Full wwPDB EM Validation Report ⓘ

Oct 6, 2024 – 03:32 pm BST

PDB ID	:	7QOH
EMDB ID	:	EMD-14090
Title	:	Unique vertex of the phicrAss001 virion with C5 symmetry imposed
Authors	:	Bayfield, O.W.; Shkoporov, A.N.; Yutin, N.; Khokhlova, E.V.; Smith, J.L.R.; Hawkins, D.E.D.P.; Koonin, E.V.; Hill, C.; Antson, A.A.
Deposited on	:	2021-12-24
Resolution	:	3.32 Å(reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

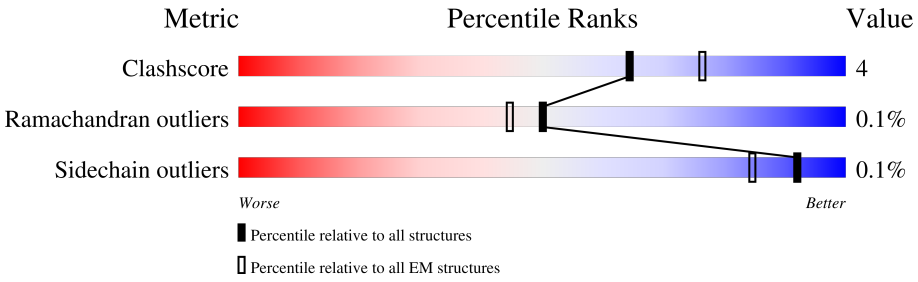
EMDB validation analysis	:	0.0.1.dev113
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.32 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)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	504	19% 85% 11%
1	B	504	13% 87% 12%
1	C	504	12% 87% 13%
1	D	504	13% 78% 12% 10%
1	E	504	15% 91% 9%
1	F	504	25% 91% 8%
2	a	333	26% 99%
2	b	333	17% 99%

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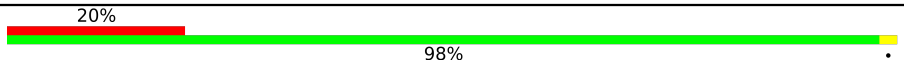
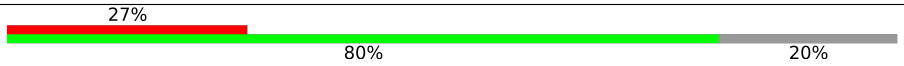
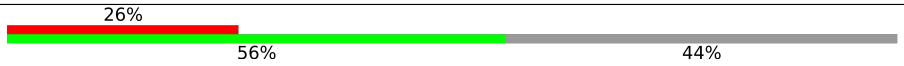
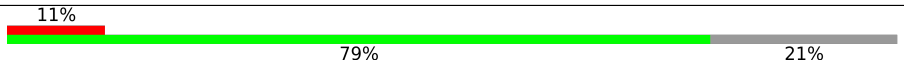
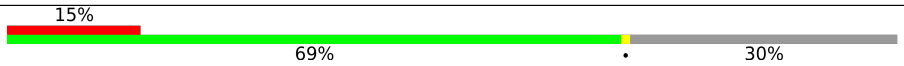
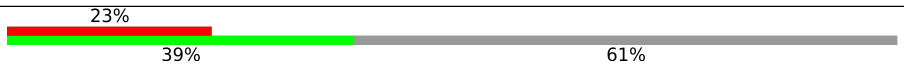
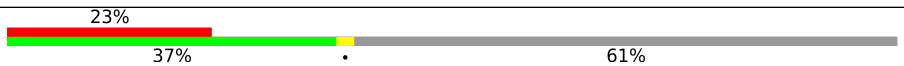
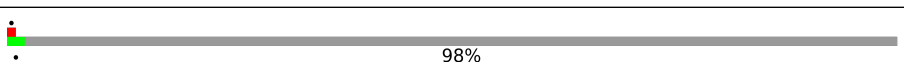
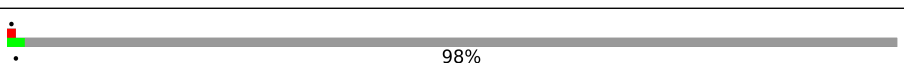
Mol	Chain	Length	Quality of chain
2	d	333	
2	e	333	
2	f	333	
3	g	104	
3	h	104	
4	i	97	
4	j	97	
4	k	97	
5	l	806	
5	m	806	

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 37079 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 Major capsid protein gp32.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	484	Total	C	N	O	S	0	0
			3861	2451	668	723	19		
1	B	503	Total	C	N	O	S	0	0
			4012	2552	695	745	20		
1	C	503	Total	C	N	O	S	0	0
			4012	2552	695	745	20		
1	D	456	Total	C	N	O	S	0	0
			3649	2329	631	671	18		
1	E	503	Total	C	N	O	S	0	0
			4012	2552	695	745	20		
1	F	503	Total	C	N	O	S	0	0
			4012	2552	695	745	20		

- Molecule 2 is a protein called Auxiliary capsid protein gp36.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	a	333	Total	C	N	O	S	0	0
			2542	1624	410	498	10		
2	b	333	Total	C	N	O	S	0	0
			2542	1624	410	498	10		
2	d	333	Total	C	N	O	S	0	0
			2542	1624	410	498	10		
2	e	267	Total	C	N	O	S	0	0
			2077	1335	332	401	9		
2	f	185	Total	C	N	O	S	0	0
			1434	919	226	283	6		

- Molecule 3 is a protein called Portal vertex capsid protein gp57.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	g	82	Total	C	N	O	S	0	0
			619	392	100	118	9		
3	h	73	Total	C	N	O	S	0	0
			563	359	91	105	8		

- Molecule 4 is a protein called Head fiber trimer protein gp21.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	i	38	Total	C	N	O	S	0	0
			310	201	51	56	2		
4	j	38	Total	C	N	O	S	0	0
			310	201	51	56	2		
4	k	38	Total	C	N	O	S	0	0
			310	201	51	56	2		

- Molecule 5 is a protein called Portal protein gp20.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	l	16	Total	C	N	O	S	0	0
			126	75	22	28	1		
5	m	17	Total	C	N	O	S	0	0
			140	85	24	30	1		

- Molecule 6 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

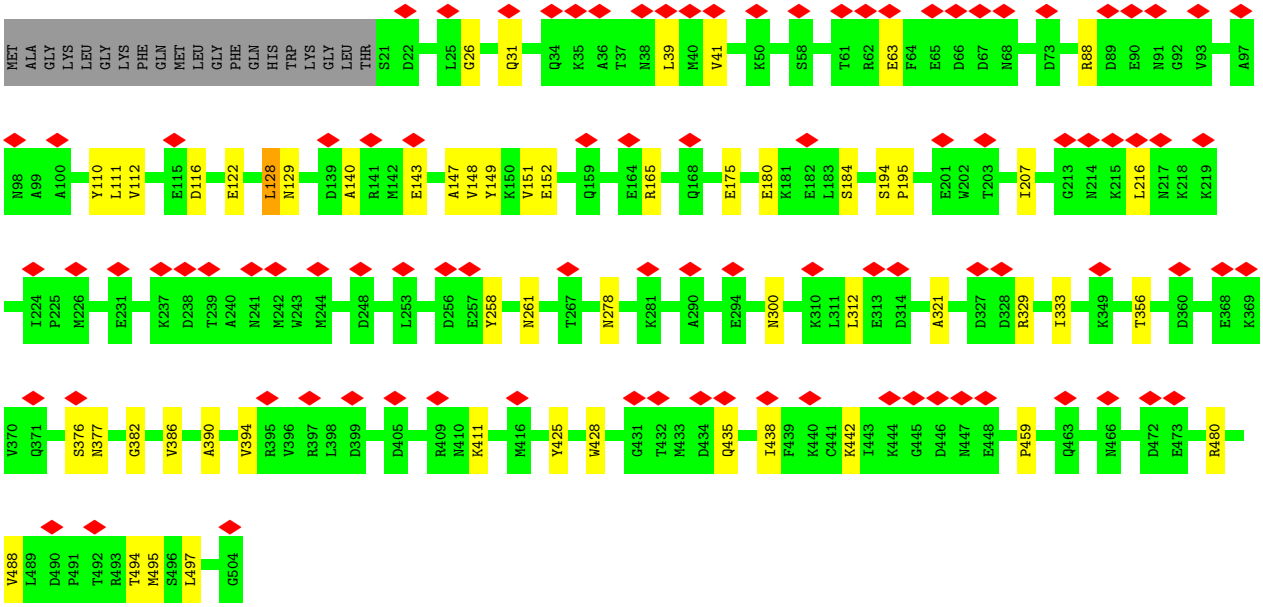
Mol	Chain	Residues	Atoms		AltConf
6	A	1	Total	Mg	0
			1	1	
6	B	1	Total	Mg	0
			1	1	
6	C	1	Total	Mg	0
			1	1	
6	D	1	Total	Mg	0
			1	1	
6	E	1	Total	Mg	0
			1	1	
6	F	1	Total	Mg	0
			1	1	

3 Residue-property plots (i)

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

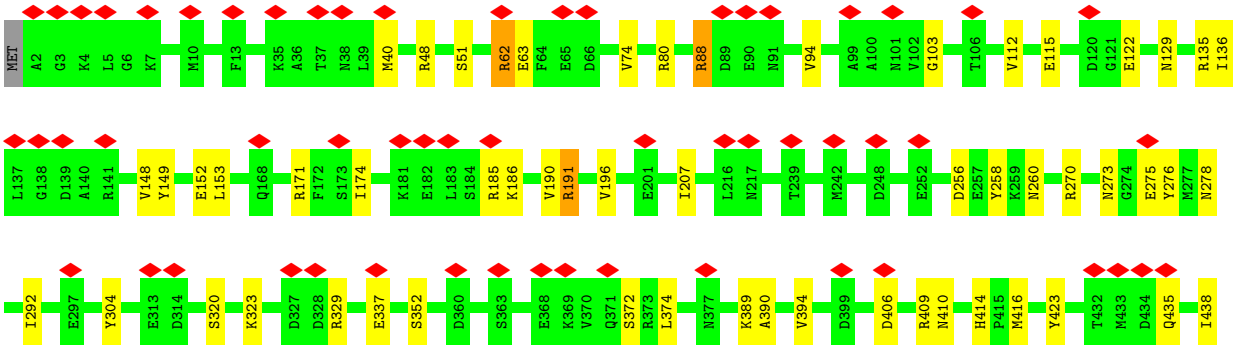
• Molecule 1: Major capsid protein gp32

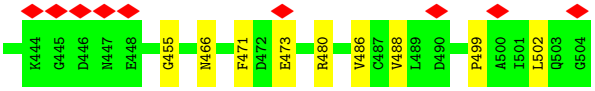
Chain A:



• Molecule 1: Major capsid protein gp32

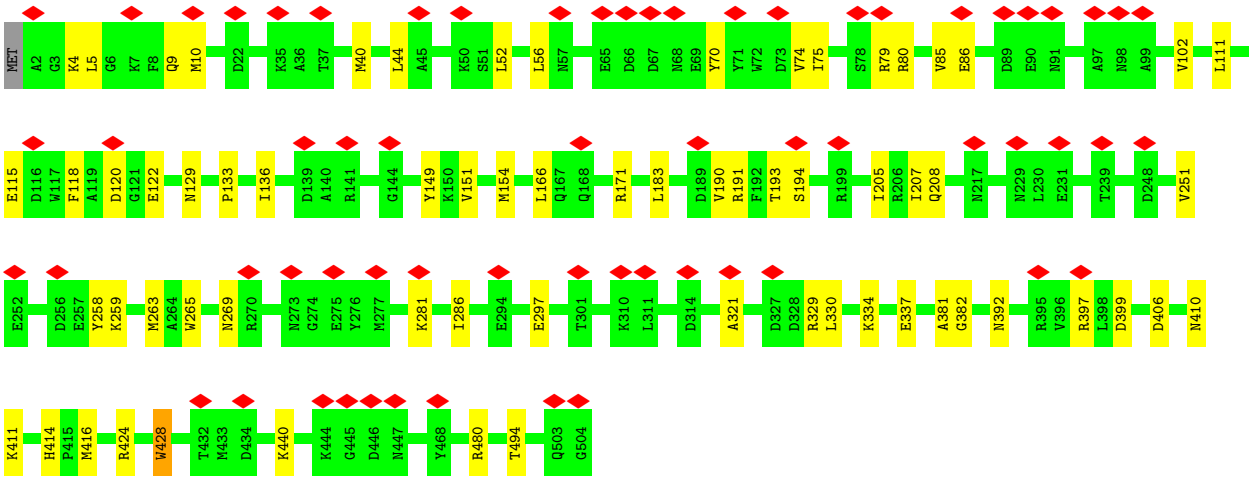
Chain B:





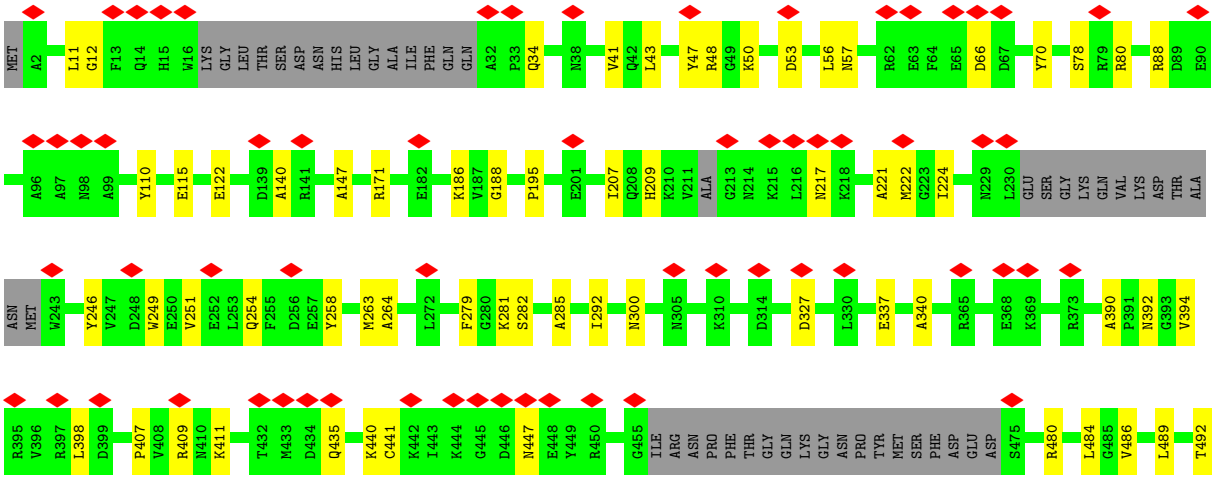
• Molecule 1: Major capsid protein gp32

Chain C:



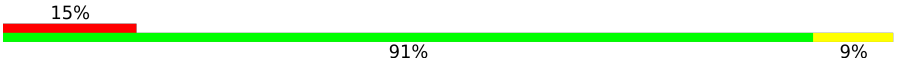
• Molecule 1: Major capsid protein gp32

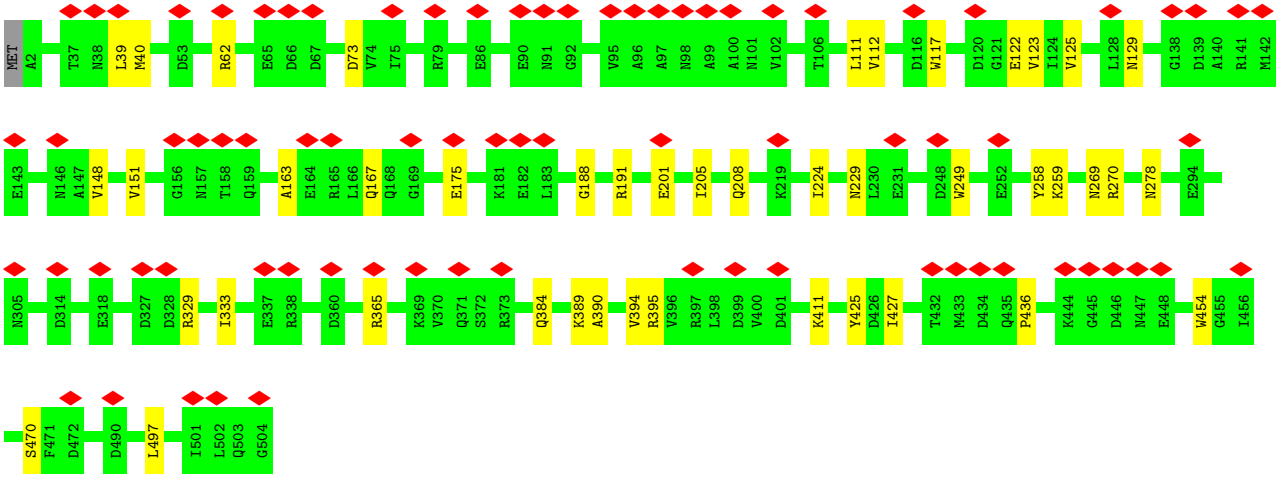
Chain D:



• Molecule 1: Major capsid protein gp32

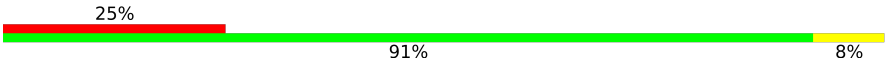
Chain E:

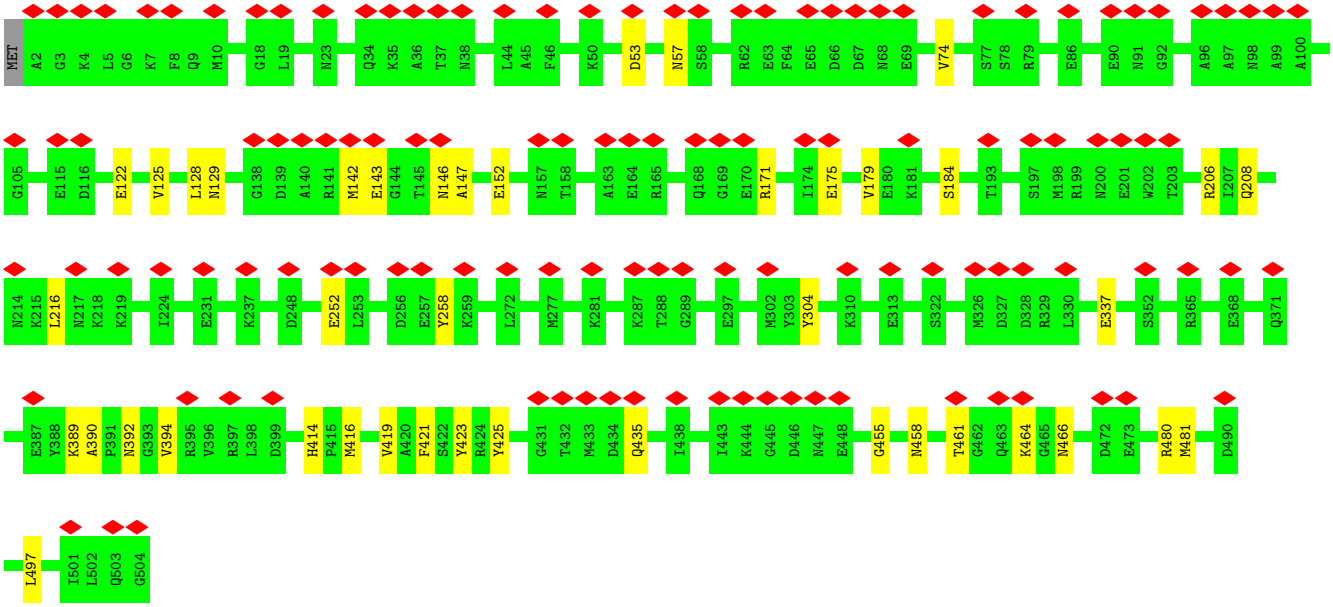




• Molecule 1: Major capsid protein gp32

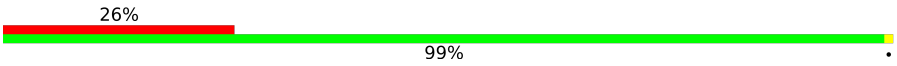
Chain F:

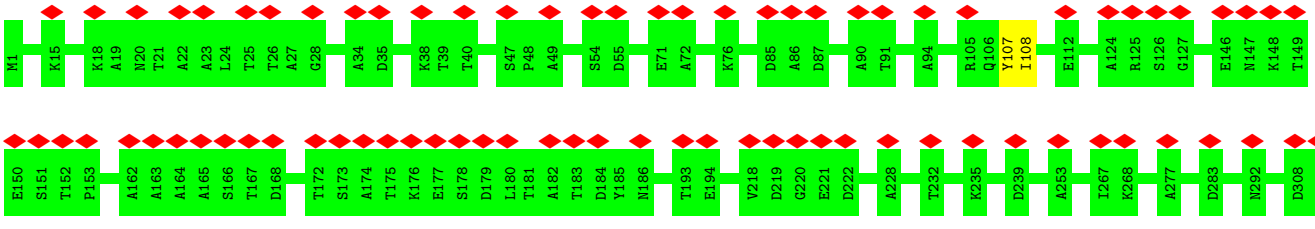


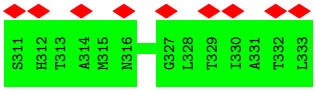


• Molecule 2: Auxiliary capsid protein gp36

Chain a:

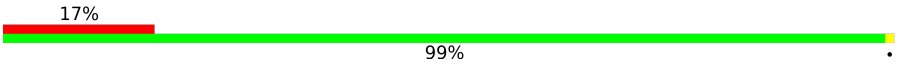


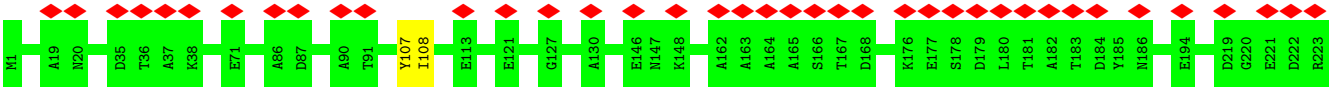


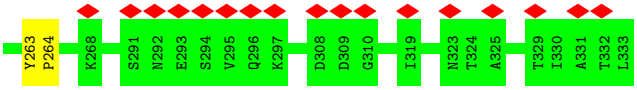


• Molecule 2: Auxiliary capsid protein gp36

Chain b:

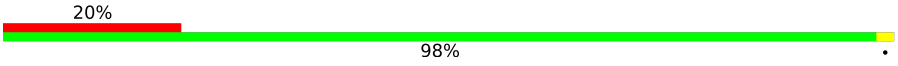


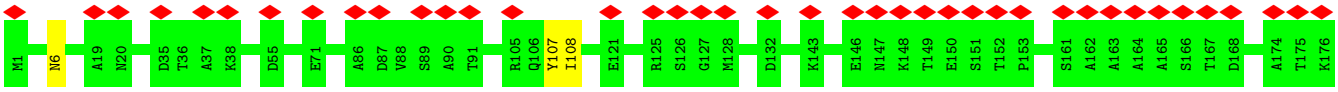


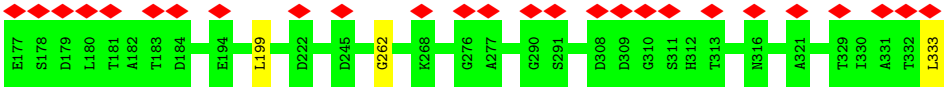


• Molecule 2: Auxiliary capsid protein gp36

Chain d:

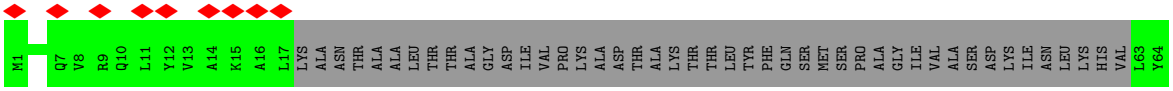


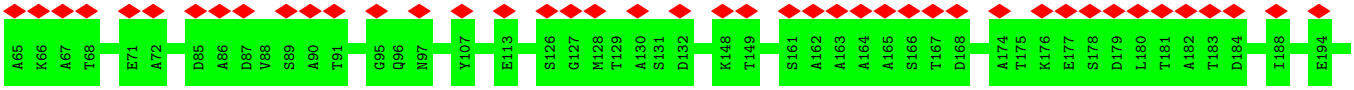


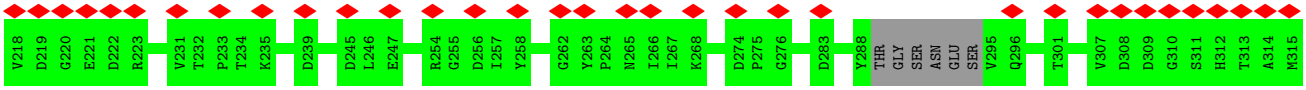


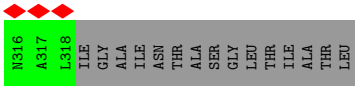
• Molecule 2: Auxiliary capsid protein gp36

Chain e:



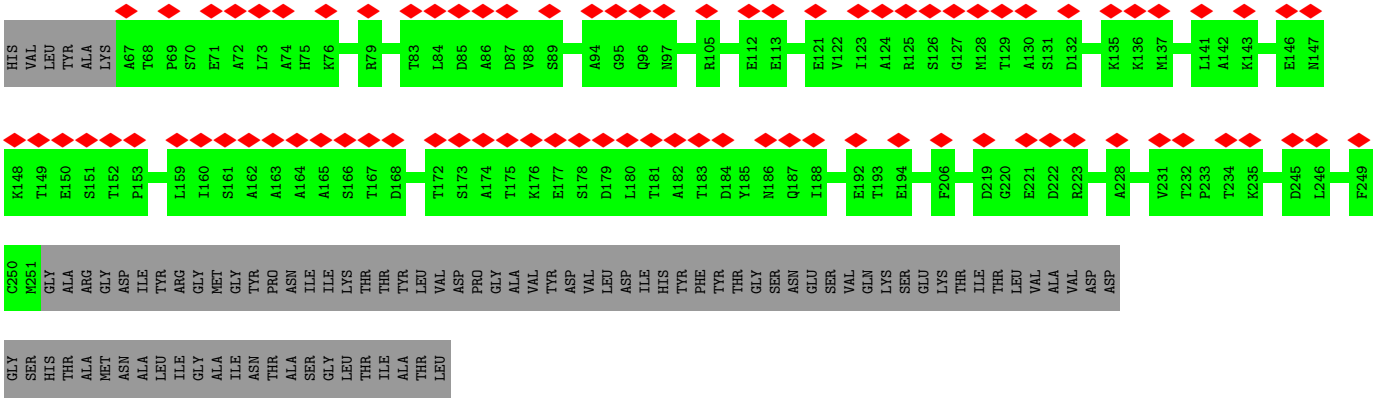






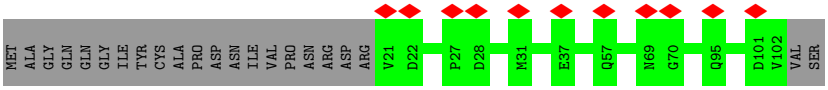
• Molecule 2: Auxiliary capsid protein gp36

Chain f:



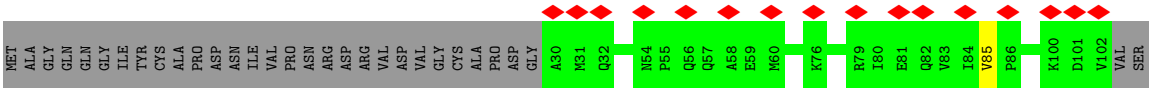
• Molecule 3: Portal vertex capsid protein gp57

Chain g:



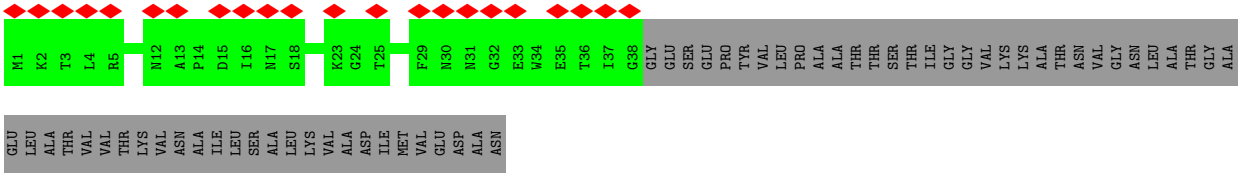
• Molecule 3: Portal vertex capsid protein gp57

Chain h:



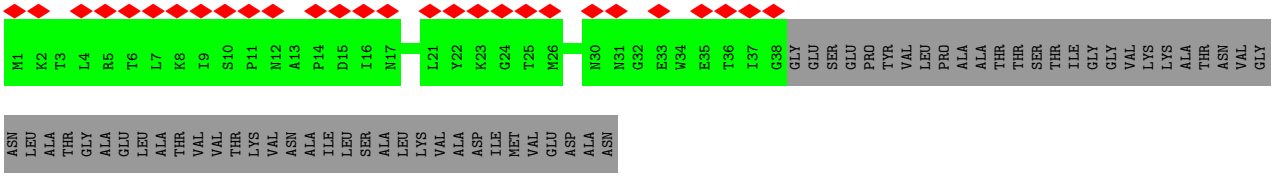
• Molecule 4: Head fiber trimer protein gp21

Chain i:

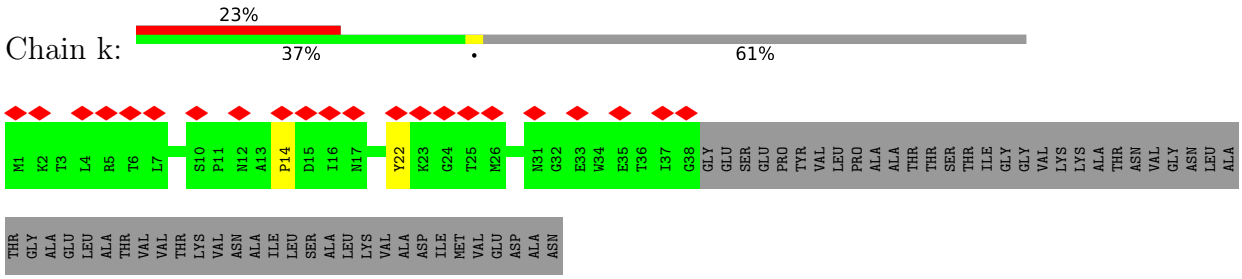


• Molecule 4: Head fiber trimer protein gp21

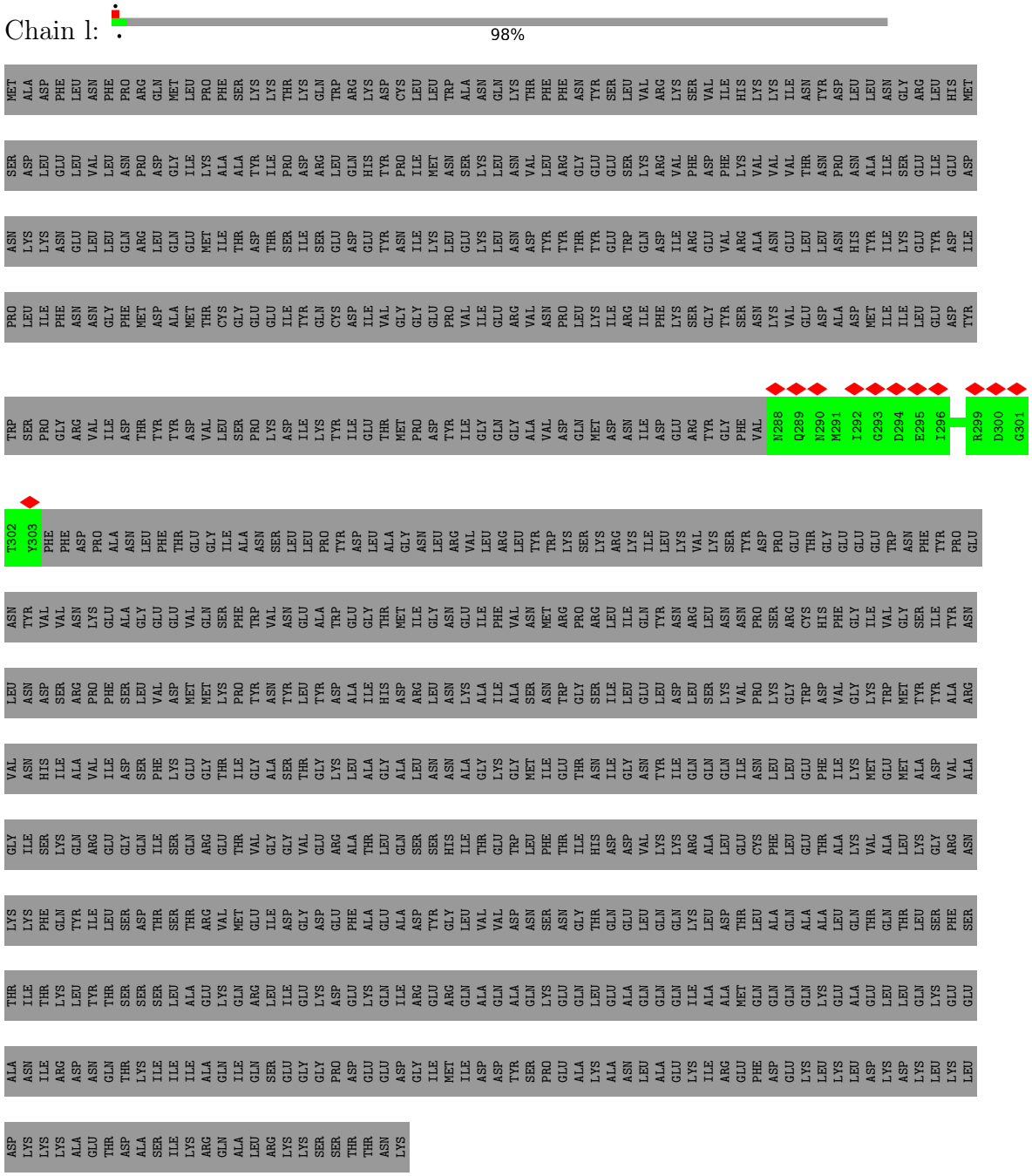
Chain j:



• Molecule 4: Head fiber trimer protein gp21

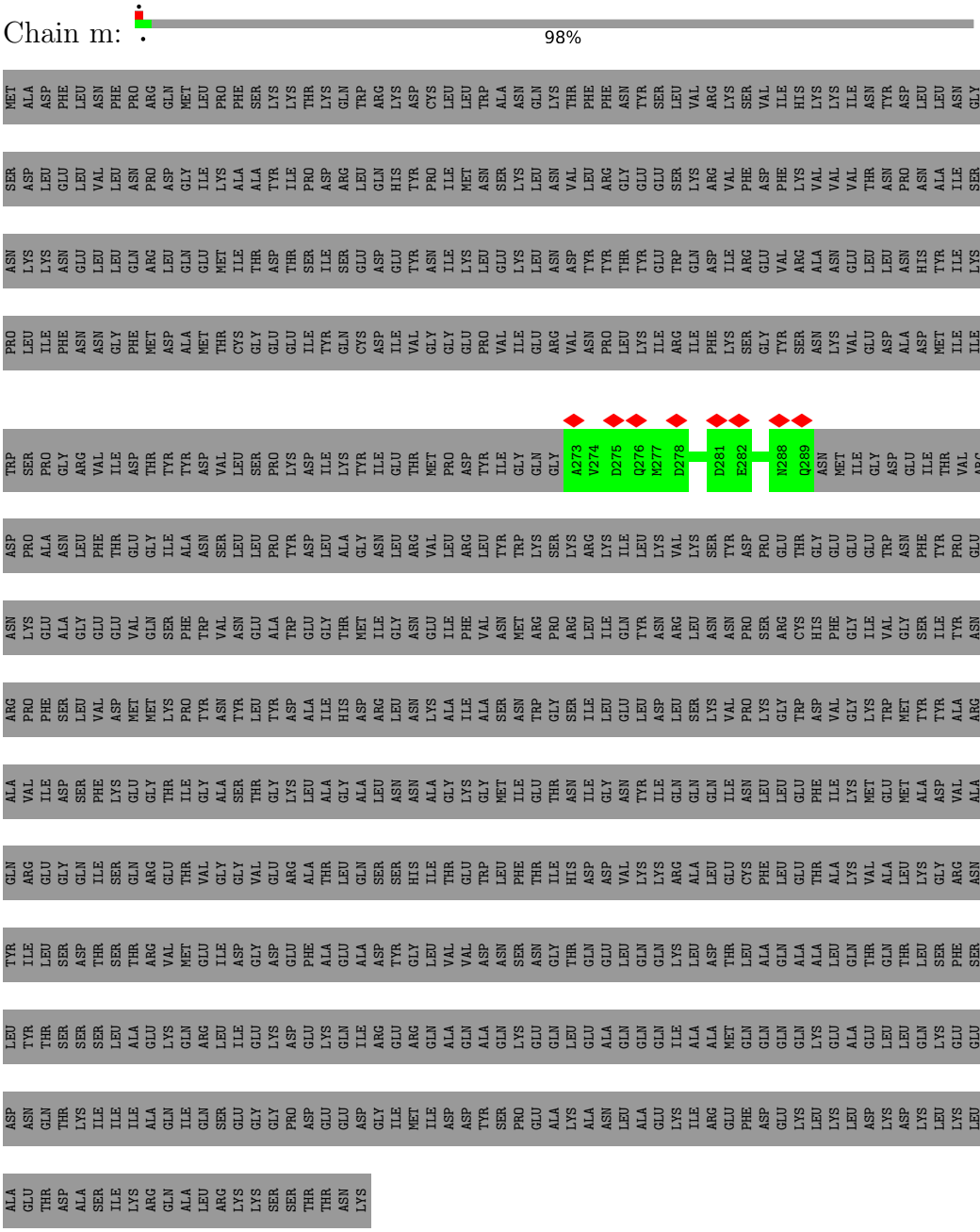


• Molecule 5: Portal protein gp20



• Molecule 5: Portal protein gp20

Chain m:


98%
MET ALA ASP PHE LEU ASN PHE PRO ARG GLN MET LEU PRO PHE SER LYS LYS THR LYS GLN TRP ARG LYS ASP CYS LEU LEU TRP ALA ASN GLN LYS THR PHE PHE ASN TYR SER LEU VAL ARG LYS SER VAL ILE HIS LYS LYS ILE ASN TYR ASP LEU LEU ASN GLY ARG LEU HIS MET
SER ASP LEU GLU LEU VAL LEU ASN PRO ASP GLY ILE LYS ALA ALA TYR ILE PRO ASP ARG LEU GLN HIS TYR PRO ILE MET ASN SER LYS LEU ASN VAL LEU ARG GLY GLU GLU SER LYS ARG VAL PHE ASP PHE LYS VAL VAL VAL THR ASN PRO ASN ALA ILE SER GLU ILE GLU ASP
ASN LYS LYS ASN GLU LEU LEU GLN ARG LEU GLN GLU MET ILE THR ASP THR SER ILE SER GLU GLU LEU GLN LYS LEU ASN ASP TYR THR TYR GLU TRP GLN ASP ILE ARG GLU VAL ARG ALA ASN GLU LEU LEU ASN HIS TYR ILE LYS GLU TYR ASP ILE
PRO LEU ILE PHE ASN ASN GLY PHE MET ASP ALA MET THR CYS GLY GLU GLU ILE TYR GLN CYS ASP ILE VAL GLY GLY GLU PRO VAL ILE GLU ARG VAL ASN PRO LEU LYS ILE ARG ILE PHE LYS SER GLY TYR SER ASN LYS VAL GLU ASP ALA ASP MET ILE ILE LEU GLU ASP TYR
TRP SER PRO GLY ARG VAL ILE ASP THR TYR TYR ASP VAL LEU SER PRO LYS ASP ILE LYS TYR ILE GLU THR MET PRO ASP TYR ILE GLY GLN GLY A273 V274 D275 Q276 M277 D278 D281 E282 N288 Q289 ASN MET ILE GLY ASP GLU ILE THR VAL ARG ASP GLY THR TYR PHE PHE
ASP PRO ALA ASN LEU PHE THR GLU GLY ILE ALA ASN SER LEU LEU PRO TYR ASP LEU ALA GLY ASN LEU ARG VAL LEU ARG LEU TYR TRP LYS SER ARG LYS ILE LEU LYS VAL LYS SER TYR ASP PRO GLU THR GLY GLU GLU GLU TRP ASN PHE TYR PRO GLU ASN TYR VAL VAL
ASN LYS GLU ALA GLY GLU GLU VAL GLN SER PHE TRP VAL ASN GLU ALA TRP GLU GLY THR MET ILE GLY ASN GLU ILE PHE VAL ASN MET ARG PRO ARG LEU ILE GLN TYR ASN ARG LEU ASN ASN PRO SER ARG CYS HIS PHE GLY ILE VAL GLY SER ILE TYR ASN ASN LEU ASN ASP SER
ARG PRO PHE SER LEU VAL ASP MET MET LYS PRO TYR ASN TYR LEU TYR ASP ALA ILE HIS ASP ARG LEU ASN LYS ALA ILE ALA SER ASN TRP GLY SER ILE LEU LEU GLU LEU ASP LEU SER LYS VAL PRO LYS GLY TRP ASP VAL GLY LYS TRP MET TYR TYR ALA ARG VAL ASN HIS ILE
ALA VAL ILE ASP SER PHE LYS GLU GLY THR ILE GLY ALA SER THR GLY LYS LEU ALA GLY ALA LEU ASN ASN ALA GLY LYS GLY MET ILE GLU THR ASN ILE GLY ASN TYR ILE GLN GLN GLN ILE ASN LEU LEU LEU GLU PHE ILE LYS MET GLU MET ALA ASP VAL ALA GLY ILE SER LYS
GLN ARG GLU GLY GLN ILE SER GLN ARG GLU THR VAL GLY GLY VAL GLU ARG ALA THR LEU GLN SER SER HIS ILE THR GLU TRP LEU PHE THR ILE HIS ASP ASP VAL LYS LYS ARG ALA LEU GLU CYS PHE LEU GLU THR ALA LYS VAL ALA LEU LYS GLY ARG ASN LYS LYS PHE GLN
TYR ILE LEU SER ASP THR SER THR ARG VAL MET GLU ILE ASP GLY ASP GLU PHE ALA GLU GLU ALA ASP TYR GLY LEU VAL VAL ASP ASN SER ASN GLY THR GLN GLU LEU GLN GLN LYS LEU ASP THR LEU ALA GLN ALA ALA LEU GLN THR GLN THR LEU LEU SER PHE SER THR ILE THR LYS
LEU TYR THR SER SER LEU ALA GLU LYS GLN ARG LEU ILE GLU LYS ASP GLU LYS GLN ILE ARG GLU ARG GLN ALA GLN ALA GLN LYS GLU GLU ALA ALA GLN GLN GLN ILE ALA ALA MET GLN GLN GLN GLN LYS GLU ALA GLU LEU GLN LEU LEU GLN LYS GLU GLU ALA ASN ILE ARG
ASP ASN GLN THR LYS ILE ILE ILE ILE GLN SER GLU GLY GLY PRO ASP GLU GLU ASP GLY ILE MET ILE ASP ASP TYR SER PRO GLU ALA LYS ALA ASN LEU ALA GLU LYS ILE ARG GLU PHE ASP GLU LYS LEU LYS LEU ASP LYS LYS LEU LYS LEU ASP LYS LYS
ALA GLU THR ASP ALA SER ILE LYS ARG GLN ALA LEU GLN SER SER SER THR THR ASN LYS

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C5	Depositor
Number of particles used	122709	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	51	Depositor
Minimum defocus (nm)	300	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.944	Depositor
Minimum map value	-0.669	Depositor
Average map value	0.004	Depositor
Map value standard deviation	0.028	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	398.71204, 398.71204, 398.71204	wwPDB
Map dimensions	286, 286, 286	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.394098, 1.394098, 1.394098	Depositor

5 Model quality

5.1 Standard geometry

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	0.31	0/3950	0.52	0/5346
1	B	0.33	0/4106	0.52	0/5553
1	C	0.34	0/4106	0.53	1/5553 (0.0%)
1	D	0.33	0/3732	0.52	0/5044
1	E	0.31	0/4106	0.51	0/5553
1	F	0.31	0/4106	0.51	0/5553
2	a	0.31	0/2591	0.54	0/3533
2	b	0.34	0/2591	0.55	0/3533
2	d	0.32	0/2591	0.54	1/3533 (0.0%)
2	e	0.30	0/2119	0.53	0/2887
2	f	0.28	0/1465	0.52	0/2001
3	g	0.37	0/629	0.56	0/852
3	h	0.36	0/572	0.57	0/773
4	i	0.28	0/318	0.51	0/430
4	j	0.27	0/318	0.52	0/430
4	k	0.28	0/318	0.55	0/430
5	l	0.30	0/126	0.60	0/169
5	m	0.31	0/141	0.49	0/189
All	All	0.32	0/37885	0.53	2/51362 (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	A	0	1
1	F	0	1
2	a	0	1
2	b	0	2
2	d	0	3

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Mol	Chain	#Chirality outliers	#Planarity outliers
3	h	0	1
4	k	0	1
All	All	0	10

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	5	LEU	CA-CB-CG	5.46	127.85	115.30
2	d	199	LEU	CA-CB-CG	5.04	126.89	115.30

There are no chirality outliers.

All (10) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	128	LEU	Peptide
1	F	128	LEU	Peptide
2	a	107	TYR	Peptide
2	b	107	TYR	Peptide
2	b	263	TYR	Peptide
2	d	107	TYR	Peptide
2	d	262	GLY	Peptide
2	d	6	ASN	Peptide
3	h	85	VAL	Peptide
4	k	22	TYR	Peptide

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3861	0	3765	38	0
1	B	4012	0	3921	46	0
1	C	4012	0	3921	47	0
1	D	3649	0	3574	47	0
1	E	4012	0	3920	33	0
1	F	4012	0	3921	26	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	a	2542	0	2558	0	0
2	b	2542	0	2558	0	0
2	d	2542	0	2558	0	0
2	e	2077	0	2075	0	0
2	f	1434	0	1419	0	0
3	g	619	0	619	0	0
3	h	563	0	570	0	0
4	i	310	0	313	0	0
4	j	310	0	313	0	0
4	k	310	0	313	0	0
5	l	126	0	115	0	0
5	m	140	0	122	0	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0
6	C	1	0	0	0	0
6	D	1	0	0	0	0
6	E	1	0	0	0	0
6	F	1	0	0	0	0
All	All	37079	0	36555	180	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

All (180) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:39:LEU:HA	1:F:435:GLN:HE22	1.58	0.67
1:C:191:ARG:H	1:D:254:GLN:HE22	1.43	0.64
1:C:10:MET:SD	1:C:10:MET:N	2.73	0.62
1:C:194:SER:HB3	1:D:222:MET:HG2	1.82	0.62
1:E:390:ALA:HB3	1:E:394:VAL:HB	1.81	0.61
1:B:374:LEU:HD12	1:F:392:ASN:HD22	1.65	0.61
1:A:63:GLU:HG2	1:A:442:LYS:HB2	1.82	0.60
1:C:133:PRO:HB2	1:C:154:MET:HB3	1.81	0.60
1:F:425:TYR:HB2	1:F:497:LEU:HB2	1.83	0.60
1:A:175:GLU:OE2	1:B:409:ARG:NH1	2.35	0.59
1:C:414:HIS:HD2	1:C:416:MET:H	1.49	0.59
1:B:129:ASN:OD1	1:C:411:LYS:NZ	2.36	0.59
1:B:435:GLN:NE2	1:C:40:MET:O	2.36	0.59
1:B:80:ARG:NH2	1:B:115:GLU:OE2	2.36	0.59
1:F:216:LEU:HD21	1:F:464:LYS:HG2	1.84	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:190:VAL:HG21	1:D:251:VAL:HG12	1.84	0.58
1:D:246:TYR:HD2	1:D:249:TRP:HB2	1.68	0.57
1:B:435:GLN:HE22	1:C:40:MET:H	1.50	0.57
1:C:321:ALA:O	1:C:329:ARG:NH2	2.37	0.57
1:C:80:ARG:NH2	1:C:115:GLU:OE1	2.38	0.57
1:A:300:ASN:HB3	1:A:495:MET:HG3	1.87	0.57
1:A:329:ARG:NH2	1:B:337:GLU:OE2	2.38	0.56
1:A:88:ARG:HB2	1:A:110:TYR:HB2	1.88	0.56
1:C:129:ASN:ND2	1:D:409:ARG:O	2.39	0.56
1:F:179:VAL:HG22	1:F:184:SER:HB2	1.88	0.56
1:D:53:ASP:OD1	1:D:57:ASN:ND2	2.38	0.56
1:F:458:ASN:ND2	1:F:461:THR:OG1	2.39	0.55
1:D:11:LEU:HD13	1:D:224:ILE:HD13	1.89	0.55
1:D:56:LEU:HD12	1:D:440:LYS:HD3	1.86	0.55
1:F:53:ASP:O	1:F:57:ASN:ND2	2.39	0.55
1:B:171:ARG:HB2	1:C:411:LYS:HD3	1.89	0.55
1:C:70:TYR:HB3	1:D:34:GLN:HG3	1.90	0.54
1:F:206:ARG:HG3	1:F:481:MET:HB3	1.88	0.54
1:A:261:ASN:HD22	1:F:175:GLU:HA	1.72	0.54
1:B:390:ALA:HB3	1:B:394:VAL:HB	1.89	0.54
1:E:329:ARG:NH2	1:F:337:GLU:OE2	2.38	0.54
1:E:229:ASN:O	1:E:249:TRP:NE1	2.37	0.54
1:C:428:TRP:HA	1:C:494:THR:HG23	1.89	0.54
1:B:273:ASN:ND2	1:B:275:GLU:OE2	2.41	0.53
1:A:377:ASN:OD1	1:E:389:LYS:NZ	2.41	0.53
1:D:489:LEU:HD11	1:E:39:LEU:HD22	1.90	0.53
1:A:41:VAL:HB	1:F:74:VAL:HG22	1.90	0.53
1:D:435:GLN:NE2	1:E:40:MET:O	2.40	0.53
1:C:207:ILE:HG22	1:C:480:ARG:HB2	1.89	0.53
1:B:406:ASP:O	1:B:410:ASN:ND2	2.42	0.53
1:A:140:ALA:HB1	1:A:147:ALA:HB1	1.91	0.52
1:B:320:SER:HB2	1:B:329:ARG:HG2	1.90	0.52
1:E:205:ILE:HD11	1:E:259:LYS:HG3	1.91	0.52
1:F:419:VAL:HG12	1:F:421:PHE:H	1.74	0.52
1:A:333:ILE:HD12	1:A:425:TYR:HD2	1.75	0.52
1:B:389:LYS:HB2	1:C:382:GLY:HA3	1.92	0.52
1:D:88:ARG:HB2	1:D:110:TYR:HB2	1.91	0.52
1:B:207:ILE:HG22	1:B:480:ARG:HB2	1.92	0.51
1:A:207:ILE:HG22	1:A:480:ARG:HB2	1.91	0.51
1:C:406:ASP:O	1:C:410:ASN:ND2	2.43	0.51
1:D:43:LEU:O	1:D:48:ARG:NH2	2.43	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:300:ASN:ND2	1:D:492:THR:O	2.43	0.51
1:B:186:LYS:HD2	1:C:208:GLN:HG3	1.93	0.51
1:D:70:TYR:OH	1:D:441:CYS:SG	2.66	0.51
1:A:425:TYR:HB2	1:A:497:LEU:HB3	1.93	0.51
1:D:263:MET:HG3	1:D:484:LEU:HD13	1.93	0.51
1:B:438:ILE:HG23	1:B:488:VAL:HG22	1.93	0.51
1:C:56:LEU:HD13	1:C:263:MET:HE2	1.93	0.51
1:C:171:ARG:HB2	1:D:411:LYS:HD2	1.92	0.51
1:E:201:GLU:OE1	1:E:270:ARG:NH1	2.44	0.50
1:C:330:LEU:HD11	1:C:397:ARG:HD3	1.93	0.50
1:A:390:ALA:HB3	1:A:394:VAL:HB	1.94	0.49
1:A:122:GLU:OE2	1:B:258:TYR:OH	2.30	0.49
1:B:122:GLU:OE2	1:C:258:TYR:OH	2.30	0.49
1:D:340:ALA:HA	1:D:398:LEU:HD21	1.94	0.49
1:A:428:TRP:HA	1:A:494:THR:HG23	1.93	0.49
1:E:122:GLU:OE2	1:F:258:TYR:OH	2.26	0.49
1:A:435:GLN:NE2	1:B:40:MET:O	2.46	0.49
1:E:425:TYR:HB2	1:E:497:LEU:HB2	1.94	0.49
1:A:411:LYS:HG2	1:F:171:ARG:HB2	1.94	0.49
1:B:135:ARG:NH2	1:B:152:GLU:OE1	2.45	0.49
1:D:209:HIS:CE1	1:D:217:ASN:HD22	2.31	0.49
1:A:312:LEU:HD13	1:A:497:LEU:HD22	1.96	0.48
1:D:47:TYR:HB2	1:D:407:PRO:HG2	1.95	0.48
1:F:390:ALA:HB3	1:F:394:VAL:HB	1.95	0.48
1:D:207:ILE:HG22	1:D:480:ARG:HB2	1.94	0.48
1:E:112:VAL:HG22	1:E:148:VAL:HG22	1.96	0.48
1:D:392:ASN:H	1:E:384:GLN:HE22	1.61	0.48
1:C:118:PHE:HA	1:C:191:ARG:HH21	1.77	0.48
1:C:85:VAL:HG12	1:C:86:GLU:HG2	1.96	0.48
1:E:73:ASP:OD1	1:E:73:ASP:N	2.45	0.48
1:B:292:ILE:HG13	1:B:486:VAL:HG11	1.95	0.48
1:D:186:LYS:HB2	1:E:208:GLN:HG2	1.96	0.48
1:D:78:SER:OG	1:E:229:ASN:ND2	2.47	0.48
1:A:112:VAL:HG13	1:A:148:VAL:HG12	1.96	0.47
1:A:128:LEU:HD12	1:A:165:ARG:HD2	1.96	0.47
1:C:297:GLU:OE2	1:C:424:ARG:NH2	2.46	0.47
1:E:454:TRP:O	1:E:470:SER:OG	2.33	0.47
1:D:327:ASP:OD1	1:D:327:ASP:N	2.44	0.47
1:B:499:PRO:HD2	1:B:502:LEU:HD12	1.97	0.47
1:A:321:ALA:O	1:B:48:ARG:NH2	2.41	0.47
1:C:111:LEU:HD12	1:C:151:VAL:HG21	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:129:ASN:ND2	1:B:409:ARG:O	2.47	0.46
1:A:152:GLU:OE2	1:B:278:ASN:ND2	2.44	0.46
1:F:414:HIS:HD2	1:F:416:MET:H	1.64	0.46
1:D:489:LEU:HD21	1:E:39:LEU:HD13	1.97	0.46
1:D:390:ALA:HB3	1:D:394:VAL:HB	1.97	0.46
1:B:185:ARG:HB2	1:C:281:LYS:HE3	1.97	0.46
1:B:455:GLY:O	1:B:466:ASN:ND2	2.37	0.46
1:E:117:TRP:CE2	1:E:191:ARG:HD3	2.51	0.46
1:B:74:VAL:HB	1:B:196:VAL:HG23	1.97	0.46
1:D:292:ILE:HG12	1:D:486:VAL:HG11	1.98	0.46
1:C:74:VAL:HG12	1:D:41:VAL:HB	1.98	0.45
1:D:409:ARG:O	1:D:411:LYS:NZ	2.42	0.45
1:B:103:GLY:HA3	1:B:153:LEU:HD12	1.98	0.45
1:E:188:GLY:O	1:F:208:GLN:NE2	2.39	0.45
1:C:122:GLU:OE2	1:D:258:TYR:OH	2.34	0.45
1:E:62:ARG:HH21	1:E:436:PRO:HD2	1.81	0.45
1:B:304:TYR:OH	1:B:423:TYR:O	2.32	0.45
1:C:269:ASN:ND2	1:C:286:ILE:O	2.44	0.45
1:D:171:ARG:HB2	1:E:411:LYS:HG2	1.98	0.45
1:F:142:MET:HA	1:F:147:ALA:HA	1.99	0.45
1:A:26:GLY:HA2	1:A:31:GLN:HB2	1.98	0.45
1:C:4:LYS:HG2	1:C:9:GLN:HB3	1.99	0.45
1:C:102:VAL:HG21	1:C:166:LEU:HD12	1.98	0.45
1:C:205:ILE:HD11	1:C:259:LYS:HG3	1.98	0.45
1:A:88:ARG:NH2	1:A:143:GLU:OE1	2.48	0.45
1:D:66:ASP:N	1:D:66:ASP:OD1	2.50	0.45
1:B:323:LYS:HB3	1:C:44:LEU:HG	1.99	0.44
1:A:111:LEU:HD12	1:A:151:VAL:HG21	1.99	0.44
1:D:56:LEU:HD21	1:D:264:ALA:HB2	1.99	0.44
1:F:304:TYR:OH	1:F:423:TYR:O	2.28	0.44
1:B:190:VAL:HG21	1:C:251:VAL:HG22	1.99	0.44
1:F:143:GLU:N	1:F:146:ASN:O	2.42	0.44
1:C:263:MET:HE1	1:C:440:LYS:HE3	2.00	0.44
1:D:447:ASN:OD1	1:D:447:ASN:N	2.42	0.44
1:E:125:VAL:HB	1:E:129:ASN:HA	1.98	0.44
1:A:278:ASN:ND2	1:F:152:GLU:OE2	2.43	0.44
1:D:122:GLU:OE2	1:E:258:TYR:OH	2.36	0.43
1:B:174:ILE:HD13	1:B:191:ARG:HH22	1.84	0.43
1:F:252:GLU:HA	1:F:480:ARG:HH12	1.83	0.43
1:B:88:ARG:HG3	1:B:94:VAL:HA	2.00	0.43
1:C:52:LEU:HD11	1:C:265:TRP:HE1	1.83	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:123:VAL:HG23	1:E:175:GLU:HB2	2.00	0.43
1:F:455:GLY:O	1:F:466:ASN:ND2	2.43	0.43
1:D:188:GLY:O	1:E:208:GLN:NE2	2.50	0.43
1:A:376:SER:H	1:E:395:ARG:HH22	1.66	0.43
1:C:75:ILE:HD11	1:C:193:THR:HG23	2.00	0.43
1:D:12:GLY:HA2	1:D:221:ALA:HA	1.99	0.43
1:D:195:PRO:HD2	1:E:224:ILE:HD12	2.00	0.42
1:A:438:ILE:HG23	1:A:488:VAL:HG22	2.00	0.42
1:C:79:ARG:NH1	1:D:50:LYS:O	2.43	0.42
1:C:392:ASN:ND2	1:D:337:GLU:HG2	2.34	0.42
1:B:270:ARG:NH2	1:B:276:TYR:OH	2.52	0.42
1:E:163:ALA:O	1:E:167:GLN:NE2	2.51	0.42
1:E:333:ILE:HG12	1:E:427:ILE:HG12	2.01	0.42
1:A:216:LEU:HD13	1:A:459:PRO:HA	2.01	0.42
1:B:48:ARG:O	1:B:51:SER:OG	2.32	0.42
1:B:414:HIS:HD2	1:B:416:MET:HB2	1.84	0.42
1:A:180:GLU:O	1:A:184:SER:OG	2.37	0.42
1:C:183:LEU:O	1:D:282:SER:OG	2.26	0.42
1:B:112:VAL:HG13	1:B:148:VAL:HG22	2.02	0.42
1:A:356:THR:HG23	1:B:352:SER:HA	2.02	0.42
1:A:116:ASP:OD1	1:A:149:TYR:OH	2.33	0.41
1:B:62:ARG:NH1	1:B:63:GLU:O	2.54	0.41
1:B:389:LYS:N	1:C:381:ALA:O	2.50	0.41
1:D:392:ASN:H	1:E:384:GLN:NE2	2.19	0.41
1:A:194:SER:HA	1:A:195:PRO:HD3	1.93	0.41
1:E:365:ARG:HA	1:E:365:ARG:HD3	1.90	0.41
1:D:80:ARG:NH2	1:D:115:GLU:OE1	2.38	0.41
1:C:334:LYS:NZ	1:C:399:ASP:OD2	2.46	0.41
1:D:140:ALA:HB1	1:D:147:ALA:HB1	2.01	0.41
1:F:125:VAL:HB	1:F:129:ASN:HA	2.03	0.41
1:A:382:GLY:HA3	1:F:389:LYS:HB2	2.02	0.41
1:B:136:ILE:HG23	1:B:149:TYR:HB3	2.03	0.41
1:B:256:ASP:O	1:B:260:ASN:ND2	2.53	0.41
1:C:136:ILE:HG23	1:C:149:TYR:HB3	2.02	0.41
1:B:471:PHE:HD1	1:B:473:GLU:H	1.67	0.40
1:C:120:ASP:OD2	1:D:281:LYS:NZ	2.41	0.40
1:B:329:ARG:NH2	1:C:337:GLU:OE2	2.54	0.40
1:D:279:PHE:HA	1:D:285:ALA:HA	2.03	0.40
1:A:258:TYR:OH	1:F:122:GLU:OE2	2.39	0.40
1:A:386:VAL:HG21	1:B:372:SER:HB2	2.04	0.40
1:E:269:ASN:HD22	1:E:278:ASN:HB2	1.86	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:111:LEU:HD12	1:E:151:VAL:HG21	2.02	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	482/504 (96%)	471 (98%)	11 (2%)	0	100	100
1	B	501/504 (99%)	484 (97%)	17 (3%)	0	100	100
1	C	501/504 (99%)	488 (97%)	13 (3%)	0	100	100
1	D	446/504 (88%)	429 (96%)	17 (4%)	0	100	100
1	E	501/504 (99%)	487 (97%)	14 (3%)	0	100	100
1	F	501/504 (99%)	487 (97%)	14 (3%)	0	100	100
2	a	331/333 (99%)	315 (95%)	15 (4%)	1 (0%)	37	67
2	b	331/333 (99%)	316 (96%)	13 (4%)	2 (1%)	22	53
2	d	331/333 (99%)	316 (96%)	14 (4%)	1 (0%)	37	67
2	e	261/333 (78%)	247 (95%)	14 (5%)	0	100	100
2	f	183/333 (55%)	166 (91%)	17 (9%)	0	100	100
3	g	80/104 (77%)	76 (95%)	4 (5%)	0	100	100
3	h	71/104 (68%)	68 (96%)	3 (4%)	0	100	100
4	i	36/97 (37%)	34 (94%)	2 (6%)	0	100	100
4	j	36/97 (37%)	34 (94%)	2 (6%)	0	100	100
4	k	36/97 (37%)	33 (92%)	2 (6%)	1 (3%)	4	23
5	l	14/806 (2%)	10 (71%)	4 (29%)	0	100	100
5	m	15/806 (2%)	14 (93%)	1 (7%)	0	100	100
All	All	4657/6800 (68%)	4475 (96%)	177 (4%)	5 (0%)	50	77

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	b	108	ILE
2	a	108	ILE
2	d	108	ILE
2	b	264	PRO
4	k	14	PRO

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	412/427 (96%)	412 (100%)	0	100 100
1	B	426/427 (100%)	423 (99%)	3 (1%)	81 88
1	C	426/427 (100%)	425 (100%)	1 (0%)	92 95
1	D	387/427 (91%)	387 (100%)	0	100 100
1	E	426/427 (100%)	426 (100%)	0	100 100
1	F	426/427 (100%)	426 (100%)	0	100 100
2	a	275/275 (100%)	275 (100%)	0	100 100
2	b	275/275 (100%)	275 (100%)	0	100 100
2	d	275/275 (100%)	274 (100%)	1 (0%)	89 93
2	e	225/275 (82%)	225 (100%)	0	100 100
2	f	157/275 (57%)	157 (100%)	0	100 100
3	g	68/86 (79%)	68 (100%)	0	100 100
3	h	62/86 (72%)	62 (100%)	0	100 100
4	i	34/78 (44%)	34 (100%)	0	100 100
4	j	34/78 (44%)	34 (100%)	0	100 100
4	k	34/78 (44%)	34 (100%)	0	100 100
5	l	14/714 (2%)	14 (100%)	0	100 100
5	m	15/714 (2%)	15 (100%)	0	100 100
All	All	3971/5771 (69%)	3966 (100%)	5 (0%)	92 96

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	62	ARG
1	B	88	ARG
1	B	191	ARG
1	C	428	TRP
2	d	333	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (48) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	57	ASN
1	A	300	ASN
1	A	362	ASN
1	A	479	HIS
1	A	503	GLN
1	B	57	ASN
1	B	159	GLN
1	B	295	GLN
1	B	377	ASN
1	B	410	ASN
1	B	414	HIS
1	B	435	GLN
1	B	458	ASN
1	C	168	GLN
1	C	209	HIS
1	C	229	ASN
1	C	261	ASN
1	C	295	GLN
1	C	342	GLN
1	C	414	HIS
1	D	42	GLN
1	D	57	ASN
1	D	167	GLN
1	D	217	ASN
1	D	254	GLN
1	E	9	GLN
1	E	14	GLN
1	E	229	ASN
1	E	384	GLN
1	E	410	ASN
1	E	435	GLN
1	F	57	ASN

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Mol	Chain	Res	Type
1	F	68	ASN
1	F	159	GLN
1	F	261	ASN
1	F	278	ASN
1	F	362	ASN
1	F	392	ASN
1	F	414	HIS
1	F	435	GLN
1	F	458	ASN
2	a	115	GLN
2	b	61	HIS
2	d	156	ASN
2	e	97	ASN
3	g	89	ASN
4	i	12	ASN
4	k	31	ASN

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

Of 6 ligands modelled in this entry, 6 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

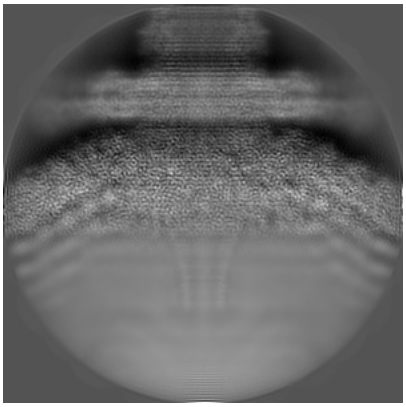
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-14090. These allow visual inspection of the internal detail of the map and identification of artifacts.

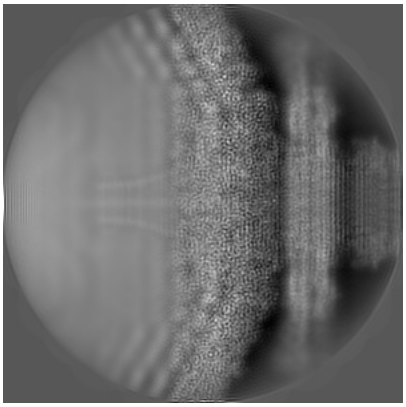
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

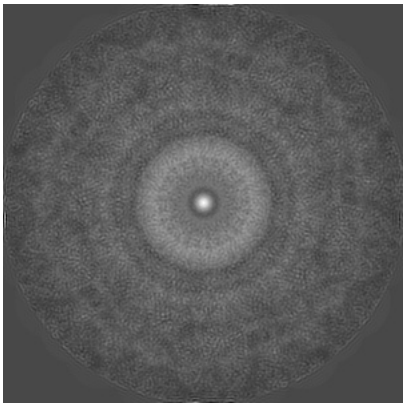
6.1.1 Primary map



X



Y

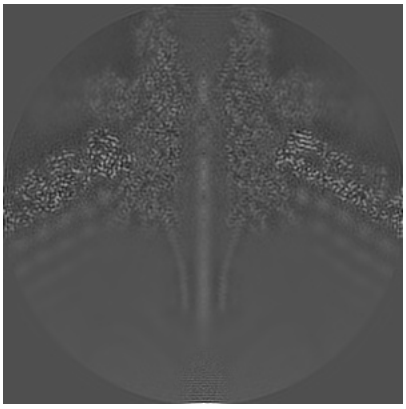


Z

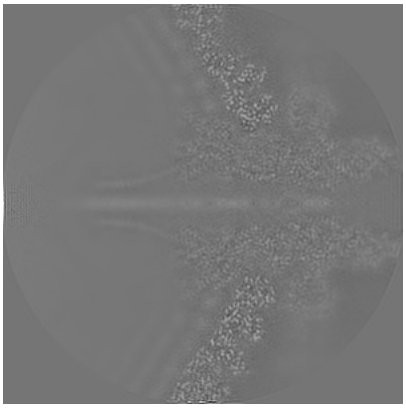
The images above show the map projected in three orthogonal directions.

6.2 Central slices

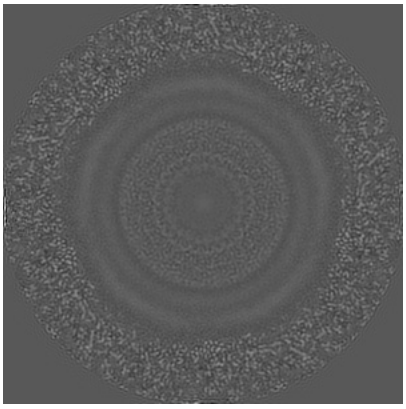
6.2.1 Primary map



X Index: 143



Y Index: 143

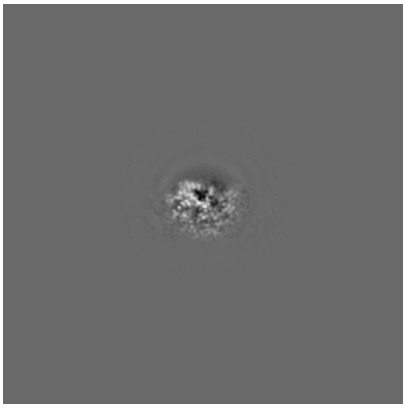


Z Index: 143

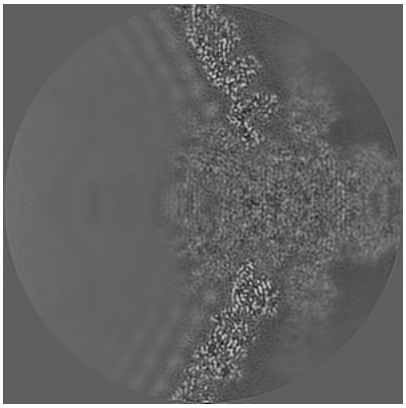
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

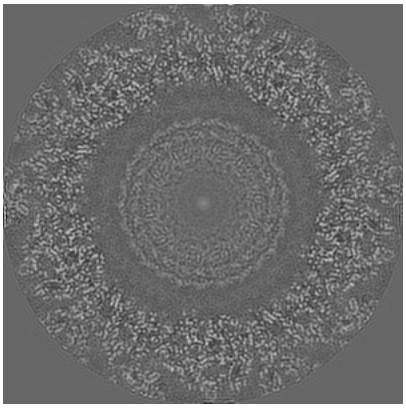
6.3.1 Primary map



X Index: 1



Y Index: 120

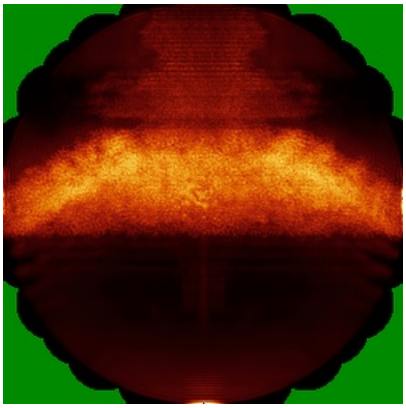


Z Index: 154

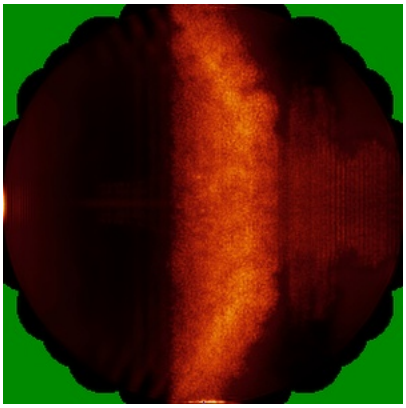
The images above show the largest variance slices of the map in three orthogonal directions.

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

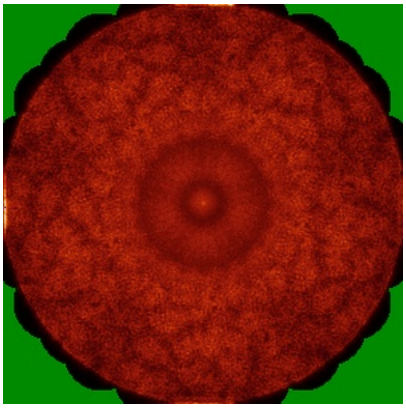
6.4.1 Primary map



X



Y

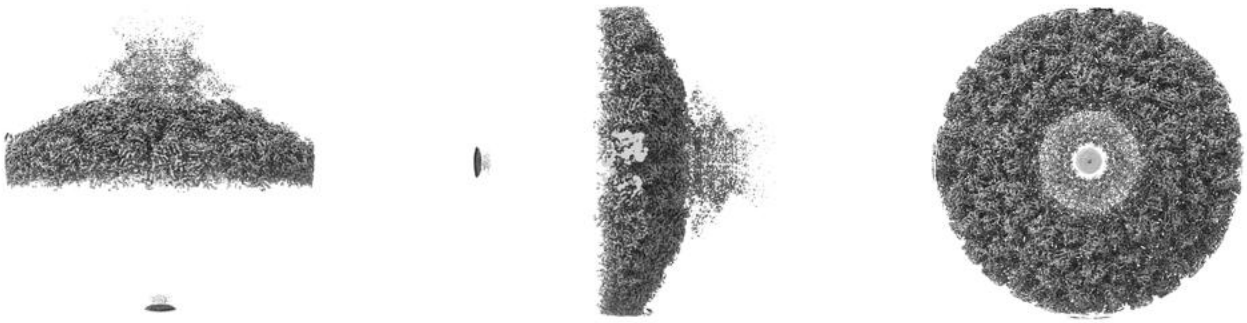


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

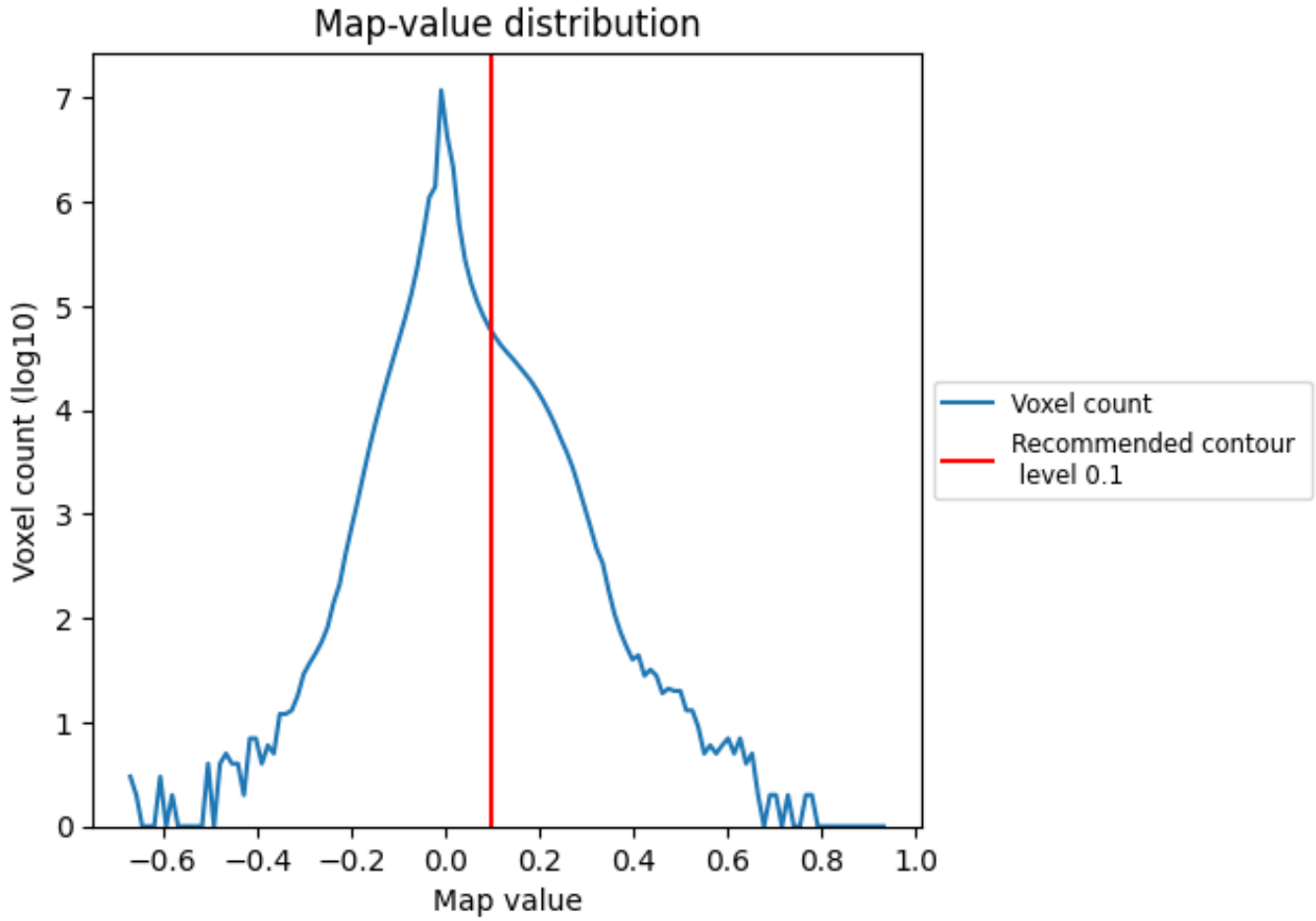
6.6 Mask visualisation (i)

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

7 Map analysis

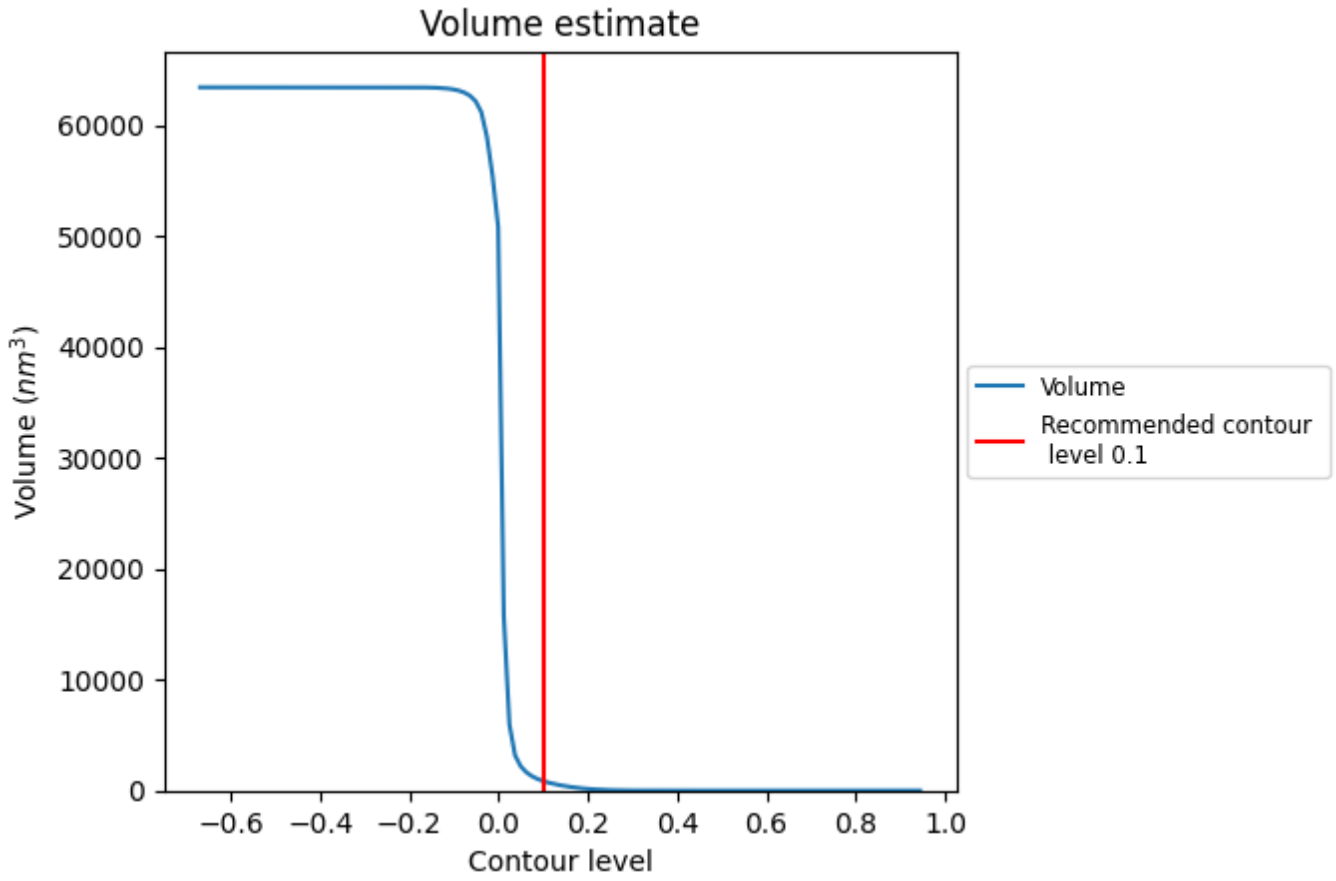
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

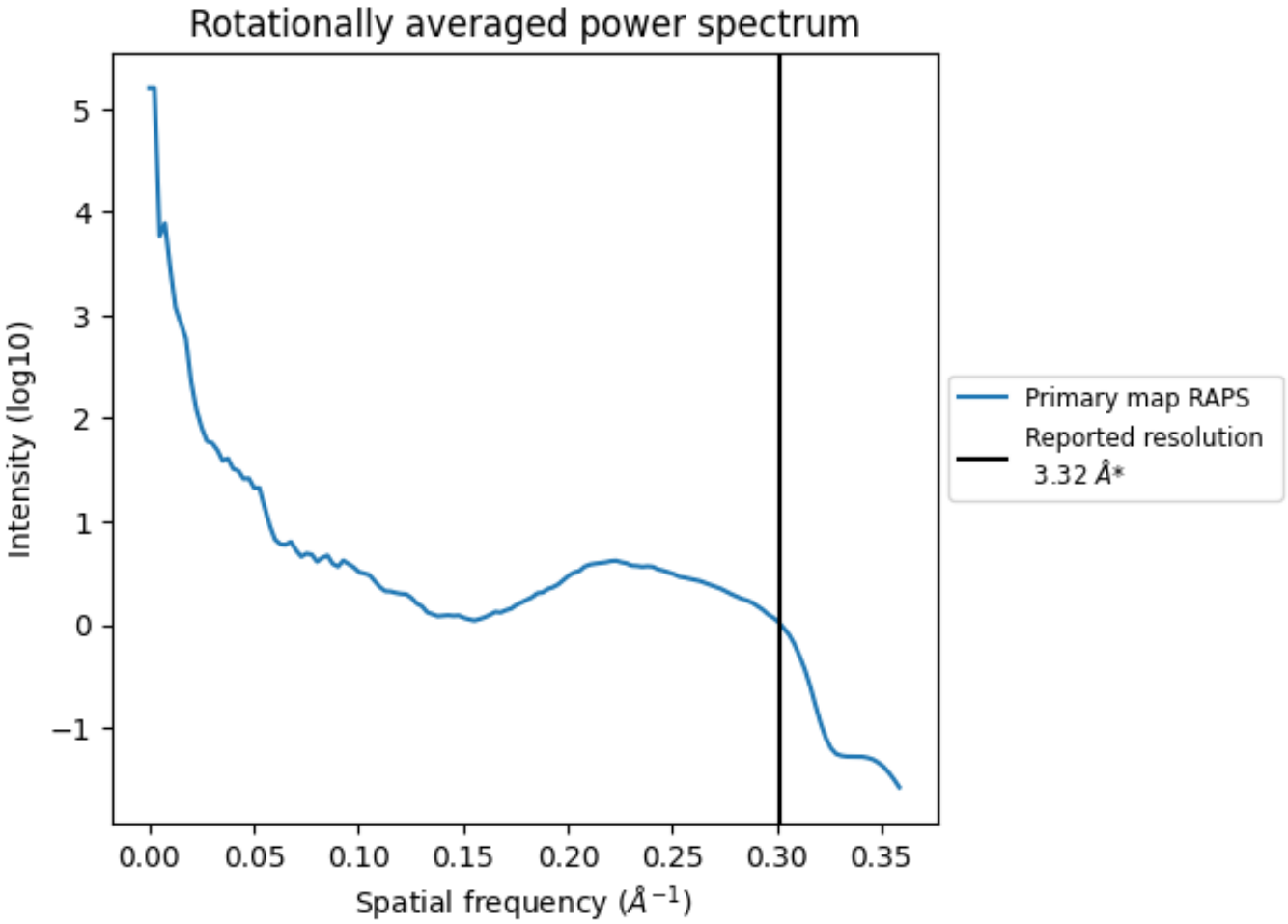
7.2 Volume estimate



The volume at the recommended contour level is 857 nm^3; this corresponds to an approximate mass of 774 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)

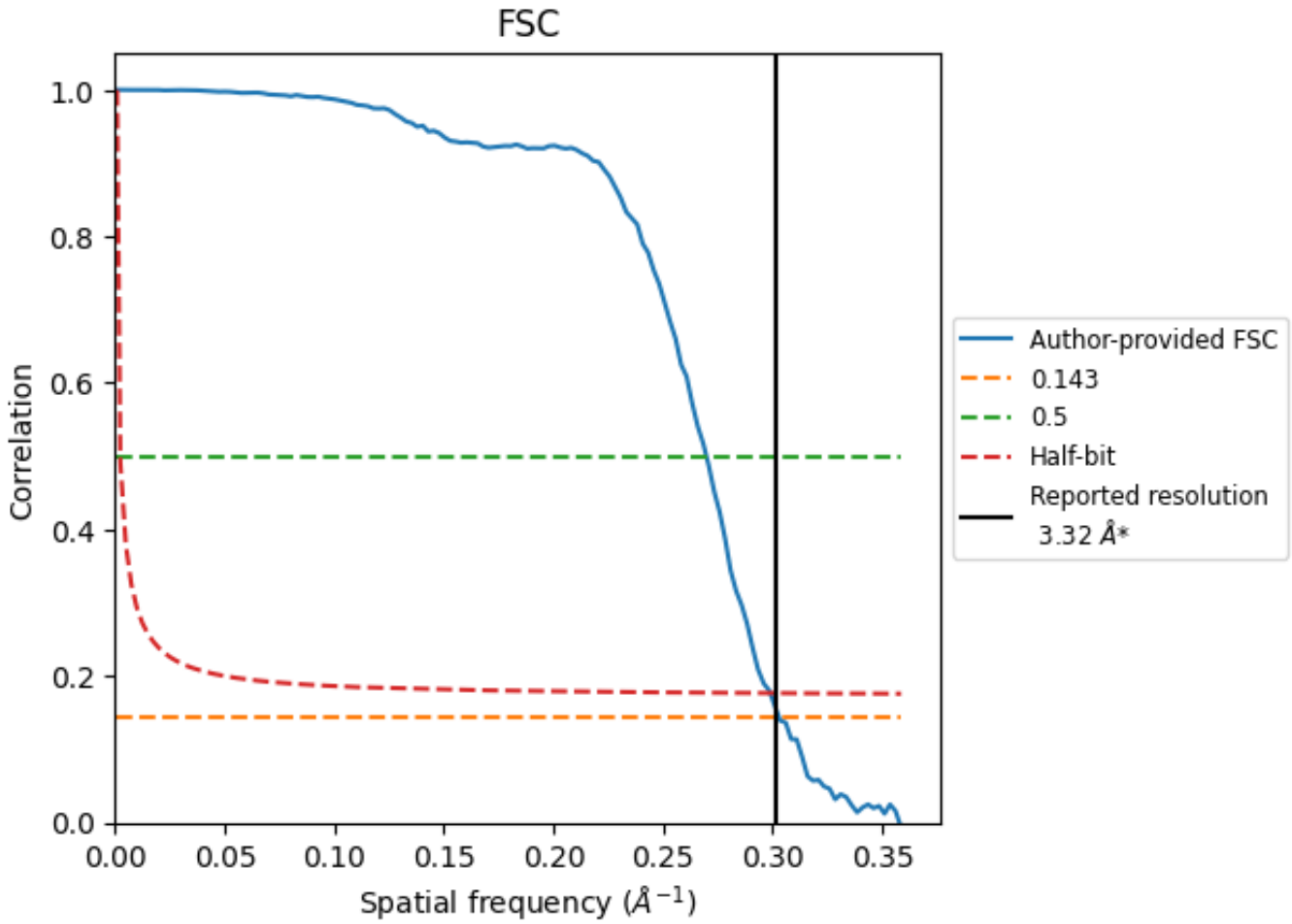


*Reported resolution corresponds to spatial frequency of 0.301 Å^{-1}

8 Fourier-Shell correlation

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

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.301 Å^{-1}

8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.32	-	-
Author-provided FSC curve	3.30	3.71	3.35
Unmasked-calculated*	-	-	-

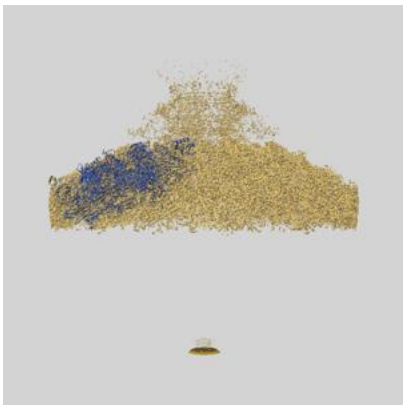
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit

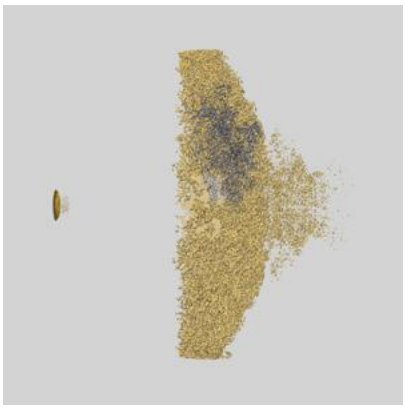
This section contains information regarding the fit between EMDB map EMD-14090 and PDB model 7QOH. Per-residue inclusion information can be found in section 3 on page 6.

9.1 Map-model overlays

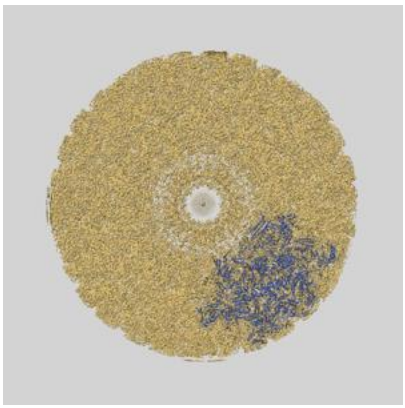
9.1.1 Map-model overlay



X

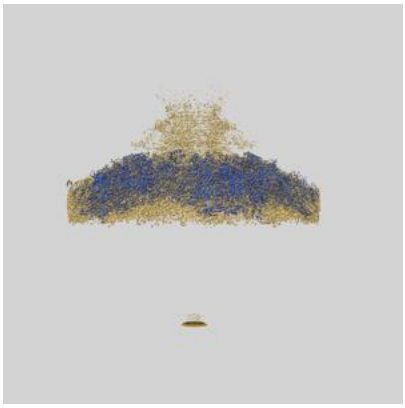


Y

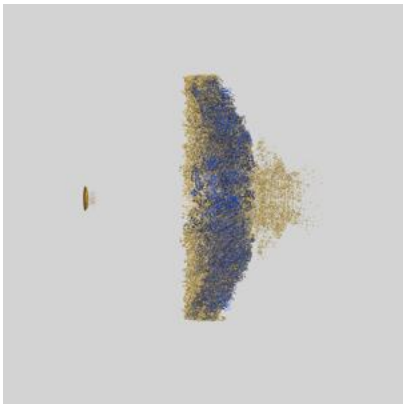


Z

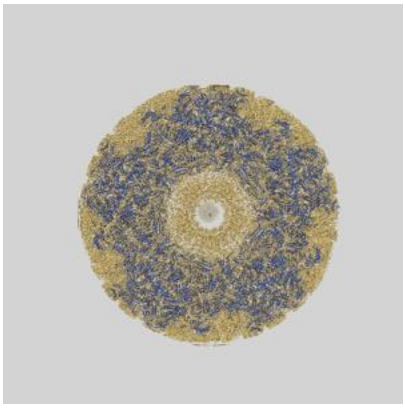
9.1.2 Map-model assembly overlay



X



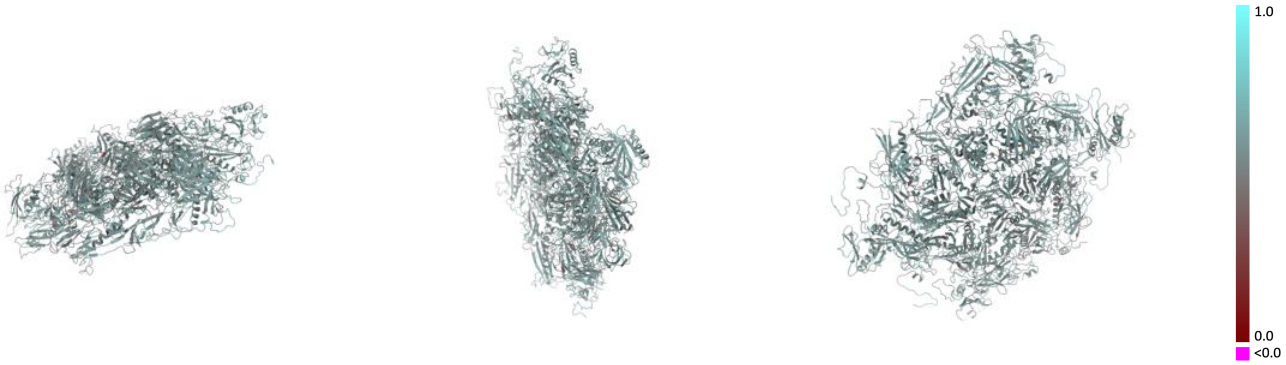
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

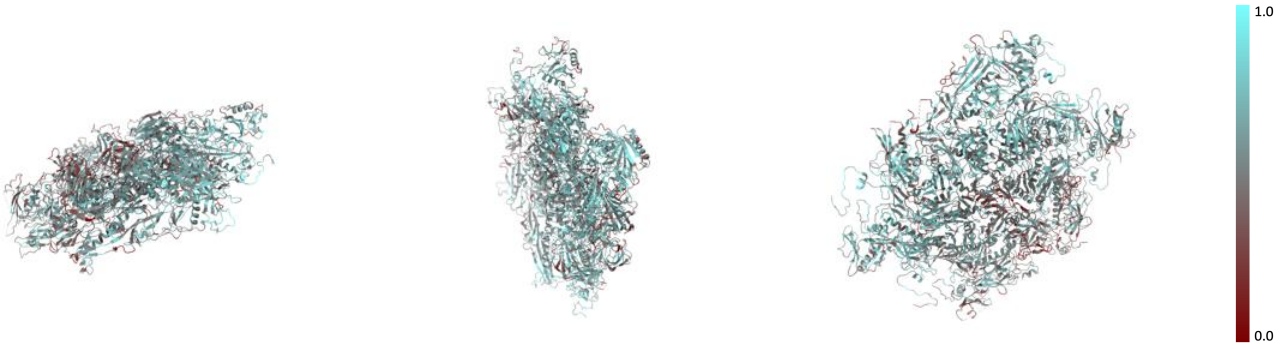
9.2 Q-score mapped to coordinate model (i)



X Y Z

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

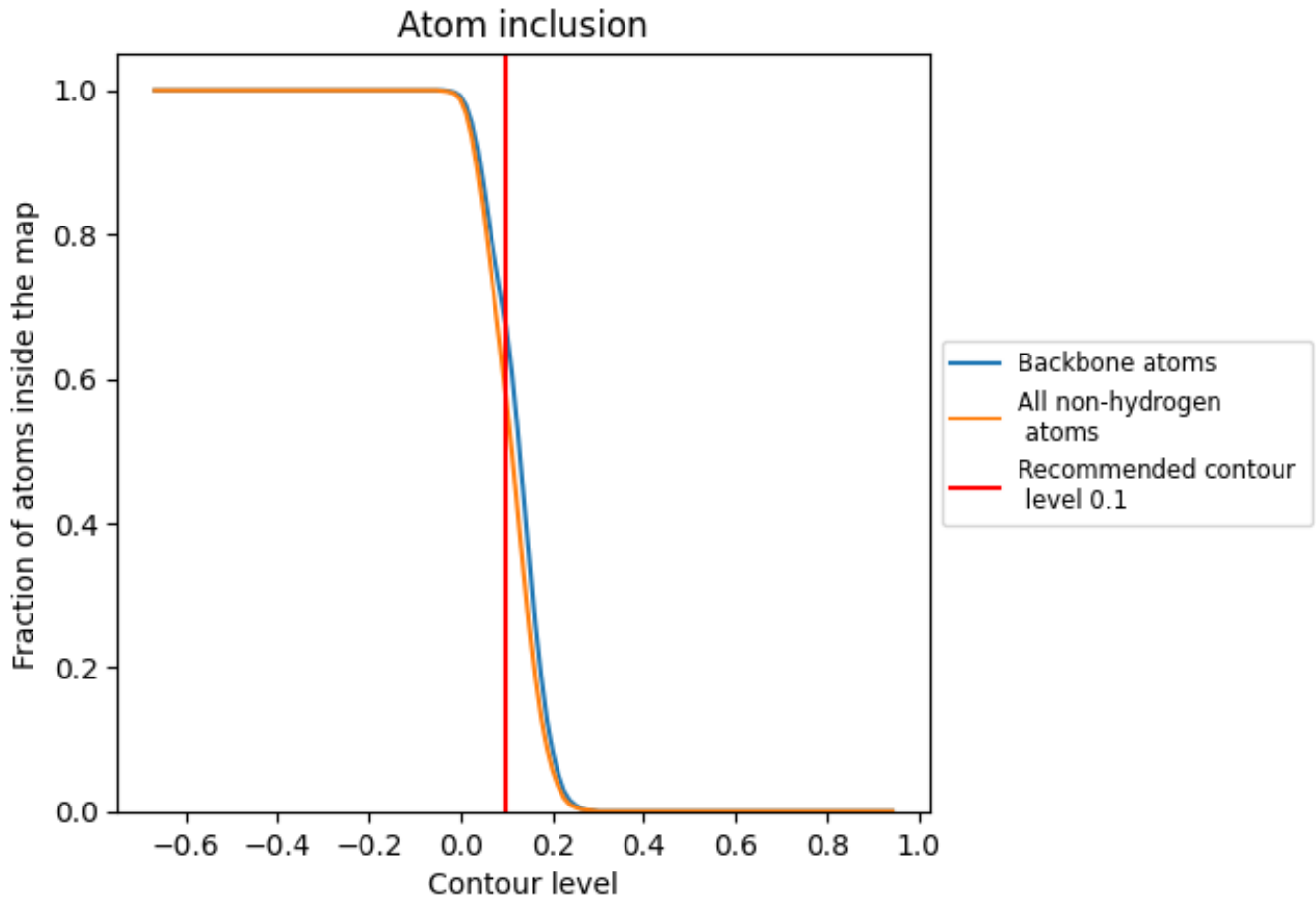
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.1).

9.4 Atom inclusion (i)



At the recommended contour level, 67% of all backbone atoms, 57% 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 (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5730	0.5590
A	0.5730	0.5610
B	0.6250	0.5710
C	0.6320	0.5670
D	0.6090	0.5610
E	0.6070	0.5710
F	0.5420	0.5550
a	0.5350	0.5480
b	0.6010	0.5600
d	0.5930	0.5550
e	0.5120	0.5530
f	0.3970	0.5290
g	0.6140	0.5600
h	0.5640	0.5420
i	0.3820	0.5510
j	0.3160	0.5410
k	0.3850	0.5410
l	0.2600	0.4610
m	0.4670	0.5400