



## wwPDB EM Validation Summary Report ⓘ

Nov 7, 2022 – 01:50 PM EST

PDB ID : 6E9D  
EMDB ID : EMD-9012  
Title : Sub-2 Angstrom Ewald Curvature-Corrected Single-Particle Cryo-EM Reconstruction of AAV-2 L336C  
Authors : Tan, Y.Z.; Aiyer, S.; Mietzsch, M.; Hull, J.A.; McKenna, R.; Baker, T.S.; Agbandje-McKenna, M.; Lyumkis, D.  
Deposited on : 2018-07-31  
Resolution : 1.86 Å (reported)  
Based on initial model : 1LP3

This is a wwPDB EM Validation Summary 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:

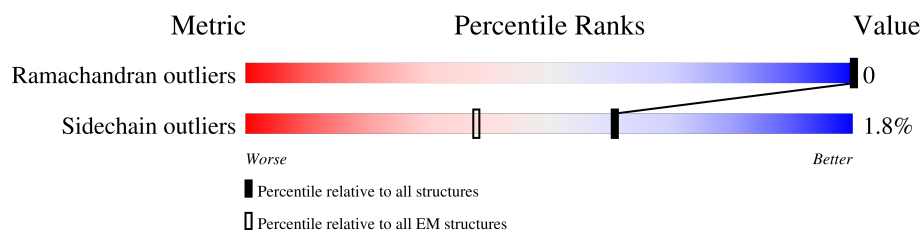
EMDB validation analysis : 0.0.1.dev43  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

# 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 1.86 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.









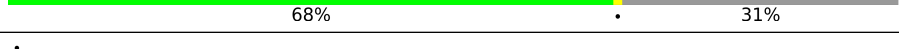
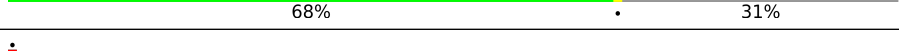
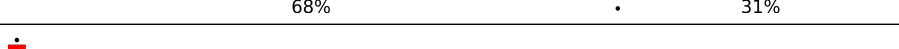
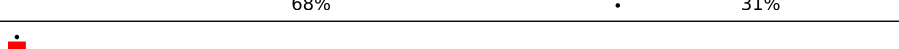
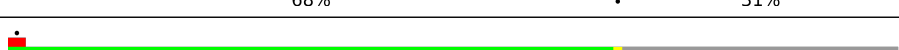

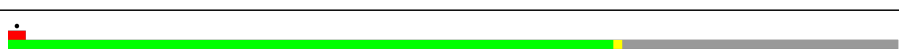

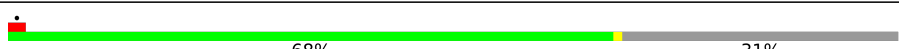





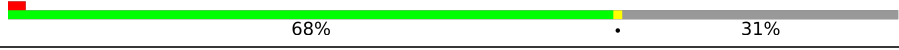
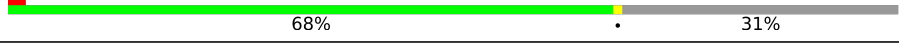



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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  $\geq 3$ , 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	1	735	
1	2	735	
1	3	735	
1	4	735	
1	5	735	
1	6	735	
1	7	735	
1	8	735	
1	A	735	



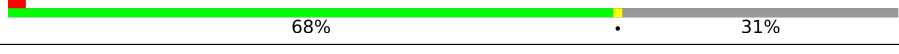

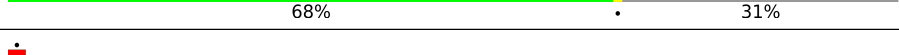
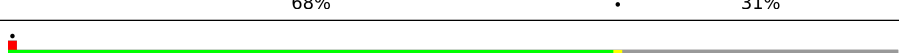
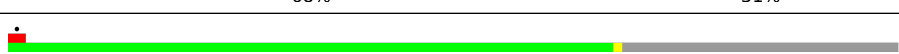
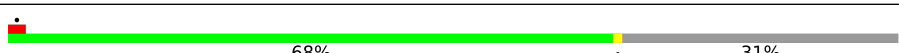


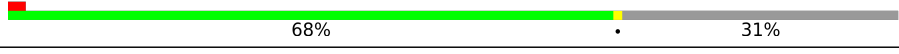




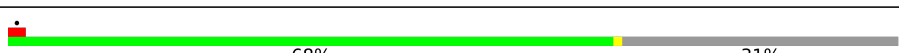


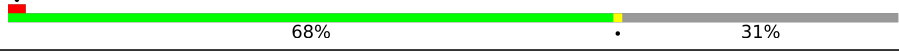


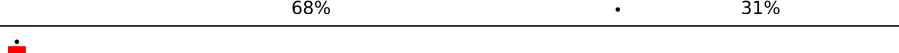



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Mol	Chain	Length	Quality of chain
1	B	735	
1	C	735	
1	D	735	
1	E	735	
1	F	735	
1	G	735	
1	H	735	
1	I	735	
1	J	735	
1	K	735	
1	L	735	
1	M	735	
1	N	735	
1	O	735	
1	P	735	
1	Q	735	
1	R	735	
1	S	735	
1	T	735	
1	U	735	
1	V	735	
1	W	735	
1	X	735	
1	Y	735	
1	Z	735	


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Mol	Chain	Length	Quality of chain
1	a	735	
1	b	735	
1	c	735	
1	d	735	
1	e	735	
1	f	735	
1	g	735	
1	h	735	
1	i	735	
1	j	735	
1	k	735	
1	l	735	
1	m	735	
1	n	735	
1	o	735	
1	p	735	
1	q	735	
1	r	735	
1	s	735	
1	t	735	
1	u	735	
1	v	735	
1	w	735	
1	x	735	
1	y	735	

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Mol	Chain	Length	Quality of chain
1	z	735	 A horizontal bar chart showing the quality of chain 1. The bar is green for 68% and grey for 31%. A red dot is at the start, and a black dot is at the end of the grey section.

## 2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 489900 atoms, of which 232200 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 Capsid protein VP1.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	A	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	B	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	C	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	D	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	E	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	F	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	G	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	H	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	I	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	J	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	K	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	L	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	M	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	N	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	O	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	P	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		
1	Q	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		

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Mol	Chain	Residues	Atoms						AltConf	Trace
1	R	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	S	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	T	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	U	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	V	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	W	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	X	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	Y	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	Z	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	1	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	2	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	3	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	4	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	5	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	6	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	a	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	b	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	c	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	d	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	e	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	f	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0

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Mol	Chain	Residues	Atoms						AltConf	Trace
1	g	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	h	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	i	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	j	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	k	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	l	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	m	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	n	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	o	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	p	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	q	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	r	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	s	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	t	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	u	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	v	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	w	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	x	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	y	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	z	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0
1	7	510	Total 7968	C 2581	H 3870	N 715	O 788	S 14	0	0

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Mol	Chain	Residues	Atoms						AltConf	Trace
1	8	510	Total	C	H	N	O	S	0	0
			7968	2581	3870	715	788	14		

There are 60 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	336	CYS	LEU	engineered mutation	UNP P03135
B	336	CYS	LEU	engineered mutation	UNP P03135
C	336	CYS	LEU	engineered mutation	UNP P03135
D	336	CYS	LEU	engineered mutation	UNP P03135
E	336	CYS	LEU	engineered mutation	UNP P03135
F	336	CYS	LEU	engineered mutation	UNP P03135
G	336	CYS	LEU	engineered mutation	UNP P03135
H	336	CYS	LEU	engineered mutation	UNP P03135
I	336	CYS	LEU	engineered mutation	UNP P03135
J	336	CYS	LEU	engineered mutation	UNP P03135
K	336	CYS	LEU	engineered mutation	UNP P03135
L	336	CYS	LEU	engineered mutation	UNP P03135
M	336	CYS	LEU	engineered mutation	UNP P03135
N	336	CYS	LEU	engineered mutation	UNP P03135
O	336	CYS	LEU	engineered mutation	UNP P03135
P	336	CYS	LEU	engineered mutation	UNP P03135
Q	336	CYS	LEU	engineered mutation	UNP P03135
R	336	CYS	LEU	engineered mutation	UNP P03135
S	336	CYS	LEU	engineered mutation	UNP P03135
T	336	CYS	LEU	engineered mutation	UNP P03135
U	336	CYS	LEU	engineered mutation	UNP P03135
V	336	CYS	LEU	engineered mutation	UNP P03135
W	336	CYS	LEU	engineered mutation	UNP P03135
X	336	CYS	LEU	engineered mutation	UNP P03135
Y	336	CYS	LEU	engineered mutation	UNP P03135
Z	336	CYS	LEU	engineered mutation	UNP P03135
1	336	CYS	LEU	engineered mutation	UNP P03135
2	336	CYS	LEU	engineered mutation	UNP P03135
3	336	CYS	LEU	engineered mutation	UNP P03135
4	336	CYS	LEU	engineered mutation	UNP P03135
5	336	CYS	LEU	engineered mutation	UNP P03135
6	336	CYS	LEU	engineered mutation	UNP P03135
a	336	CYS	LEU	engineered mutation	UNP P03135
b	336	CYS	LEU	engineered mutation	UNP P03135
c	336	CYS	LEU	engineered mutation	UNP P03135
d	336	CYS	LEU	engineered mutation	UNP P03135

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Chain	Residue	Modelled	Actual	Comment	Reference
e	336	CYS	LEU	engineered mutation	UNP P03135
f	336	CYS	LEU	engineered mutation	UNP P03135
g	336	CYS	LEU	engineered mutation	UNP P03135
h	336	CYS	LEU	engineered mutation	UNP P03135
i	336	CYS	LEU	engineered mutation	UNP P03135
j	336	CYS	LEU	engineered mutation	UNP P03135
k	336	CYS	LEU	engineered mutation	UNP P03135
l	336	CYS	LEU	engineered mutation	UNP P03135
m	336	CYS	LEU	engineered mutation	UNP P03135
n	336	CYS	LEU	engineered mutation	UNP P03135
o	336	CYS	LEU	engineered mutation	UNP P03135
p	336	CYS	LEU	engineered mutation	UNP P03135
q	336	CYS	LEU	engineered mutation	UNP P03135
r	336	CYS	LEU	engineered mutation	UNP P03135
s	336	CYS	LEU	engineered mutation	UNP P03135
t	336	CYS	LEU	engineered mutation	UNP P03135
u	336	CYS	LEU	engineered mutation	UNP P03135
v	336	CYS	LEU	engineered mutation	UNP P03135
w	336	CYS	LEU	engineered mutation	UNP P03135
x	336	CYS	LEU	engineered mutation	UNP P03135
y	336	CYS	LEU	engineered mutation	UNP P03135
z	336	CYS	LEU	engineered mutation	UNP P03135
7	336	CYS	LEU	engineered mutation	UNP P03135
8	336	CYS	LEU	engineered mutation	UNP P03135

- Molecule 2 is water.

Mol	Chain	Residues	Atoms	AltConf
2	A	197	Total O 197 197	0
2	B	199	Total O 199 199	0
2	C	198	Total O 198 198	0
2	D	197	Total O 197 197	0
2	E	197	Total O 197 197	0
2	F	196	Total O 196 196	0
2	G	197	Total O 197 197	0

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Mol	Chain	Residues	Atoms		AltConf
2	H	197	Total 197	O 197	0
2	I	197	Total 197	O 197	0
2	J	196	Total 196	O 196	0
2	K	197	Total 197	O 197	0
2	L	196	Total 196	O 196	0
2	M	196	Total 196	O 196	0
2	N	197	Total 197	O 197	0
2	O	197	Total 197	O 197	0
2	P	197	Total 197	O 197	0
2	Q	198	Total 198	O 198	0
2	R	197	Total 197	O 197	0
2	S	197	Total 197	O 197	0
2	T	197	Total 197	O 197	0
2	U	197	Total 197	O 197	0
2	V	197	Total 197	O 197	0
2	W	197	Total 197	O 197	0
2	X	197	Total 197	O 197	0
2	Y	197	Total 197	O 197	0
2	Z	197	Total 197	O 197	0
2	1	197	Total 197	O 197	0
2	2	197	Total 197	O 197	0

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Mol	Chain	Residues	Atoms	AltConf
2	3	197	Total O 197 197	0
2	4	197	Total O 197 197	0
2	5	197	Total O 197 197	0
2	6	197	Total O 197 197	0
2	a	197	Total O 197 197	0
2	b	197	Total O 197 197	0
2	c	197	Total O 197 197	0
2	d	197	Total O 197 197	0
2	e	197	Total O 197 197	0
2	f	197	Total O 197 197	0
2	g	197	Total O 197 197	0
2	h	197	Total O 197 197	0
2	i	197	Total O 197 197	0
2	j	197	Total O 197 197	0
2	k	197	Total O 197 197	0
2	l	197	Total O 197 197	0
2	m	197	Total O 197 197	0
2	n	197	Total O 197 197	0
2	o	197	Total O 197 197	0
2	p	197	Total O 197 197	0
2	q	197	Total O 197 197	0

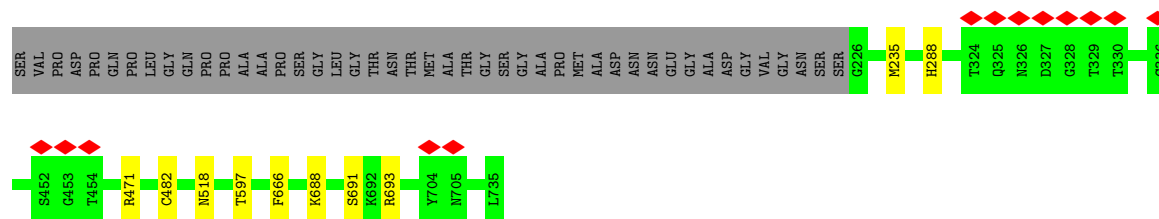
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Mol	Chain	Residues	Atoms		AltConf
2	r	197	Total 197	O 197	0
2	s	197	Total 197	O 197	0
2	t	197	Total 197	O 197	0
2	u	197	Total 197	O 197	0
2	v	197	Total 197	O 197	0
2	w	197	Total 197	O 197	0
2	x	197	Total 197	O 197	0
2	y	197	Total 197	O 197	0
2	z	197	Total 197	O 197	0
2	7	197	Total 197	O 197	0
2	8	197	Total 197	O 197	0

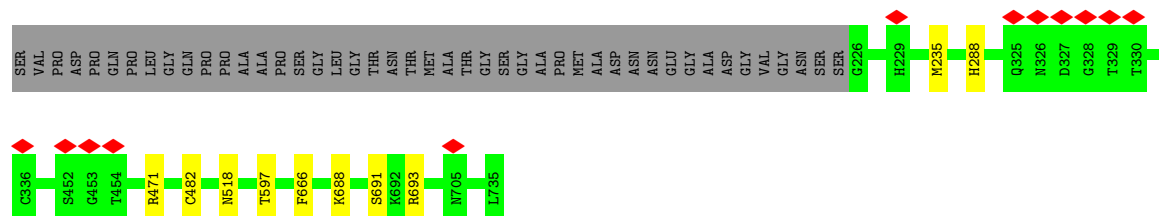
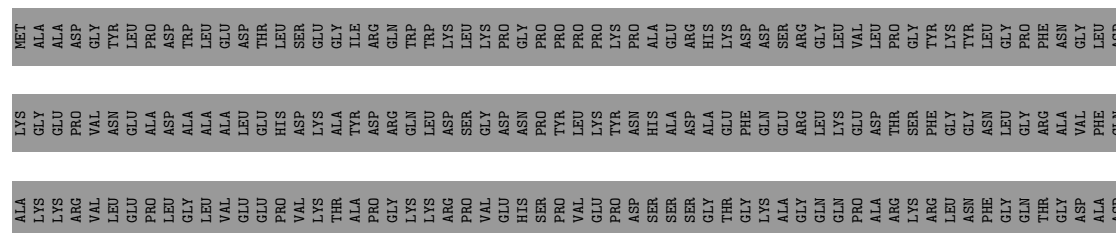


[illegible][illegible][illegible]



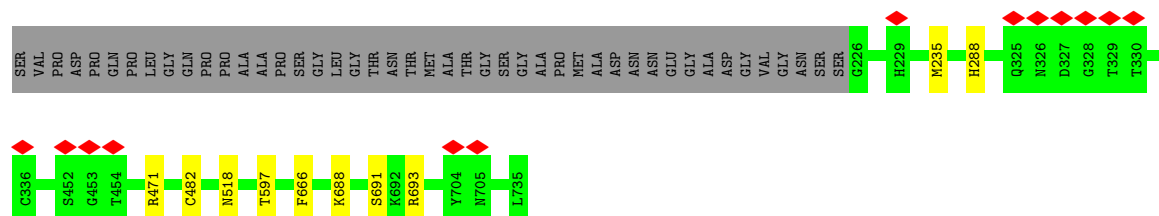
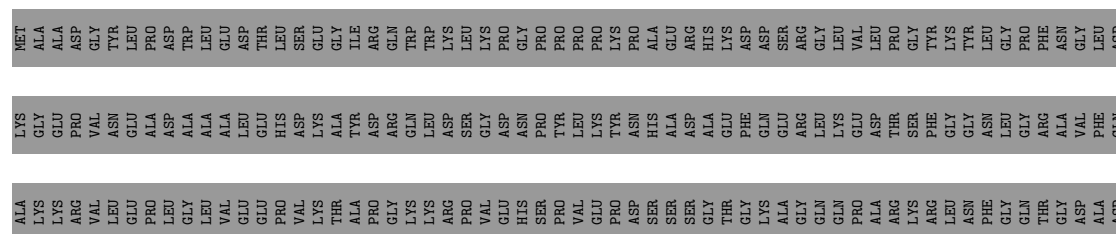
• Molecule 1: Capsid protein VP1

Chain F: 68% 31%



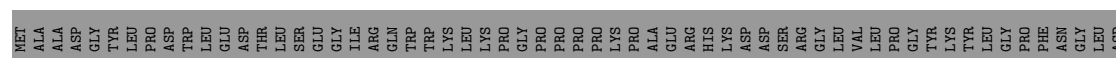
• Molecule 1: Capsid protein VP1

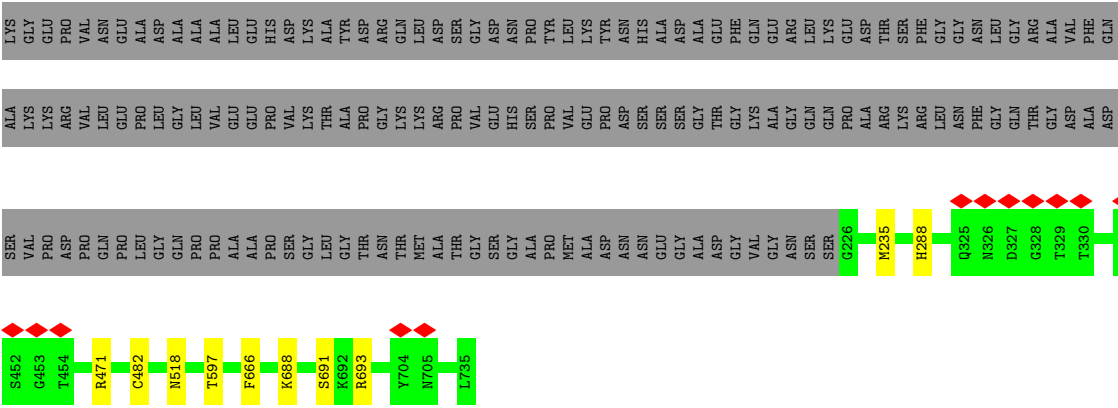
Chain G: 68% 31%



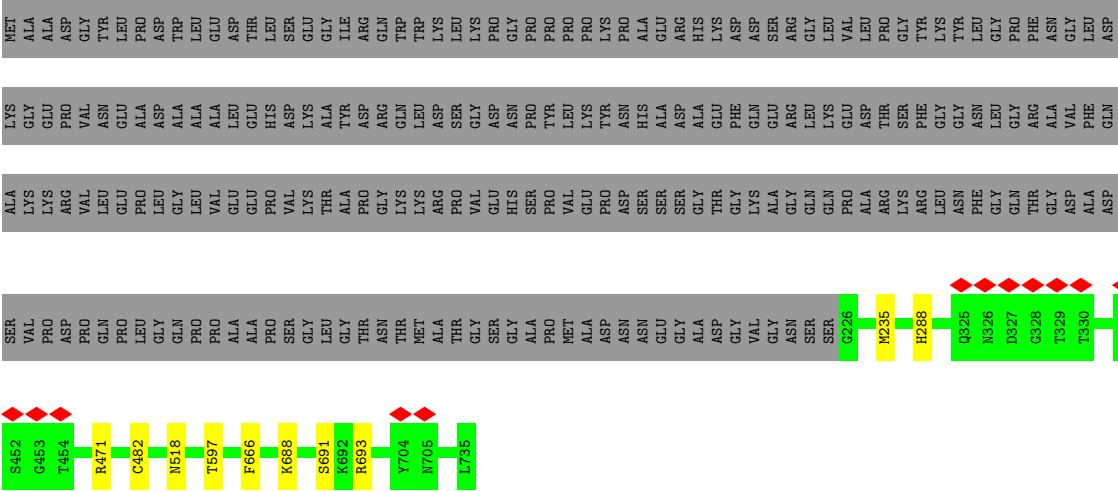
• Molecule 1: Capsid protein VP1

Chain H: 68% 31%





● Molecule 1: Capsid protein VP1



● Molecule 1: Capsid protein VP1



● Molecule 1: Capsid protein VP1

68% 31%



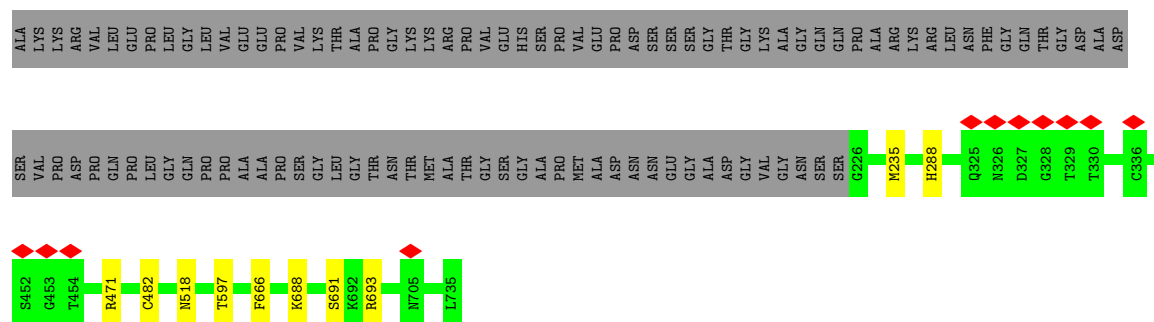
Frequency	Percentage
Often	68%
Not often	31%



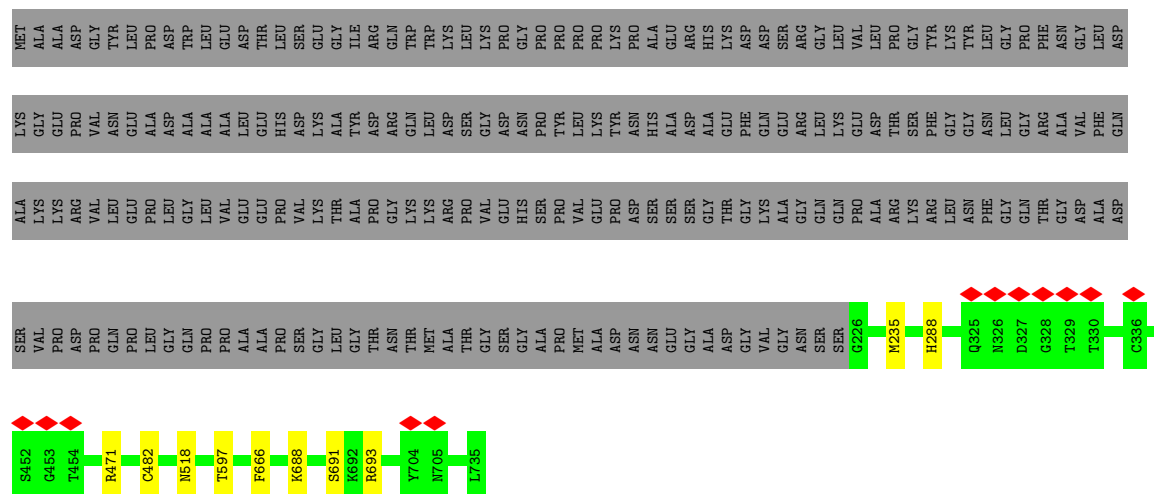
Frequency	Percentage
Often	68%
Not often	31%



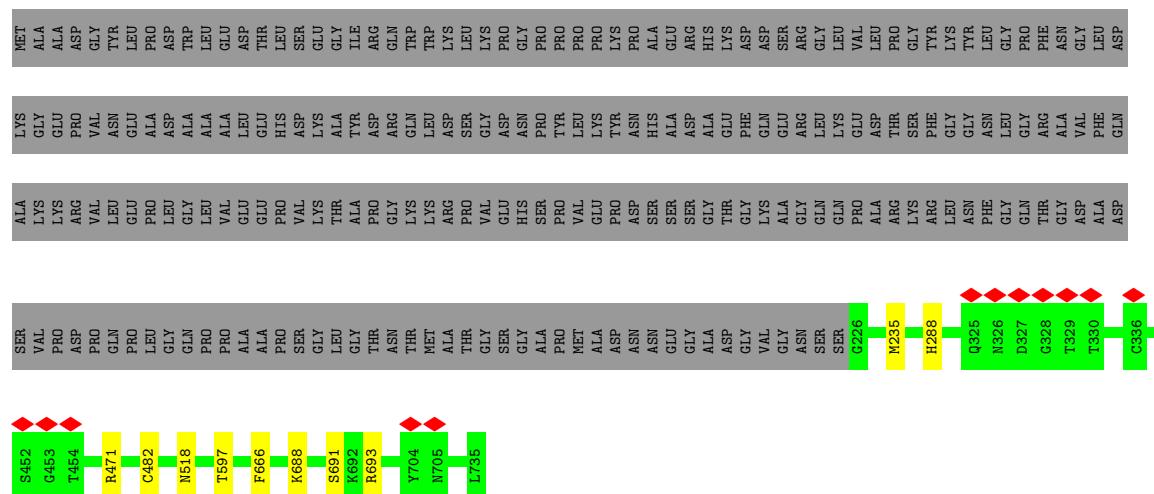




- Molecule 1: Capsid protein VP1

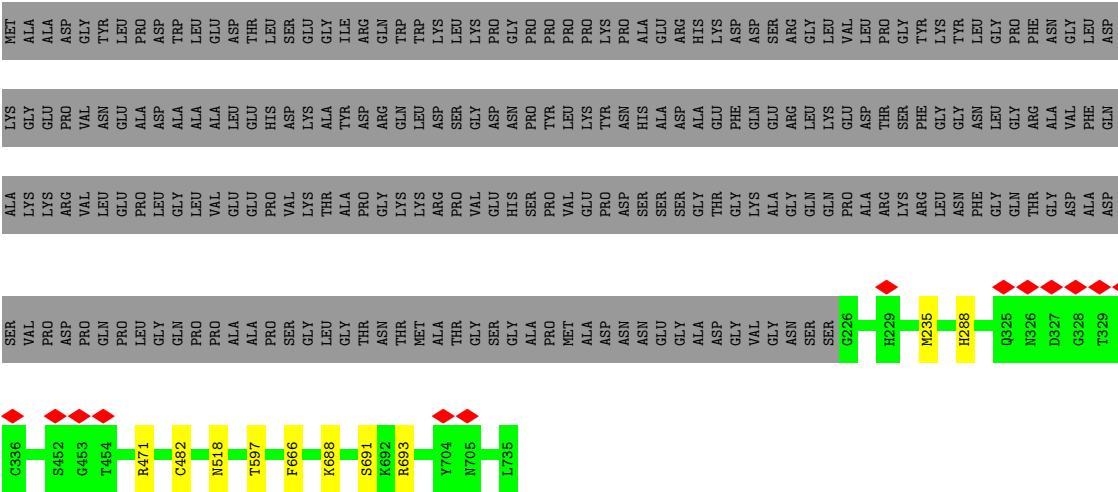


- Molecule 1: Capsid protein VP1

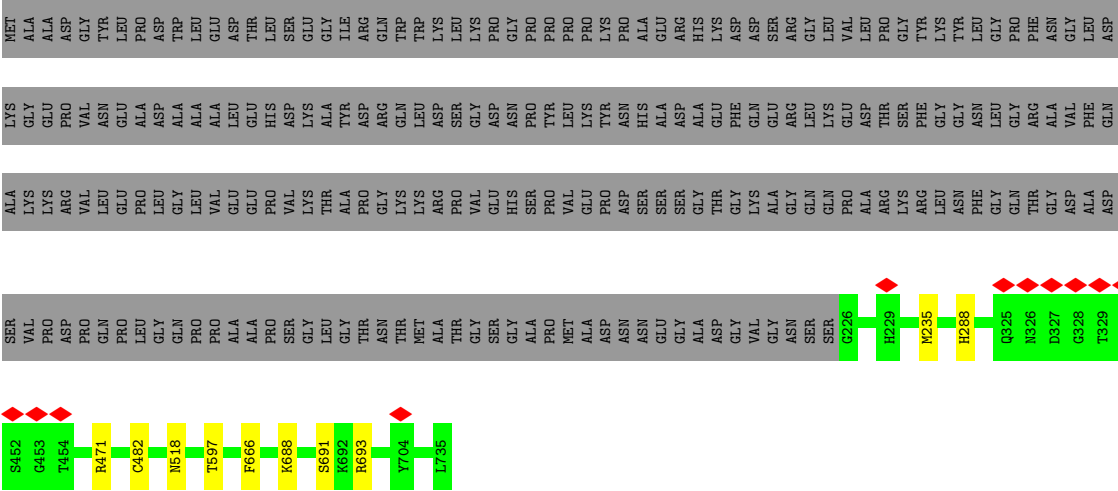


- Molecule 1: Capsid protein VP1

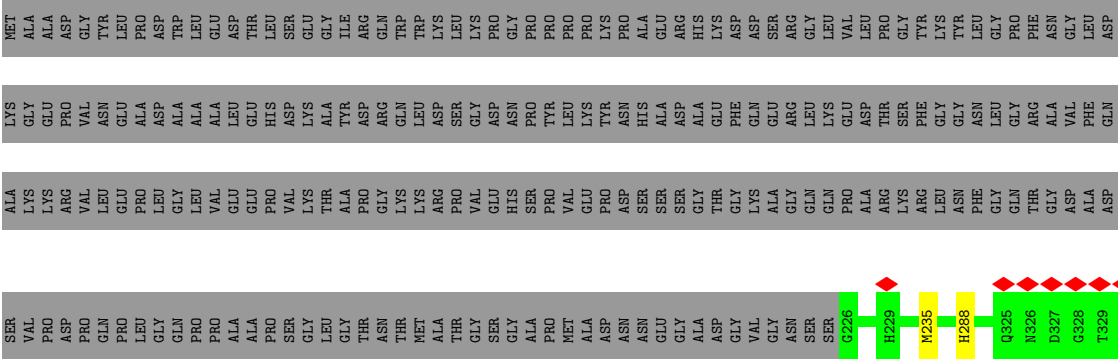


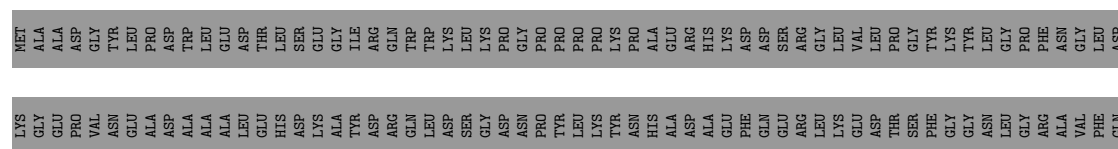


• Molecule 1: Capsid protein VP1



• Molecule 1: Capsid protein VP1





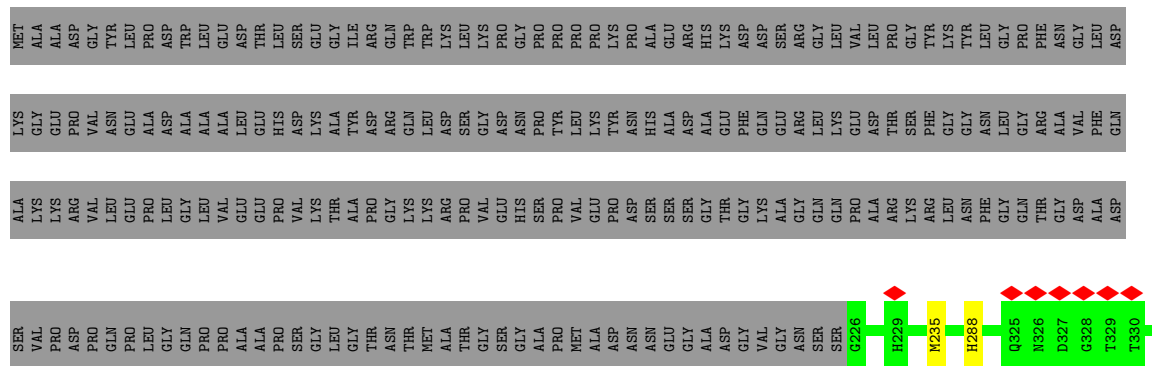






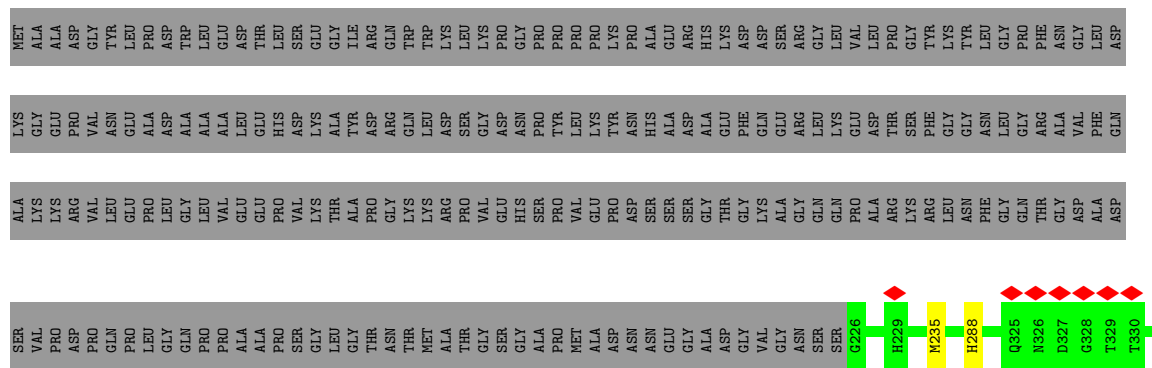
- Molecule 1: Capsid protein VP1

Chain 4:  68% 31%



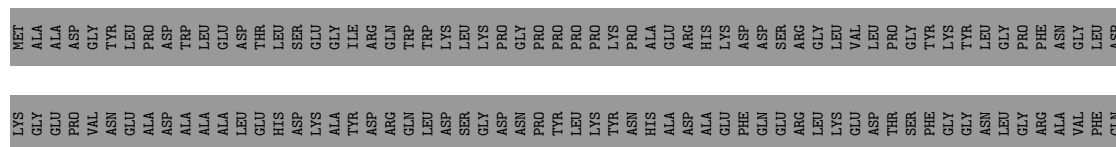
- Molecule 1: Capsid protein VP1

Chain 5:  68% 31%

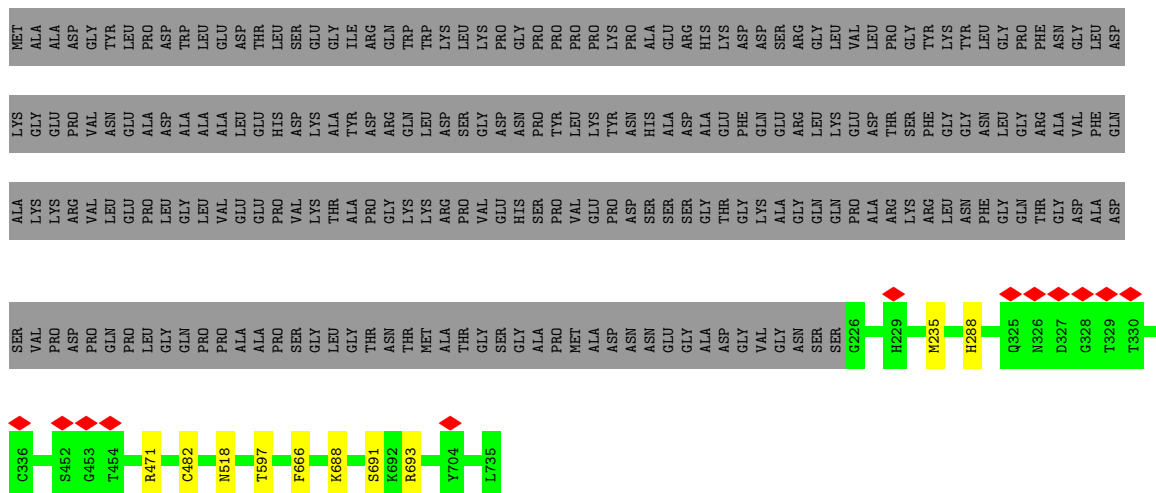


- Molecule 1: Capsid protein VP1

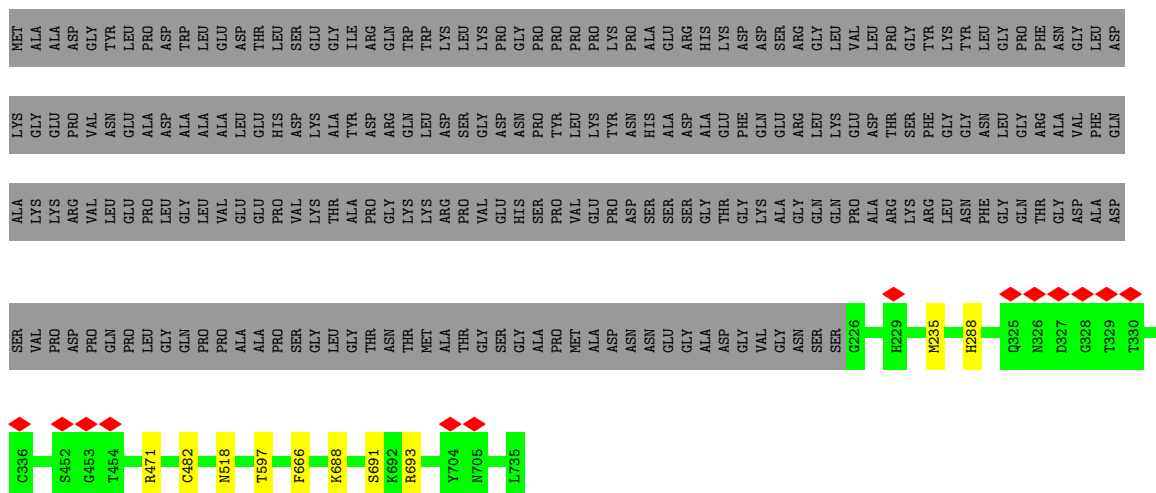
Chain 6:  68% 31%



- Molecule 1: Capsid protein VP1



- Molecule 1: Capsid protein VP1



- Molecule 1: Capsid protein VP1

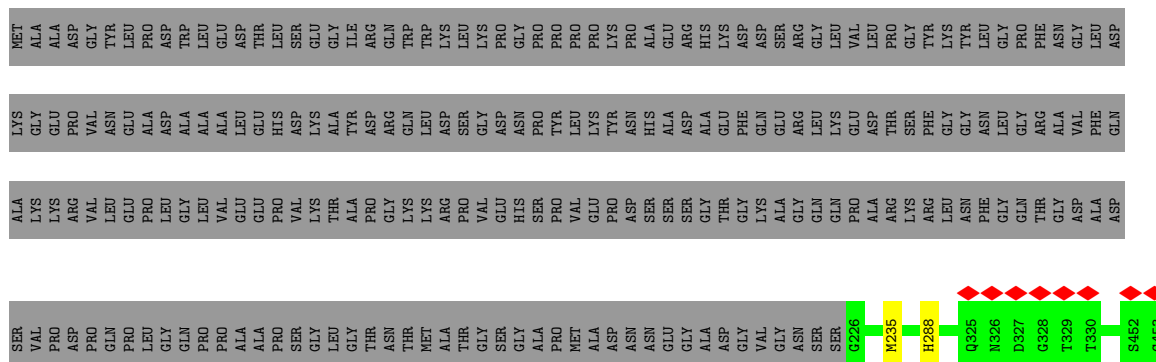


- Molecule 1: Capsid protein VP1

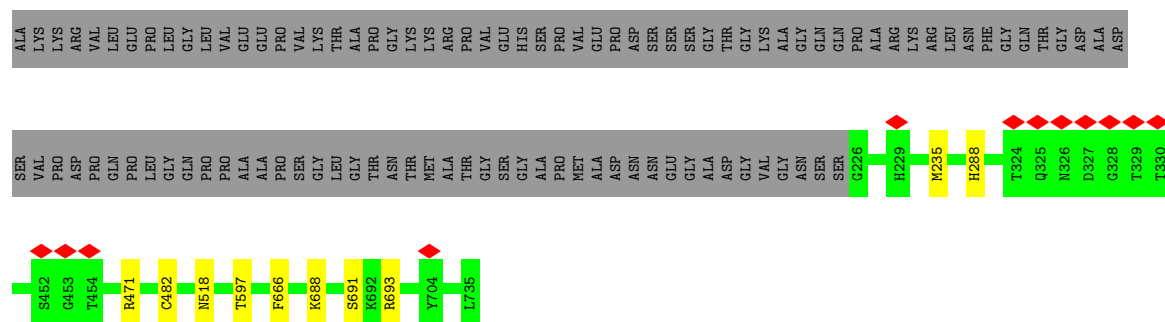
Chain d:  68% 31%

- Molecule 1: Capsid protein VP1

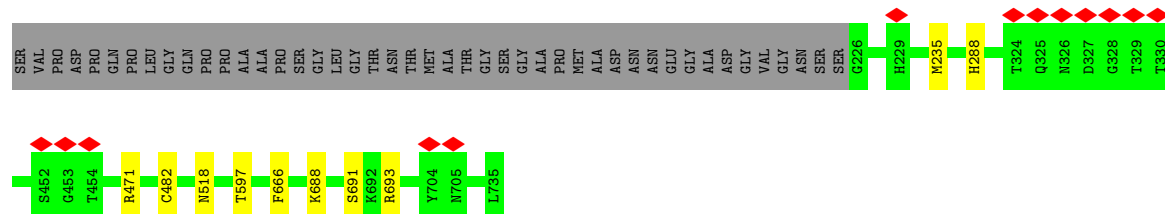
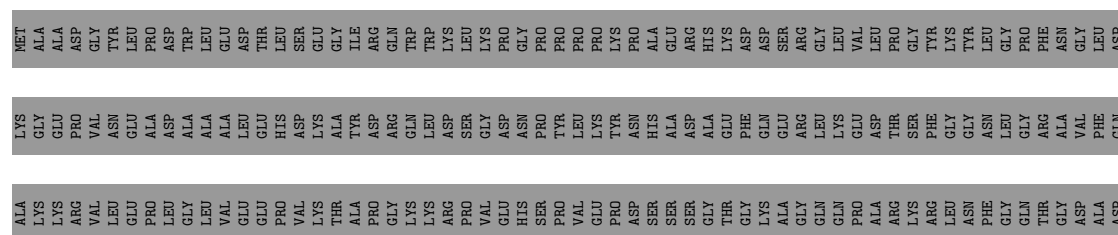
Chain e:  68% 31%



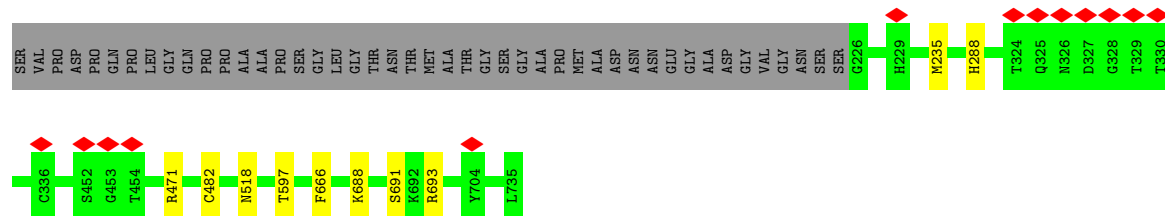
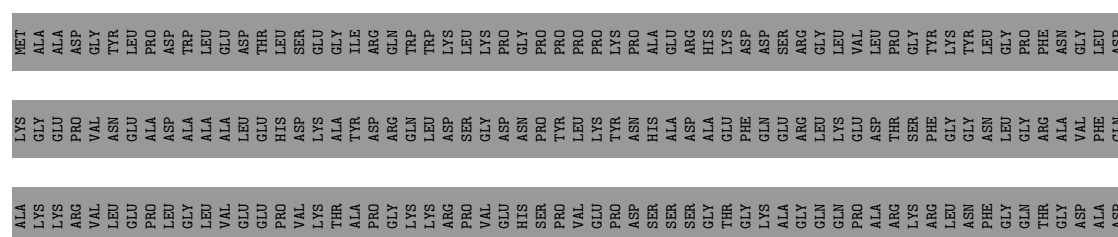




- Molecule 1: Capsid protein VP1

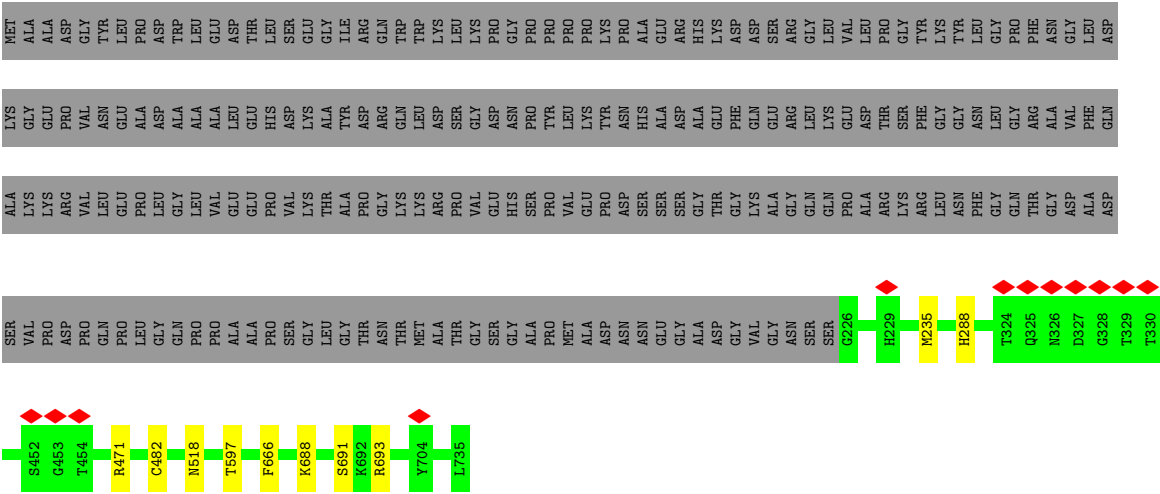


- Molecule 1: Capsid protein VP1

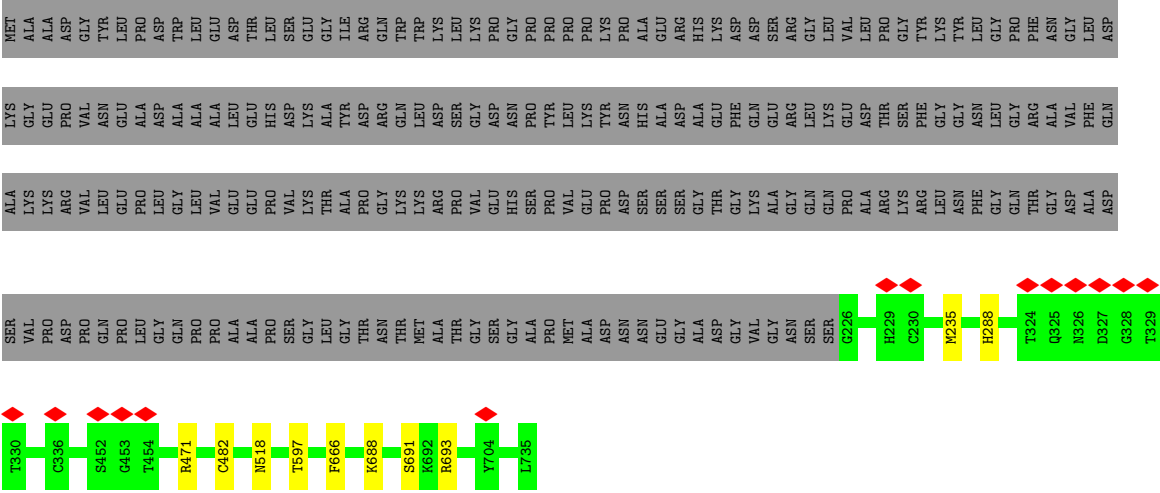


- Molecule 1: Capsid protein VP1

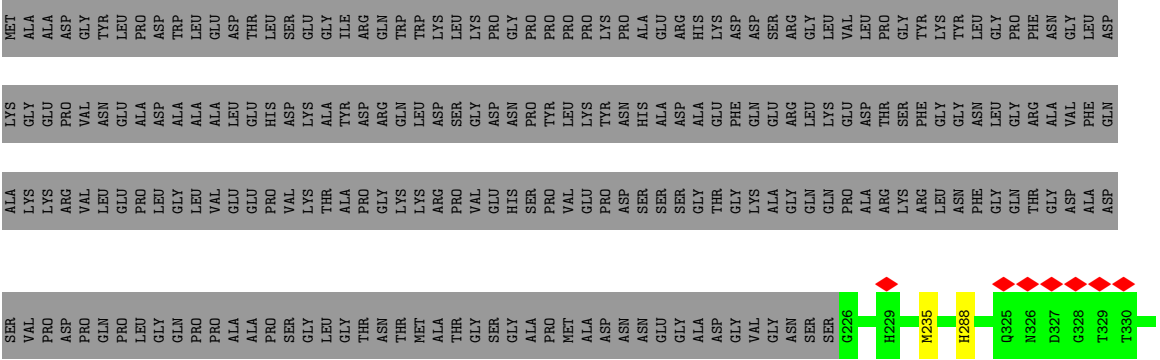


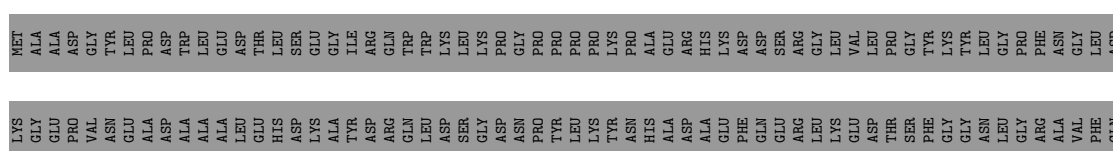


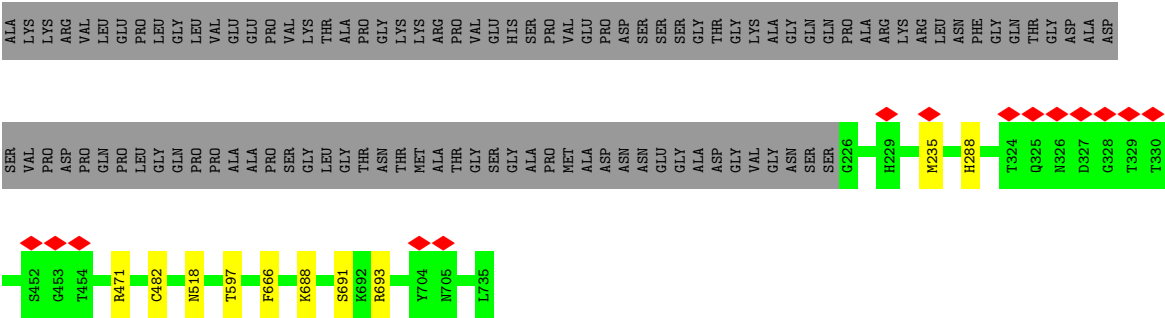
• Molecule 1: Capsid protein VP1



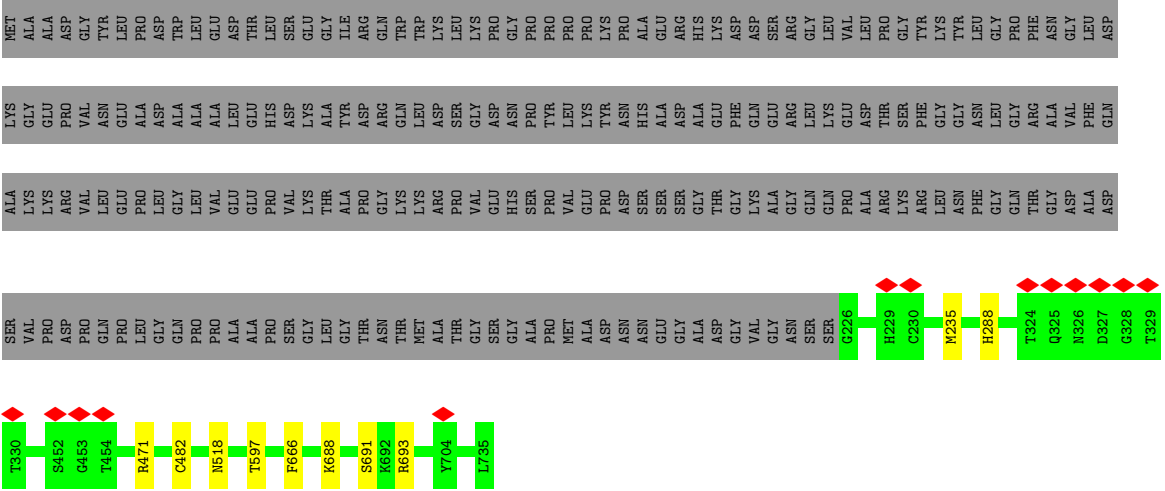
• Molecule 1: Capsid protein VP1



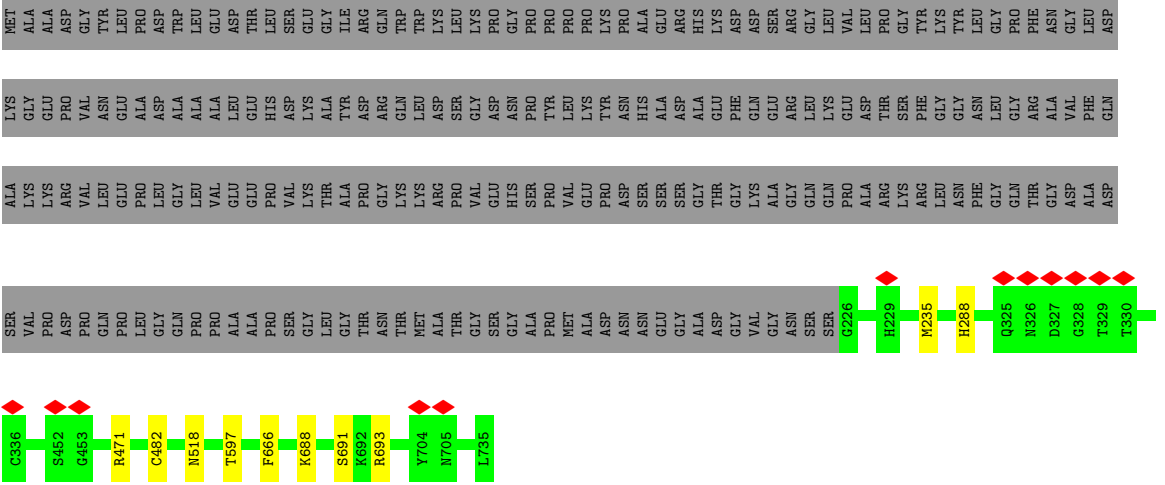




● Molecule 1: Capsid protein VP1



● Molecule 1: Capsid protein VP1

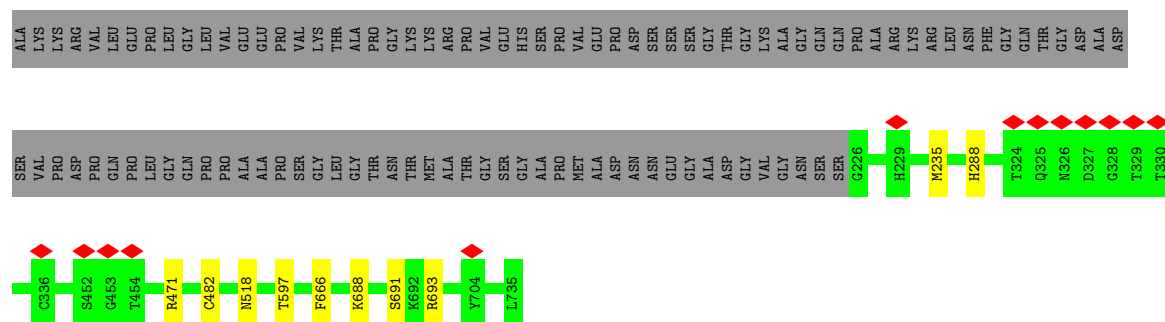


● Molecule 1: Capsid protein VP1

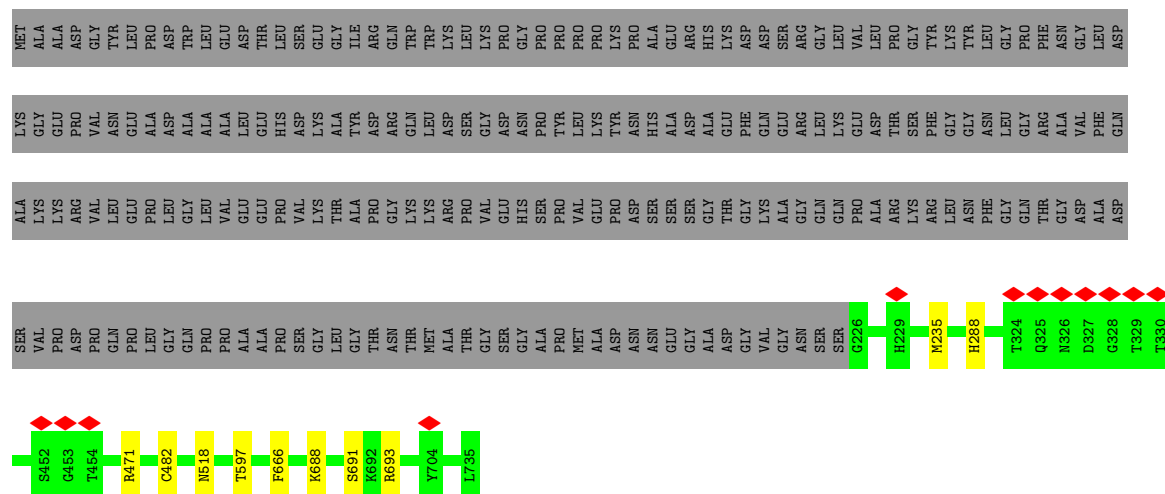




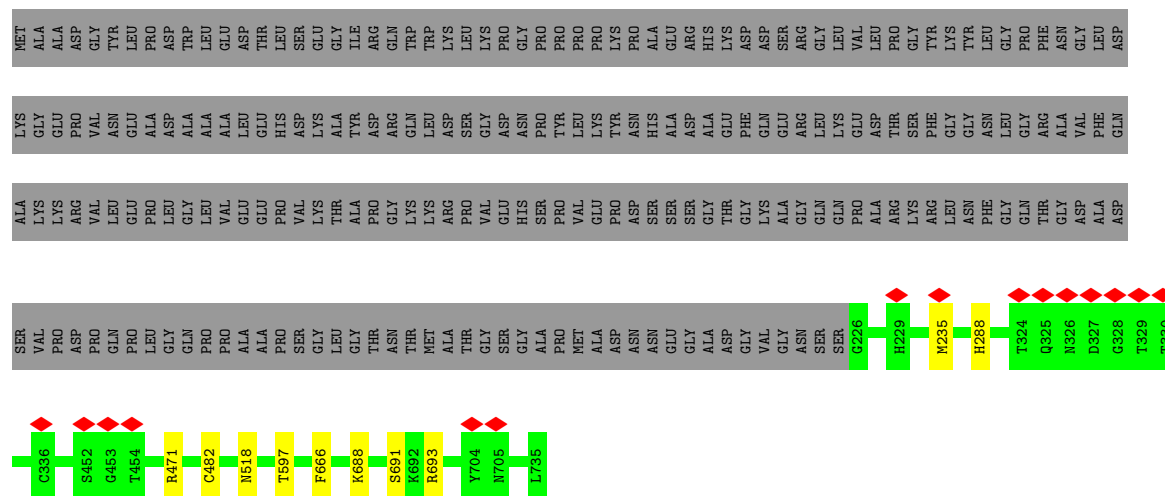




- Molecule 1: Capsid protein VP1



- Molecule 1: Capsid protein VP1



- Molecule 1: Capsid protein VP1





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, I	Depositor
Number of particles used	30515	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION; CTF estimation per particle - Gctf, CTF estimation per micrograph - CTFFIND4	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	22.5	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	37000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.416	Depositor
Minimum map value	-0.223	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.030	Depositor
Recommended contour level	0.06	Depositor
Map size (Å)	283.68, 283.68, 283.68	wwPDB
Map dimensions	720, 720, 720	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.394, 0.394, 0.394	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	0.51	0/4221	0.66	2/5754 (0.0%)
1	2	0.51	0/4221	0.66	2/5754 (0.0%)
1	3	0.51	0/4221	0.66	2/5754 (0.0%)
1	4	0.51	0/4221	0.66	2/5754 (0.0%)
1	5	0.51	0/4221	0.66	2/5754 (0.0%)
1	6	0.51	0/4221	0.66	2/5754 (0.0%)
1	7	0.51	0/4221	0.66	2/5754 (0.0%)
1	8	0.51	0/4221	0.66	2/5754 (0.0%)
1	A	0.51	0/4221	0.66	2/5754 (0.0%)
1	B	0.51	0/4221	0.66	2/5754 (0.0%)
1	C	0.51	0/4221	0.66	2/5754 (0.0%)
1	D	0.51	0/4221	0.66	2/5754 (0.0%)
1	E	0.51	0/4221	0.66	2/5754 (0.0%)
1	F	0.51	0/4221	0.66	2/5754 (0.0%)
1	G	0.51	0/4221	0.66	2/5754 (0.0%)
1	H	0.51	0/4221	0.66	2/5754 (0.0%)
1	I	0.51	0/4221	0.66	2/5754 (0.0%)
1	J	0.51	0/4221	0.66	2/5754 (0.0%)
1	K	0.51	0/4221	0.66	2/5754 (0.0%)
1	L	0.51	0/4221	0.66	2/5754 (0.0%)
1	M	0.51	0/4221	0.66	2/5754 (0.0%)
1	N	0.51	0/4221	0.66	2/5754 (0.0%)
1	O	0.51	0/4221	0.66	2/5754 (0.0%)
1	P	0.51	0/4221	0.66	2/5754 (0.0%)
1	Q	0.51	0/4221	0.66	2/5754 (0.0%)
1	R	0.51	0/4221	0.66	2/5754 (0.0%)
1	S	0.51	0/4221	0.66	2/5754 (0.0%)
1	T	0.51	0/4221	0.66	2/5754 (0.0%)
1	U	0.51	0/4221	0.66	2/5754 (0.0%)
1	V	0.51	0/4221	0.66	2/5754 (0.0%)
1	W	0.51	0/4221	0.66	2/5754 (0.0%)
1	X	0.51	0/4221	0.66	2/5754 (0.0%)
1	Y	0.51	0/4221	0.66	2/5754 (0.0%)
1	Z	0.51	0/4221	0.66	2/5754 (0.0%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	a	0.51	0/4221	0.66	2/5754 (0.0%)
1	b	0.51	0/4221	0.66	2/5754 (0.0%)
1	c	0.51	0/4221	0.66	2/5754 (0.0%)
1	d	0.51	0/4221	0.66	2/5754 (0.0%)
1	e	0.51	0/4221	0.66	2/5754 (0.0%)
1	f	0.51	0/4221	0.66	2/5754 (0.0%)
1	g	0.51	0/4221	0.66	2/5754 (0.0%)
1	h	0.51	0/4221	0.66	2/5754 (0.0%)
1	i	0.51	0/4221	0.66	2/5754 (0.0%)
1	j	0.51	0/4221	0.66	2/5754 (0.0%)
1	k	0.51	0/4221	0.66	2/5754 (0.0%)
1	l	0.51	0/4221	0.66	2/5754 (0.0%)
1	m	0.51	0/4221	0.66	2/5754 (0.0%)
1	n	0.51	0/4221	0.66	2/5754 (0.0%)
1	o	0.51	0/4221	0.66	2/5754 (0.0%)
1	p	0.51	0/4221	0.66	2/5754 (0.0%)
1	q	0.51	0/4221	0.66	2/5754 (0.0%)
1	r	0.51	0/4221	0.66	2/5754 (0.0%)
1	s	0.51	0/4221	0.66	2/5754 (0.0%)
1	t	0.51	0/4221	0.66	2/5754 (0.0%)
1	u	0.51	0/4221	0.66	2/5754 (0.0%)
1	v	0.51	0/4221	0.66	2/5754 (0.0%)
1	w	0.51	0/4221	0.66	2/5754 (0.0%)
1	x	0.51	0/4221	0.66	2/5754 (0.0%)
1	y	0.51	0/4221	0.66	2/5754 (0.0%)
1	z	0.51	0/4221	0.66	2/5754 (0.0%)
All	All	0.51	0/253260	0.66	120/345240 (0.0%)

There are no bond length outliers.

The worst 5 of 120 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	471	ARG	NE-CZ-NH2	-6.42	117.09	120.30
1	w	471	ARG	NE-CZ-NH2	-6.41	117.10	120.30
1	7	471	ARG	NE-CZ-NH2	-6.39	117.11	120.30
1	N	471	ARG	NE-CZ-NH2	-6.38	117.11	120.30
1	Q	471	ARG	NE-CZ-NH2	-6.37	117.12	120.30

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

### 5.3.1 Protein backbone

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	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	2	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	3	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	4	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	5	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	6	508/735 (69%)	501 (99%)	7 (1%)	0	100	100
1	7	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	8	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	A	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	B	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	C	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	D	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	E	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	F	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	G	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	H	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	I	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	J	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	K	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	L	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	M	508/735 (69%)	502 (99%)	6 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	N	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	O	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	P	508/735 (69%)	501 (99%)	7 (1%)	0	100	100
1	Q	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	R	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	S	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	T	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	U	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	V	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	W	508/735 (69%)	501 (99%)	7 (1%)	0	100	100
1	X	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	Y	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	Z	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	a	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	b	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	c	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	d	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	e	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	f	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	g	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	h	508/735 (69%)	501 (99%)	7 (1%)	0	100	100
1	i	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	j	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	k	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	l	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	m	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	n	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	o	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	p	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	q	508/735 (69%)	501 (99%)	7 (1%)	0	100	100
1	r	508/735 (69%)	502 (99%)	6 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	s	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	t	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	u	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	v	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	w	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	x	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	y	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
1	z	508/735 (69%)	502 (99%)	6 (1%)	0	100	100
All	All	30480/44100 (69%)	30115 (99%)	365 (1%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains ⓘ

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	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	2	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	3	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	4	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	5	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	6	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	7	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	8	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	A	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	B	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	C	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	D	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	E	454/630 (72%)	446 (98%)	8 (2%)	59	45

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	F	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	G	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	H	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	I	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	J	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	K	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	L	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	M	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	N	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	O	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	P	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	Q	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	R	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	S	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	T	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	U	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	V	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	W	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	X	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	Y	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	Z	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	a	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	b	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	c	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	d	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	e	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	f	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	g	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	h	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	i	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	j	454/630 (72%)	446 (98%)	8 (2%)	59	45

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	k	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	l	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	m	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	n	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	o	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	p	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	q	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	r	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	s	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	t	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	u	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	v	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	w	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	x	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	y	454/630 (72%)	446 (98%)	8 (2%)	59	45
1	z	454/630 (72%)	446 (98%)	8 (2%)	59	45
All	All	27240/37800 (72%)	26760 (98%)	480 (2%)	61	45

5 of 480 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	3	693	ARG
1	x	597	THR
1	d	691	SER
1	w	691	SER
1	8	288	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 517 such sidechains are listed below:

Mol	Chain	Res	Type
1	v	457	GLN
1	x	303	ASN
1	v	349	GLN
1	W	457	GLN
1	W	288	HIS

### 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.

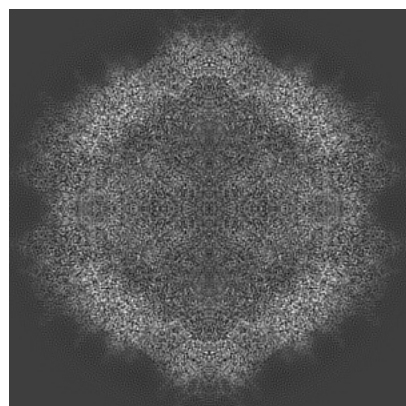
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-9012. These allow visual inspection of the internal detail of the map and identification of artifacts.

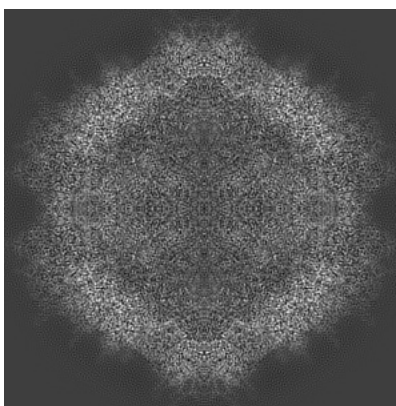
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

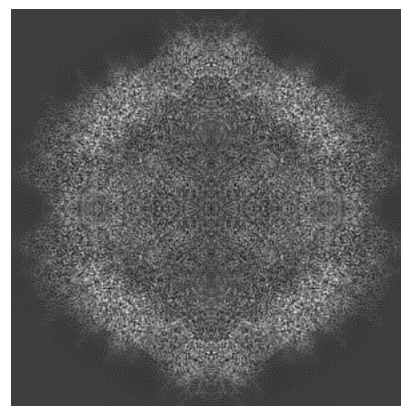
#### 6.1.1 Primary map



X

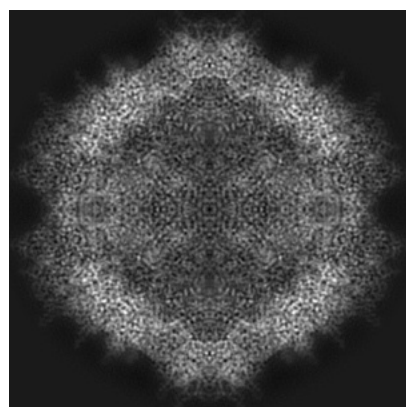


Y

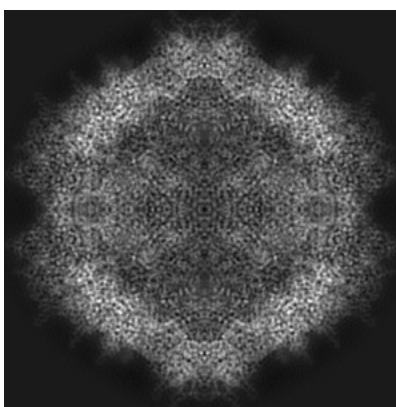


Z

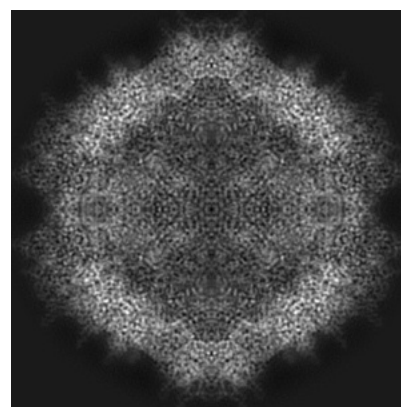
#### 6.1.2 Raw map



X



Y

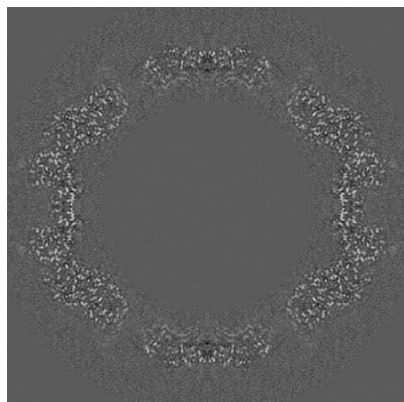


Z

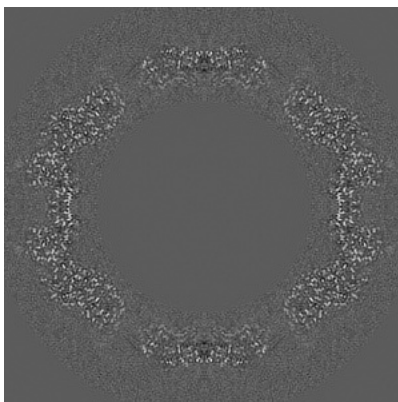
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

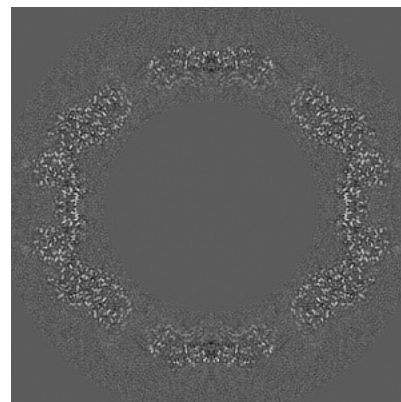
### 6.2.1 Primary map



X Index: 360

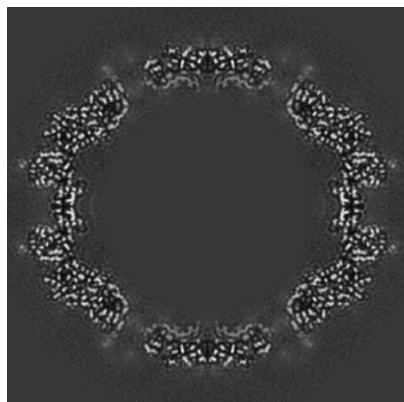


Y Index: 360

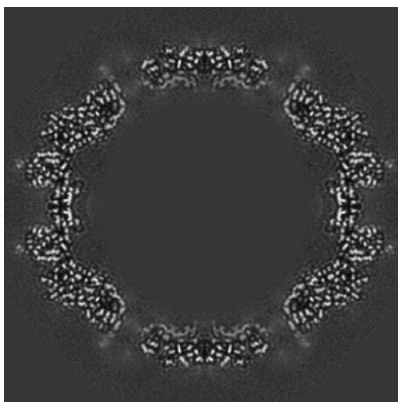


Z Index: 360

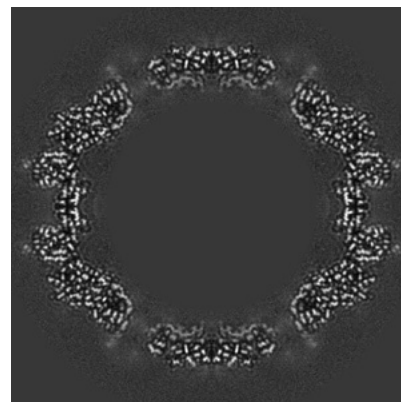
### 6.2.2 Raw map



X Index: 180



Y Index: 180

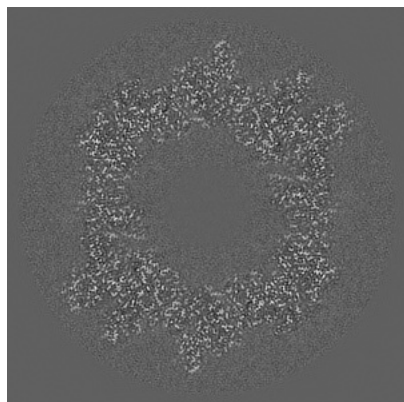


Z Index: 180

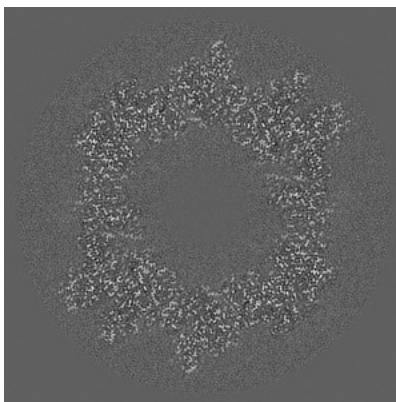
The images above show central slices of the map in three orthogonal directions.

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

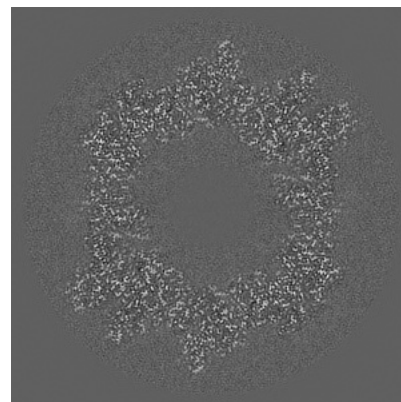
### 6.3.1 Primary map



X Index: 534

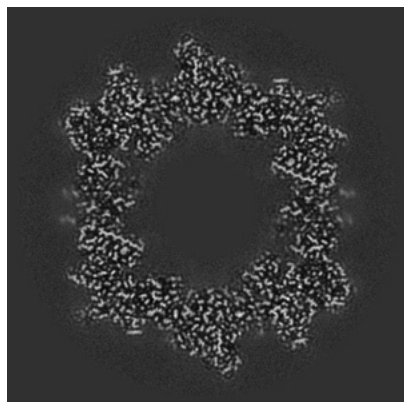


Y Index: 534

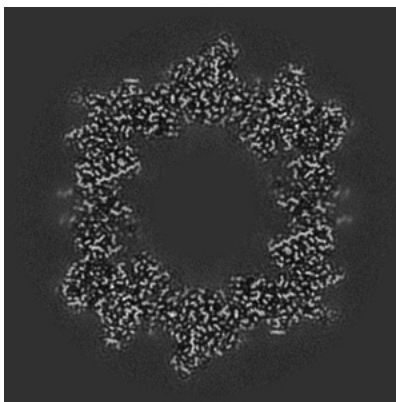


Z Index: 534

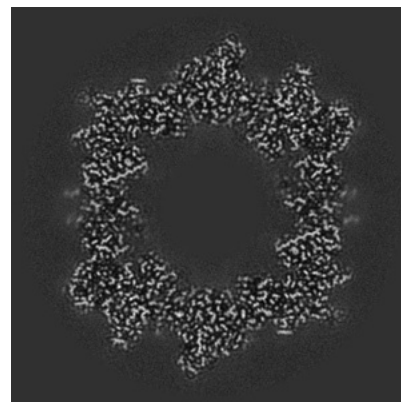
### 6.3.2 Raw map



X Index: 97



Y Index: 263

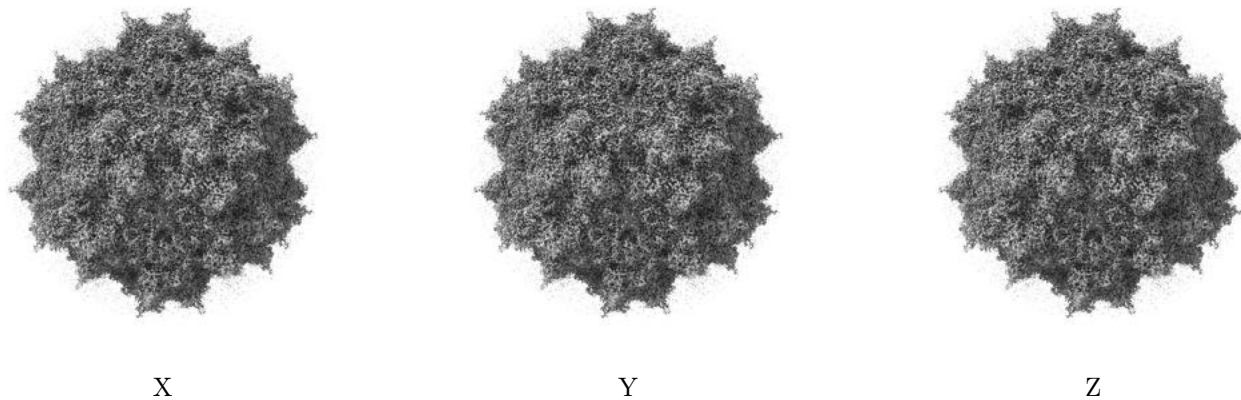


Z Index: 263

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

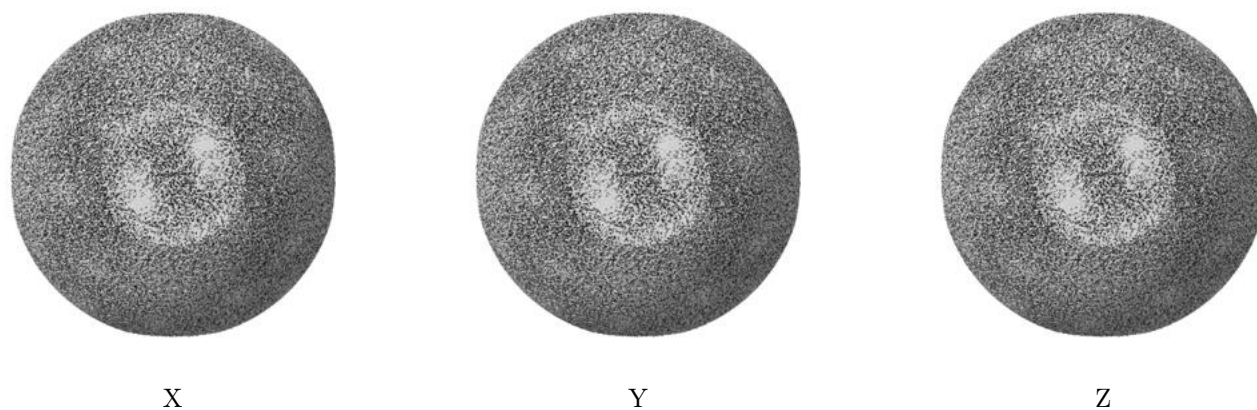
## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.06. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.4.2 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.

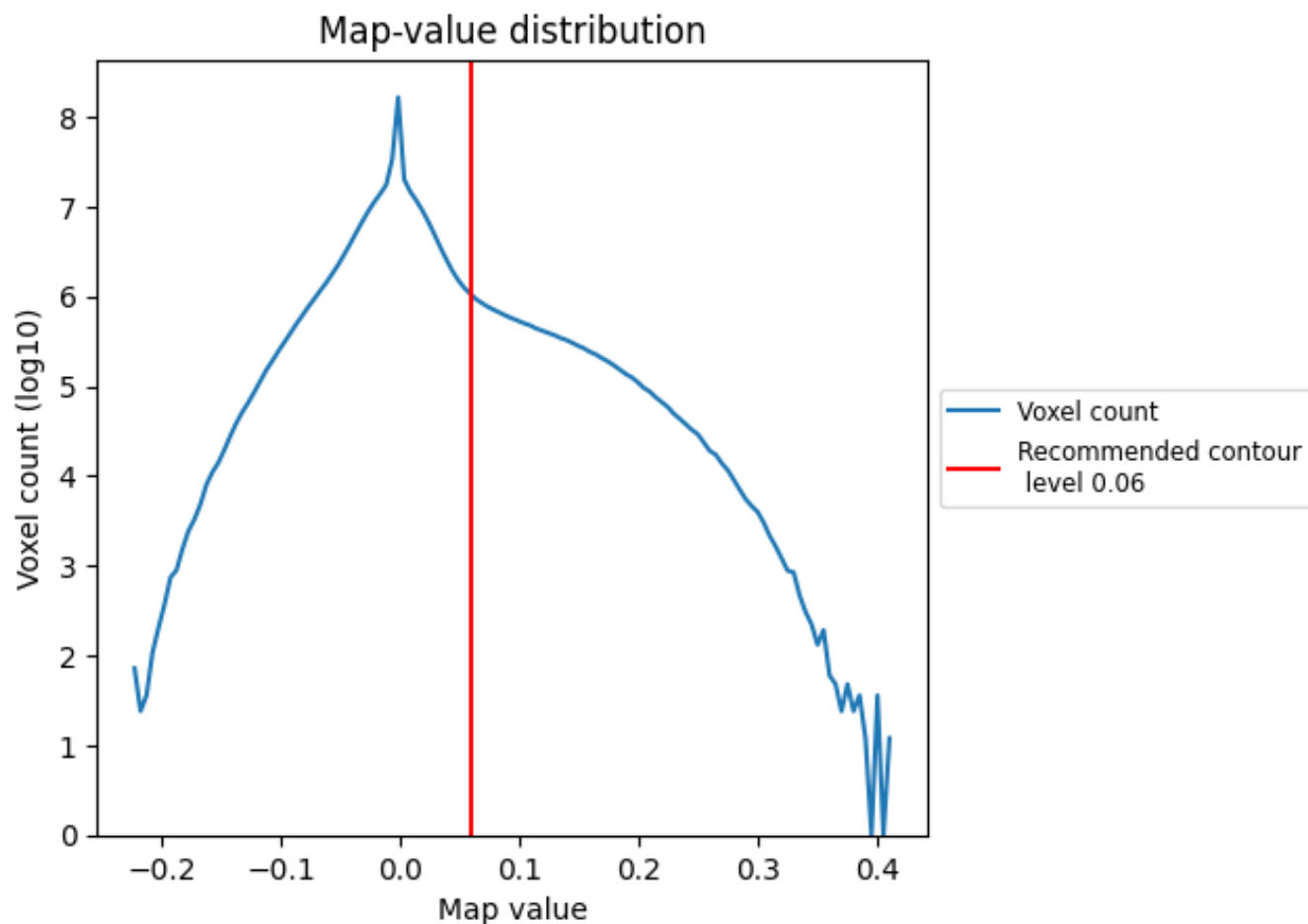
## 6.5 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

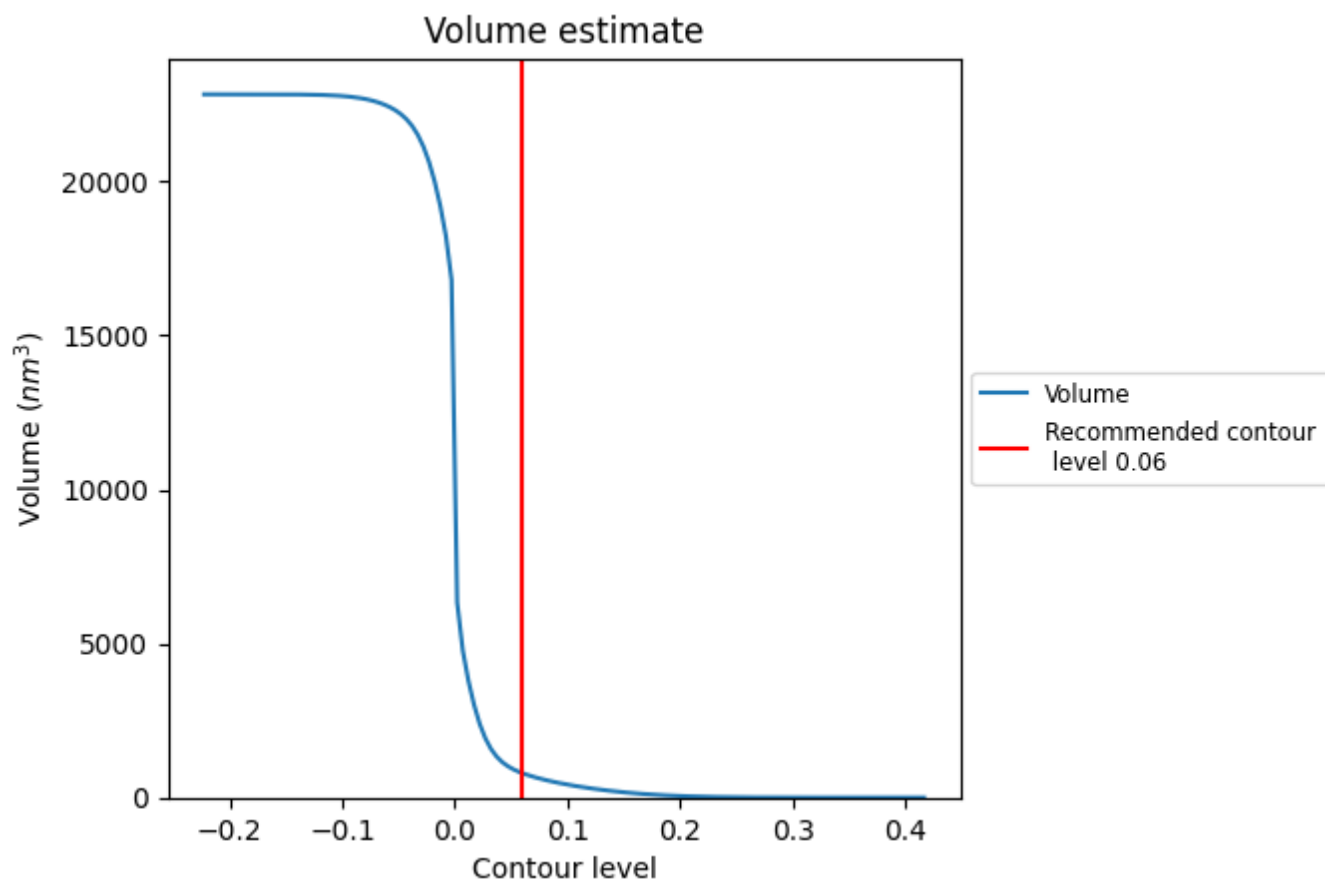
This section contains the results of statistical analysis of the map.

### 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.

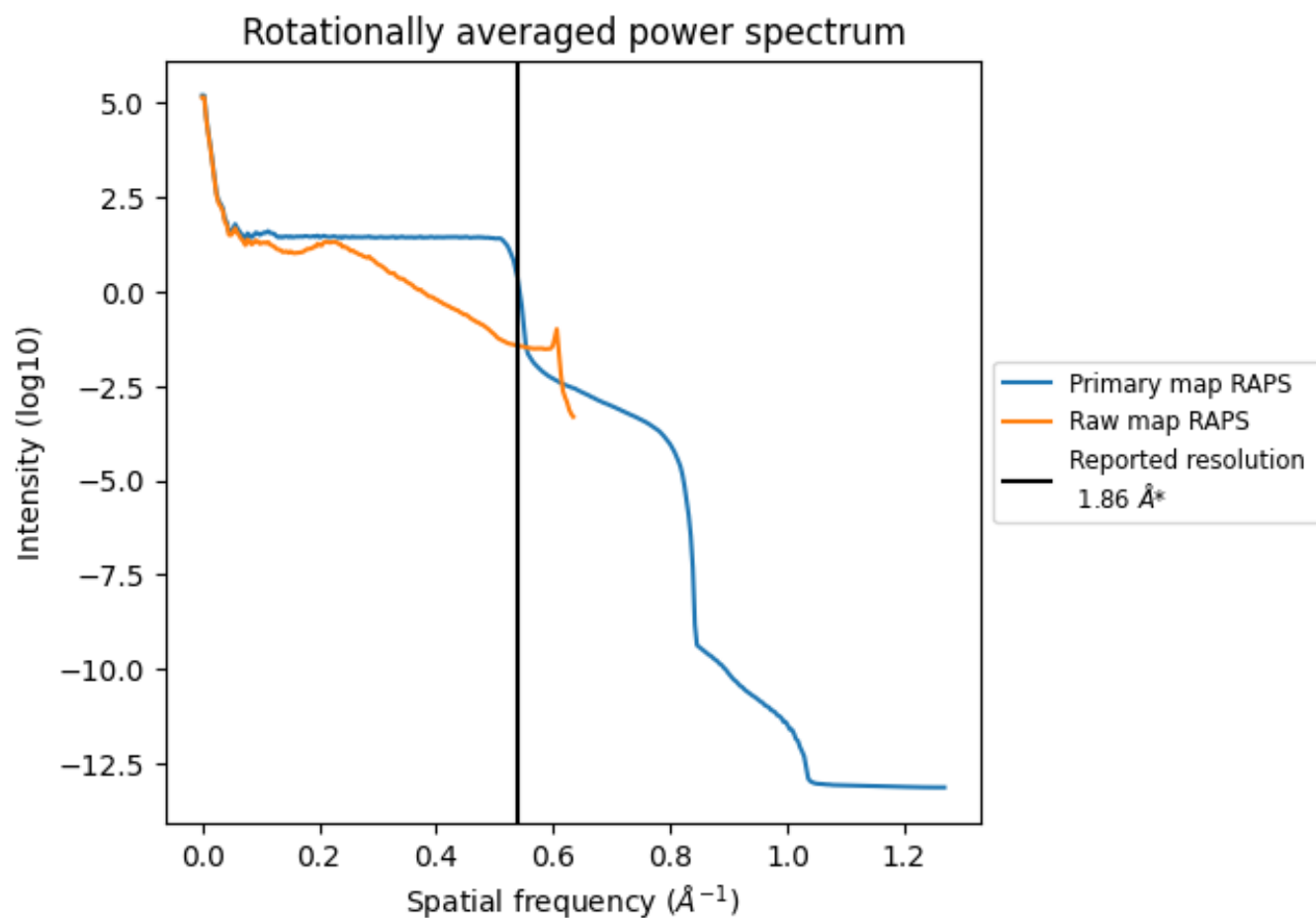
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 790 nm<sup>3</sup>; this corresponds to an approximate mass of 714 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 ⓘ

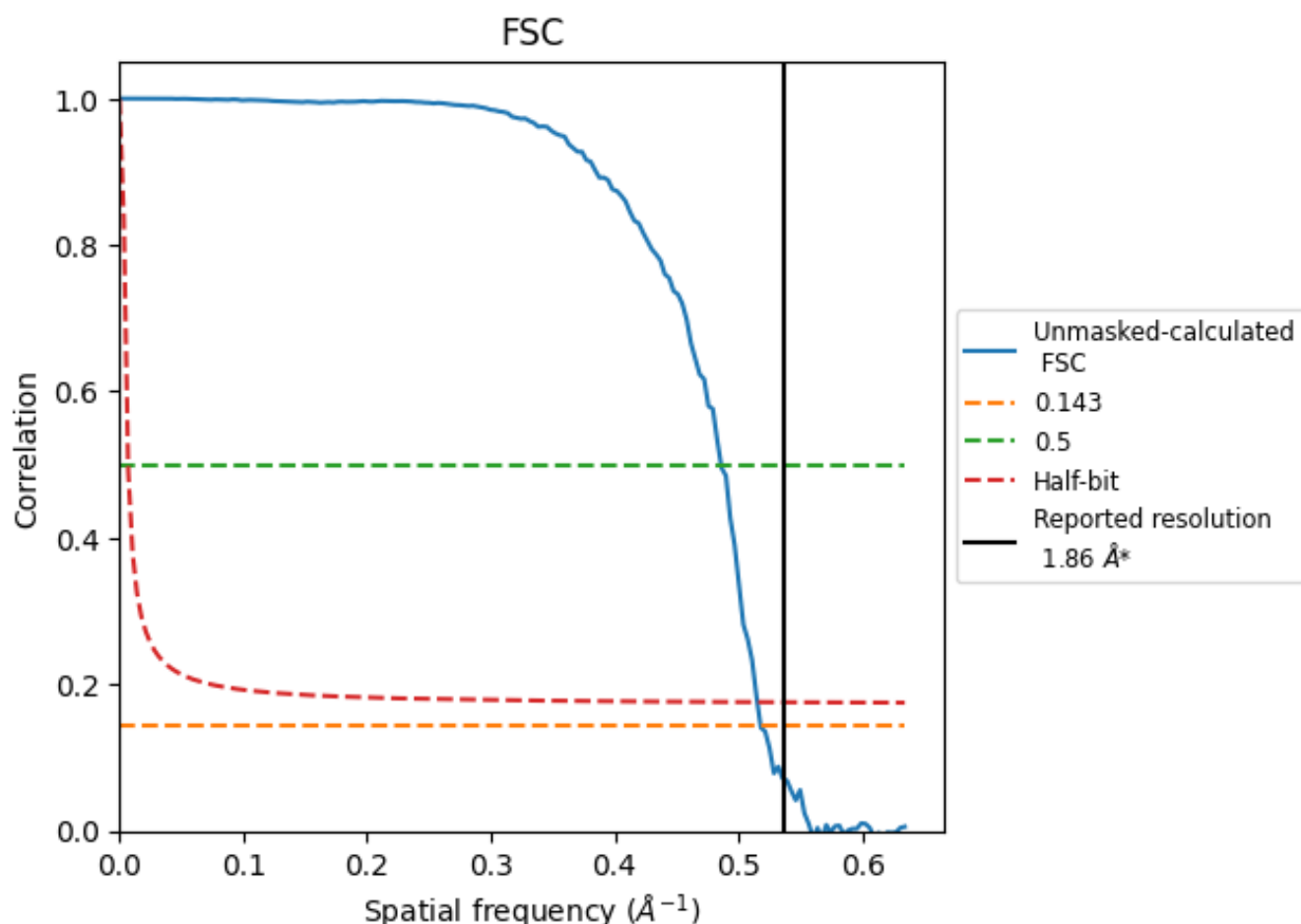


\*Reported resolution corresponds to spatial frequency of 0.538  $\text{\AA}^{-1}$

## 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 0.538 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

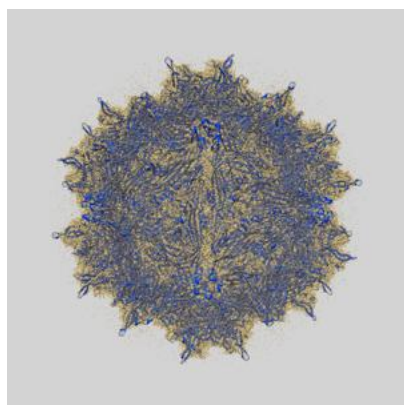
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	1.86	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	1.93	2.06	1.94

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

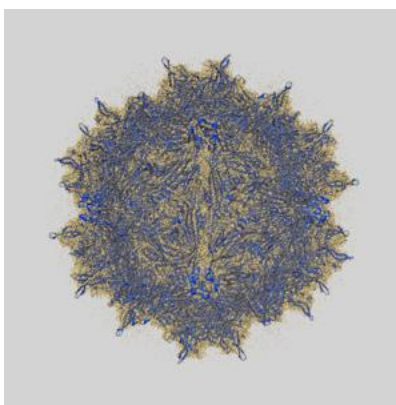
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-9012 and PDB model 6E9D. Per-residue inclusion information can be found in [section 3](#) on [page 14](#).

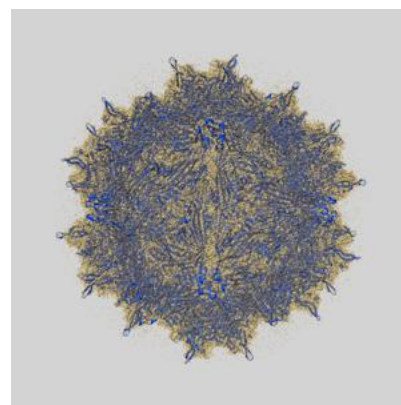
### 9.1 Map-model overlay [i](#)



X



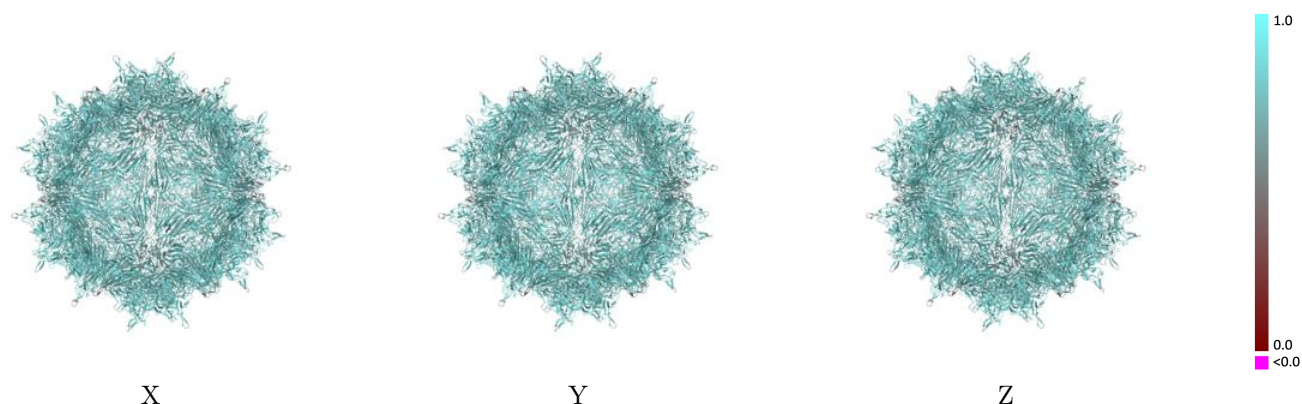
Y



Z

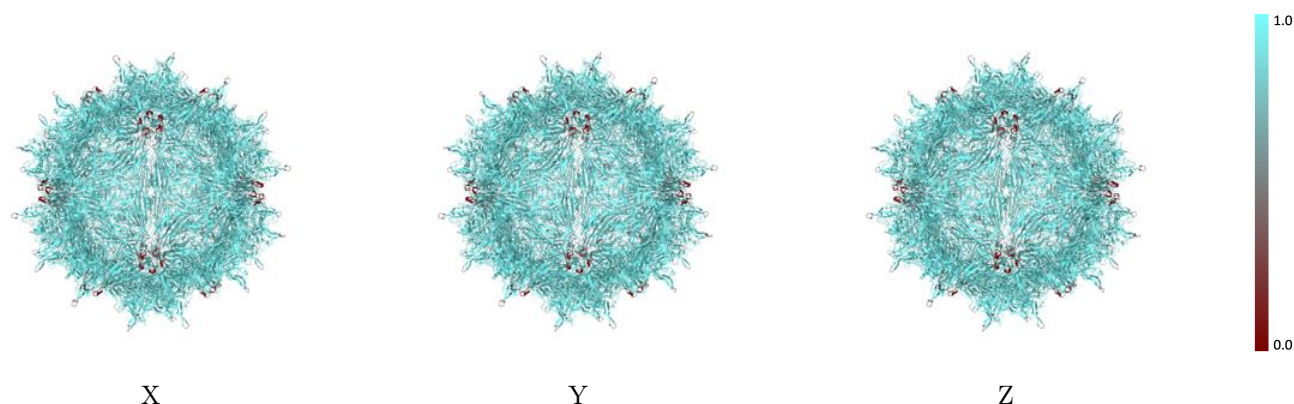
The images above show the 3D surface view of the map at the recommended contour level 0.06 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



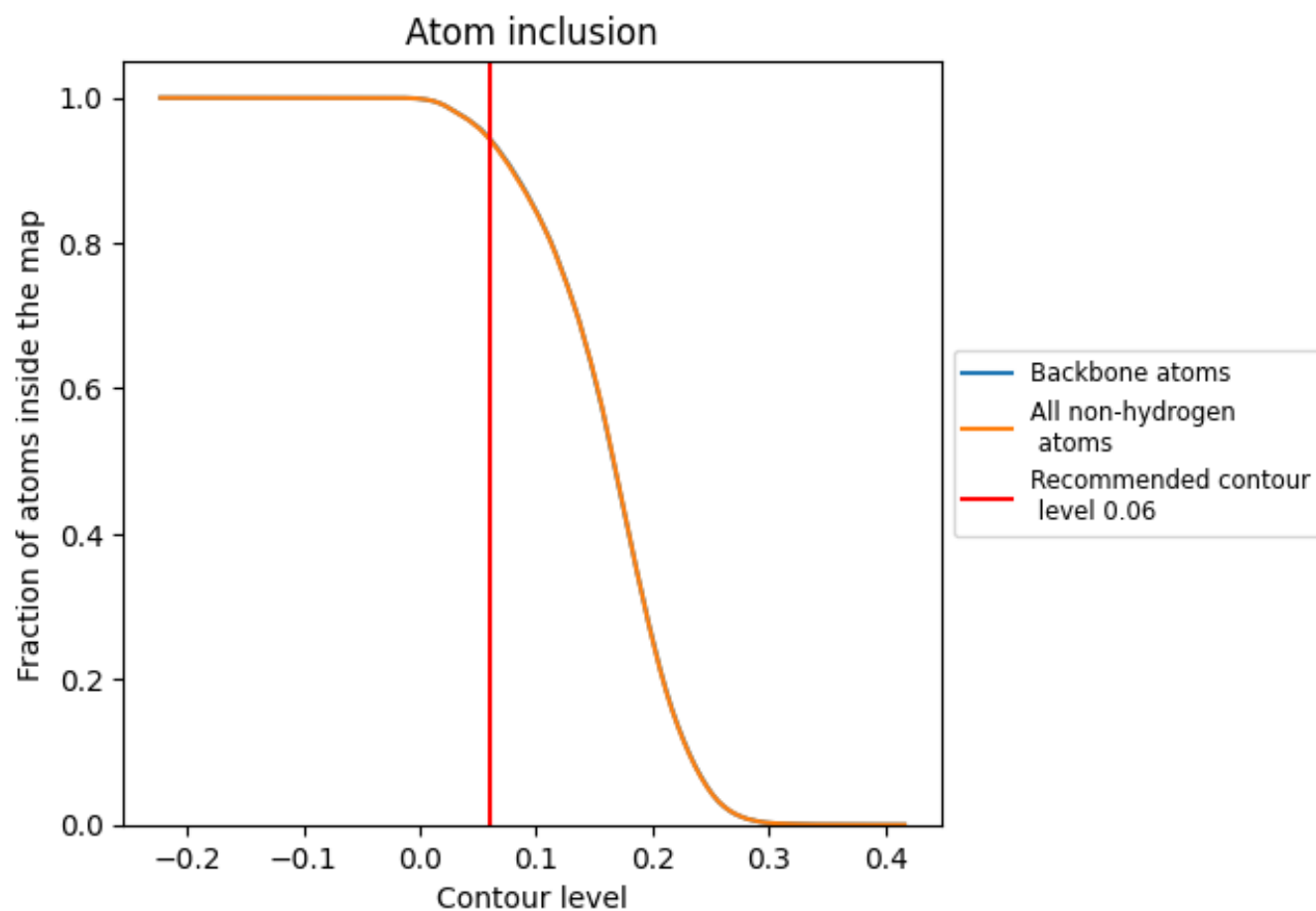
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.06).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 94% of all backbone atoms, 94% 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 (0.06) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9428	 0.8010
1	 0.9454	 0.8040
2	 0.9466	 0.8080
3	 0.9444	 0.8050
4	 0.9479	 0.8040
5	 0.9451	 0.8000
6	 0.9451	 0.7910
7	 0.9416	 0.7900
8	 0.9421	 0.7950
A	 0.9506	 0.8190
B	 0.9494	 0.8140
C	 0.9489	 0.8130
D	 0.9506	 0.8180
E	 0.9499	 0.8180
F	 0.9489	 0.8170
G	 0.9494	 0.8190
H	 0.9489	 0.8160
I	 0.9486	 0.8170
J	 0.9476	 0.8100
K	 0.9434	 0.8020
L	 0.9459	 0.8100
M	 0.9484	 0.8140
N	 0.9511	 0.8170
O	 0.9481	 0.8130
P	 0.9499	 0.8180
Q	 0.9496	 0.8170
R	 0.9486	 0.8110
S	 0.9474	 0.8080
T	 0.9451	 0.7990
U	 0.9466	 0.8030
V	 0.9466	 0.8080
W	 0.9496	 0.8150
X	 0.9476	 0.8050
Y	 0.9451	 0.8110
Z	 0.9484	 0.8070



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Chain	Atom inclusion	Q-score
a	 0.9404	 0.7820
b	 0.9419	 0.7880
c	 0.9404	 0.7870
d	 0.9419	 0.7830
e	 0.9397	 0.7780
f	 0.9436	 0.7950
g	 0.9496	 0.8100
h	 0.9449	 0.8060
i	 0.9426	 0.7960
j	 0.9426	 0.7970
k	 0.9424	 0.7910
l	 0.9436	 0.8000
m	 0.9454	 0.8030
n	 0.9382	 0.7780
o	 0.9379	 0.7770
p	 0.9384	 0.7760
q	 0.9401	 0.7780
r	 0.9434	 0.7850
s	 0.9377	 0.7780
t	 0.9411	 0.7910
u	 0.9397	 0.7810
v	 0.9394	 0.7870
w	 0.9426	 0.7990
x	 0.9451	 0.8020
y	 0.9384	 0.7850
z	 0.9429	 0.7870