



wwPDB EM Validation Summary Report ⓘ

Nov 22, 2023 – 01:17 PM EST

PDB ID : 8U11
EMDB ID : EMD-41792
Title : In situ cryo-EM structure of bacteriophage P22 gp1:gp5:gp4: gp10: gp9 N-term complex in conformation 2 at 3.1Å resolution
Authors : Iglesias, S.; Feng-Hou, C.; Cingolani, G.
Deposited on : 2023-08-30
Resolution : 3.10 Å(reported)

This is a wwPDB EM Validation Summary 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:

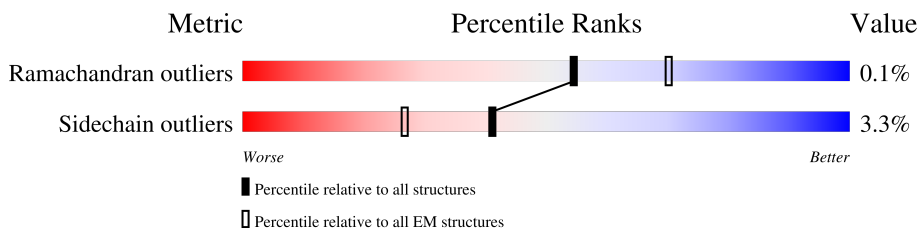
EMDB validation analysis : 0.0.1.dev70
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

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 3.10 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	1	472	5% (red), 97% (green), . (yellow)
1	2	472	8% (red), 98% (green), . (yellow)
1	3	472	7% (red), 97% (green), . (yellow)
1	4	472	5% (red), 97% (green), . (yellow)
1	5	472	6% (red), 97% (green), . (yellow)
1	6	472	7% (red), 97% (green), . (yellow)
2	10	667	. (red), 17% (green), . (yellow), 82% (grey)
2	11	667	. (red), 17% (green), . (yellow), 82% (grey)
2	12	667	. (red), 18% (green), . (yellow), 82% (grey)

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Mol	Chain	Length	Quality of chain
2	13	667	18% 82%
2	14	667	17% 82%
2	15	667	17% 82%
2	16	667	18% 82%
2	17	667	18% 82%
2	18	667	18% 82%
2	19	667	17% 82%
2	20	667	18% 82%
2	21	667	17% 82%
2	22	667	18% 82%
2	23	667	17% 82%
2	24	667	18% 82%
2	7	667	18% 82%
2	8	667	17% 82%
2	9	667	17% 82%
3	a	725	29% 73% 25%
3	b	725	27% 73% 25%
3	c	725	26% 73% 25%
3	d	725	26% 73% 25%
3	e	725	28% 72% 25%
3	f	725	26% 73% 25%
3	g	725	28% 73% 25%
3	h	725	27% 72% 25%
3	i	725	27% 73% 25%
3	j	725	29% 73% 25%

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Mol	Chain	Length	Quality of chain
3	k	725	29% 72% 25%
3	l	725	31% 72% 25%
4	m	166	20% 88% 8%
4	n	166	15% 88% 8%
4	o	166	17% 90% 8%
4	p	166	11% 90% 8%
4	q	166	14% 89% 8%
4	r	166	19% 91% 8%
4	s	166	11% 87% 5% 8%
4	t	166	13% 89% 8%
4	u	166	17% 87% 5% 8%
4	v	166	11% 89% 8%
4	x	166	10% 89% 8%
4	y	166	15% 89% 8%
5	A	430	8% 97% .
5	B	430	5% 94% . .
5	C	430	9% 97% .
5	D	430	7% 94% . .
5	E	430	10% 94% 5%
5	F	430	5% 93% . .
5	G	430	9% 97% .
5	H	430	6% 95% . .
5	I	430	6% 98% .
5	J	430	8% 95% . .

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 138386 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 Packaged DNA stabilization protein gp10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	1	471	Total 3683	C 2325	N 631	O 709	S 18	0	0
1	2	471	Total 3683	C 2325	N 631	O 709	S 18	0	0
1	3	471	Total 3683	C 2325	N 631	O 709	S 18	0	0
1	4	471	Total 3683	C 2325	N 631	O 709	S 18	0	0
1	5	471	Total 3683	C 2325	N 631	O 709	S 18	0	0
1	6	471	Total 3683	C 2325	N 631	O 709	S 18	0	0

- Molecule 2 is a protein called Tail spike protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	7	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	8	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	9	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	10	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	11	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	12	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	13	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	14	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	15	120	Total 934	C 595	N 156	O 182	S 1	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	16	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	17	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	18	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	19	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	20	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	21	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	22	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	23	120	Total 934	C 595	N 156	O 182	S 1	0	0
2	24	120	Total 934	C 595	N 156	O 182	S 1	0	0

- Molecule 3 is a protein called Portal protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	a	544	Total 4417	C 2791	N 756	O 850	S 20	0	0
3	b	544	Total 4417	C 2791	N 756	O 850	S 20	0	0
3	c	544	Total 4417	C 2791	N 756	O 850	S 20	0	0
3	d	544	Total 4417	C 2791	N 756	O 850	S 20	0	0
3	e	544	Total 4417	C 2791	N 756	O 850	S 20	0	0
3	l	544	Total 4417	C 2791	N 756	O 850	S 20	0	0
3	f	544	Total 4417	C 2791	N 756	O 850	S 20	0	0
3	k	544	Total 4417	C 2791	N 756	O 850	S 20	0	0
3	i	544	Total 4417	C 2791	N 756	O 850	S 20	0	0
3	j	544	Total 4417	C 2791	N 756	O 850	S 20	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
3	h	544	Total	C	N	O	S	0	0
			4417	2791	756	850	20		
3	g	544	Total	C	N	O	S	0	0
			4417	2791	756	850	20		

- Molecule 4 is a protein called Peptidoglycan hydrolase gp4.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	y	152	Total	C	N	O	S	0	0
			1166	731	200	229	6		
4	m	152	Total	C	N	O	S	0	0
			1166	731	200	229	6		
4	n	152	Total	C	N	O	S	0	0
			1166	731	200	229	6		
4	o	152	Total	C	N	O	S	0	0
			1166	731	200	229	6		
4	p	152	Total	C	N	O	S	0	0
			1166	731	200	229	6		
4	q	152	Total	C	N	O	S	0	0
			1166	731	200	229	6		
4	r	152	Total	C	N	O	S	0	0
			1166	731	200	229	6		
4	s	152	Total	C	N	O	S	0	0
			1166	731	200	229	6		
4	t	152	Total	C	N	O	S	0	0
			1166	731	200	229	6		
4	u	152	Total	C	N	O	S	0	0
			1166	731	200	229	6		
4	v	152	Total	C	N	O	S	0	0
			1166	731	200	229	6		
4	x	152	Total	C	N	O	S	0	0
			1166	731	200	229	6		

- Molecule 5 is a protein called Major capsid protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	429	Total	C	N	O	S	0	0
			3277	2053	568	643	13		
5	C	429	Total	C	N	O	S	0	0
			3277	2053	568	643	13		
5	A	429	Total	C	N	O	S	0	0
			3277	2053	568	643	13		

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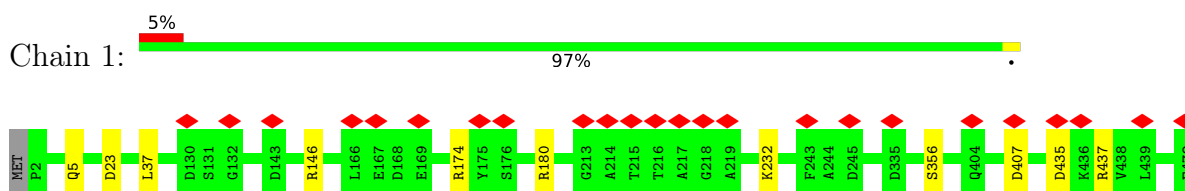
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Mol	Chain	Residues	Atoms					AltConf	Trace
5	G	429	Total	C	N	O	S	0	0
			3277	2053	568	643	13		
5	I	429	Total	C	N	O	S	0	0
			3277	2053	568	643	13		
5	D	421	Total	C	N	O	S	0	0
			3219	2017	558	631	13		
5	B	421	Total	C	N	O	S	0	0
			3219	2017	558	631	13		
5	F	421	Total	C	N	O	S	0	0
			3219	2017	558	631	13		
5	H	421	Total	C	N	O	S	0	0
			3219	2017	558	631	13		
5	J	421	Total	C	N	O	S	0	0
			3219	2017	558	631	13		

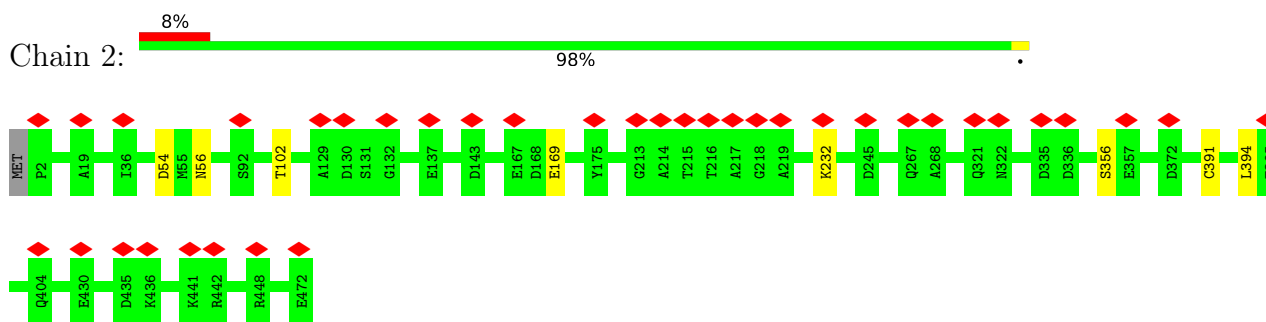
3 Residue-property plots [i](#)

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.

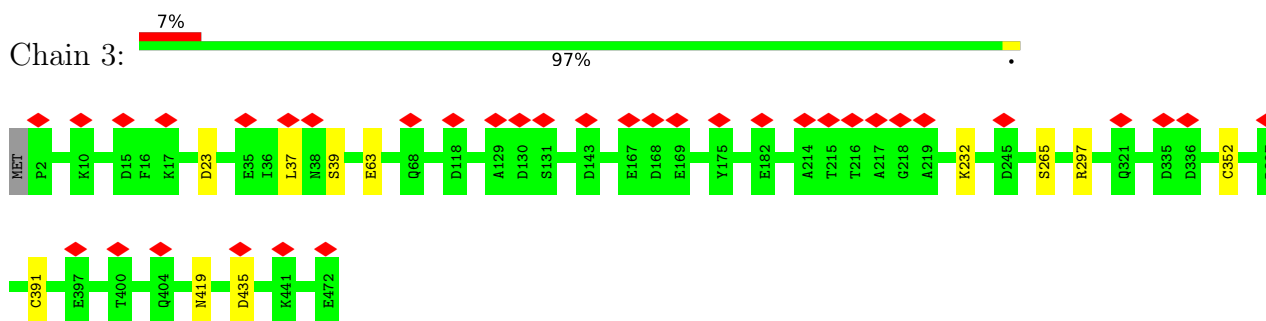
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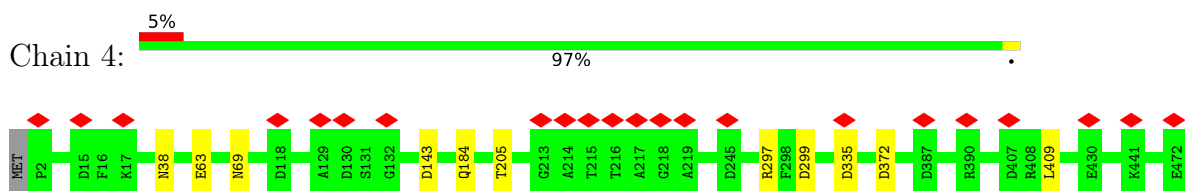
- Molecule 1: Packaged DNA stabilization protein gp10



- Molecule 1: Packaged DNA stabilization protein gp10



- Molecule 1: Packaged DNA stabilization protein gp10



SER THR SER ASP ILE T5 A6 N7 E19 D37 E54 N76 D94 A95 N96 D101 E117 Y124 SER VAL LYS LEU SER ASP TYR PRO THR LEU GLN ASP ALA THR SER ALA VAL ASP GLY LEU LEU THR LEU ALA THR LEU

● Molecule 2: Tail spike protein



MET THR ASP ILE T5 A6 N7 E19 D37 E54 N76 D94 A95 N96 D101 E117 Y124 SER VAL LYS LEU SER ASP TYR PRO THR LEU GLN ASP ALA THR SER ALA VAL ASP GLY LEU LEU THR LEU ALA THR LEU

ASP PHE GLY ILE T5 A6 N7 E19 D37 E54 N76 D94 A95 N96 D101 E117 Y124 SER VAL LYS LEU SER ASP TYR PRO THR LEU GLN ASP ALA THR SER ALA VAL ASP GLY LEU LEU THR LEU ALA THR LEU

ALA VAL THR LEU GLN SER ASP TYR PRO THR LEU GLN ASP ALA THR SER ALA VAL ASP GLY LEU LEU THR LEU ALA THR LEU

MET ALA PHE ARG GLY CYS HIS CYS MET VAL ALA ASN PRO GLY ASP TYR PRO THR LEU GLN ASP ALA THR SER ALA VAL ASP GLY LEU LEU THR LEU ALA THR LEU

ASN ASN PHE GLU ARG ASP GLY VAL THR SER ASP TYR PRO THR LEU GLN ASP ALA THR SER ALA VAL ASP GLY LEU LEU THR LEU ALA THR LEU

ASP THR MET ASN PRO GLU LEU ASP ARG HIS VAL THR SER ASP TYR PRO THR LEU GLN ASP ALA THR SER ALA VAL ASP GLY LEU LEU THR LEU ALA THR LEU

ALA GLY SER THR TYR LEU THR HIS VAL THR SER ASP TYR PRO THR LEU GLN ASP ALA THR SER ALA VAL ASP GLY LEU LEU THR LEU ALA THR LEU

PRO ASN THR VAL SER GLY THR MET VAL ASP TYR PRO THR LEU GLN ASP ALA THR SER ALA VAL ASP GLY LEU LEU THR LEU ALA THR LEU

HIS ILE ASN GLY ALA THR VAL THR SER ASP TYR PRO THR LEU GLN ASP ALA THR SER ALA VAL ASP GLY LEU LEU THR LEU ALA THR LEU

TYR TRP ASN GLU SER THR LEU LEU THR VAL THR SER ASP TYR PRO THR LEU GLN ASP ALA THR SER ALA VAL ASP GLY LEU LEU THR LEU

● Molecule 2: Tail spike protein



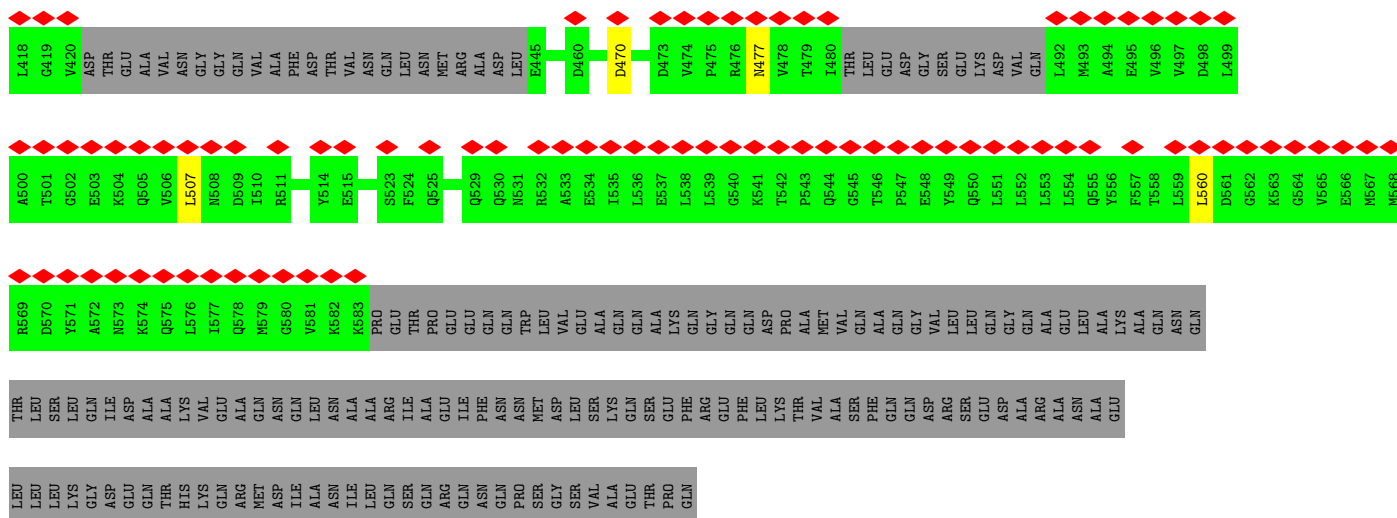
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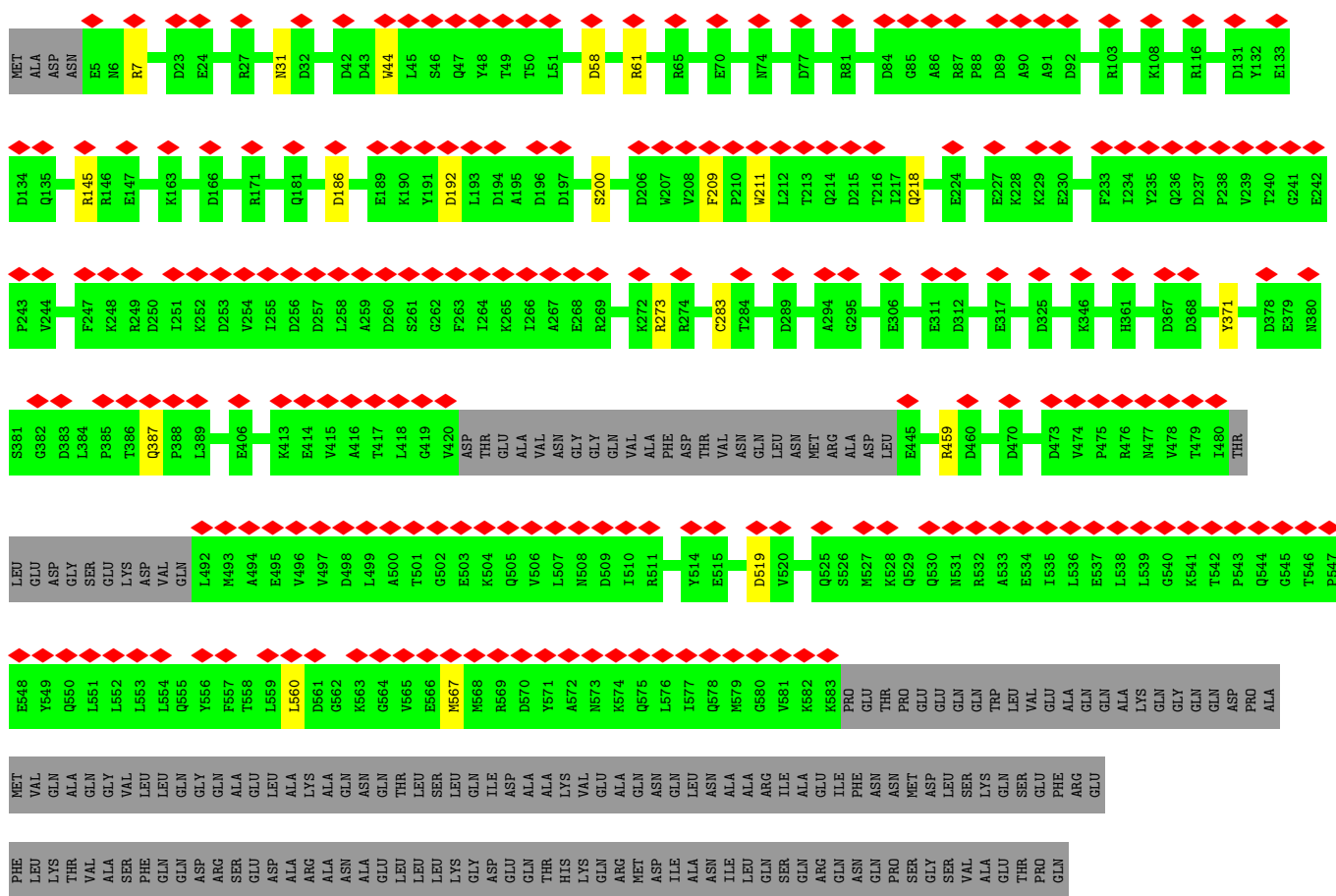
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GLU VAL HIS ARG ALA SER GLY MET PHE LEU PHE ARG GLY CYS HIS VAL THR SER ASP TYR PRO THR LEU GLN ASP ALA THR SER ALA VAL ASP GLY LEU LEU THR LEU

VAL SER ALA GLN PHE LEU ARG ASN GLY PHE LEU PHE ARG ASP TYR PRO THR LEU GLN ASP ALA THR SER ALA VAL ASP GLY LEU LEU THR LEU

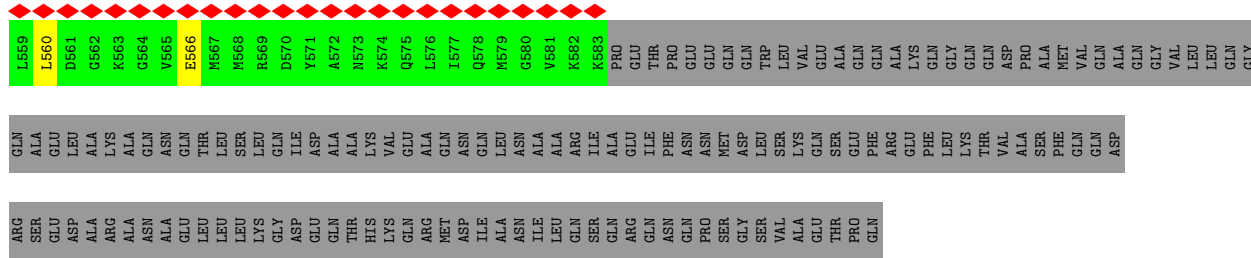


• Molecule 3: Portal protein

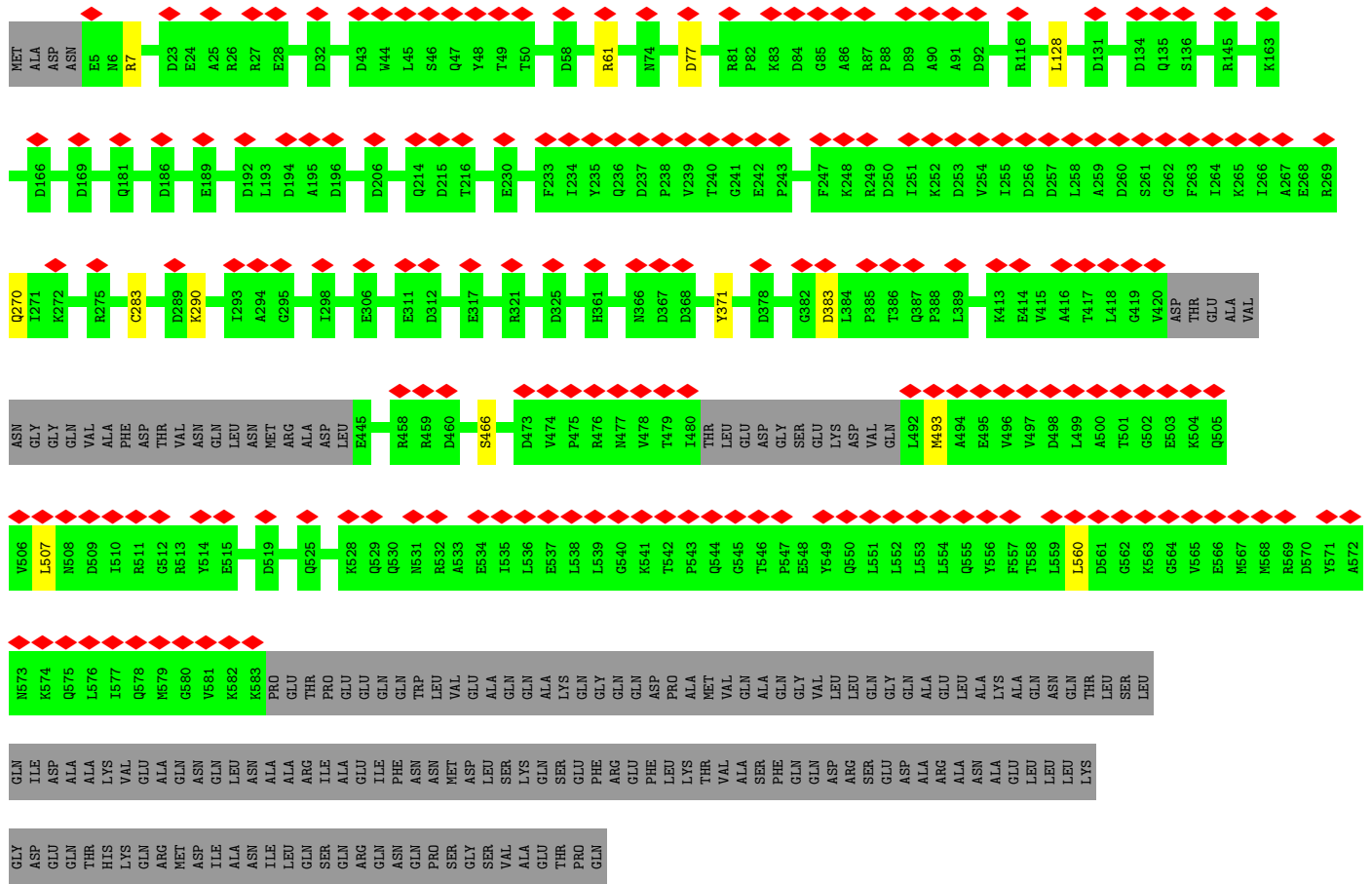


• Molecule 3: Portal protein

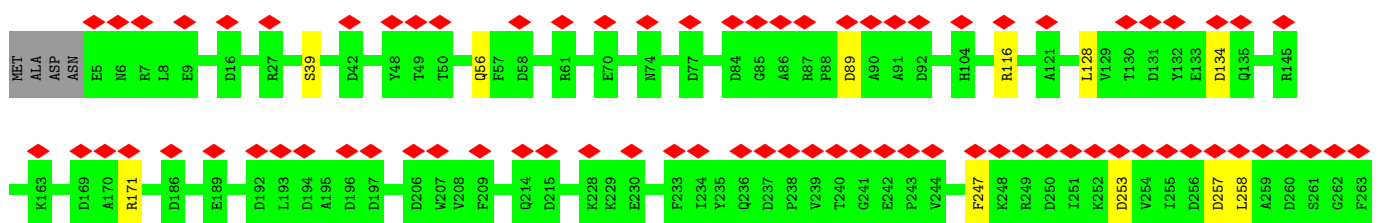


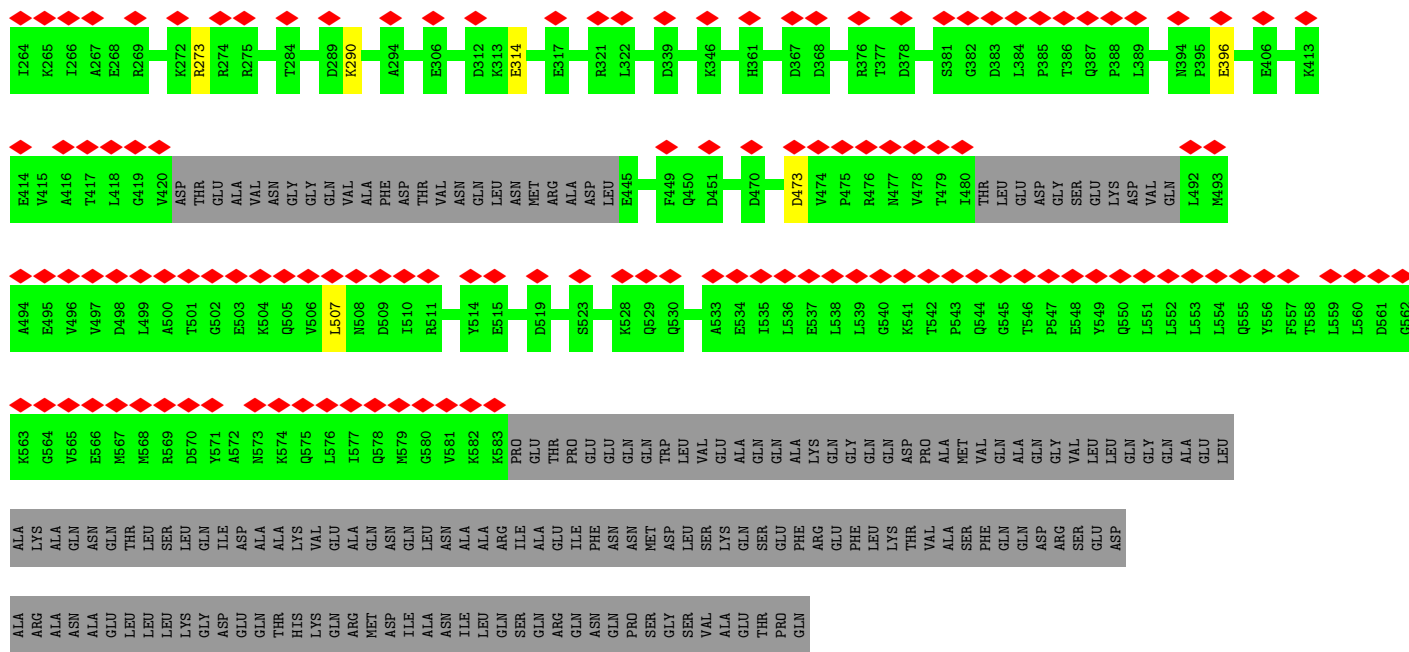


• Molecule 3: Portal protein

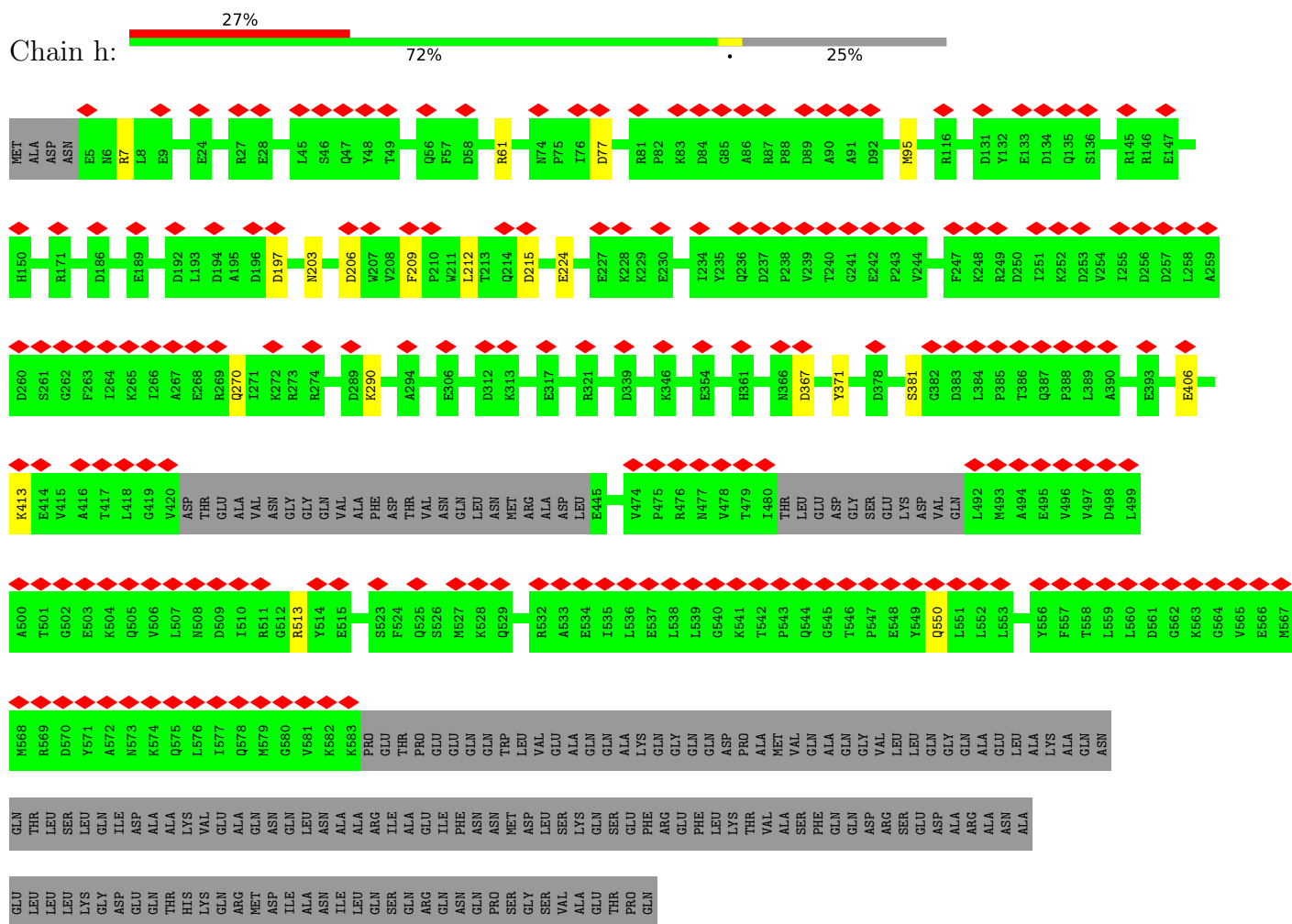


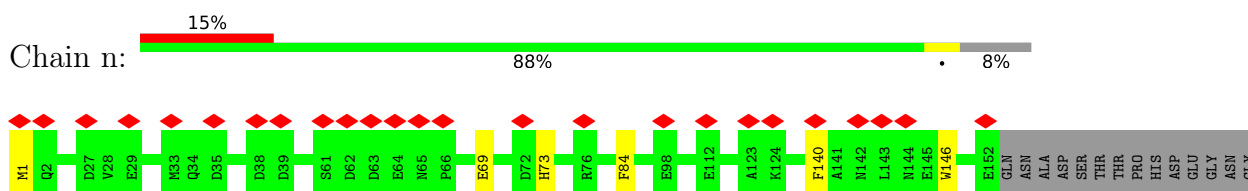
• Molecule 3: Portal protein



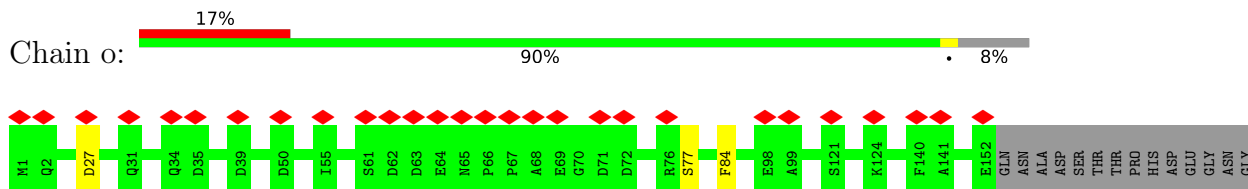


• Molecule 3: Portal protein

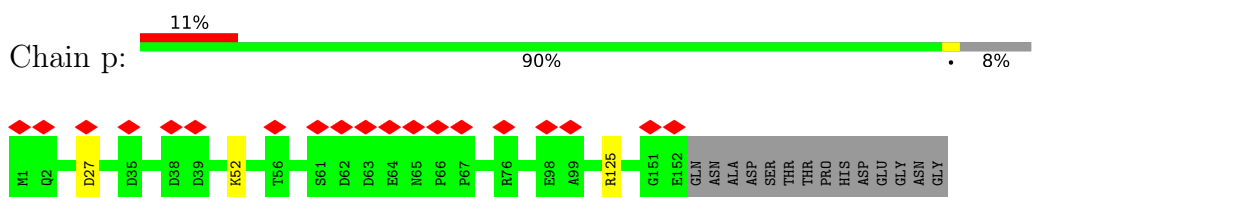




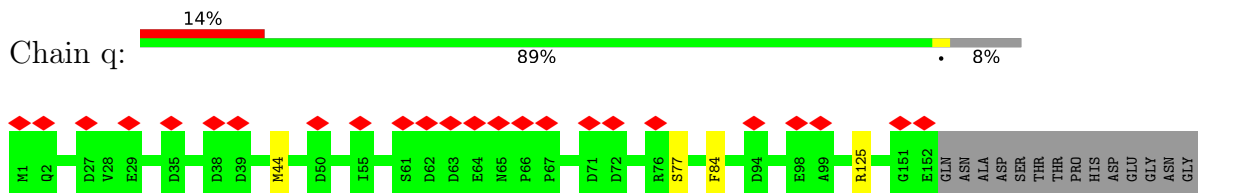
- Molecule 4: Peptidoglycan hydrolase gp4



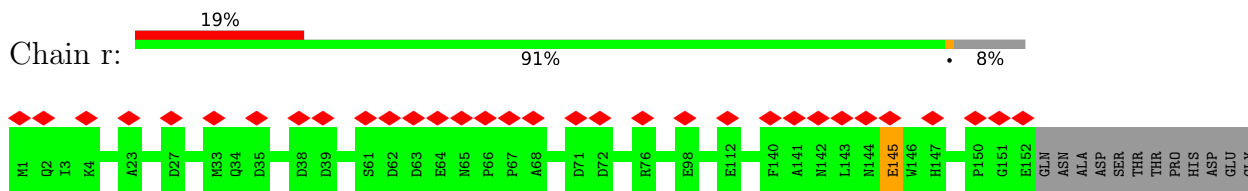
- Molecule 4: Peptidoglycan hydrolase gp4



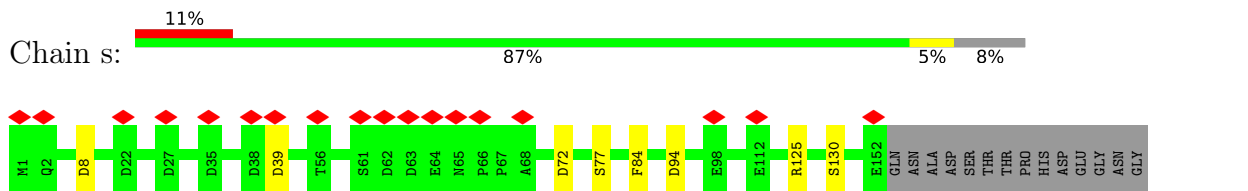
- Molecule 4: Peptidoglycan hydrolase gp4



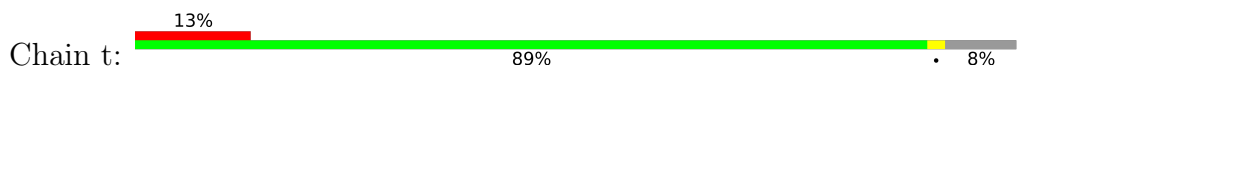
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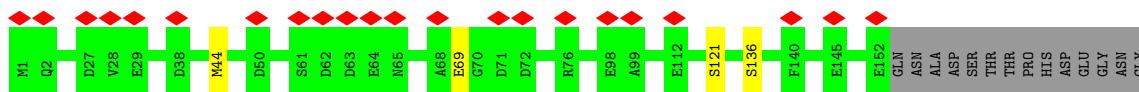


- Molecule 4: Peptidoglycan hydrolase gp4

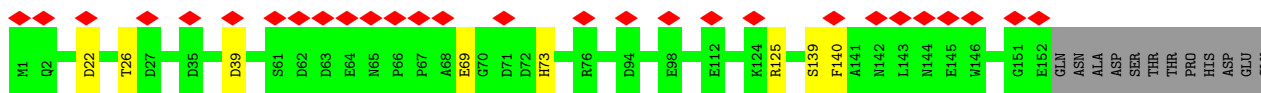
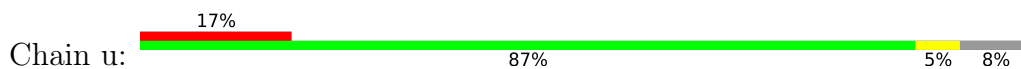


- Molecule 4: Peptidoglycan hydrolase gp4

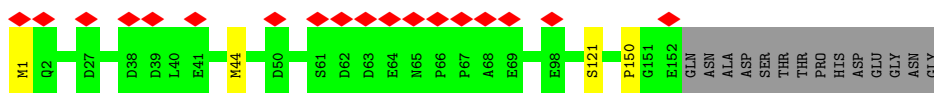
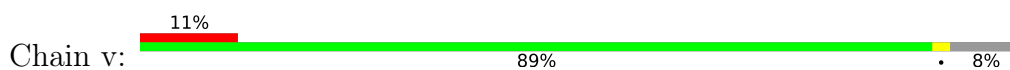




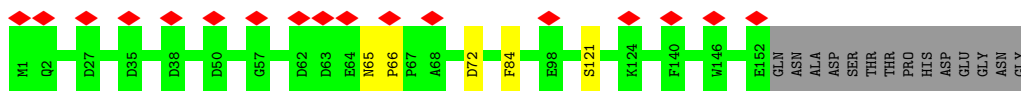
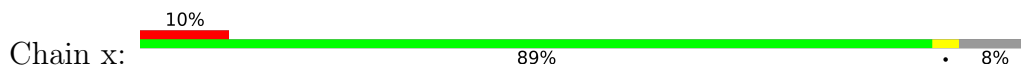
• Molecule 4: Peptidoglycan hydrolase gp4



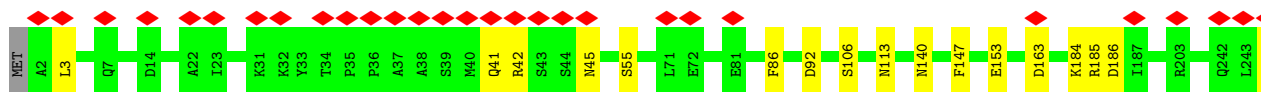
• Molecule 4: Peptidoglycan hydrolase gp4



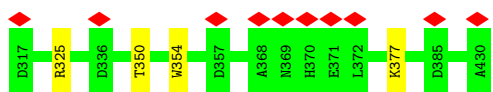
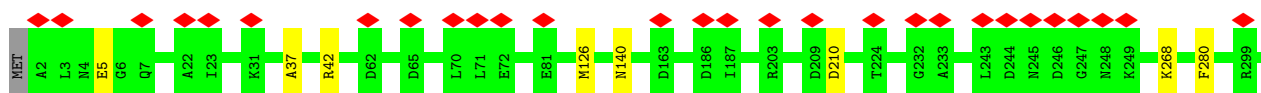
• Molecule 4: Peptidoglycan hydrolase gp4



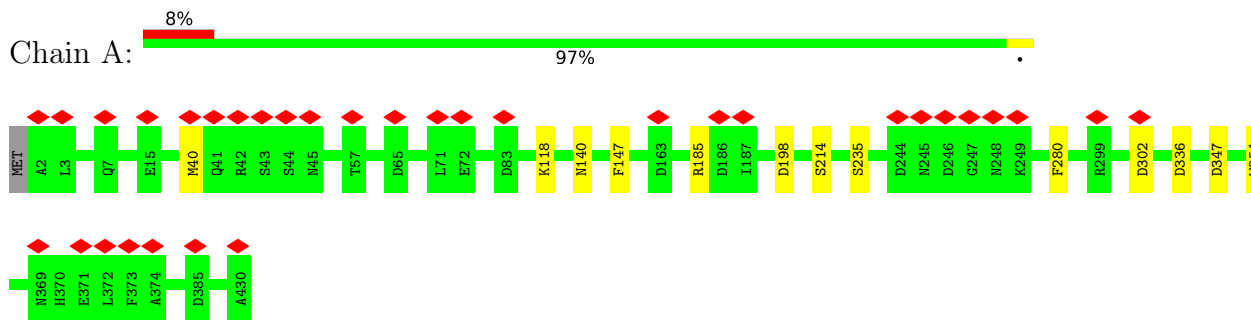
• Molecule 5: Major capsid protein



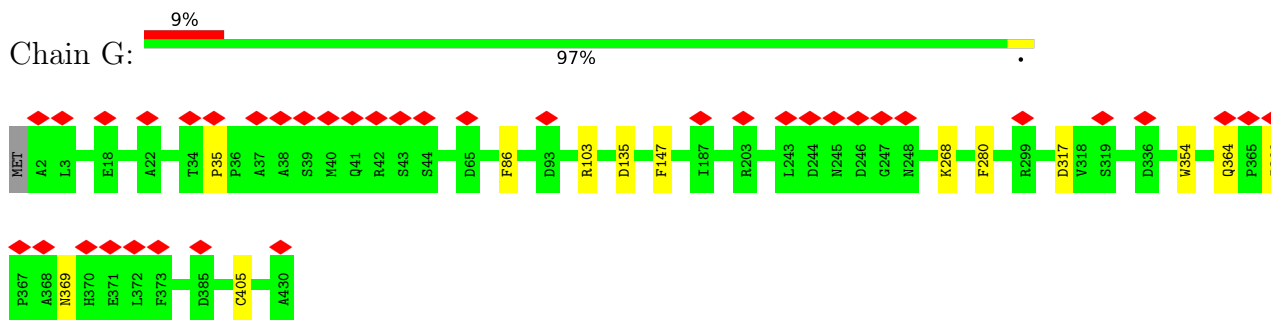
• Molecule 5: Major capsid protein



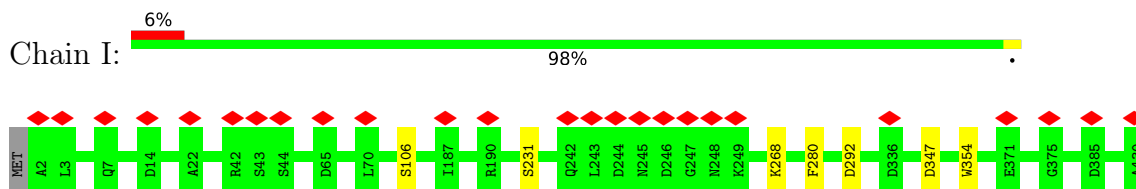
• Molecule 5: Major capsid protein



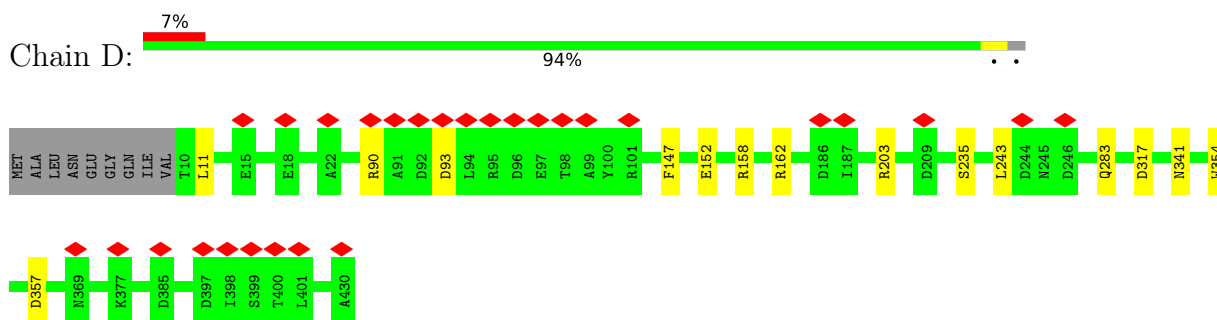
• Molecule 5: Major capsid protein



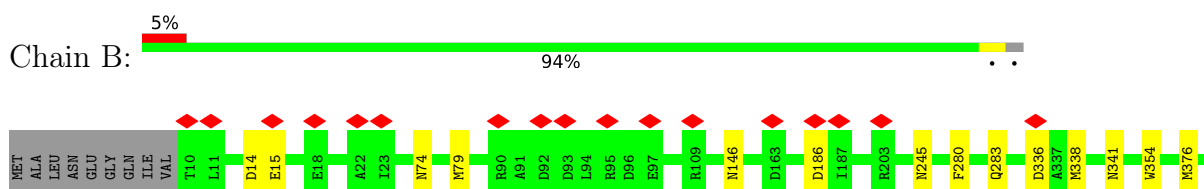
• Molecule 5: Major capsid protein

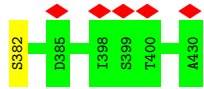


• Molecule 5: Major capsid protein

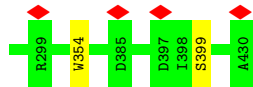
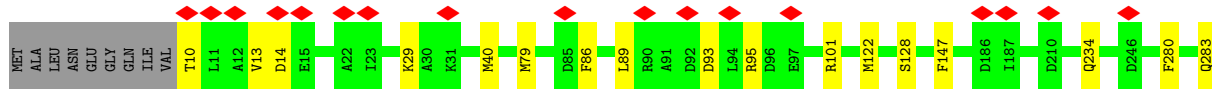
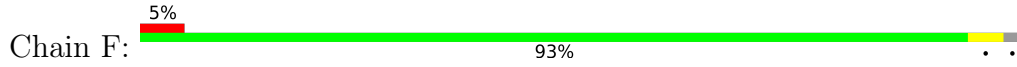


• Molecule 5: Major capsid protein

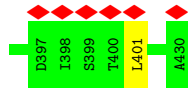
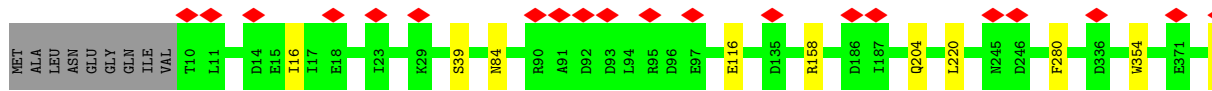




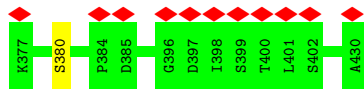
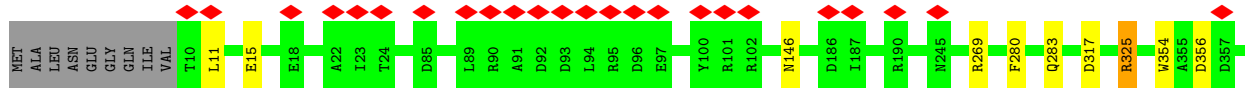
• Molecule 5: Major capsid protein



• Molecule 5: Major capsid protein



• Molecule 5: Major capsid protein



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	17944	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	1.08	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2100	Depositor
Magnification	29000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	23.428	Depositor
Minimum map value	-16.095	Depositor
Average map value	0.000	Depositor
Map value standard deviation	1.000	Depositor
Recommended contour level	3.5	Depositor
Map size (Å)	512.9599, 512.9599, 512.9599	wwPDB
Map dimensions	440, 440, 440	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.165818, 1.165818, 1.165818	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	1	0.35	0/3764	0.55	0/5097
1	2	0.36	0/3764	0.54	0/5097
1	3	0.34	0/3764	0.55	0/5097
1	4	0.36	0/3764	0.56	0/5097
1	5	0.34	0/3764	0.55	0/5097
1	6	0.34	0/3764	0.55	0/5097
2	10	0.33	0/953	0.53	1/1299 (0.1%)
2	11	0.36	0/953	0.51	0/1299
2	12	0.33	0/953	0.48	0/1299
2	13	0.33	0/953	0.49	0/1299
2	14	0.38	0/953	0.54	1/1299 (0.1%)
2	15	0.35	0/953	0.50	0/1299
2	16	0.33	0/953	0.50	0/1299
2	17	0.36	0/953	0.51	0/1299
2	18	0.34	0/953	0.49	0/1299
2	19	0.33	0/953	0.51	0/1299
2	20	0.36	0/953	0.50	0/1299
2	21	0.37	0/953	0.52	0/1299
2	22	0.32	0/953	0.48	0/1299
2	23	0.35	0/953	0.49	0/1299
2	24	0.35	0/953	0.49	0/1299
2	7	0.33	0/953	0.51	0/1299
2	8	0.37	0/953	0.60	1/1299 (0.1%)
2	9	0.37	0/953	0.54	0/1299
3	a	0.34	0/4512	0.51	0/6117
3	b	0.35	0/4512	0.52	0/6117
3	c	0.34	0/4512	0.54	3/6117 (0.0%)
3	d	0.34	0/4512	0.51	0/6117
3	e	0.34	0/4512	0.50	0/6117
3	f	0.34	0/4512	0.51	0/6117
3	g	0.34	0/4512	0.51	0/6117
3	h	0.34	0/4512	0.50	0/6117
3	i	0.34	0/4512	0.51	0/6117
3	j	0.34	0/4512	0.51	0/6117

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
3	k	0.34	0/4512	0.51	0/6117
3	l	0.34	0/4512	0.51	0/6117
4	m	0.34	0/1191	0.51	0/1614
4	n	0.35	0/1191	0.50	0/1614
4	o	0.35	0/1191	0.52	0/1614
4	p	0.36	0/1191	0.51	0/1614
4	q	0.36	0/1191	0.51	0/1614
4	r	0.36	0/1191	0.52	0/1614
4	s	0.37	0/1191	0.51	0/1614
4	t	0.36	0/1191	0.52	0/1614
4	u	0.36	0/1191	0.53	0/1614
4	v	0.37	0/1191	0.51	0/1614
4	x	0.37	0/1191	0.52	0/1614
4	y	0.35	0/1191	0.50	0/1614
5	A	0.36	0/3335	0.53	0/4535
5	B	0.37	0/3277	0.54	0/4456
5	C	0.35	0/3335	0.53	0/4535
5	D	0.36	0/3277	0.52	0/4456
5	E	0.35	0/3335	0.53	0/4535
5	F	0.38	0/3277	0.54	1/4456 (0.0%)
5	G	0.36	0/3335	0.54	0/4535
5	H	0.37	0/3277	0.54	1/4456 (0.0%)
5	I	0.37	0/3335	0.54	0/4535
5	J	0.38	0/3277	0.54	0/4456
All	All	0.35	0/141234	0.52	8/191691 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	1	0	1
1	6	0	1
3	a	0	1
3	e	0	1
3	f	0	1
3	k	0	2
3	l	0	2
4	r	0	1
4	u	0	1
5	C	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
5	D	0	1
5	G	0	1
5	H	0	1
5	J	0	1
All	All	0	16

There are no bond length outliers.

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	c	561	ASP	CB-CA-C	-10.45	89.51	110.40
3	c	89	ASP	CB-CG-OD1	5.60	123.34	118.30
5	H	401	LEU	CA-CB-CG	5.40	127.72	115.30
2	10	112	ASP	CB-CG-OD1	5.34	123.10	118.30
3	c	561	ASP	N-CA-CB	-5.31	101.03	110.60

There are no chirality outliers.

5 of 16 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	1	437	ARG	Sidechain
1	6	408	ARG	Sidechain
3	a	376	ARG	Sidechain
3	e	37	ARG	Sidechain
3	l	61	ARG	Sidechain

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	1	469/472 (99%)	427 (91%)	42 (9%)	0	100	100
1	2	469/472 (99%)	435 (93%)	34 (7%)	0	100	100
1	3	469/472 (99%)	428 (91%)	41 (9%)	0	100	100
1	4	469/472 (99%)	425 (91%)	44 (9%)	0	100	100
1	5	469/472 (99%)	425 (91%)	44 (9%)	0	100	100
1	6	469/472 (99%)	437 (93%)	32 (7%)	0	100	100
2	10	118/667 (18%)	108 (92%)	10 (8%)	0	100	100
2	11	118/667 (18%)	112 (95%)	6 (5%)	0	100	100
2	12	118/667 (18%)	114 (97%)	4 (3%)	0	100	100
2	13	118/667 (18%)	113 (96%)	5 (4%)	0	100	100
2	14	118/667 (18%)	112 (95%)	6 (5%)	0	100	100
2	15	118/667 (18%)	111 (94%)	7 (6%)	0	100	100
2	16	118/667 (18%)	111 (94%)	7 (6%)	0	100	100
2	17	118/667 (18%)	110 (93%)	8 (7%)	0	100	100
2	18	118/667 (18%)	108 (92%)	10 (8%)	0	100	100
2	19	118/667 (18%)	112 (95%)	6 (5%)	0	100	100
2	20	118/667 (18%)	111 (94%)	7 (6%)	0	100	100
2	21	118/667 (18%)	111 (94%)	7 (6%)	0	100	100
2	22	118/667 (18%)	110 (93%)	8 (7%)	0	100	100
2	23	118/667 (18%)	110 (93%)	8 (7%)	0	100	100
2	24	118/667 (18%)	114 (97%)	4 (3%)	0	100	100
2	7	118/667 (18%)	111 (94%)	7 (6%)	0	100	100
2	8	118/667 (18%)	110 (93%)	8 (7%)	0	100	100
2	9	118/667 (18%)	113 (96%)	5 (4%)	0	100	100
3	a	538/725 (74%)	511 (95%)	27 (5%)	0	100	100
3	b	538/725 (74%)	512 (95%)	26 (5%)	0	100	100
3	c	538/725 (74%)	508 (94%)	28 (5%)	2 (0%)	34	69
3	d	538/725 (74%)	508 (94%)	30 (6%)	0	100	100
3	e	538/725 (74%)	511 (95%)	26 (5%)	1 (0%)	47	79
3	f	538/725 (74%)	507 (94%)	31 (6%)	0	100	100
3	g	538/725 (74%)	505 (94%)	33 (6%)	0	100	100
3	h	538/725 (74%)	510 (95%)	27 (5%)	1 (0%)	47	79

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	i	538/725 (74%)	513 (95%)	25 (5%)	0	100	100
3	j	538/725 (74%)	513 (95%)	25 (5%)	0	100	100
3	k	538/725 (74%)	507 (94%)	29 (5%)	2 (0%)	34	69
3	l	538/725 (74%)	508 (94%)	30 (6%)	0	100	100
4	m	150/166 (90%)	143 (95%)	7 (5%)	0	100	100
4	n	150/166 (90%)	147 (98%)	3 (2%)	0	100	100
4	o	150/166 (90%)	141 (94%)	9 (6%)	0	100	100
4	p	150/166 (90%)	147 (98%)	3 (2%)	0	100	100
4	q	150/166 (90%)	142 (95%)	8 (5%)	0	100	100
4	r	150/166 (90%)	142 (95%)	7 (5%)	1 (1%)	22	57
4	s	150/166 (90%)	147 (98%)	3 (2%)	0	100	100
4	t	150/166 (90%)	149 (99%)	1 (1%)	0	100	100
4	u	150/166 (90%)	141 (94%)	8 (5%)	1 (1%)	22	57
4	v	150/166 (90%)	145 (97%)	5 (3%)	0	100	100
4	x	150/166 (90%)	144 (96%)	5 (3%)	1 (1%)	22	57
4	y	150/166 (90%)	143 (95%)	7 (5%)	0	100	100
5	A	427/430 (99%)	392 (92%)	35 (8%)	0	100	100
5	B	419/430 (97%)	396 (94%)	22 (5%)	1 (0%)	47	79
5	C	427/430 (99%)	400 (94%)	25 (6%)	2 (0%)	29	64
5	D	419/430 (97%)	405 (97%)	13 (3%)	1 (0%)	47	79
5	E	427/430 (99%)	396 (93%)	31 (7%)	0	100	100
5	F	419/430 (97%)	397 (95%)	21 (5%)	1 (0%)	47	79
5	G	427/430 (99%)	387 (91%)	39 (9%)	1 (0%)	47	79
5	H	419/430 (97%)	398 (95%)	20 (5%)	1 (0%)	47	79
5	I	427/430 (99%)	396 (93%)	31 (7%)	0	100	100
5	J	419/430 (97%)	397 (95%)	21 (5%)	1 (0%)	47	79
All	All	17424/29830 (58%)	16386 (94%)	1021 (6%)	17 (0%)	54	83

5 of 17 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	r	145	GLU
3	k	209	PHE

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Mol	Chain	Res	Type
3	h	209	PHE
5	C	37	ALA
5	F	283	GLN

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	1	394/395 (100%)	384 (98%)	10 (2%)	47	75
1	2	394/395 (100%)	386 (98%)	8 (2%)	55	80
1	3	394/395 (100%)	383 (97%)	11 (3%)	43	73
1	4	394/395 (100%)	383 (97%)	11 (3%)	43	73
1	5	394/395 (100%)	383 (97%)	11 (3%)	43	73
1	6	394/395 (100%)	382 (97%)	12 (3%)	41	71
2	10	103/548 (19%)	99 (96%)	4 (4%)	32	65
2	11	103/548 (19%)	98 (95%)	5 (5%)	25	57
2	12	103/548 (19%)	100 (97%)	3 (3%)	42	72
2	13	103/548 (19%)	102 (99%)	1 (1%)	76	90
2	14	103/548 (19%)	96 (93%)	7 (7%)	16	45
2	15	103/548 (19%)	95 (92%)	8 (8%)	12	40
2	16	103/548 (19%)	102 (99%)	1 (1%)	76	90
2	17	103/548 (19%)	102 (99%)	1 (1%)	76	90
2	18	103/548 (19%)	103 (100%)	0	100	100
2	19	103/548 (19%)	99 (96%)	4 (4%)	32	65
2	20	103/548 (19%)	100 (97%)	3 (3%)	42	72
2	21	103/548 (19%)	97 (94%)	6 (6%)	20	51
2	22	103/548 (19%)	100 (97%)	3 (3%)	42	72
2	23	103/548 (19%)	99 (96%)	4 (4%)	32	65
2	24	103/548 (19%)	101 (98%)	2 (2%)	57	81

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	7	103/548 (19%)	101 (98%)	2 (2%)	57	81
2	8	103/548 (19%)	100 (97%)	3 (3%)	42	72
2	9	103/548 (19%)	98 (95%)	5 (5%)	25	57
3	a	480/630 (76%)	465 (97%)	15 (3%)	40	70
3	b	480/630 (76%)	466 (97%)	14 (3%)	42	72
3	c	480/630 (76%)	467 (97%)	13 (3%)	44	74
3	d	480/630 (76%)	468 (98%)	12 (2%)	47	75
3	e	480/630 (76%)	461 (96%)	19 (4%)	31	65
3	f	480/630 (76%)	466 (97%)	14 (3%)	42	72
3	g	480/630 (76%)	463 (96%)	17 (4%)	36	68
3	h	480/630 (76%)	461 (96%)	19 (4%)	31	65
3	i	480/630 (76%)	467 (97%)	13 (3%)	44	74
3	j	480/630 (76%)	463 (96%)	17 (4%)	36	68
3	k	480/630 (76%)	462 (96%)	18 (4%)	33	66
3	l	480/630 (76%)	462 (96%)	18 (4%)	33	66
4	m	120/131 (92%)	114 (95%)	6 (5%)	24	57
4	n	120/131 (92%)	114 (95%)	6 (5%)	24	57
4	o	120/131 (92%)	117 (98%)	3 (2%)	47	75
4	p	120/131 (92%)	117 (98%)	3 (2%)	47	75
4	q	120/131 (92%)	116 (97%)	4 (3%)	38	69
4	r	120/131 (92%)	120 (100%)	0	100	100
4	s	120/131 (92%)	112 (93%)	8 (7%)	16	46
4	t	120/131 (92%)	116 (97%)	4 (3%)	38	69
4	u	120/131 (92%)	114 (95%)	6 (5%)	24	57
4	v	120/131 (92%)	116 (97%)	4 (3%)	38	69
4	x	120/131 (92%)	116 (97%)	4 (3%)	38	69
4	y	120/131 (92%)	116 (97%)	4 (3%)	38	69
5	A	351/352 (100%)	338 (96%)	13 (4%)	34	66
5	B	345/352 (98%)	331 (96%)	14 (4%)	30	64
5	C	351/352 (100%)	342 (97%)	9 (3%)	46	74
5	D	345/352 (98%)	332 (96%)	13 (4%)	33	66

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
5	E	351/352 (100%)	328 (93%)	23 (7%)	16	47
5	F	345/352 (98%)	328 (95%)	17 (5%)	25	57
5	G	351/352 (100%)	340 (97%)	11 (3%)	40	70
5	H	345/352 (98%)	337 (98%)	8 (2%)	50	77
5	I	351/352 (100%)	344 (98%)	7 (2%)	55	80
5	J	345/352 (98%)	335 (97%)	10 (3%)	42	72
All	All	14898/24886 (60%)	14407 (97%)	491 (3%)	41	69

5 of 491 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	l	283	CYS
5	B	15	GLU
3	i	270	GLN
5	D	317	ASP
5	H	16	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 33 such sidechains are listed below:

Mol	Chain	Res	Type
5	I	389	ASN
5	B	74	ASN
5	F	171	ASN
2	18	86	GLN
2	16	46	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no 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.

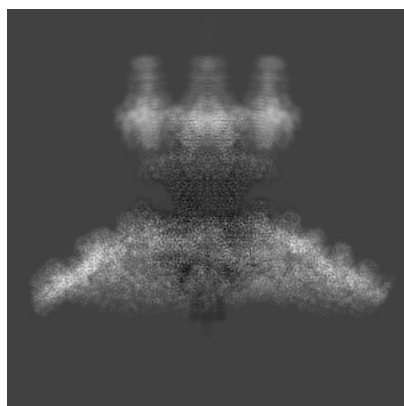
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-41792. These allow visual inspection of the internal detail of the map and identification of artifacts.

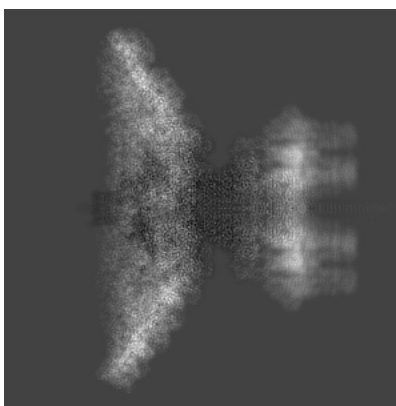
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

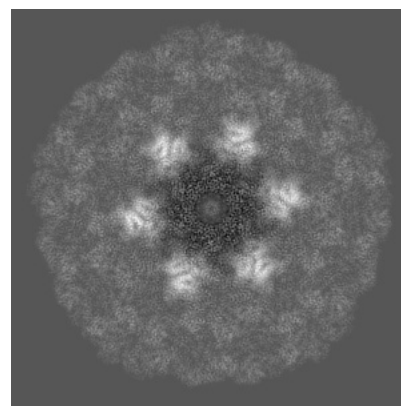
6.1.1 Primary map



X

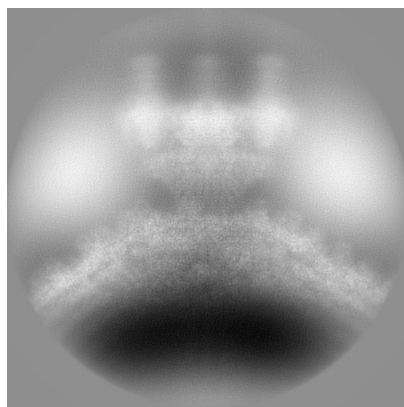


Y

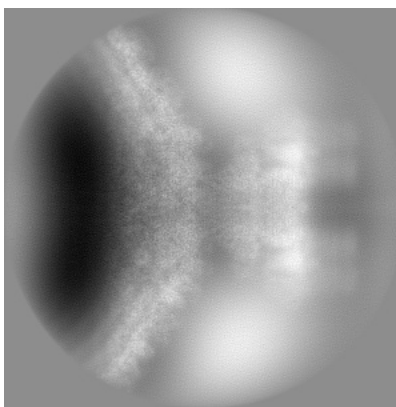


Z

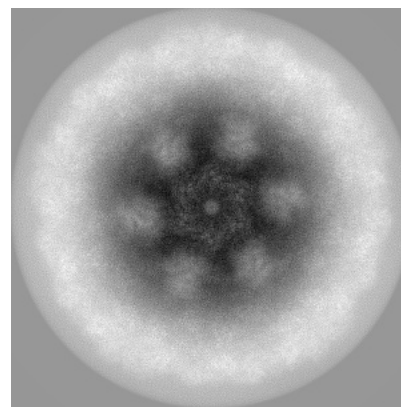
6.1.2 Raw map



X



Y

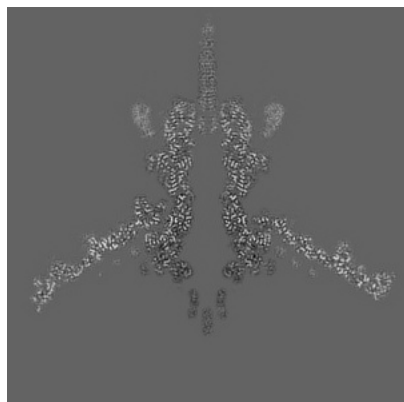


Z

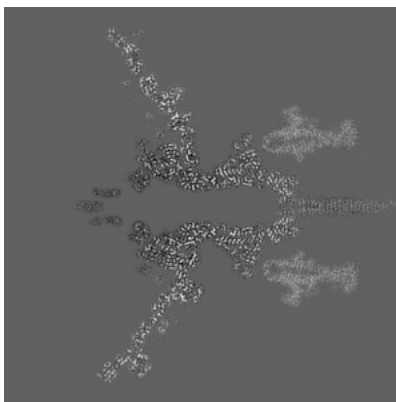
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

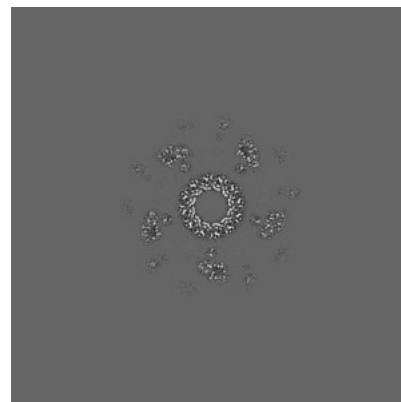
6.2.1 Primary map



X Index: 220

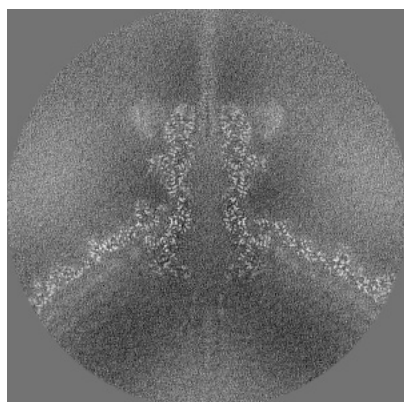


Y Index: 220

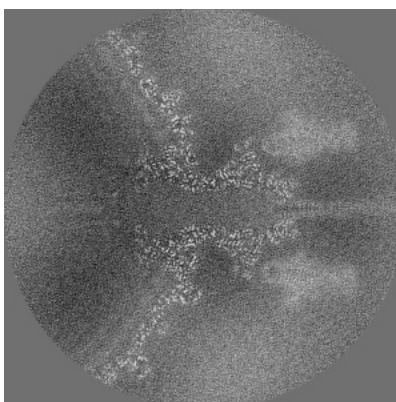


Z Index: 220

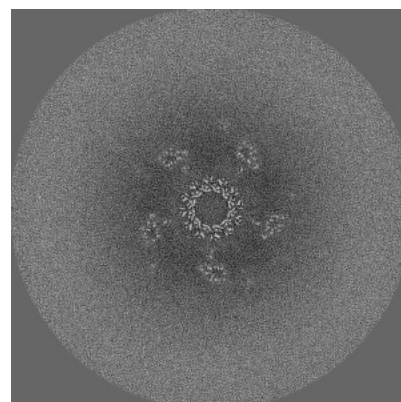
6.2.2 Raw map



X Index: 220



Y Index: 220

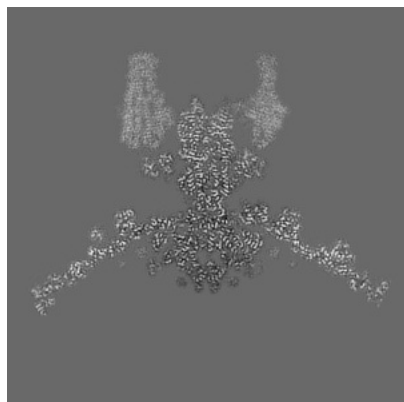


Z Index: 220

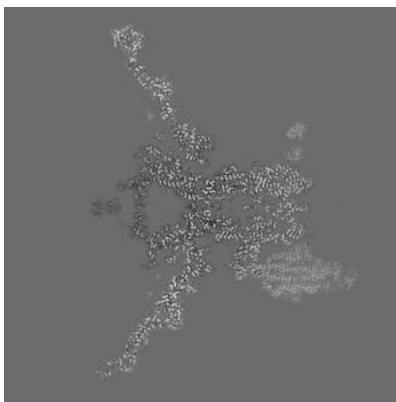
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

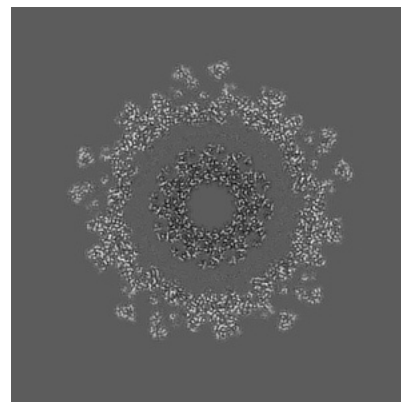
6.3.1 Primary map



X Index: 188

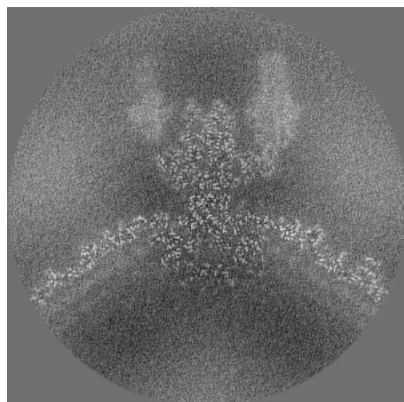


Y Index: 202

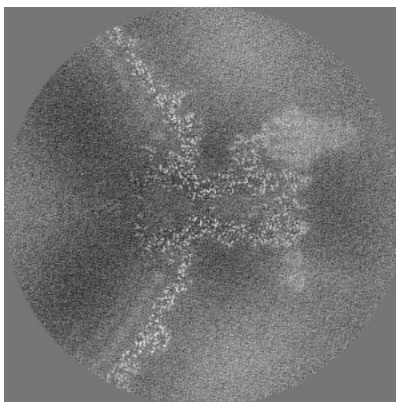


Z Index: 177

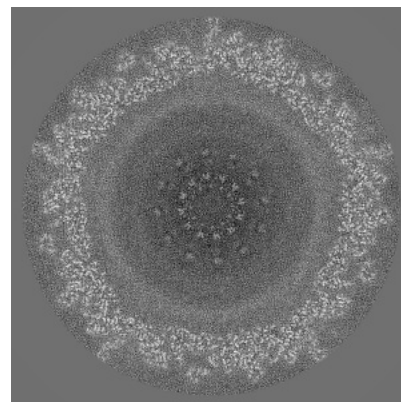
6.3.2 Raw map



X Index: 247



Y Index: 236

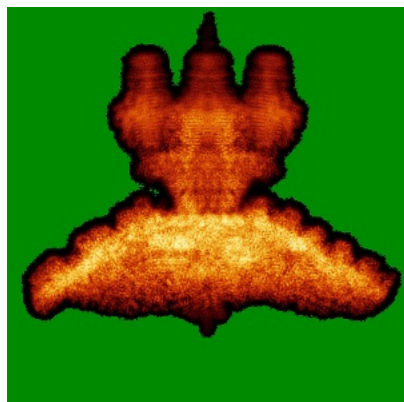


Z Index: 144

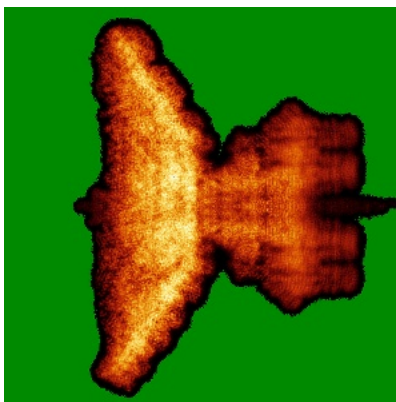
The images above show the largest variance slices of the map in three orthogonal directions.

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

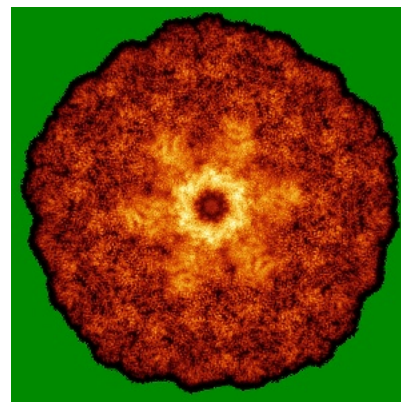
6.4.1 Primary map



X

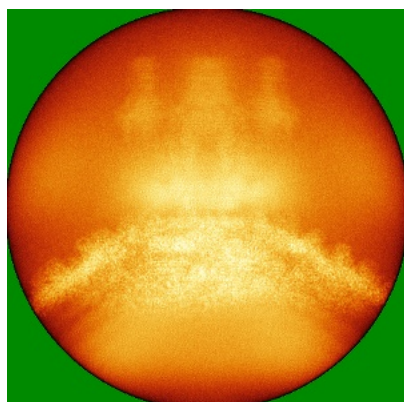


Y

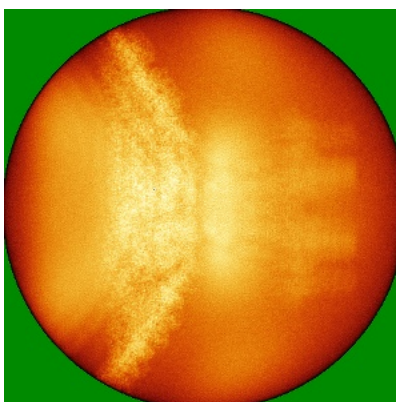


Z

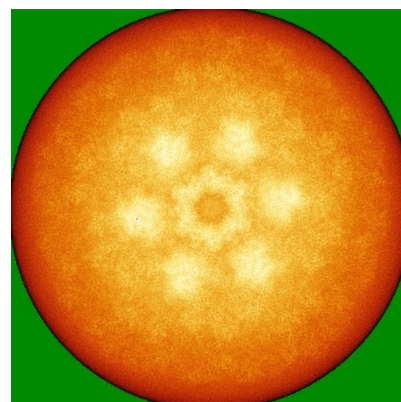
6.4.2 Raw map



X



Y

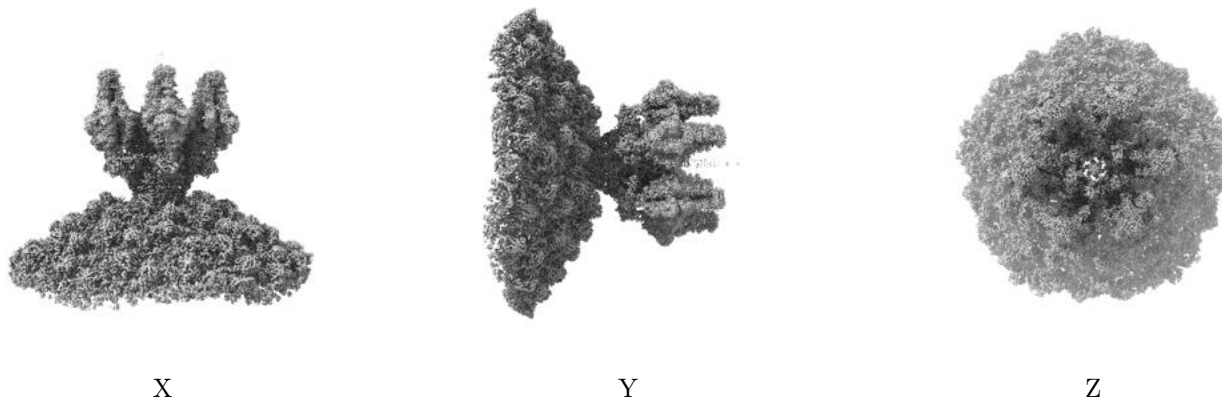


Z

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.

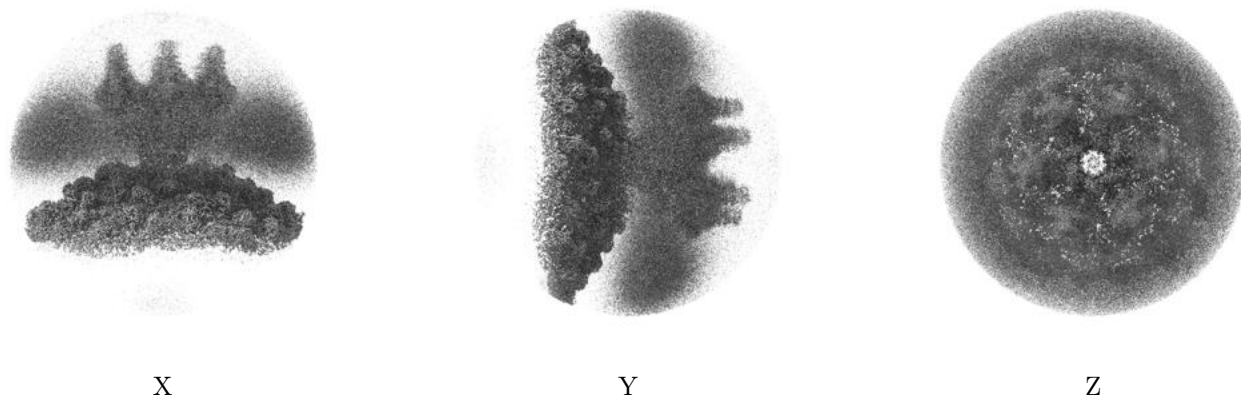
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 3.5. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

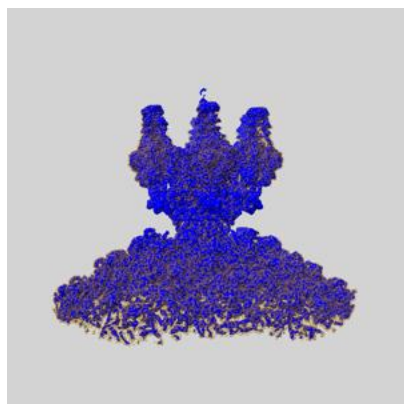
6.6 Mask visualisation [i](#)

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

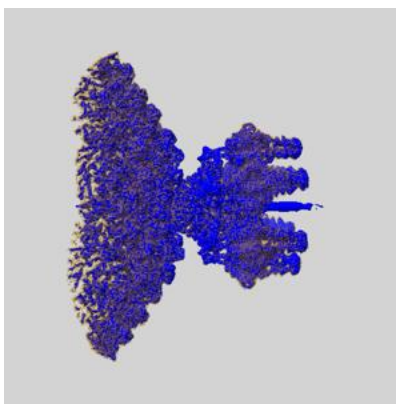
A mask typically either:

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

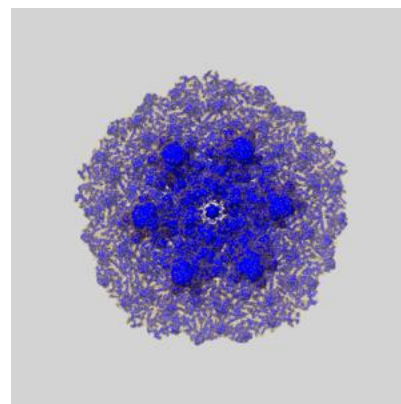
6.6.1 emd_41792_msk_1.map [i](#)



X



Y

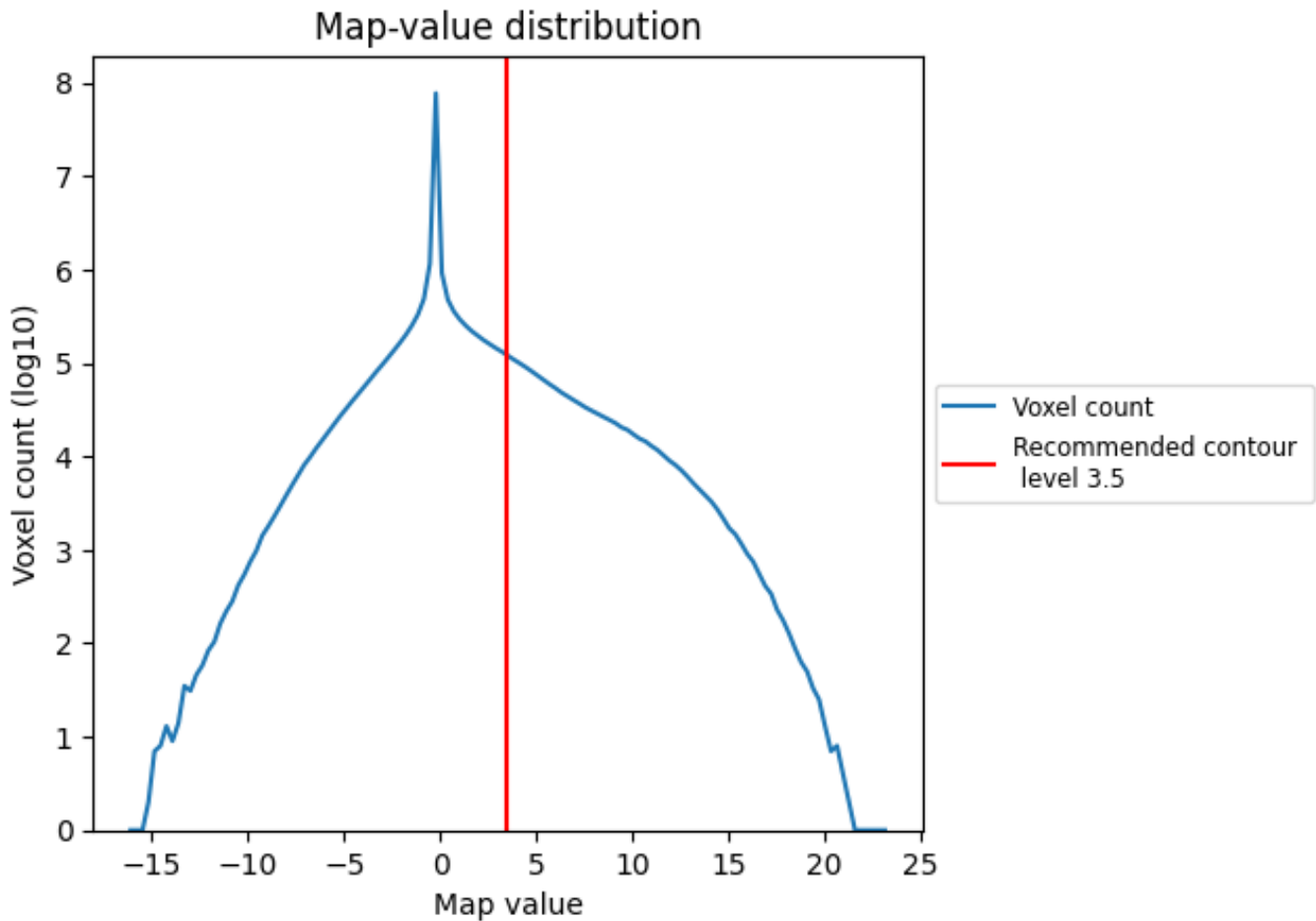


Z

7 Map analysis [i](#)

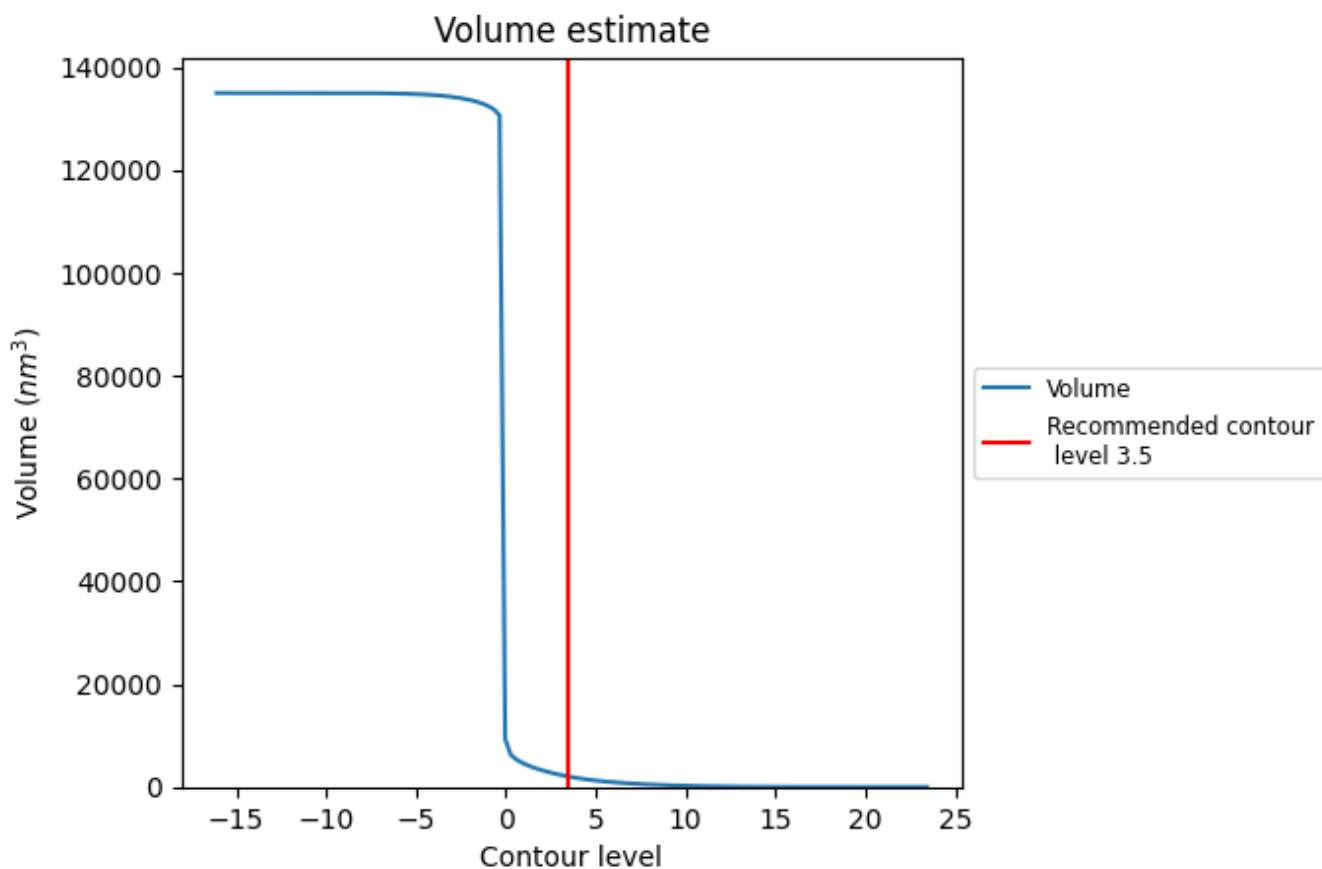
This section contains the results of statistical analysis of the map.

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.

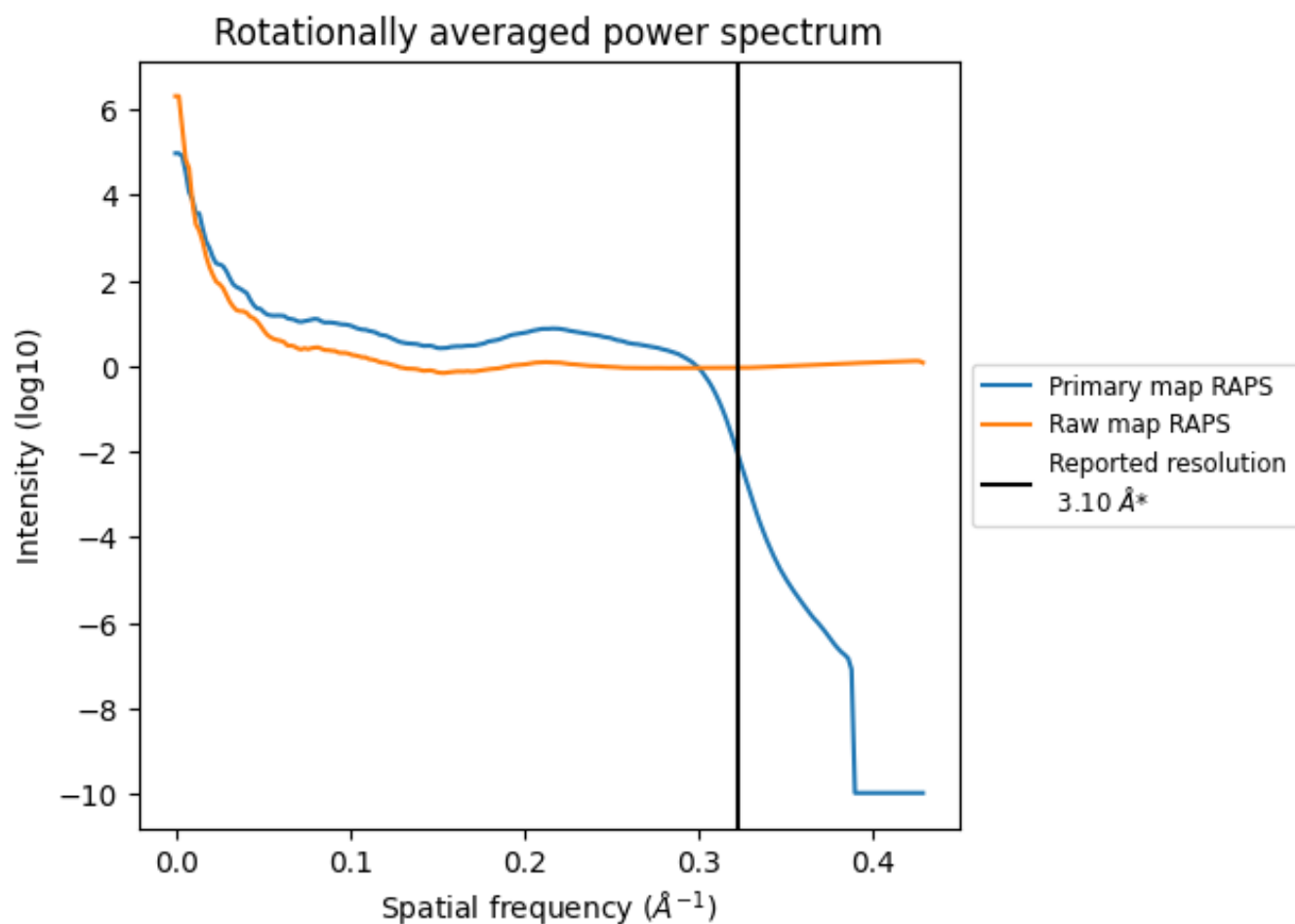
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 2023 nm³; this corresponds to an approximate mass of 1827 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](#)

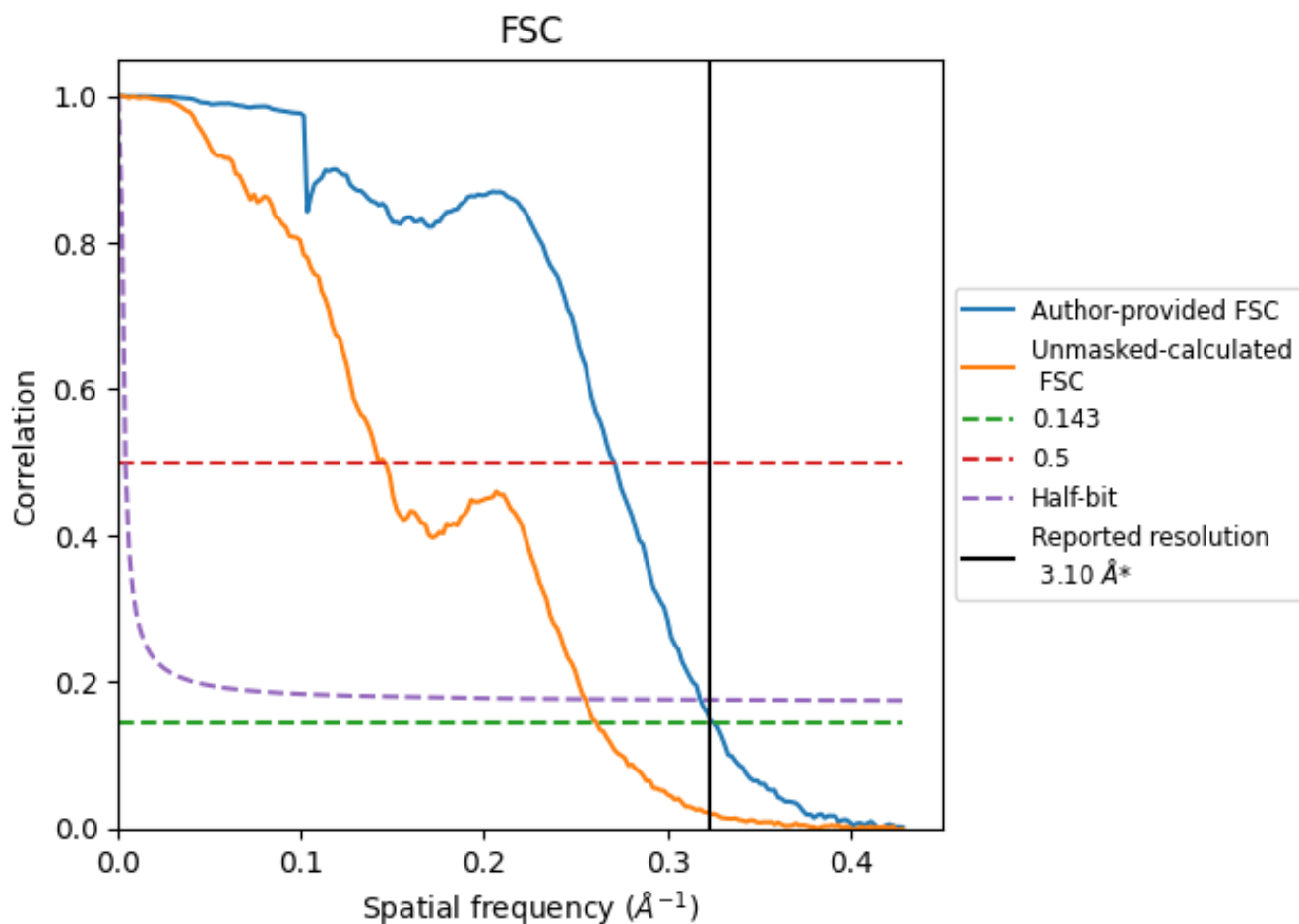


*Reported resolution corresponds to spatial frequency of 0.323 Å⁻¹

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 0.323 Å⁻¹

8.2 Resolution estimates [i](#)

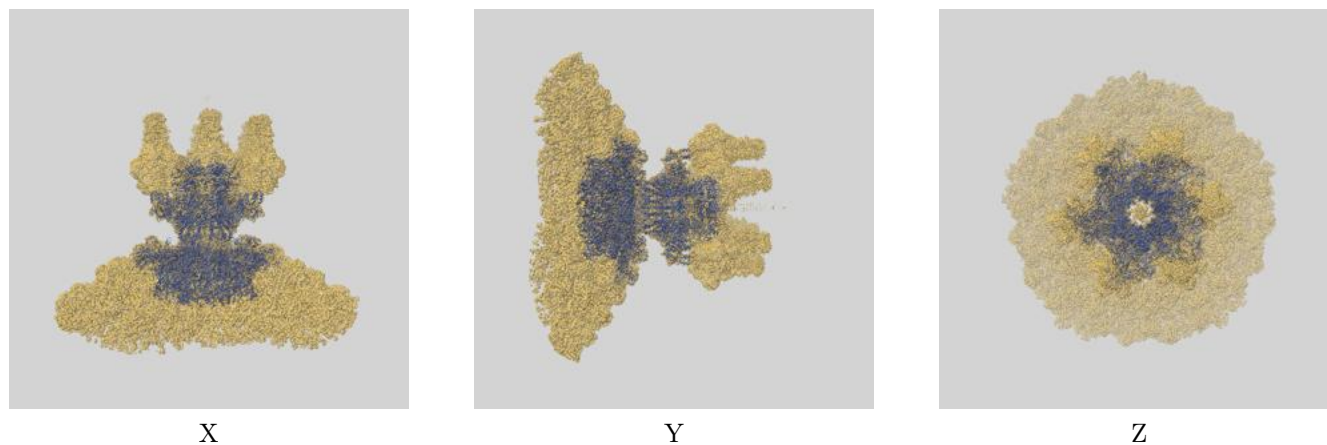
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.10	-	-
Author-provided FSC curve	3.07	3.69	3.14
Unmasked-calculated*	3.82	7.03	3.92

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.82 differs from the reported value 3.1 by more than 10 %

9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-41792 and PDB model 8U11. Per-residue inclusion information can be found in section 3 on page 9.

9.1 Map-model overlay [i](#)

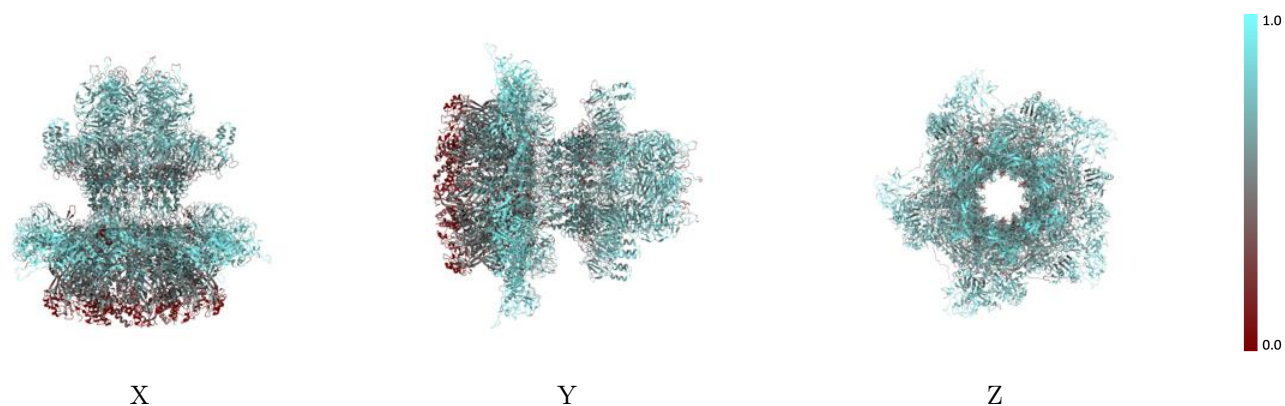


The images above show the 3D surface view of the map at the recommended contour level 3.5 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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

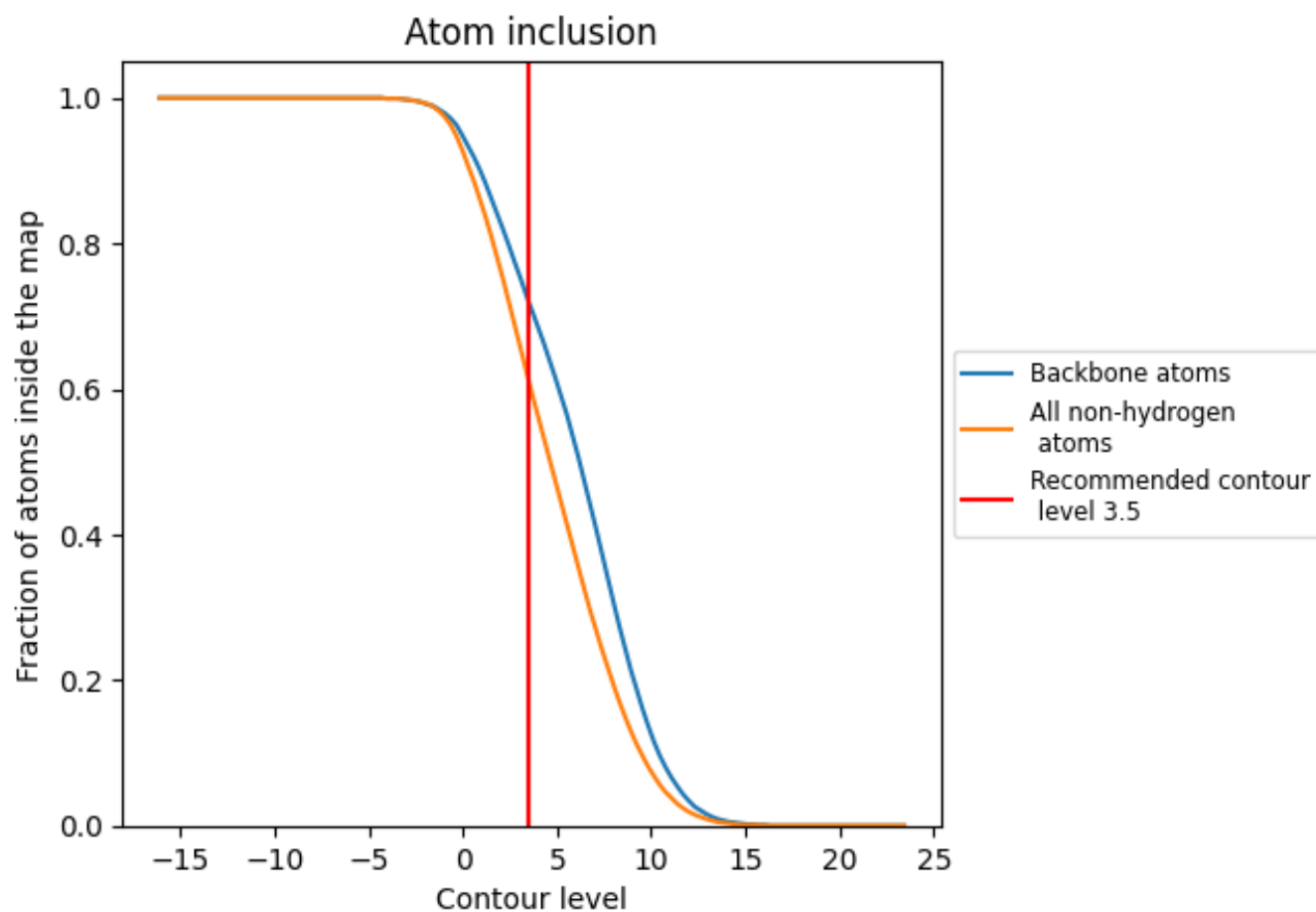
This section was not generated.

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 (3.5).

9.4 Atom inclusion [i](#)



At the recommended contour level, 72% of all backbone atoms, 61% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (3.5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion
All	0.6110
1	0.7130
10	0.6170
11	0.6600
12	0.6840
13	0.6150
14	0.6530
15	0.6830
16	0.6110
17	0.6710
18	0.6670
19	0.6320
2	0.6970
20	0.6600
21	0.7070
22	0.6040
23	0.6540
24	0.6910
3	0.7000
4	0.7100
5	0.7080
6	0.7110
7	0.6230
8	0.6570
9	0.6820
A	0.7100
B	0.7790
C	0.7020
D	0.7470
E	0.6770
F	0.7730
G	0.6870
H	0.7680
I	0.7040
J	0.7510



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Chain	Atom inclusion
a	0.4830
b	0.4930
c	0.5000
d	0.4880
e	0.4710
f	0.4900
g	0.4780
h	0.4800
i	0.4930
j	0.4770
k	0.4750
l	0.4620
m	0.5620
n	0.6170
o	0.6010
p	0.6320
q	0.6240
r	0.5800
s	0.6340
t	0.6250
u	0.6030
v	0.6120
x	0.6450
y	0.6320