



Full wwPDB EM Validation Report ⓘ

Mar 11, 2024 – 09:48 AM EDT

PDB ID : 6UOV
EMDB ID : EMD-20833
Title : Cryo-EM reconstruction of the PrgHK periplasmic ring from Salmonella's needle complex assembled in the absence of the export apparatus
Authors : Butan, C.; Galan, J.
Deposited on : 2019-10-15
Resolution : 3.50 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:

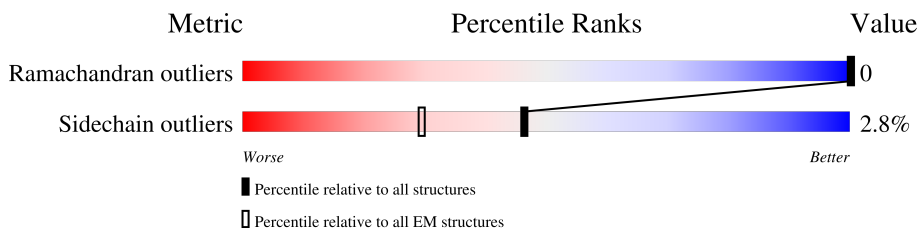
EMDB validation analysis : 0.0.1.dev70
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

1 Overall quality at a glance

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

The reported resolution of this entry is 3.50 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

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 $\leq 5\%$. 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	A	252	5% 71% 27%
1	C	252	5% 71% 27%
1	E	252	5% 71% 27%
1	G	252	5% 71% 27%
1	I	252	5% 71% 27%
1	K	252	5% 71% 27%
1	M	252	5% 71% 27%
1	O	252	5% 71% 27%
1	Q	252	5% 71% 27%

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Mol	Chain	Length	Quality of chain	
1	S	252	6%	71% 27%
1	U	252	5%	71% 27%
1	W	252	5%	71% 27%
1	Y	252	.	71% 27%
1	a	252	5%	71% 27%
1	c	252	5%	71% 27%
1	e	252	5%	71% 27%
1	g	252	5%	71% 27%
1	i	252	5%	71% 27%
1	k	252	5%	71% 27%
1	m	252	5%	71% 27%
1	o	252	5%	71% 27%
1	q	252	5%	71% 27%
1	s	252	5%	71% 27%
2	B	392	.	48% 51%
2	D	392	.	48% 51%
2	F	392	.	48% 51%
2	H	392	.	48% 51%
2	J	392	.	48% 51%
2	L	392	.	48% 51%
2	N	392	.	48% 51%
2	P	392	.	48% 51%
2	R	392	.	48% 51%
2	T	392	.	48% 51%
2	V	392	.	48% 51%

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Mol	Chain	Length	Quality of chain
2	X	392	
2	Z	392	
2	b	392	
2	d	392	
2	f	392	
2	h	392	
2	j	392	
2	l	392	
2	n	392	
2	p	392	
2	r	392	
2	t	392	

2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 69851 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 Lipoprotein PrgK.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	184	1437	905	250	279	3	0	0
1	C	184	1437	905	250	279	3	0	0
1	E	184	1437	905	250	279	3	0	0
1	G	184	1437	905	250	279	3	0	0
1	I	184	1437	905	250	279	3	0	0
1	K	184	1437	905	250	279	3	0	0
1	M	184	1437	905	250	279	3	0	0
1	O	184	1437	905	250	279	3	0	0
1	Q	184	1437	905	250	279	3	0	0
1	S	184	1437	905	250	279	3	0	0
1	U	184	1437	905	250	279	3	0	0
1	W	184	1437	905	250	279	3	0	0
1	Y	184	1437	905	250	279	3	0	0
1	a	184	1437	905	250	279	3	0	0
1	c	184	1437	905	250	279	3	0	0
1	e	184	1437	905	250	279	3	0	0
1	g	184	1437	905	250	279	3	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
1	i	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	k	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	m	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	o	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	q	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	s	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		

- Molecule 2 is a protein called Protein PrgH.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	D	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	F	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	H	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	J	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	L	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	N	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	P	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	R	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	T	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	V	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	X	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	Z	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		

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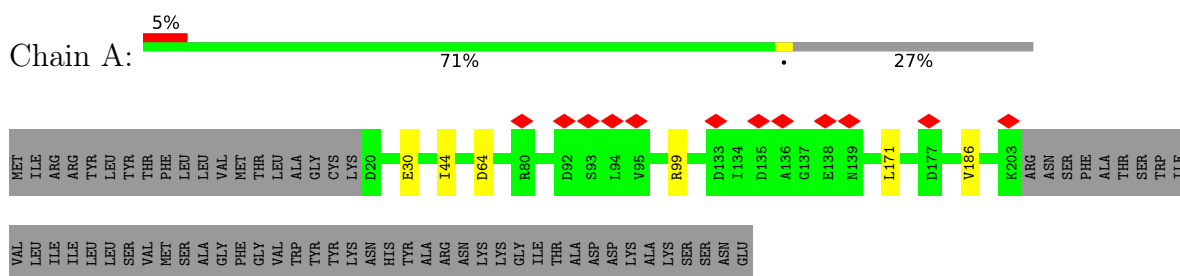
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Mol	Chain	Residues	Atoms					AltConf	Trace
2	b	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	d	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	f	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	h	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	j	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	l	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	n	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	p	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	r	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	t	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		

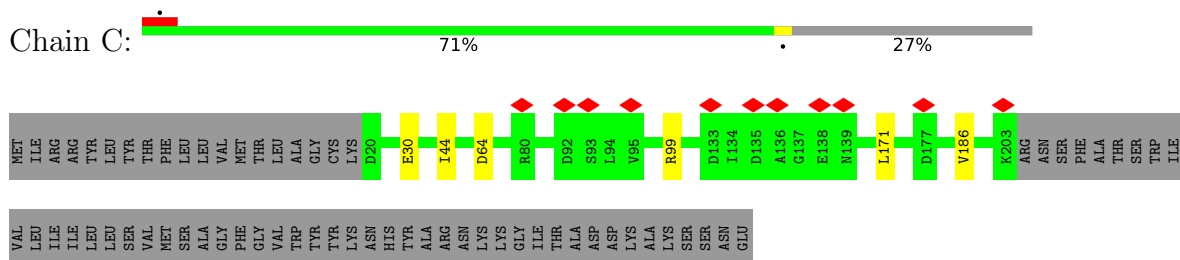
3 Residue-property plots

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

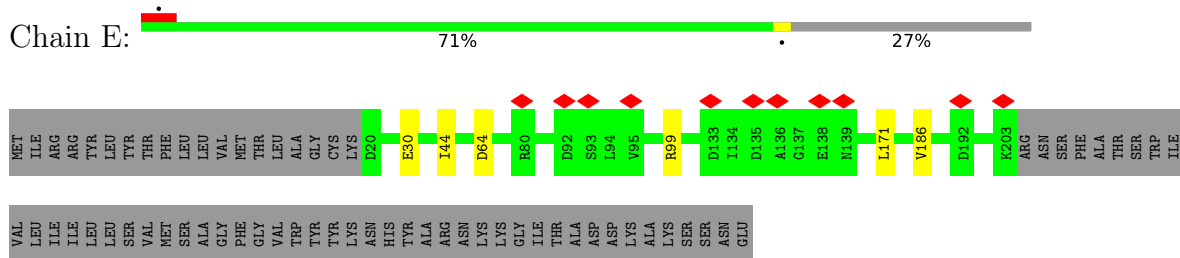
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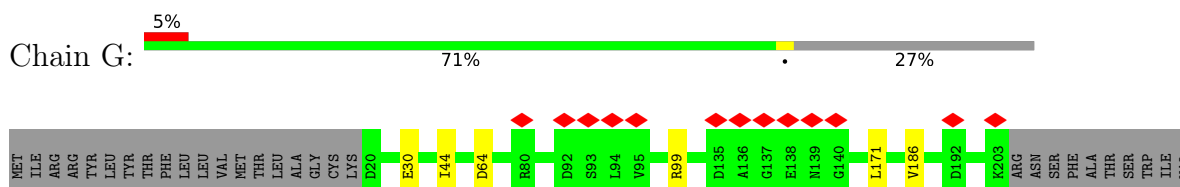
- Molecule 1: Lipoprotein PrgK



- Molecule 1: Lipoprotein PrgK



- Molecule 1: Lipoprotein PrgK



VAL LEU ILE ARG ILE LEU LEU LEU SER VAL MET PHE SER SER ALA ALA GLY PHE MET GLY VAL TRP TRP TYR TYR LYS ASN HIS TYR THR ALA ALA ARG ARG ASN LYS LYS GLY THR ILE THR ALA ASP ASP LYS LYS ALA LYS SER SER ASN GLU

• Molecule 1: Lipoprotein PrgK



MET ILE ARG TYR TYR THR PHE SER LEU LEU VAL MET MET THR VAL TRP TRP TYR TYR LYS ASN HIS TYR THR ALA ALA ARG ARG ASN LYS LYS GLY THR ILE THR ALA ASP ASP LYS LYS ALA LYS SER SER ASN GLU

• Molecule 1: Lipoprotein PrgK



MET ILE ARG TYR TYR THR PHE SER LEU LEU VAL MET MET THR VAL TRP TRP TYR TYR LYS ASN HIS TYR THR ALA ALA ARG ARG ASN LYS LYS GLY THR ILE THR ALA ASP ASP LYS LYS ALA LYS SER SER ASN GLU

• Molecule 1: Lipoprotein PrgK



MET ILE ARG TYR TYR THR PHE SER LEU LEU VAL MET MET THR VAL TRP TRP TYR TYR LYS ASN HIS TYR THR ALA ALA ARG ARG ASN LYS LYS GLY THR ILE THR ALA ASP ASP LYS LYS ALA LYS SER SER ASN GLU

• Molecule 1: Lipoprotein PrgK



MET ILE ARG TYR TYR THR PHE SER LEU LEU VAL MET MET THR VAL TRP TRP TYR TYR LYS ASN HIS TYR THR ALA ALA ARG ARG ASN LYS LYS GLY THR ILE THR ALA ASP ASP LYS LYS ALA LYS SER SER ASN GLU

• Molecule 1: Lipoprotein PrgK



MET ILE ARG TYR TYR THR PHE SER LEU LEU VAL MET MET THR VAL TRP TRP TYR TYR LYS ASN HIS TYR THR ALA ALA ARG ARG ASN LYS LYS GLY THR ILE THR ALA ASP ASP LYS LYS ALA LYS SER SER ASN GLU

ILE VAL LEU LEU ILE ILE ILE LEU LEU LEU VAL MET MET SER SER ALA ALA GLY PHE GLY VAL TRP TRP TYR TYR LYS LYS ASN ASN HIS TYR TYR TYR TYR ALA ALA ARG ARG ASN ASN LYS LYS LYS LYS GLY GLY THR THR ILE ILE ALA ALA ASP ASP LYS LYS ALA ALA LYS LYS SER SER SER SER ASN ASN GLU

• Molecule 1: Lipoprotein PrgK



MET ILE ARG ARG TYR TYR THR PHE LEU LEU VAL MET MET THR LEU LEU ALA VAL GLY TRP CYS TYR TYR D20 E30 I44 D64 R80 D92 S93 L94 V95 R99 D133 I134 D135 A136 G137 E138 N139 G140 L171 V186 D192 K203 ARG ASN SER PHE ALA THR TRP

ILE VAL LEU LEU ILE ILE ILE LEU LEU LEU SER VAL PHE LEU SER SER ALA ALA GLY PHE GLY VAL VAL TRP TYR TYR LYS LYS ASN ASN HIS TYR TYR TYR TYR ALA ALA ARG ARG ASN ASN LYS LYS LYS LYS GLY GLY THR THR ILE ILE ALA ALA ASP ASP LYS LYS ALA LYS SER SER SER SER ASN ASN GLU

• Molecule 1: Lipoprotein PrgK



MET ILE ARG ARG TYR TYR THR PHE LEU LEU VAL MET MET THR LEU LEU ALA VAL GLY TRP CYS TYR TYR D20 E30 I44 D64 R80 D92 S93 L94 V95 R99 D133 I134 D135 A136 G137 E138 N139 G140 R141 P142 L171 V186 D192 K203 ARG ASN SER PHE ALA THR

SER TRP ILE ARG VAL LEU LEU ILE ILE LEU LEU LEU SER VAL PHE LEU SER SER ALA ALA GLY PHE GLY VAL VAL TRP TYR TYR TYR LYS LYS ASN ASN HIS TYR TYR TYR TYR ALA ALA ARG ARG ASN ASN LYS LYS LYS LYS GLY GLY THR THR ILE ILE ALA ALA ASP ASP LYS LYS ALA LYS SER SER SER SER ASN ASN GLU

• Molecule 1: Lipoprotein PrgK



MET ILE ARG ARG TYR TYR THR PHE LEU LEU VAL MET MET THR LEU LEU ALA VAL GLY TRP CYS TYR TYR D20 E30 I44 D64 R80 D92 S93 L94 V95 R99 D133 I134 D135 A136 G137 E138 N139 G140 L171 D177 V186 K203 ARG ASN SER PHE ALA THR TRP

ILE VAL LEU LEU ILE ILE ILE LEU LEU LEU SER VAL PHE LEU SER SER ALA ALA GLY PHE GLY VAL VAL TRP TYR TYR LYS LYS ASN ASN HIS TYR TYR TYR TYR ALA ALA ARG ARG ASN ASN LYS LYS LYS LYS GLY GLY THR THR ILE ILE ALA ALA ASP ASP LYS LYS ALA LYS SER SER SER SER ASN ASN GLU

• Molecule 1: Lipoprotein PrgK



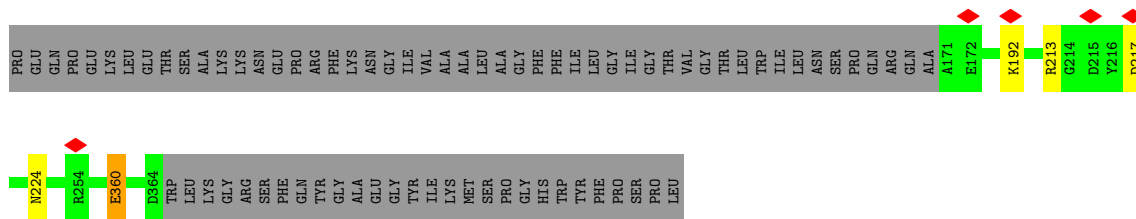
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SER TRP ILE ARG VAL LEU LEU ILE ILE LEU LEU LEU SER VAL PHE LEU SER SER ALA ALA GLY PHE GLY VAL VAL TRP TYR TYR TYR LYS LYS ASN ASN HIS TYR TYR TYR TYR ALA ALA ARG ARG ASN ASN LYS LYS LYS LYS GLY GLY THR THR ILE ILE ALA ALA ASP ASP LYS LYS ALA LYS SER SER SER SER ASN ASN GLU

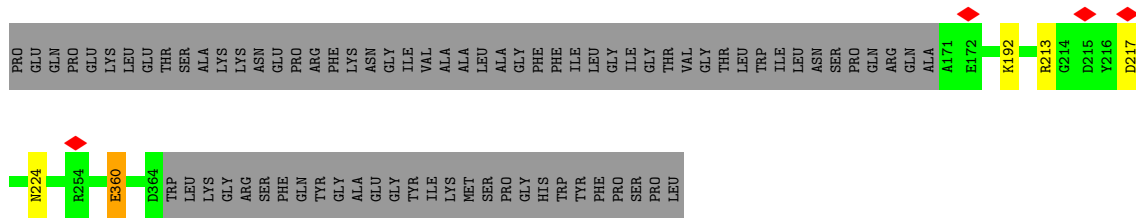
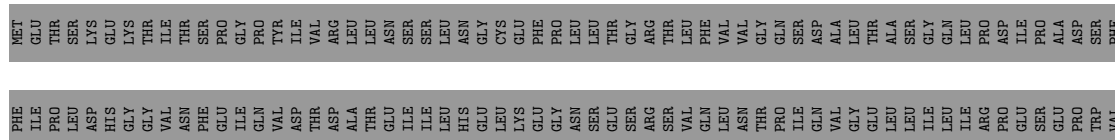
• Molecule 2: Protein PrgH



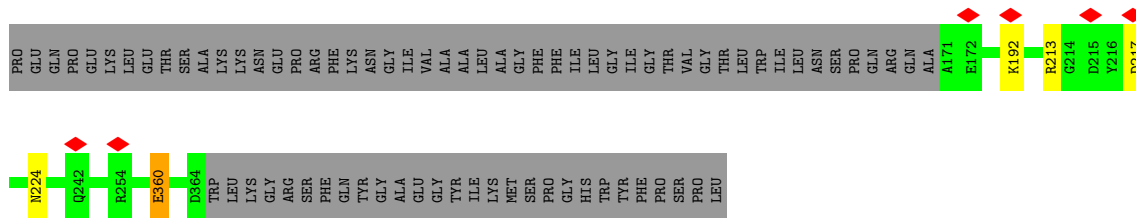
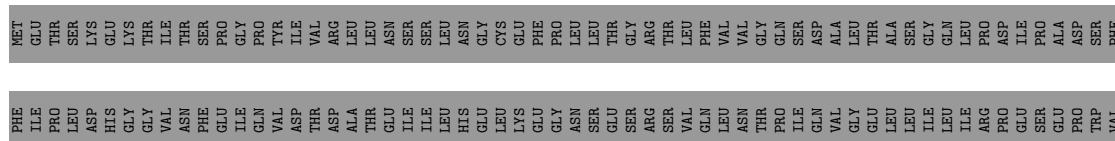
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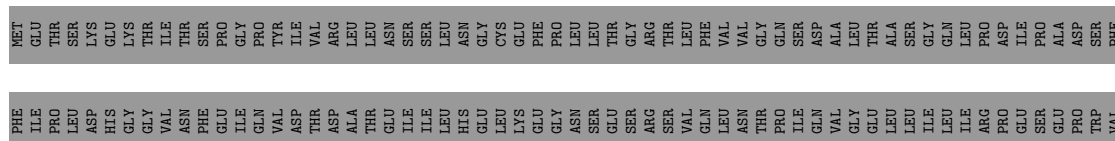
• Molecule 2: Protein PrgH

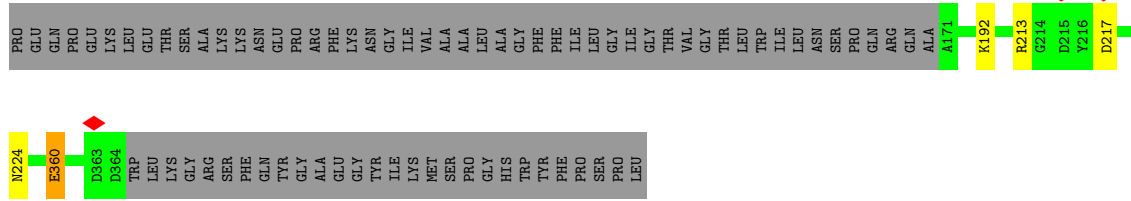


• Molecule 2: Protein PrgH

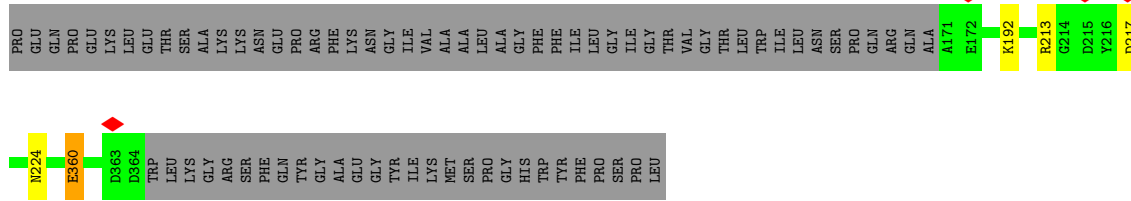
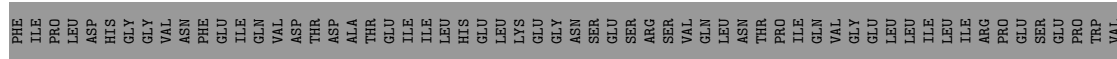
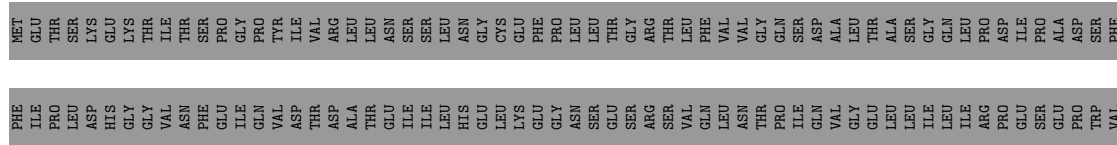


• Molecule 2: Protein PrgH

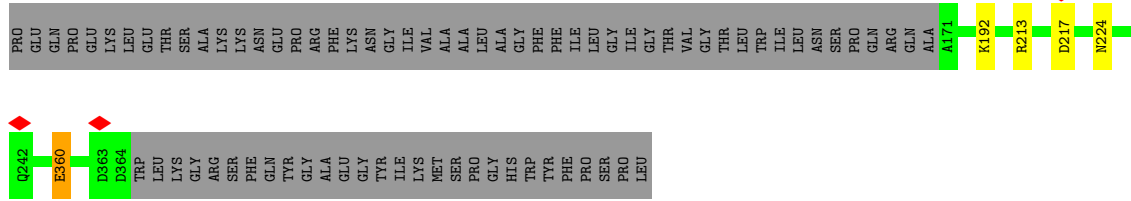
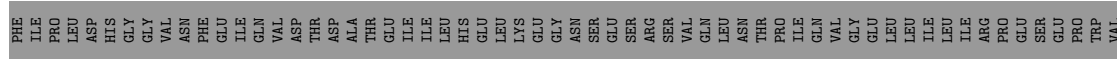
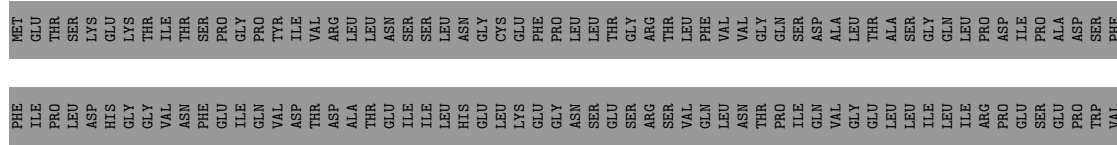




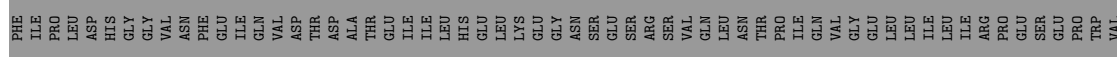
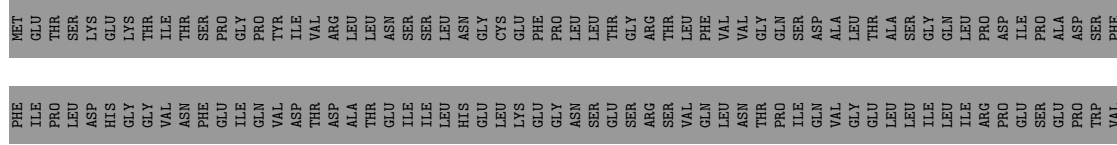
• Molecule 2: Protein PrgH



• Molecule 2: Protein PrgH



• Molecule 2: Protein PrgH



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C23	Depositor
Number of particles used	10674	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 ($e^-/\text{\AA}^2$)	51	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.287	Depositor
Minimum map value	-0.190	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.012	Depositor
Recommended contour level	0.038	Depositor
Map size (Å)	385.2, 385.2, 385.2	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.07, 1.07, 1.07	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.50	0/1465	0.64	2/1989 (0.1%)
1	C	0.50	0/1465	0.64	2/1989 (0.1%)
1	E	0.50	0/1465	0.64	2/1989 (0.1%)
1	G	0.50	0/1465	0.64	2/1989 (0.1%)
1	I	0.50	0/1465	0.64	2/1989 (0.1%)
1	K	0.50	0/1465	0.64	2/1989 (0.1%)
1	M	0.50	0/1465	0.64	2/1989 (0.1%)
1	O	0.50	0/1465	0.64	2/1989 (0.1%)
1	Q	0.50	0/1465	0.64	2/1989 (0.1%)
1	S	0.50	0/1465	0.64	2/1989 (0.1%)
1	U	0.50	0/1465	0.64	2/1989 (0.1%)
1	W	0.50	0/1465	0.64	2/1989 (0.1%)
1	Y	0.50	0/1465	0.64	2/1989 (0.1%)
1	a	0.50	0/1465	0.64	2/1989 (0.1%)
1	c	0.50	0/1465	0.64	2/1989 (0.1%)
1	e	0.50	0/1465	0.64	2/1989 (0.1%)
1	g	0.50	0/1465	0.64	2/1989 (0.1%)
1	i	0.50	0/1465	0.64	2/1989 (0.1%)
1	k	0.50	0/1465	0.64	2/1989 (0.1%)
1	m	0.51	0/1465	0.64	2/1989 (0.1%)
1	o	0.50	0/1465	0.64	2/1989 (0.1%)
1	q	0.50	0/1465	0.64	2/1989 (0.1%)
1	s	0.50	0/1465	0.64	2/1989 (0.1%)
2	B	0.41	0/1632	0.61	1/2204 (0.0%)
2	D	0.41	0/1632	0.61	1/2204 (0.0%)
2	F	0.41	0/1632	0.61	1/2204 (0.0%)
2	H	0.41	0/1632	0.61	1/2204 (0.0%)
2	J	0.41	0/1632	0.61	1/2204 (0.0%)
2	L	0.41	0/1632	0.61	1/2204 (0.0%)
2	N	0.41	0/1632	0.61	1/2204 (0.0%)
2	P	0.41	0/1632	0.61	1/2204 (0.0%)
2	R	0.41	0/1632	0.61	1/2204 (0.0%)
2	T	0.41	0/1632	0.61	1/2204 (0.0%)
2	V	0.41	0/1632	0.61	1/2204 (0.0%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
2	X	0.41	0/1632	0.61	1/2204 (0.0%)
2	Z	0.41	0/1632	0.61	1/2204 (0.0%)
2	b	0.41	0/1632	0.61	1/2204 (0.0%)
2	d	0.41	0/1632	0.61	1/2204 (0.0%)
2	f	0.41	0/1632	0.61	1/2204 (0.0%)
2	h	0.41	0/1632	0.61	1/2204 (0.0%)
2	j	0.41	0/1632	0.61	1/2204 (0.0%)
2	l	0.41	0/1632	0.61	1/2204 (0.0%)
2	n	0.41	0/1632	0.61	1/2204 (0.0%)
2	p	0.41	0/1632	0.61	1/2204 (0.0%)
2	r	0.41	0/1632	0.61	1/2204 (0.0%)
2	t	0.41	0/1632	0.61	1/2204 (0.0%)
All	All	0.45	0/71231	0.63	69/96439 (0.1%)

There are no bond length outliers.

All (69) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	N	360	GLU	CA-CB-CG	7.24	129.32	113.40
2	H	360	GLU	CA-CB-CG	7.23	129.31	113.40
2	p	360	GLU	CA-CB-CG	7.23	129.31	113.40
2	V	360	GLU	CA-CB-CG	7.23	129.30	113.40
2	f	360	GLU	CA-CB-CG	7.23	129.30	113.40
2	T	360	GLU	CA-CB-CG	7.22	129.29	113.40
2	d	360	GLU	CA-CB-CG	7.22	129.29	113.40
2	r	360	GLU	CA-CB-CG	7.22	129.29	113.40
2	R	360	GLU	CA-CB-CG	7.22	129.29	113.40
2	l	360	GLU	CA-CB-CG	7.22	129.29	113.40
2	n	360	GLU	CA-CB-CG	7.22	129.28	113.40
2	B	360	GLU	CA-CB-CG	7.22	129.28	113.40
2	D	360	GLU	CA-CB-CG	7.22	129.28	113.40
2	F	360	GLU	CA-CB-CG	7.22	129.28	113.40
2	J	360	GLU	CA-CB-CG	7.22	129.27	113.40
2	P	360	GLU	CA-CB-CG	7.21	129.27	113.40
2	j	360	GLU	CA-CB-CG	7.21	129.27	113.40
2	t	360	GLU	CA-CB-CG	7.21	129.27	113.40
2	L	360	GLU	CA-CB-CG	7.21	129.27	113.40
2	X	360	GLU	CA-CB-CG	7.21	129.27	113.40
2	Z	360	GLU	CA-CB-CG	7.21	129.26	113.40
2	b	360	GLU	CA-CB-CG	7.21	129.25	113.40
2	h	360	GLU	CA-CB-CG	7.21	129.25	113.40
1	a	171	LEU	CA-CB-CG	6.11	129.36	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	m	171	LEU	CA-CB-CG	6.11	129.35	115.30
1	q	171	LEU	CA-CB-CG	6.11	129.35	115.30
1	s	171	LEU	CA-CB-CG	6.11	129.35	115.30
1	S	171	LEU	CA-CB-CG	6.11	129.34	115.30
1	Y	171	LEU	CA-CB-CG	6.10	129.33	115.30
1	i	171	LEU	CA-CB-CG	6.10	129.34	115.30
1	U	171	LEU	CA-CB-CG	6.10	129.33	115.30
1	A	171	LEU	CA-CB-CG	6.10	129.33	115.30
1	W	171	LEU	CA-CB-CG	6.10	129.33	115.30
1	g	171	LEU	CA-CB-CG	6.10	129.33	115.30
1	k	171	LEU	CA-CB-CG	6.10	129.32	115.30
1	M	171	LEU	CA-CB-CG	6.09	129.32	115.30
1	e	171	LEU	CA-CB-CG	6.09	129.32	115.30
1	E	171	LEU	CA-CB-CG	6.09	129.31	115.30
1	Q	171	LEU	CA-CB-CG	6.09	129.31	115.30
1	c	171	LEU	CA-CB-CG	6.09	129.31	115.30
1	o	171	LEU	CA-CB-CG	6.09	129.31	115.30
1	K	171	LEU	CA-CB-CG	6.09	129.30	115.30
1	O	171	LEU	CA-CB-CG	6.09	129.30	115.30
1	C	171	LEU	CA-CB-CG	6.08	129.29	115.30
1	G	171	LEU	CA-CB-CG	6.08	129.29	115.30
1	I	171	LEU	CA-CB-CG	6.08	129.27	115.30
1	A	44	ILE	CG1-CB-CG2	-5.09	100.19	111.40
1	W	44	ILE	CG1-CB-CG2	-5.09	100.19	111.40
1	Y	44	ILE	CG1-CB-CG2	-5.09	100.19	111.40
1	G	44	ILE	CG1-CB-CG2	-5.09	100.20	111.40
1	m	44	ILE	CG1-CB-CG2	-5.09	100.20	111.40
1	E	44	ILE	CG1-CB-CG2	-5.09	100.21	111.40
1	U	44	ILE	CG1-CB-CG2	-5.09	100.21	111.40
1	g	44	ILE	CG1-CB-CG2	-5.09	100.21	111.40
1	c	44	ILE	CG1-CB-CG2	-5.08	100.22	111.40
1	k	44	ILE	CG1-CB-CG2	-5.08	100.22	111.40
1	M	44	ILE	CG1-CB-CG2	-5.08	100.22	111.40
1	a	44	ILE	CG1-CB-CG2	-5.08	100.22	111.40
1	s	44	ILE	CG1-CB-CG2	-5.08	100.22	111.40
1	o	44	ILE	CG1-CB-CG2	-5.08	100.23	111.40
1	K	44	ILE	CG1-CB-CG2	-5.08	100.23	111.40
1	Q	44	ILE	CG1-CB-CG2	-5.08	100.24	111.40
1	C	44	ILE	CG1-CB-CG2	-5.07	100.24	111.40
1	O	44	ILE	CG1-CB-CG2	-5.07	100.25	111.40
1	i	44	ILE	CG1-CB-CG2	-5.07	100.25	111.40
1	I	44	ILE	CG1-CB-CG2	-5.07	100.25	111.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	e	44	ILE	CG1-CB-CG2	-5.06	100.27	111.40
1	q	44	ILE	CG1-CB-CG2	-5.06	100.27	111.40
1	S	44	ILE	CG1-CB-CG2	-5.05	100.28	111.40

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	A	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	C	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	E	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	G	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	I	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	K	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	M	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	O	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	Q	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	S	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	U	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	W	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	Y	182/252 (72%)	171 (94%)	11 (6%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	a	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	c	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	e	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	g	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	i	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	k	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	m	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	o	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	q	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
1	s	182/252 (72%)	171 (94%)	11 (6%)	0	100	100
2	B	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	D	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	F	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	H	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	J	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	L	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	N	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	P	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	R	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	T	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	V	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	X	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	Z	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	b	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	d	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	f	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	h	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	j	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	l	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	n	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	p	192/392 (49%)	179 (93%)	13 (7%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	r	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
2	t	192/392 (49%)	179 (93%)	13 (7%)	0	100	100
All	All	8602/14812 (58%)	8050 (94%)	552 (6%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	C	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	E	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	G	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	I	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	K	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	M	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	O	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	Q	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	S	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	U	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	W	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	Y	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	a	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	c	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	e	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	g	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	i	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	k	157/215 (73%)	153 (98%)	4 (2%)	47	75

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	m	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	o	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	q	157/215 (73%)	153 (98%)	4 (2%)	47	75
1	s	157/215 (73%)	153 (98%)	4 (2%)	47	75
2	B	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	D	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	F	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	H	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	J	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	L	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	N	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	P	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	R	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	T	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	V	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	X	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	Z	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	b	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	d	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	f	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	h	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	j	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	l	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	n	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	p	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	r	167/337 (50%)	162 (97%)	5 (3%)	41	71
2	t	167/337 (50%)	162 (97%)	5 (3%)	41	71
All	All	7452/12696 (59%)	7245 (97%)	207 (3%)	46	72

All (207) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	30	GLU

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Mol	Chain	Res	Type
1	A	64	ASP
1	A	99	ARG
1	A	186	VAL
2	B	192	LYS
2	B	213	ARG
2	B	217	ASP
2	B	224	ASN
2	B	360	GLU
1	C	30	GLU
1	C	64	ASP
1	C	99	ARG
1	C	186	VAL
2	D	192	LYS
2	D	213	ARG
2	D	217	ASP
2	D	224	ASN
2	D	360	GLU
1	E	30	GLU
1	E	64	ASP
1	E	99	ARG
1	E	186	VAL
2	F	192	LYS
2	F	213	ARG
2	F	217	ASP
2	F	224	ASN
2	F	360	GLU
1	G	30	GLU
1	G	64	ASP
1	G	99	ARG
1	G	186	VAL
2	H	192	LYS
2	H	213	ARG
2	H	217	ASP
2	H	224	ASN
2	H	360	GLU
1	I	30	GLU
1	I	64	ASP
1	I	99	ARG
1	I	186	VAL
2	J	192	LYS
2	J	213	ARG
2	J	217	ASP

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Mol	Chain	Res	Type
2	J	224	ASN
2	J	360	GLU
1	K	30	GLU
1	K	64	ASP
1	K	99	ARG
1	K	186	VAL
2	L	192	LYS
2	L	213	ARG
2	L	217	ASP
2	L	224	ASN
2	L	360	GLU
1	M	30	GLU
1	M	64	ASP
1	M	99	ARG
1	M	186	VAL
2	N	192	LYS
2	N	213	ARG
2	N	217	ASP
2	N	224	ASN
2	N	360	GLU
1	O	30	GLU
1	O	64	ASP
1	O	99	ARG
1	O	186	VAL
2	P	192	LYS
2	P	213	ARG
2	P	217	ASP
2	P	224	ASN
2	P	360	GLU
1	Q	30	GLU
1	Q	64	ASP
1	Q	99	ARG
1	Q	186	VAL
2	R	192	LYS
2	R	213	ARG
2	R	217	ASP
2	R	224	ASN
2	R	360	GLU
1	S	30	GLU
1	S	64	ASP
1	S	99	ARG
1	S	186	VAL

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Mol	Chain	Res	Type
2	T	192	LYS
2	T	213	ARG
2	T	217	ASP
2	T	224	ASN
2	T	360	GLU
1	U	30	GLU
1	U	64	ASP
1	U	99	ARG
1	U	186	VAL
2	V	192	LYS
2	V	213	ARG
2	V	217	ASP
2	V	224	ASN
2	V	360	GLU
1	W	30	GLU
1	W	64	ASP
1	W	99	ARG
1	W	186	VAL
2	X	192	LYS
2	X	213	ARG
2	X	217	ASP
2	X	224	ASN
2	X	360	GLU
1	Y	30	GLU
1	Y	64	ASP
1	Y	99	ARG
1	Y	186	VAL
2	Z	192	LYS
2	Z	213	ARG
2	Z	217	ASP
2	Z	224	ASN
2	Z	360	GLU
1	a	30	GLU
1	a	64	ASP
1	a	99	ARG
1	a	186	VAL
2	b	192	LYS
2	b	213	ARG
2	b	217	ASP
2	b	224	ASN
2	b	360	GLU
1	c	30	GLU

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Mol	Chain	Res	Type
1	c	64	ASP
1	c	99	ARG
1	c	186	VAL
2	d	192	LYS
2	d	213	ARG
2	d	217	ASP
2	d	224	ASN
2	d	360	GLU
1	e	30	GLU
1	e	64	ASP
1	e	99	ARG
1	e	186	VAL
2	f	192	LYS
2	f	213	ARG
2	f	217	ASP
2	f	224	ASN
2	f	360	GLU
1	g	30	GLU
1	g	64	ASP
1	g	99	ARG
1	g	186	VAL
2	h	192	LYS
2	h	213	ARG
2	h	217	ASP
2	h	224	ASN
2	h	360	GLU
1	i	30	GLU
1	i	64	ASP
1	i	99	ARG
1	i	186	VAL
2	j	192	LYS
2	j	213	ARG
2	j	217	ASP
2	j	224	ASN
2	j	360	GLU
1	k	30	GLU
1	k	64	ASP
1	k	99	ARG
1	k	186	VAL
2	l	192	LYS
2	l	213	ARG
2	l	217	ASP

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Mol	Chain	Res	Type
2	l	224	ASN
2	l	360	GLU
1	m	30	GLU
1	m	64	ASP
1	m	99	ARG
1	m	186	VAL
2	n	192	LYS
2	n	213	ARG
2	n	217	ASP
2	n	224	ASN
2	n	360	GLU
1	o	30	GLU
1	o	64	ASP
1	o	99	ARG
1	o	186	VAL
2	p	192	LYS
2	p	213	ARG
2	p	217	ASP
2	p	224	ASN
2	p	360	GLU
1	q	30	GLU
1	q	64	ASP
1	q	99	ARG
1	q	186	VAL
2	r	192	LYS
2	r	213	ARG
2	r	217	ASP
2	r	224	ASN
2	r	360	GLU
1	s	30	GLU
1	s	64	ASP
1	s	99	ARG
1	s	186	VAL
2	t	192	LYS
2	t	213	ARG
2	t	217	ASP
2	t	224	ASN
2	t	360	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (80) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	76	GLN
1	A	87	GLN
1	A	196	GLN
2	B	224	ASN
1	C	76	GLN
1	C	87	GLN
1	C	196	GLN
2	D	224	ASN
1	E	76	GLN
1	E	87	GLN
1	E	196	GLN
2	F	224	ASN
1	G	76	GLN
1	G	87	GLN
1	G	196	GLN
2	H	224	ASN
1	I	76	GLN
1	I	87	GLN
2	J	224	ASN
1	K	29	GLN
1	K	76	GLN
1	K	87	GLN
1	K	196	GLN
2	L	224	ASN
1	M	76	GLN
1	M	87	GLN
2	N	224	ASN
1	O	76	GLN
1	O	87	GLN
2	P	224	ASN
1	Q	76	GLN
1	Q	87	GLN
2	R	224	ASN
1	S	76	GLN
1	S	87	GLN
2	T	224	ASN
1	U	29	GLN
1	U	76	GLN
1	U	87	GLN
2	V	224	ASN
1	W	76	GLN
1	W	87	GLN
2	X	224	ASN

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Mol	Chain	Res	Type
1	Y	76	GLN
1	Y	87	GLN
2	Z	224	ASN
1	a	29	GLN
1	a	76	GLN
1	a	87	GLN
1	a	196	GLN
2	b	224	ASN
1	c	76	GLN
1	c	87	GLN
2	d	224	ASN
1	e	76	GLN
1	e	87	GLN
2	f	224	ASN
1	g	76	GLN
1	g	87	GLN
2	h	224	ASN
1	i	76	GLN
1	i	87	GLN
1	i	196	GLN
2	j	224	ASN
1	k	76	GLN
1	k	196	GLN
2	l	224	ASN
1	m	76	GLN
2	n	224	ASN
1	o	76	GLN
1	o	87	GLN
2	p	224	ASN
1	q	76	GLN
1	q	87	GLN
1	q	196	GLN
2	r	224	ASN
1	s	76	GLN
1	s	87	GLN
1	s	196	GLN
2	t	224	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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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.

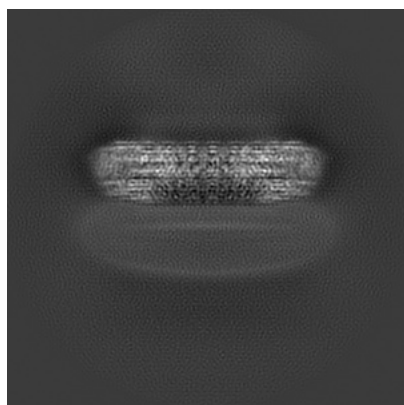
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-20833. These allow visual inspection of the internal detail of the map and identification of artifacts.

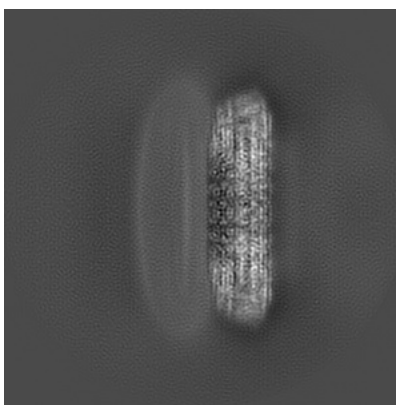
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

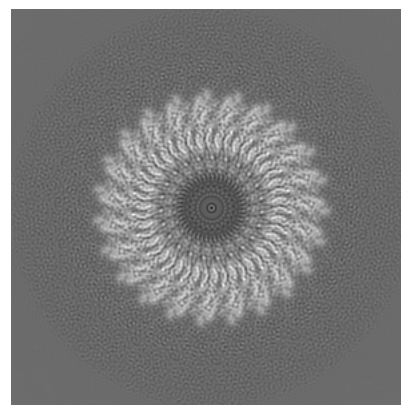
6.1.1 Primary map



X



Y

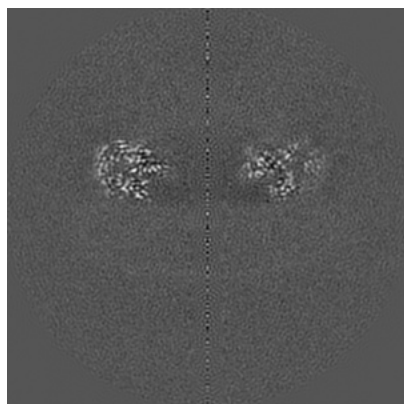


Z

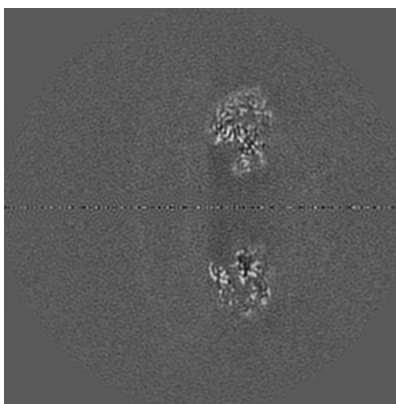
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

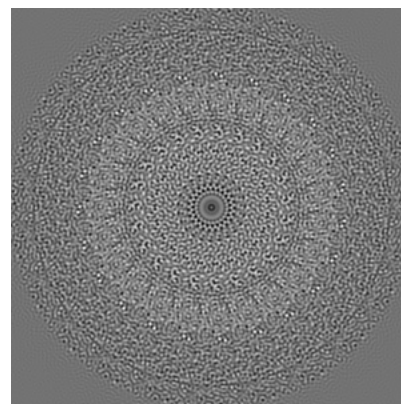
6.2.1 Primary map



X Index: 180



Y Index: 180

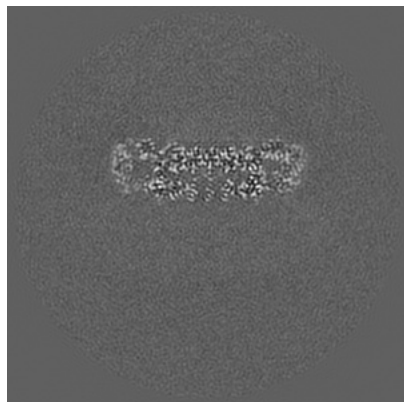


Z Index: 180

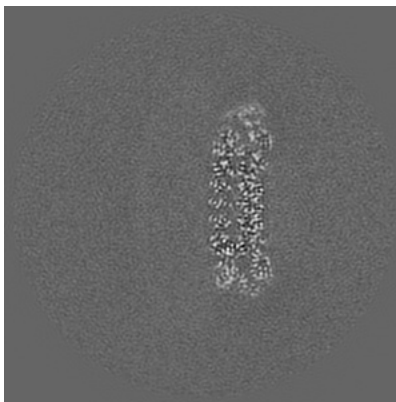
The images above show central slices of the map in three orthogonal directions.

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

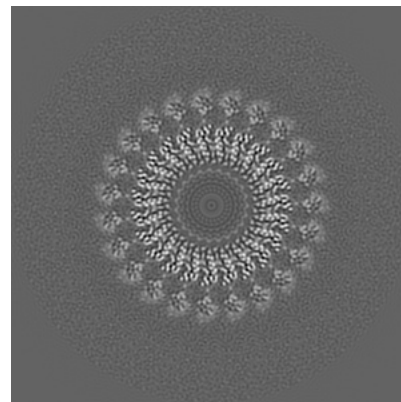
6.3.1 Primary map



X Index: 126



Y Index: 125

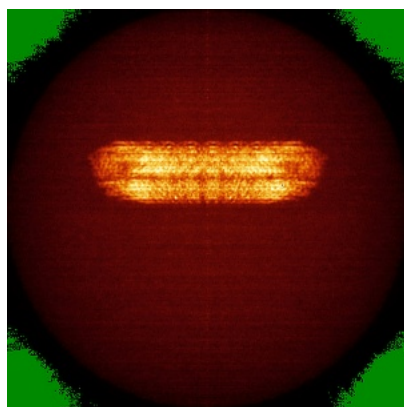


Z Index: 214

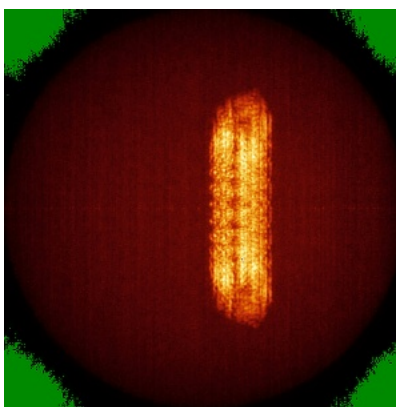
The images above show the largest variance slices of the map in three orthogonal directions.

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

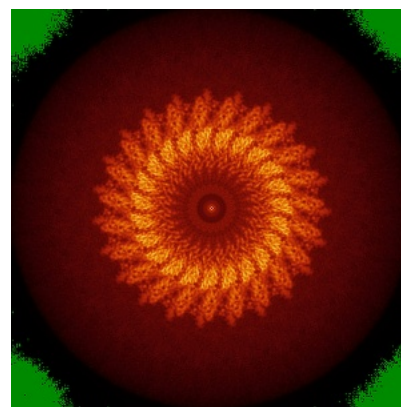
6.4.1 Primary map



X



Y

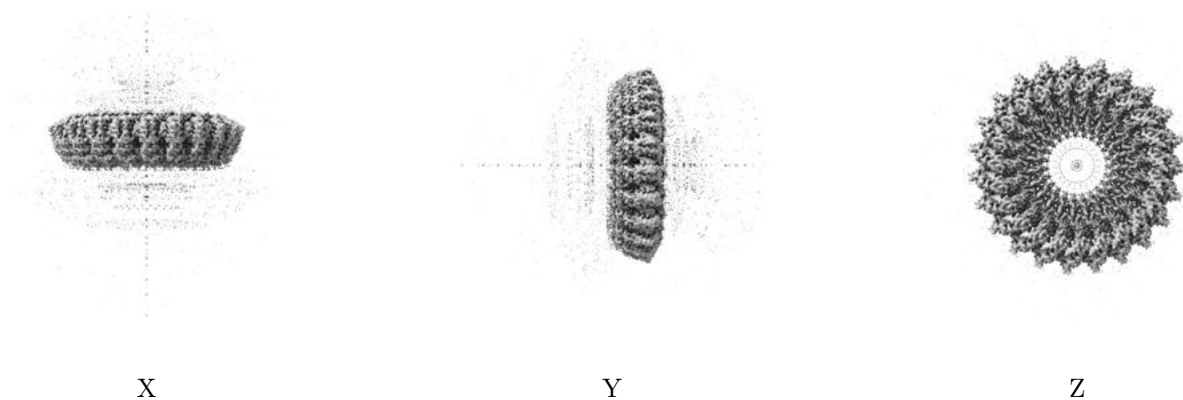


Z

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



The images above show the 3D surface view of the map at the recommended contour level 0.038. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

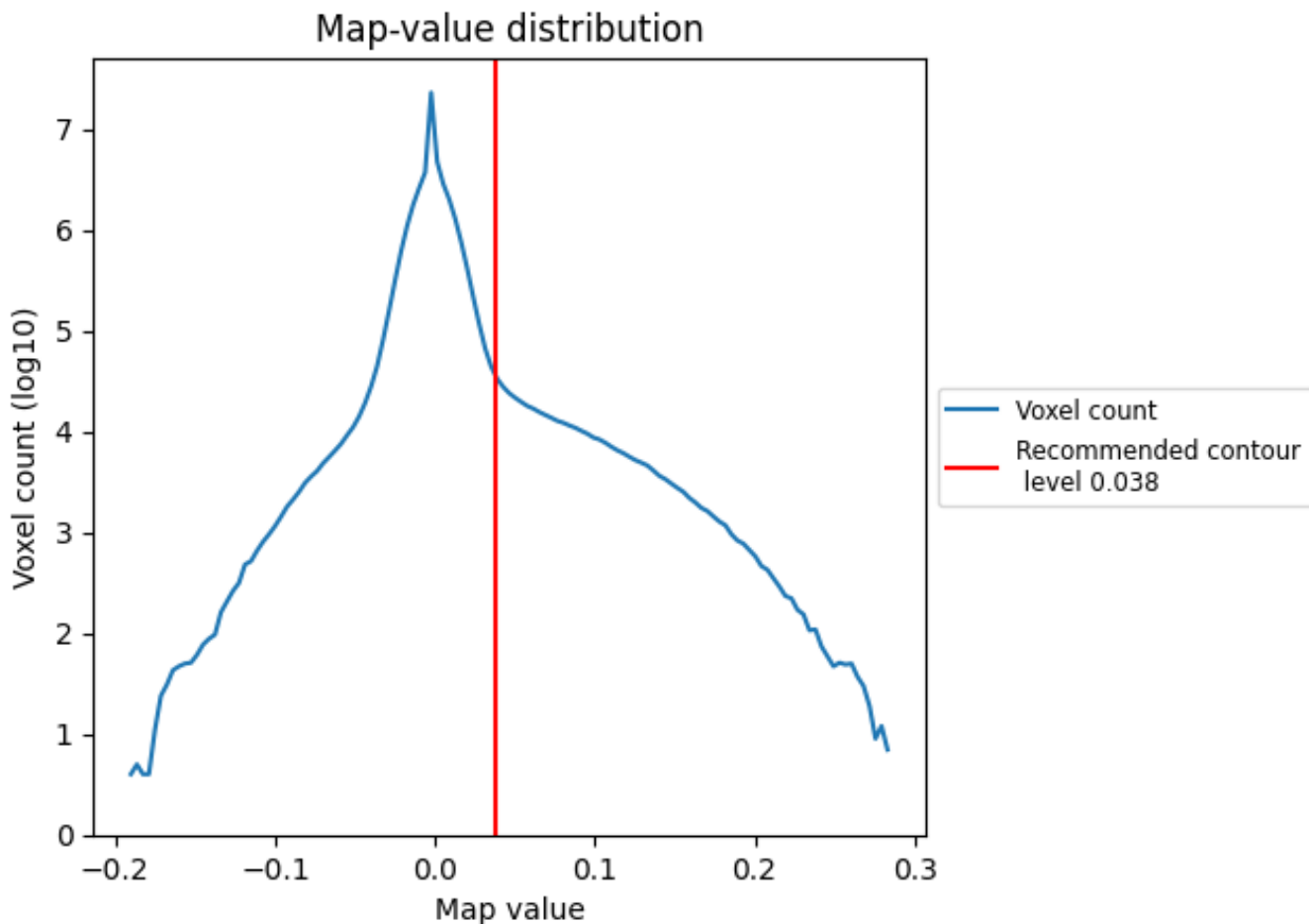
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

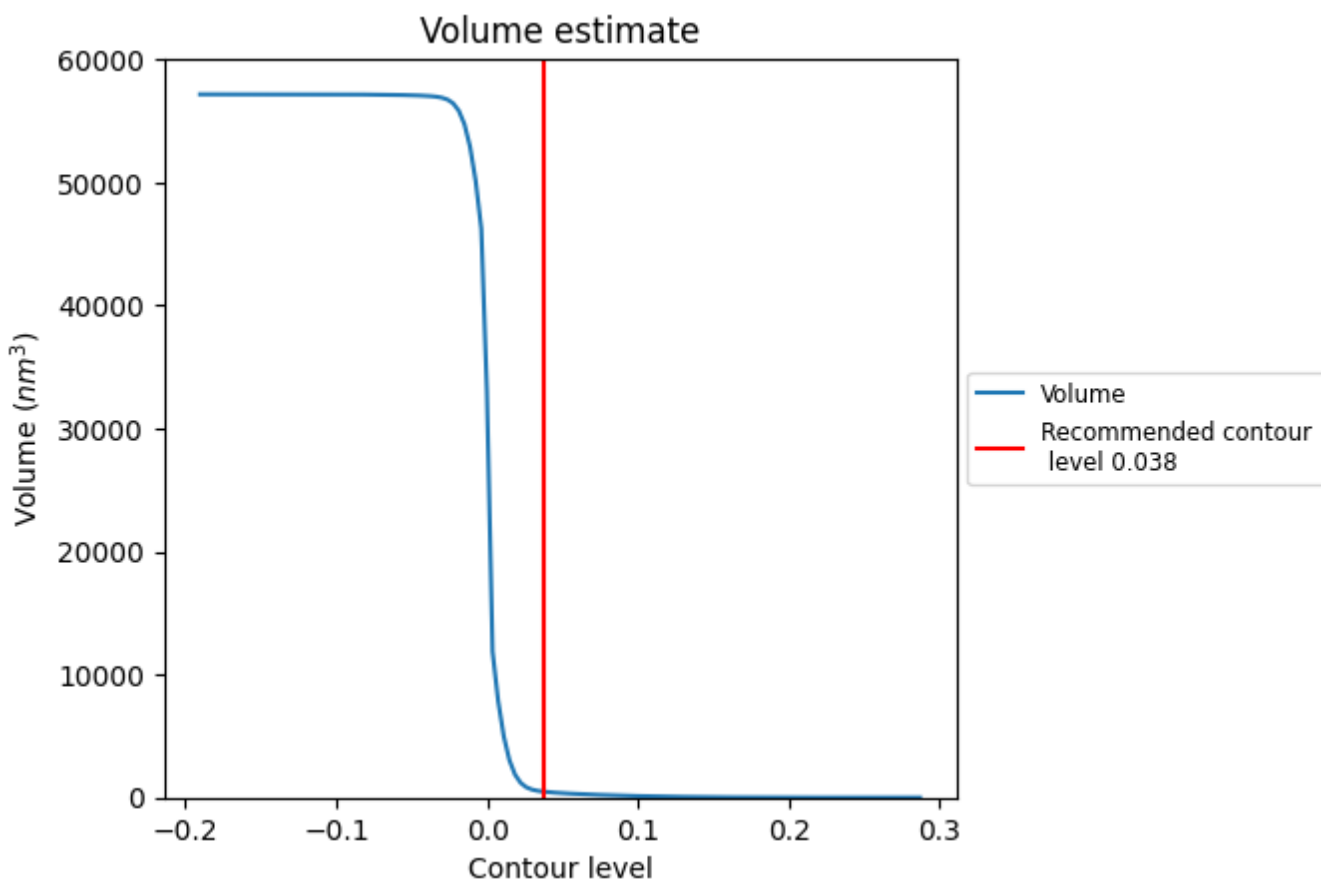
This section contains the results of statistical analysis of the map.

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.

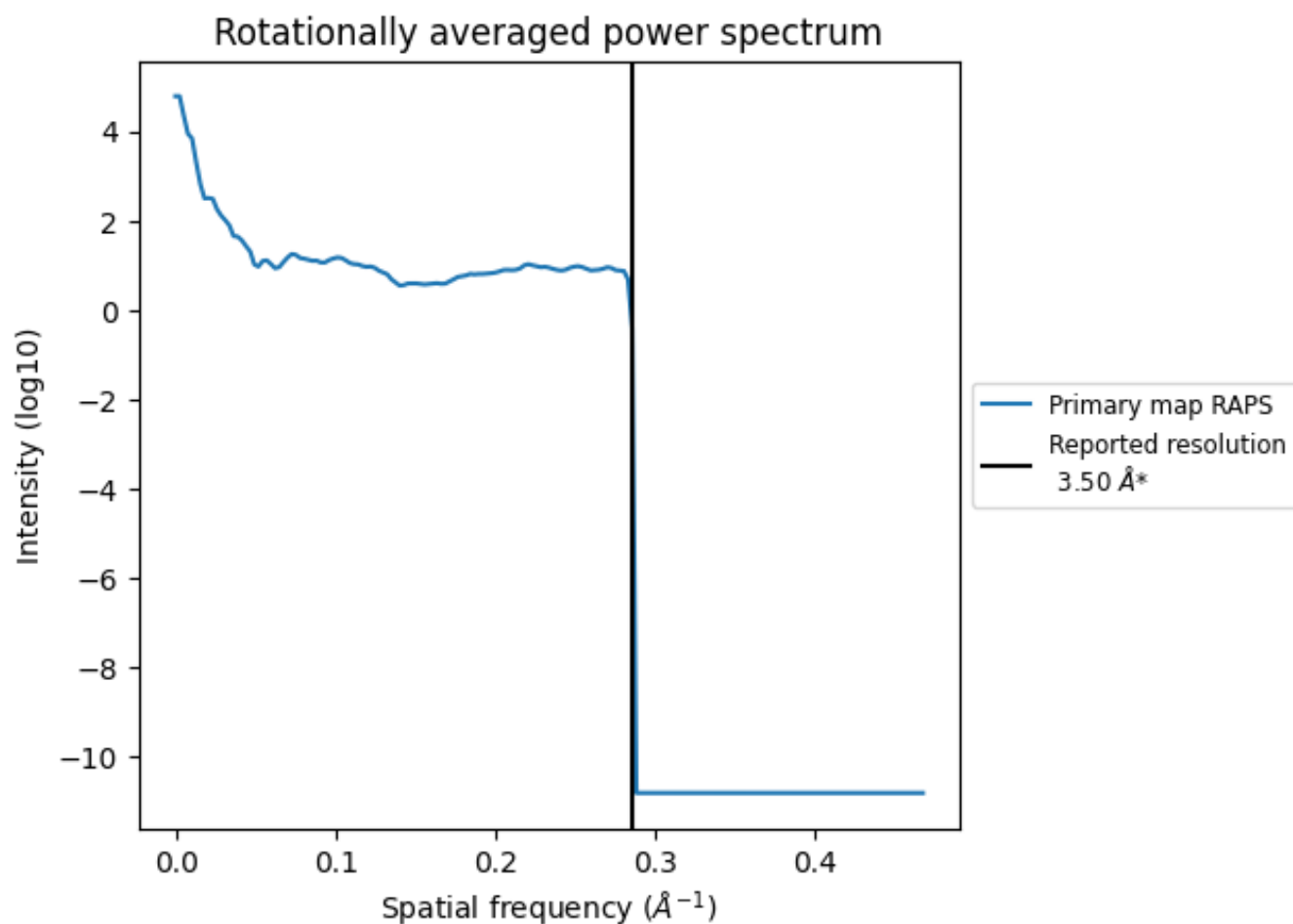
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 474 nm³; this corresponds to an approximate mass of 428 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 [\(i\)](#)

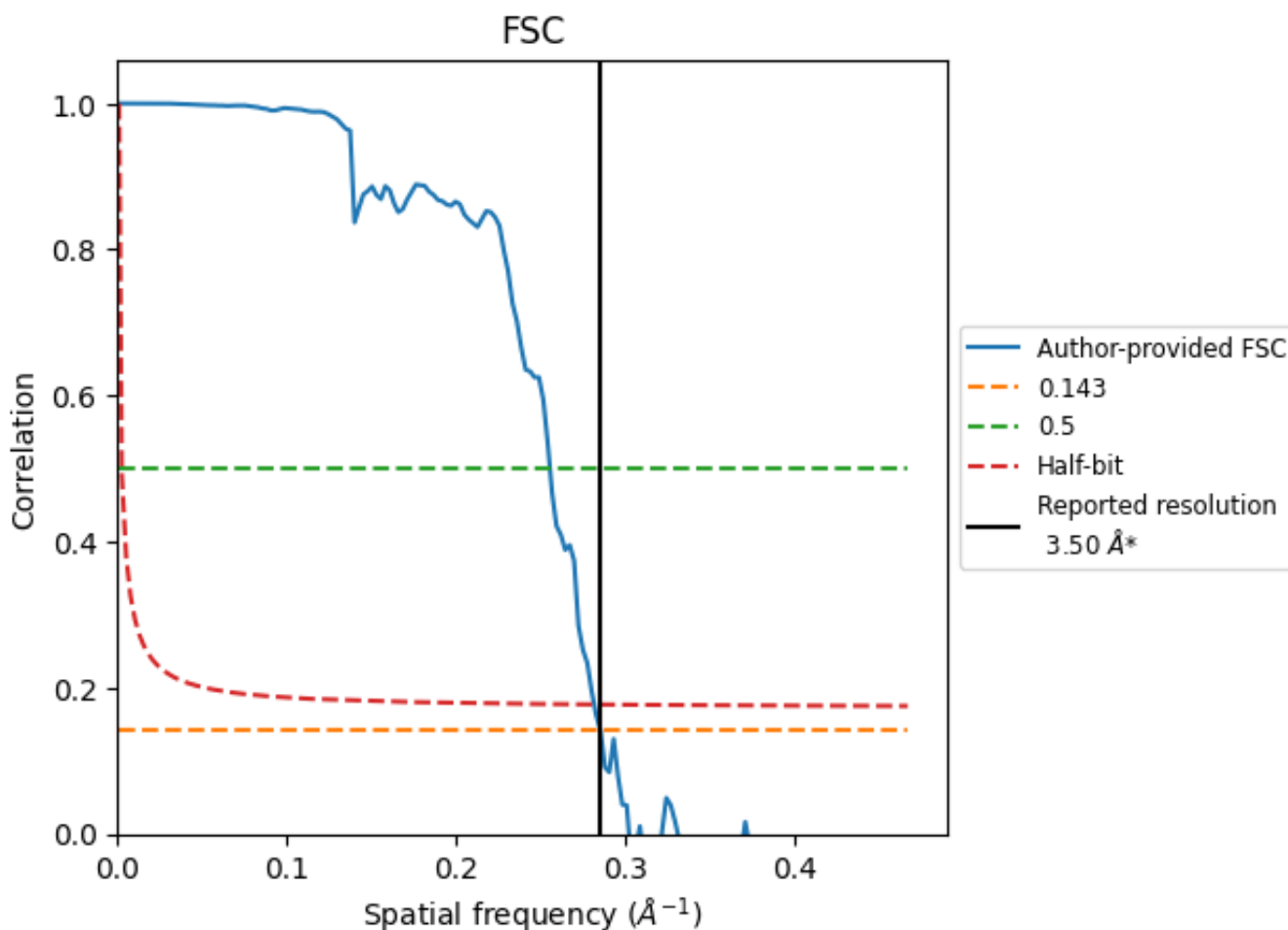


*Reported resolution corresponds to spatial frequency of 0.286 Å⁻¹

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 0.286 Å⁻¹

8.2 Resolution estimates [i](#)

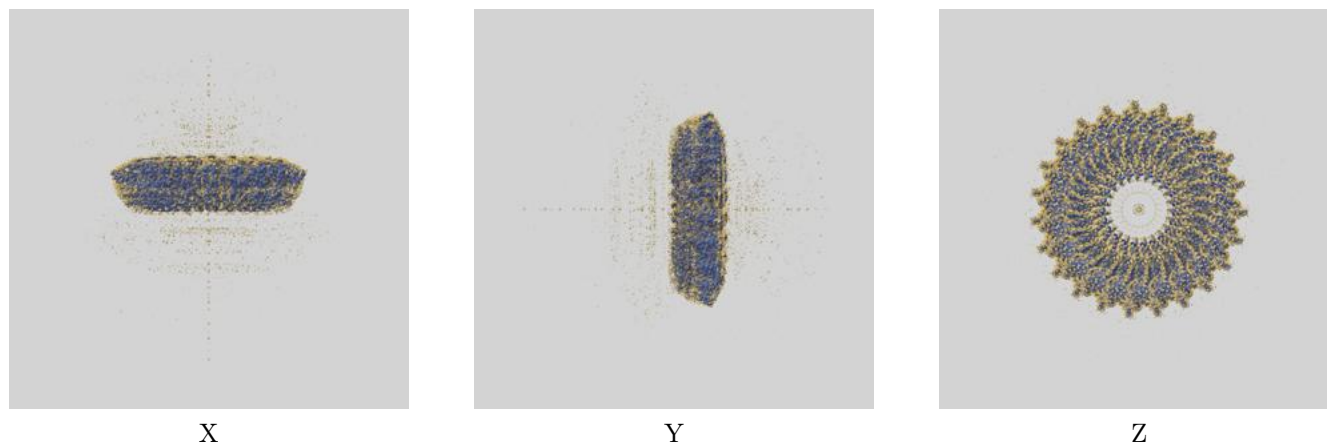
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.50	-	-
Author-provided FSC curve	3.50	3.91	3.55
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

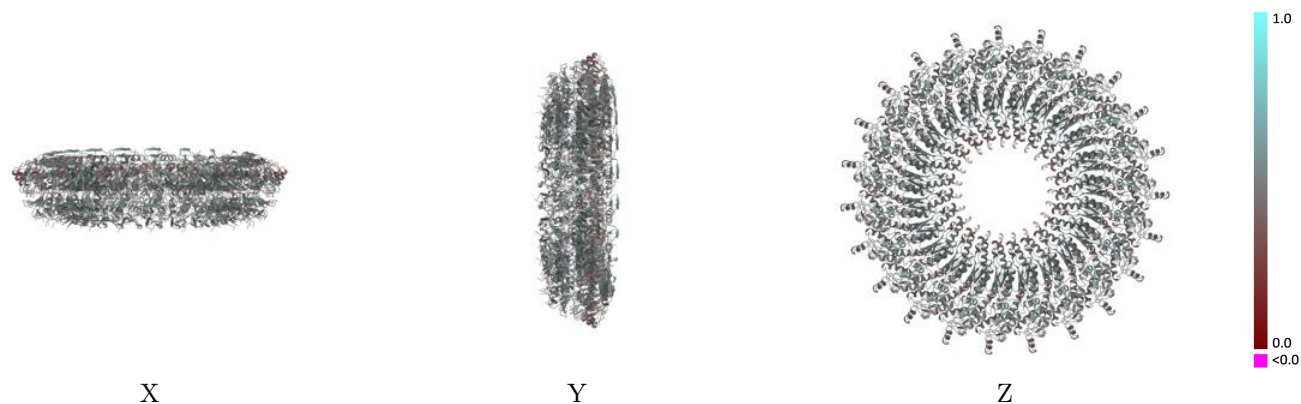
This section contains information regarding the fit between EMDB map EMD-20833 and PDB model 6UOV. Per-residue inclusion information can be found in section [3](#) on page [8](#).

9.1 Map-model overlay [i](#)



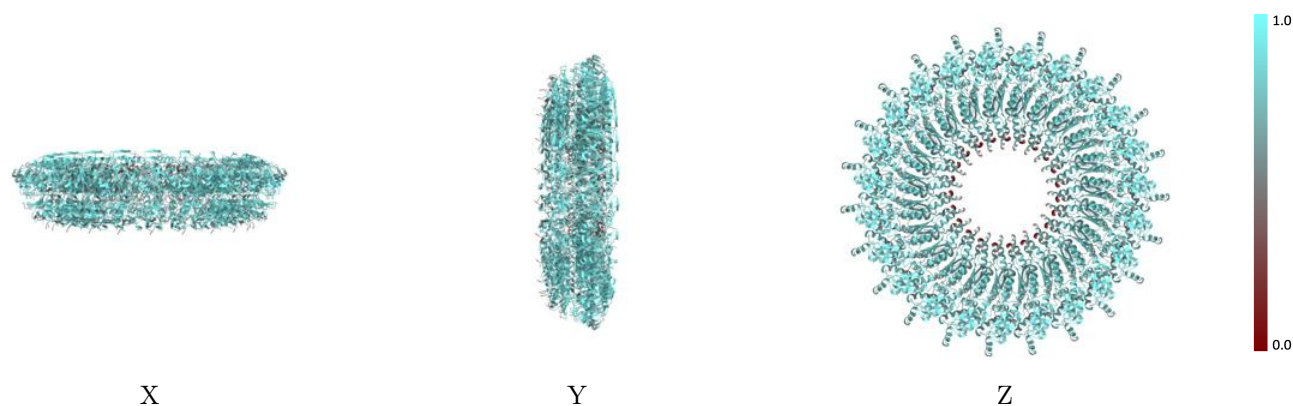
The images above show the 3D surface view of the map at the recommended contour level 0.038 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



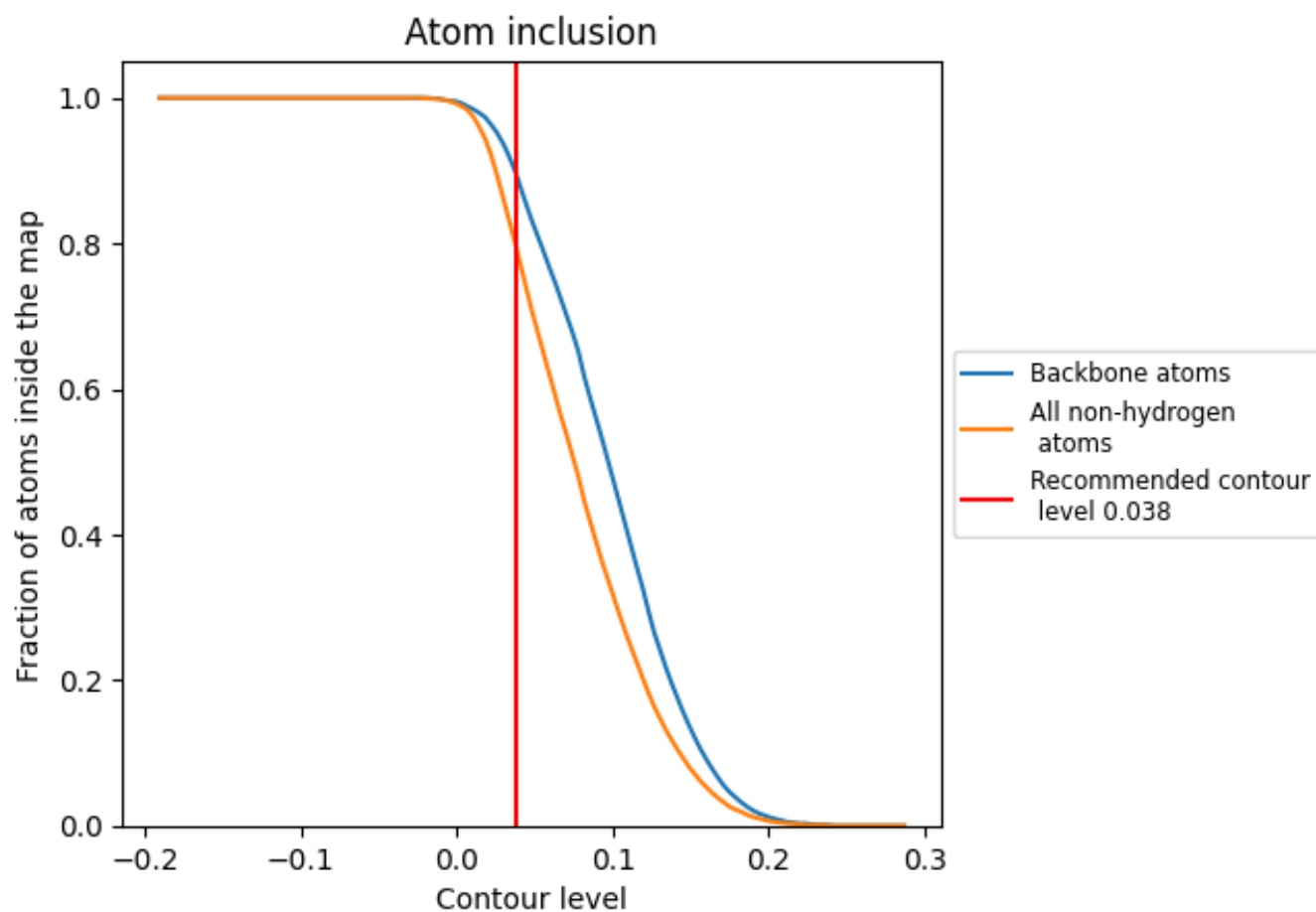
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.038).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 90% of all backbone atoms, 80% 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 (0.038) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7970	 0.4900
A	 0.7920	 0.5020
B	 0.8000	 0.4800
C	 0.7930	 0.5030
D	 0.8000	 0.4790
E	 0.7830	 0.5000
F	 0.8090	 0.4780
G	 0.7930	 0.5000
H	 0.8100	 0.4790
I	 0.7860	 0.5000
J	 0.8080	 0.4800
K	 0.7840	 0.5020
L	 0.8100	 0.4770
M	 0.7710	 0.4770
N	 0.8100	 0.4770
O	 0.7900	 0.5020
P	 0.8130	 0.4790
Q	 0.7900	 0.5040
R	 0.8050	 0.4790
S	 0.7830	 0.5040
T	 0.8110	 0.4790
U	 0.7880	 0.5030
V	 0.8050	 0.4790
W	 0.7880	 0.5030
X	 0.8120	 0.4780
Y	 0.7880	 0.5030
Z	 0.8020	 0.4810
a	 0.7880	 0.5000
b	 0.8050	 0.4820
c	 0.7910	 0.5040
d	 0.7980	 0.4810
e	 0.7880	 0.5000
f	 0.8010	 0.4810
g	 0.7890	 0.5020
h	 0.8020	 0.4820



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Chain	Atom inclusion	Q-score
i	 0.7850	 0.4960
j	 0.8040	 0.4790
k	 0.7850	 0.5020
l	 0.8030	 0.4810
m	 0.7850	 0.5040
n	 0.8040	 0.4810
o	 0.7900	 0.5020
p	 0.7990	 0.4800
q	 0.7930	 0.5030
r	 0.8060	 0.4790
s	 0.7890	 0.5020
t	 0.8110	 0.4780