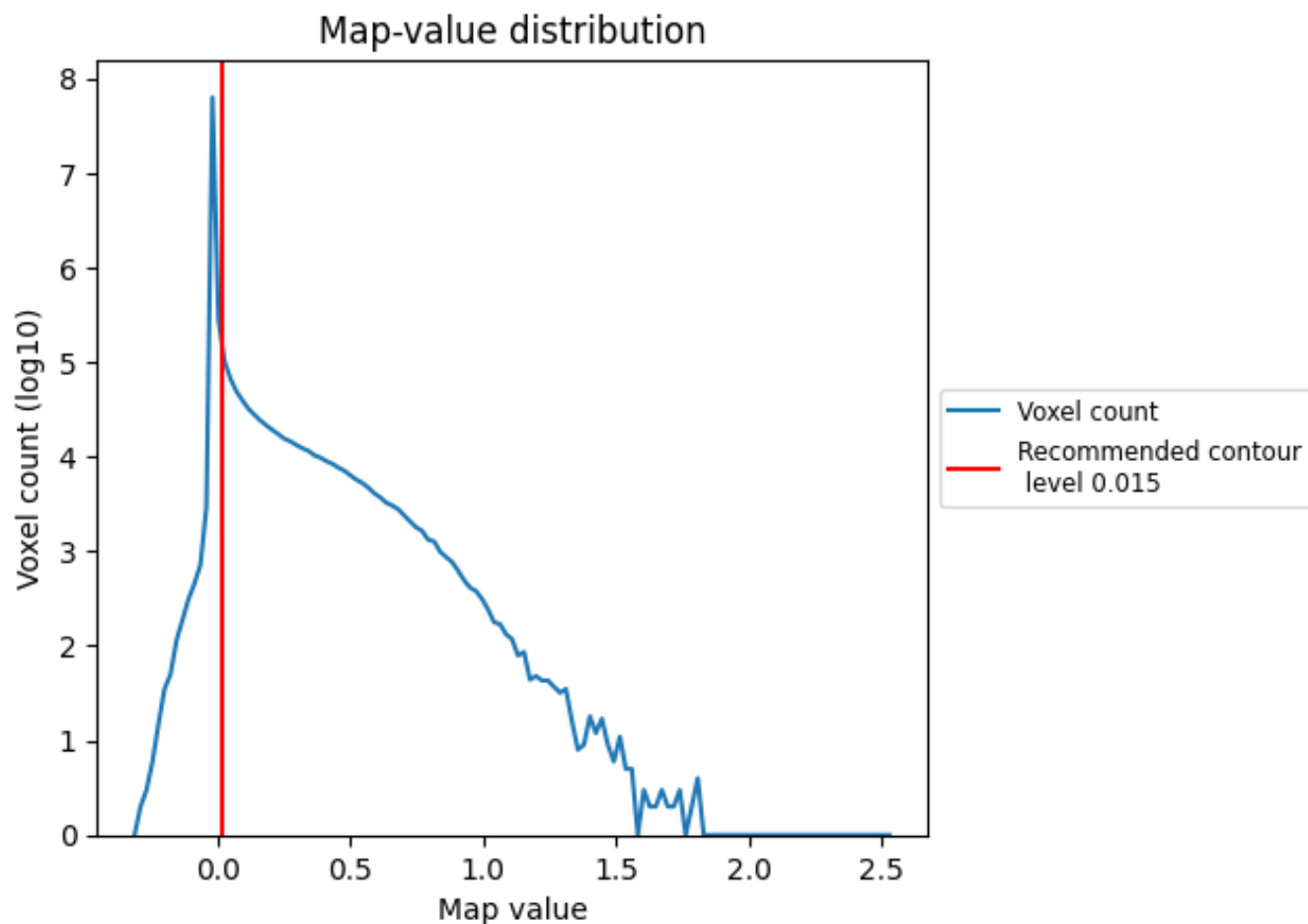
This section was not generated. No masks/segmentation were deposited.



## 7 Map analysis [i](#)

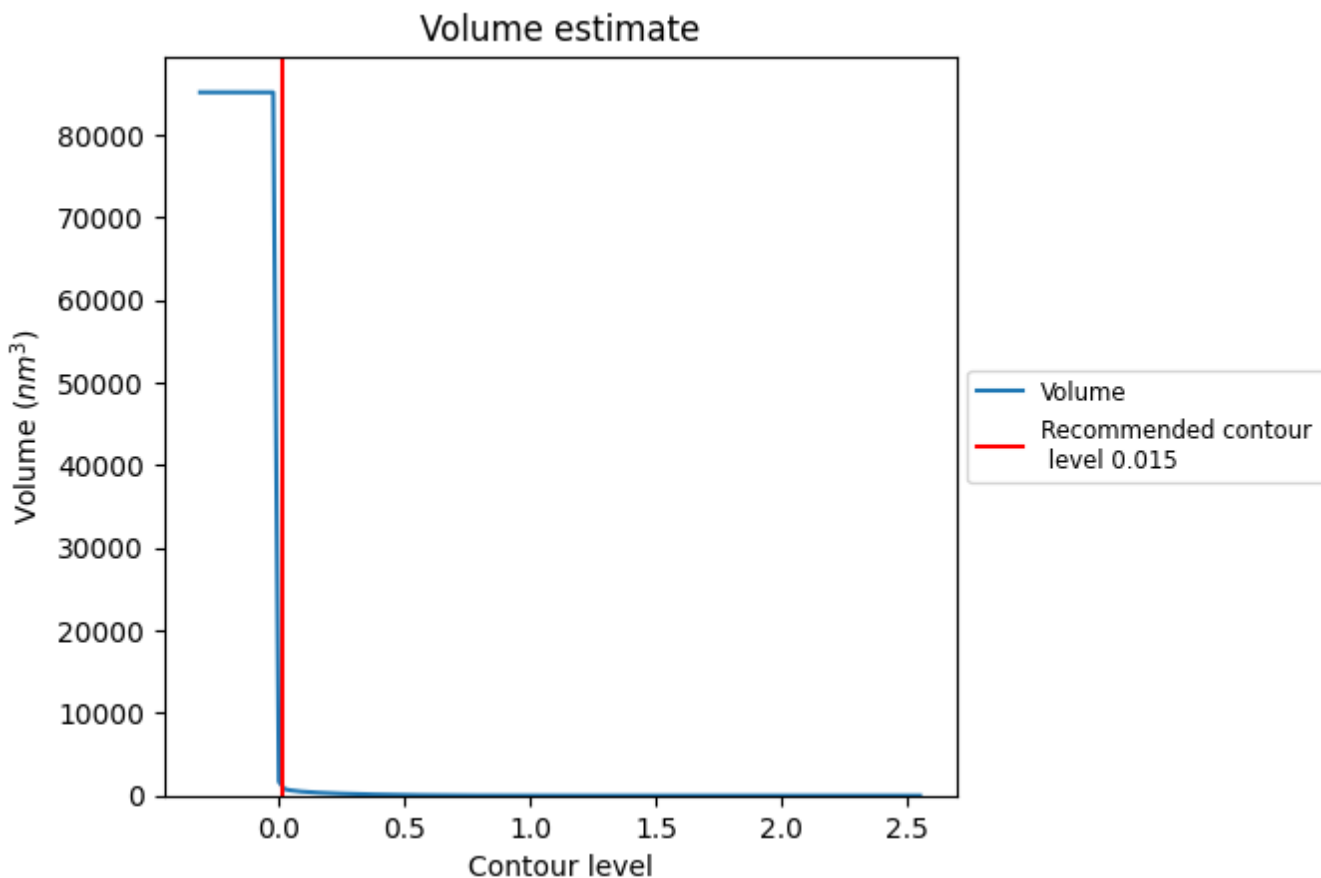
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



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

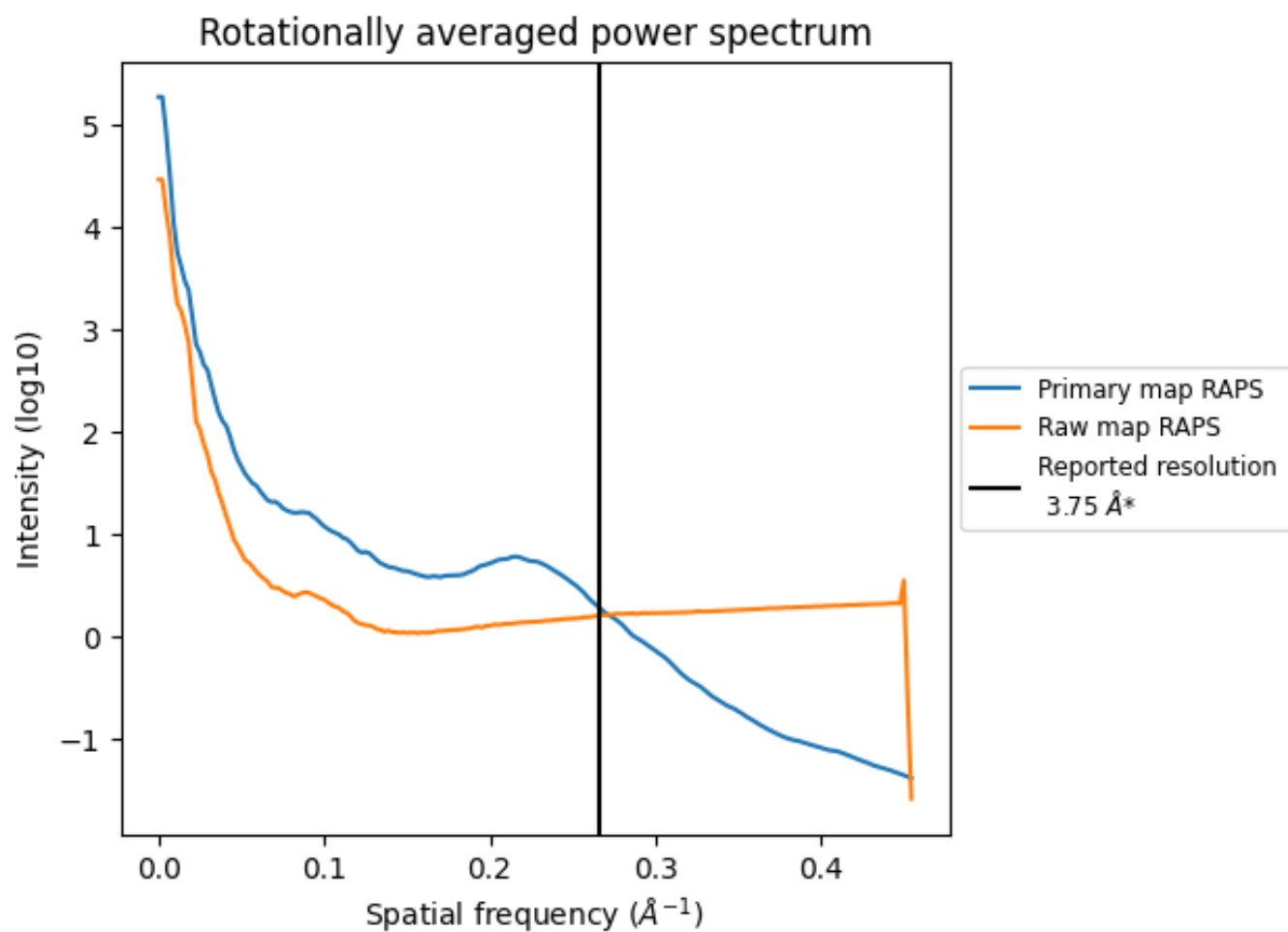
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1087 nm<sup>3</sup>; this corresponds to an approximate mass of 982 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

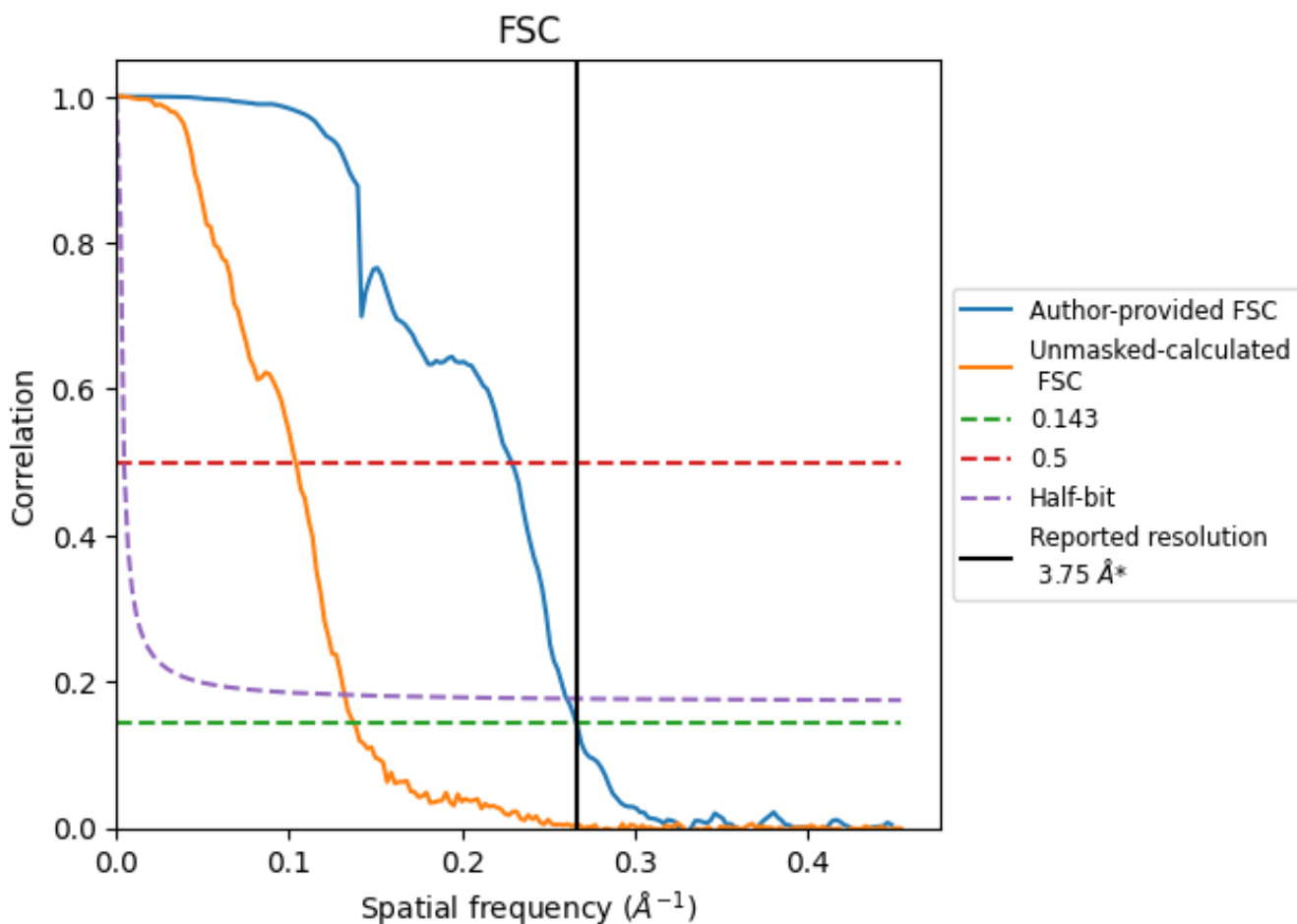


\*Reported resolution corresponds to spatial frequency of 0.267 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.267 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

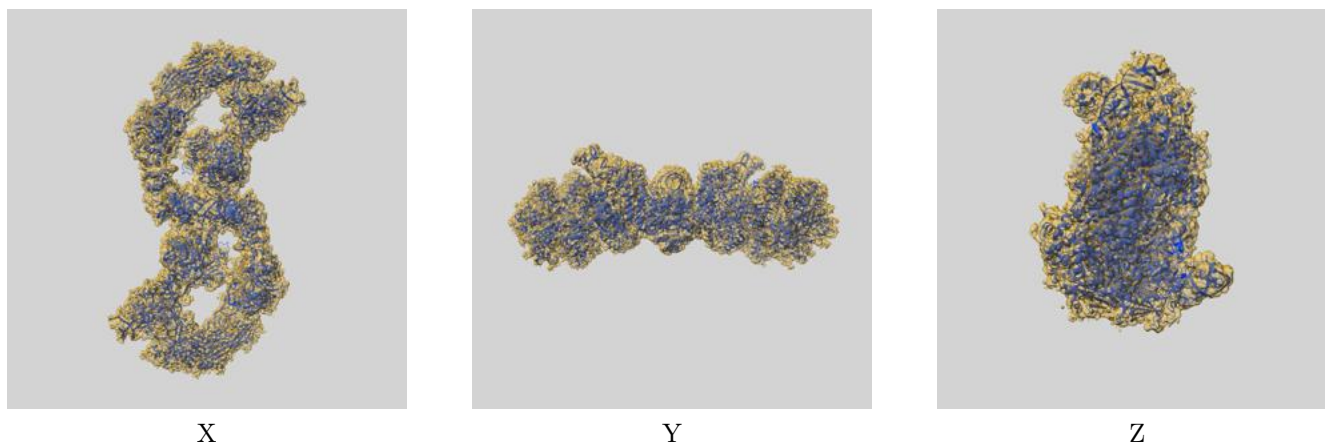
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.75	-	-
Author-provided FSC curve	3.75	4.37	3.83
Unmasked-calculated*	7.27	9.62	7.56

\*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 7.27 differs from the reported value 3.75 by more than 10 %

## 9 Map-model fit [i](#)

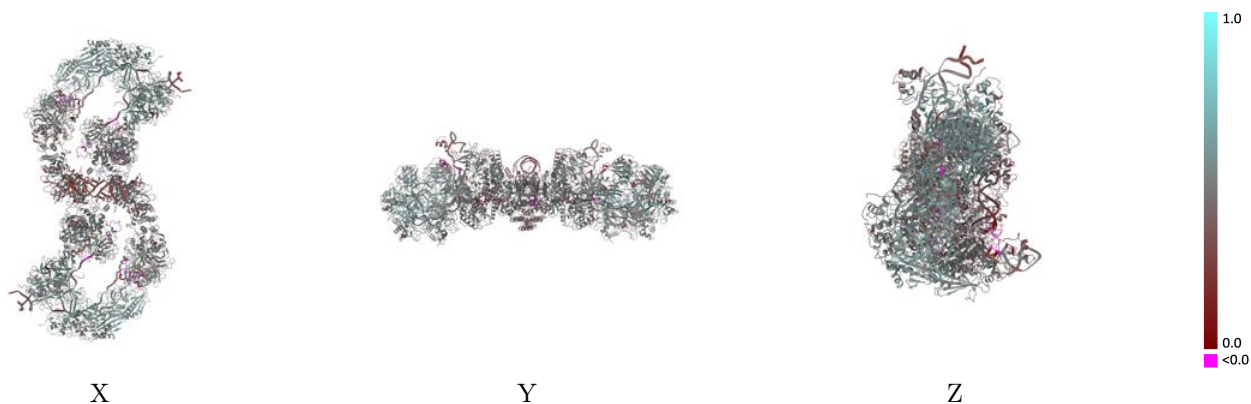
This section contains information regarding the fit between EMDB map EMD-36826 and PDB model 8K23. Per-residue inclusion information can be found in section 3 on page 8.

### 9.1 Map-model overlay [i](#)



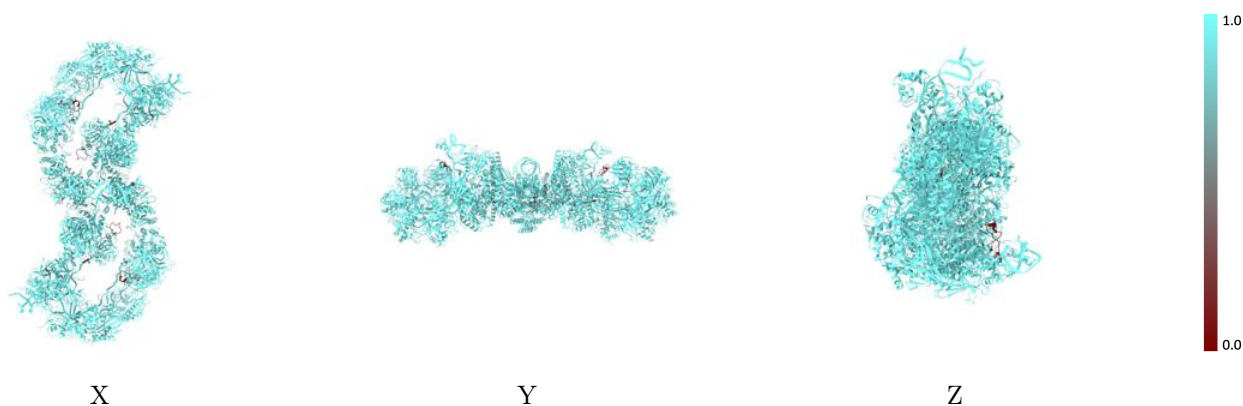
The images above show the 3D surface view of the map at the recommended contour level 0.015 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



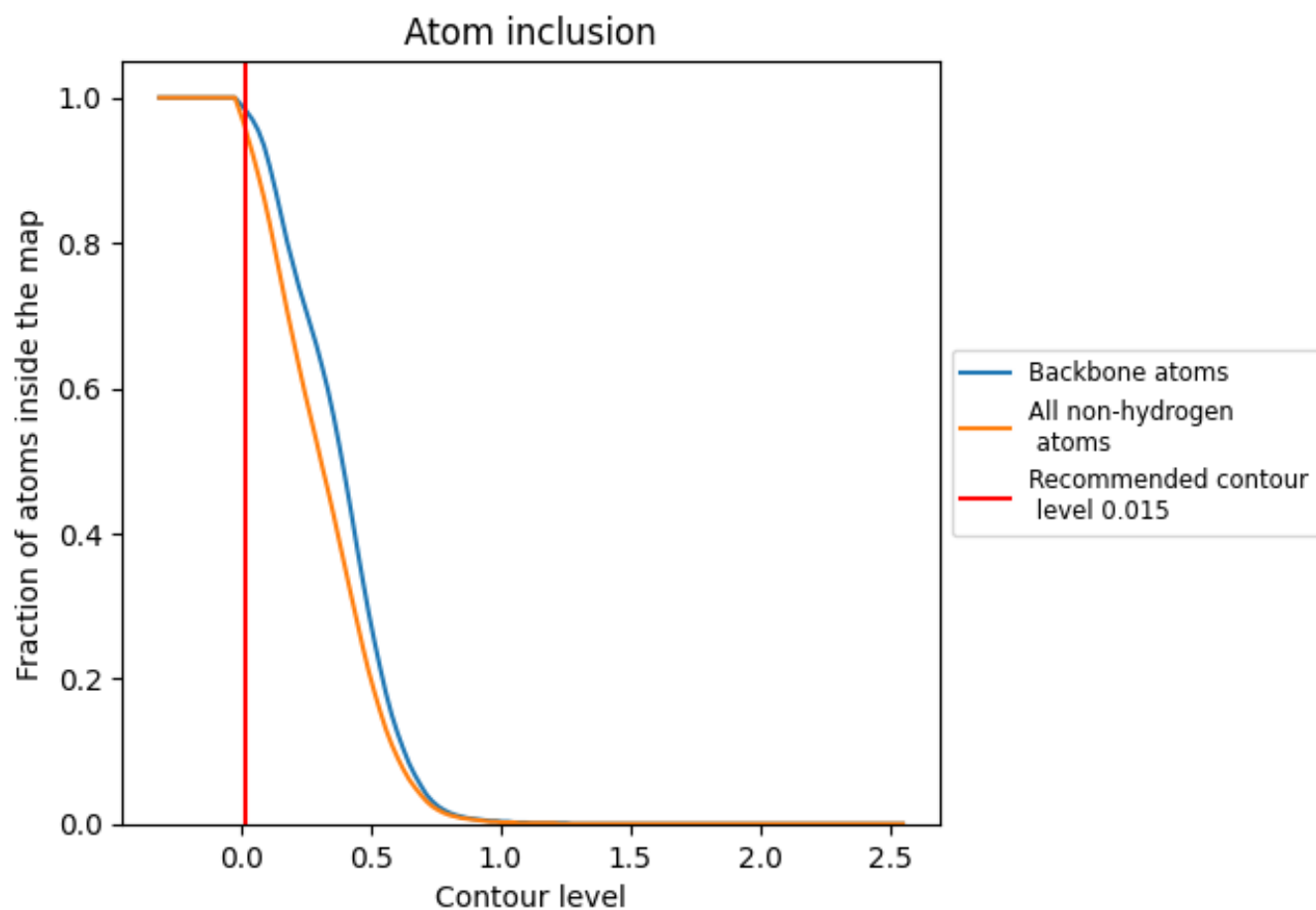
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

## 9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.015).

## 9.4 Atom inclusion [i](#)





































































At the recommended contour level, 98% of all backbone atoms, 96% 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 (0.015) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9610	 0.4690
A	 0.9680	 0.4440
B	 0.9750	 0.4940
C	 0.9730	 0.5180
D	 0.9370	 0.4270
E	 0.9480	 0.4300
G	 0.9710	 0.5240
H	 0.9580	 0.4100
I	 0.9700	 0.5180
J	 0.9710	 0.5230
K	 0.9720	 0.5150
L	 0.9040	 0.4340
M	 0.9740	 0.5070
P	 0.9870	 0.4750
Q	 0.9660	 0.4440
R	 0.9190	 0.3670
U	 1.0000	 0.2690
V	 1.0000	 0.2710
a	 0.9700	 0.4480
b	 0.9740	 0.4950
c	 0.9700	 0.5210
d	 0.9340	 0.4020
e	 0.9420	 0.4230
g	 0.9720	 0.5280
h	 0.9580	 0.4120
i	 0.9690	 0.5190
j	 0.9700	 0.5240
k	 0.9710	 0.5180
l	 0.9040	 0.4340
m	 0.9720	 0.5100
p	 0.9850	 0.4700
q	 0.9630	 0.4450
r	 0.9160	 0.3690

