Full wwPDB EM Validation Report

Oct 16, 2025 – 04:24 pm BST

PDB ID	:	9HH9 / pdb_00009hh9
EMDB ID	:	EMD-52169
Title	:	Cryo-EM structure of VSV-Indiana glycoprotein (MUDD-SUMMERS strain) in its pre-fusion conformation in complex with 8G5F11 Fab
Authors	:	Albertini, A.; Minoves, M.J.; OuldAli, M.; Gaudin, Y.; Schoehn, G.; Zarkadas, E.
Deposited on	:	2024-11-21
Resolution	:	2.93 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 (i) 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 (i)) were used in the production of this report:

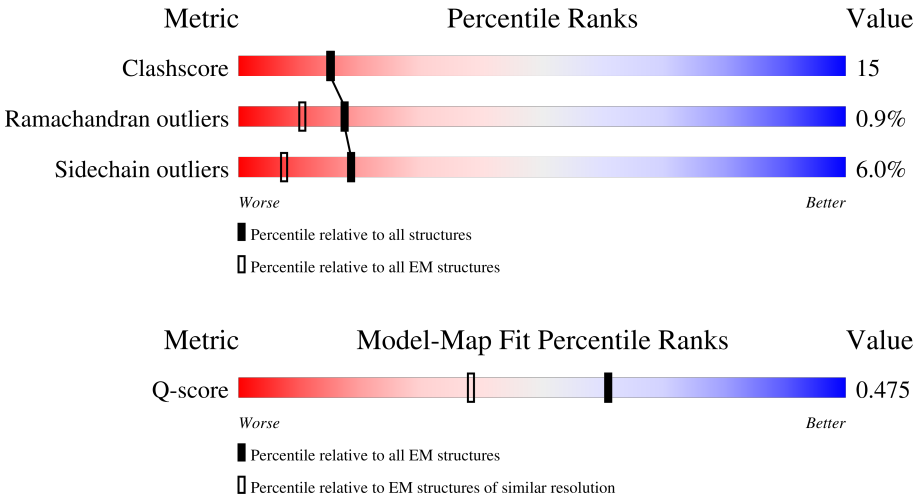
EMDB validation analysis	:	0.0.1.dev129
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

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 2.93 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)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	13037 (2.43 - 3.43)

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	495	70% 14% 14%
1	B	495	65% 20% 14%
1	C	495	7% 64% 20% 14%
2	D	214	21% 25% 50%

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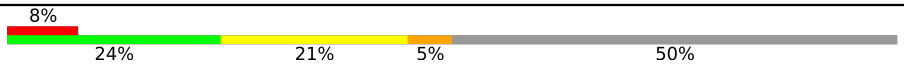
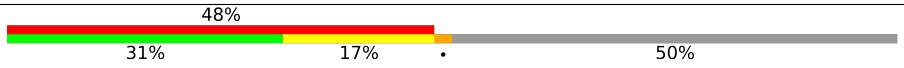
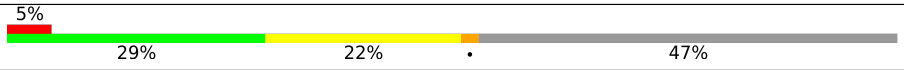
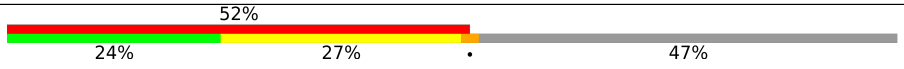
Mol	Chain	Length	Quality of chain
2	F	214	
2	H	214	
3	E	229	
3	G	229	
3	I	229	

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 15613 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 Glycoprotein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	426	Total	C	N	O	S	5	0
			3406	2169	568	648	21		
1	B	426	Total	C	N	O	S	2	0
			3379	2153	563	642	21		
1	C	426	Total	C	N	O	S	3	0
			3388	2158	564	645	21		

- Molecule 2 is a protein called 8G5F11 VL.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	D	106	Total	C	N	O	S	2	0
			849	530	142	173	4		
2	F	106	Total	C	N	O	S	0	0
			829	519	137	169	4		
2	H	106	Total	C	N	O	S	2	0
			849	530	142	173	4		

- Molecule 3 is a protein called 8G5F11 VH.

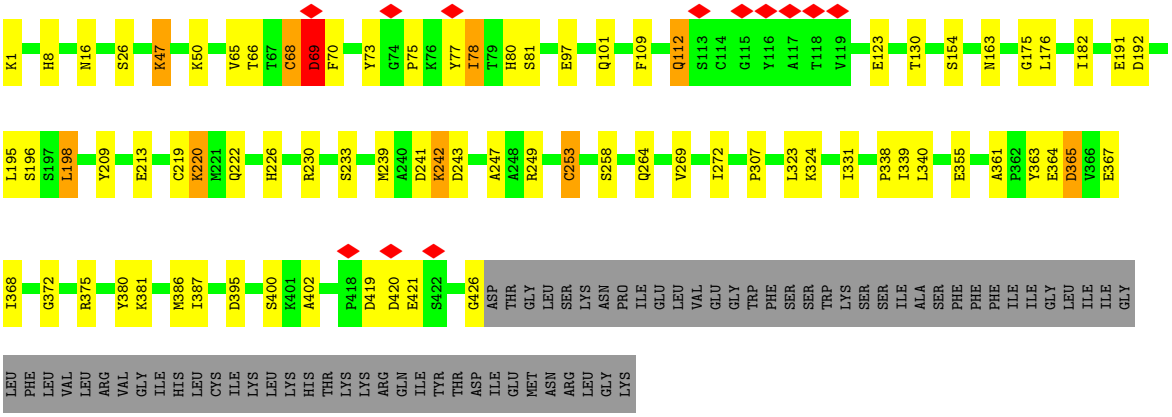
Mol	Chain	Residues	Atoms					AltConf	Trace
3	E	121	Total	C	N	O	S	0	0
			971	614	163	190	4		
3	G	121	Total	C	N	O	S	0	0
			971	614	163	190	4		
3	I	121	Total	C	N	O	S	0	0
			971	614	163	190	4		

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.

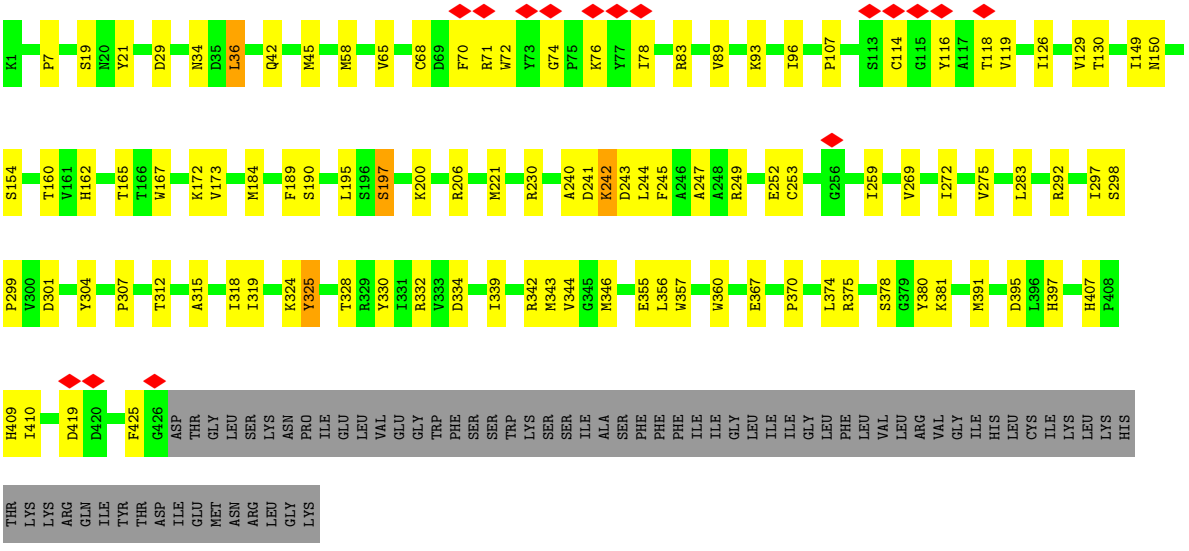
- Molecule 1: Glycoprotein

Chain A:



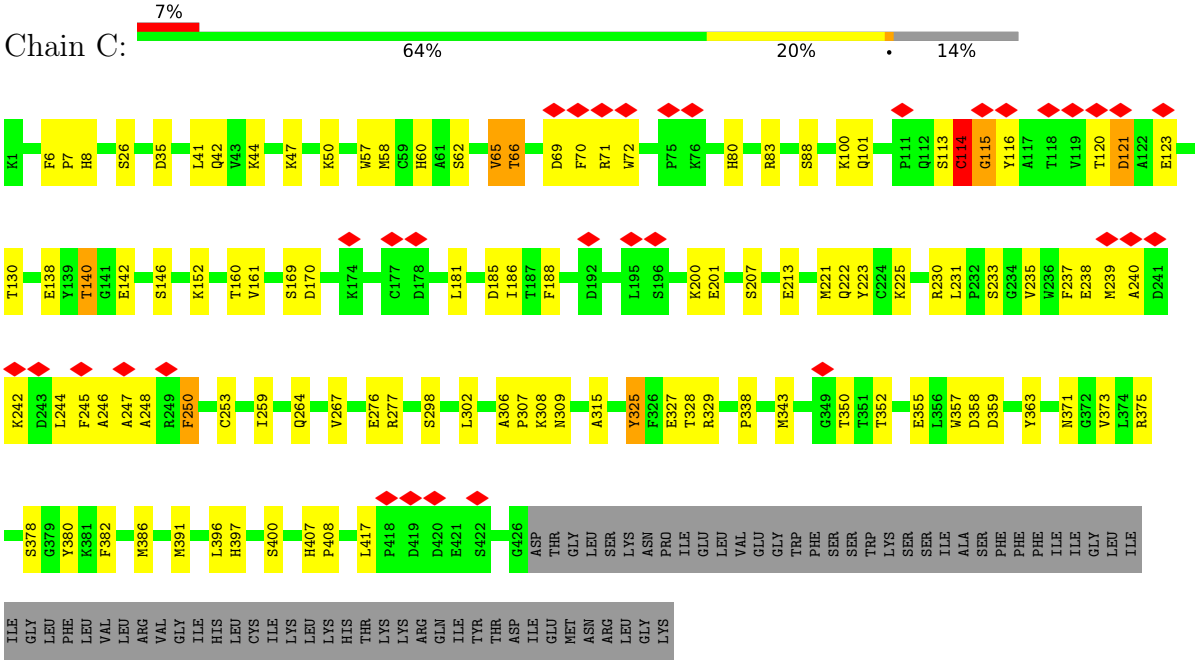
- Molecule 1: Glycoprotein

Chain B:



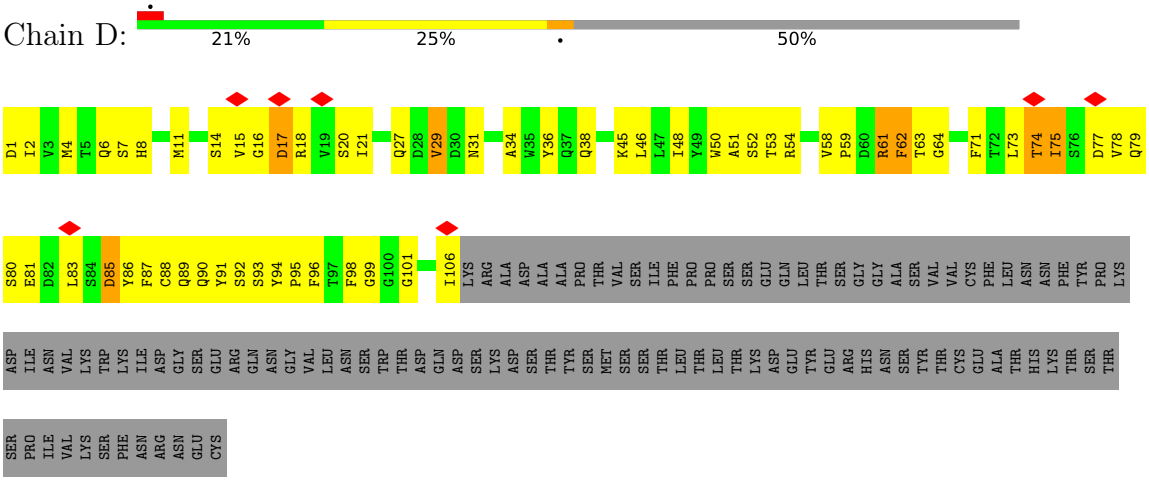
• Molecule 1: Glycoprotein

Chain C:



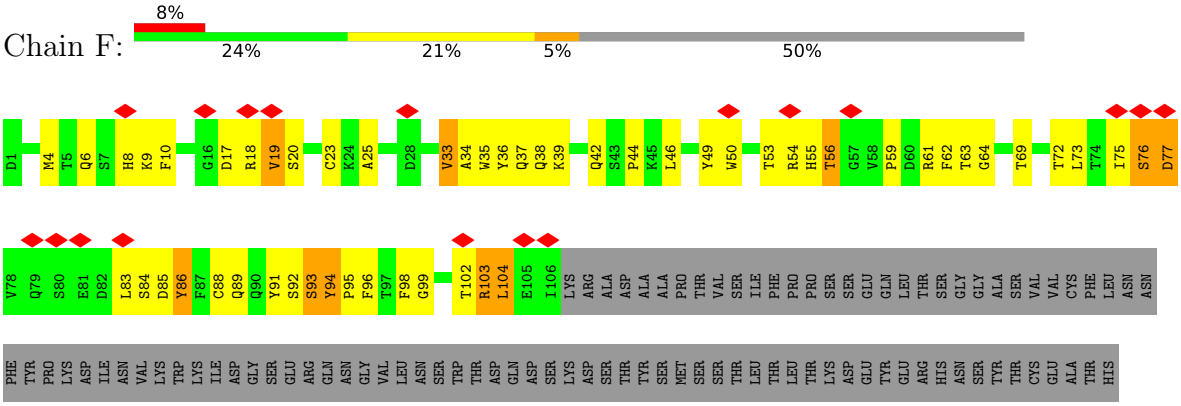
• Molecule 2: 8G5F11 VL

Chain D:



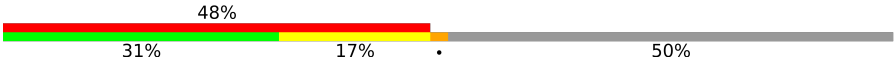
• Molecule 2: 8G5F11 VL

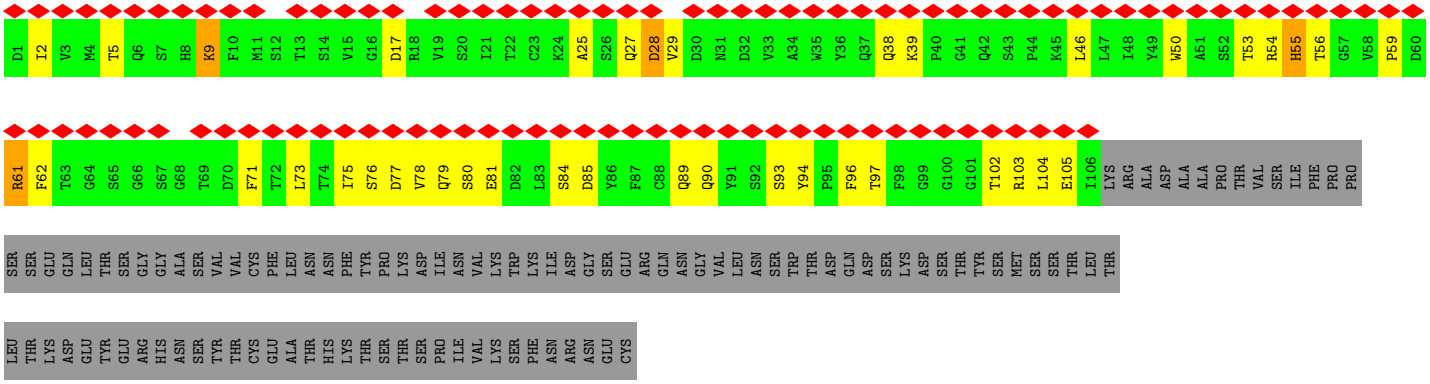
Chain F:



• Molecule 2: 8G5F11 VL

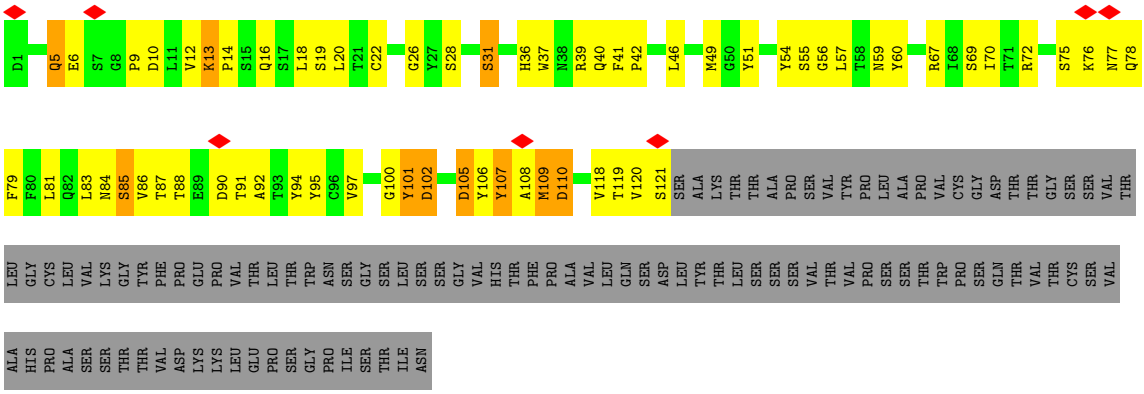
Chain H:





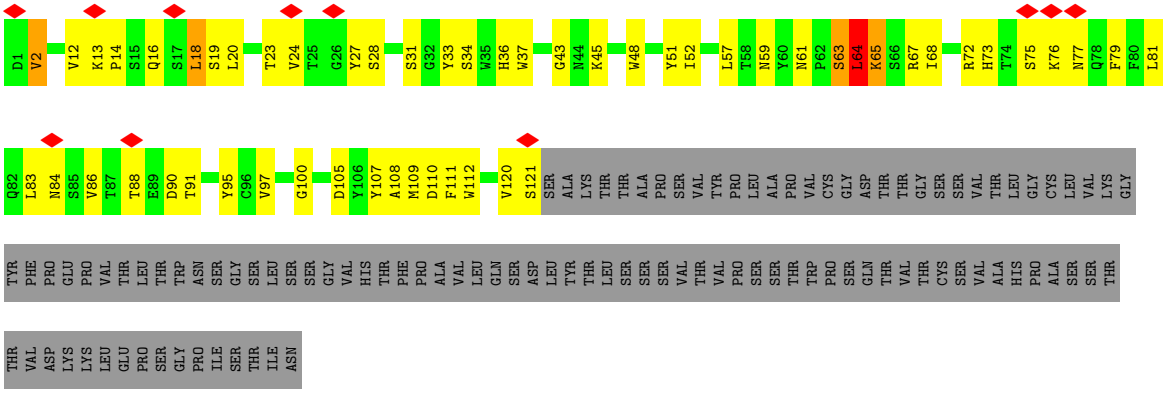
• Molecule 3: 8G5F11 VH

Chain E:

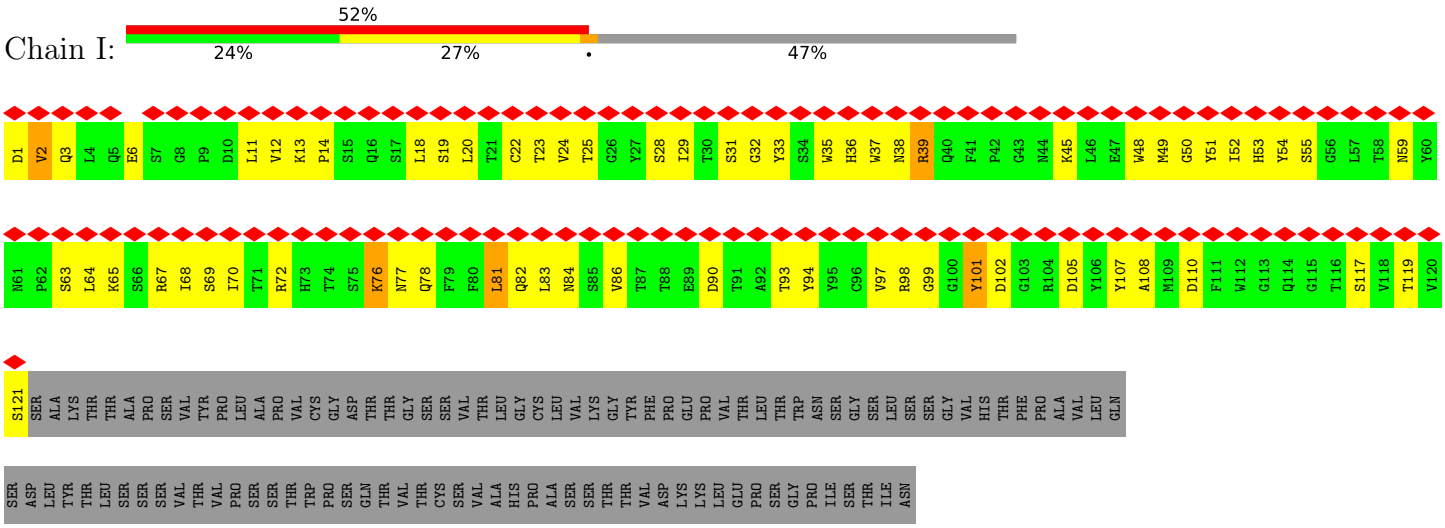


• Molecule 3: 8G5F11 VH

Chain G:



• Molecule 3: 8G5F11 VH



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	294045	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS GLACIOS	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/Å^2$)	40	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	2.657	Depositor
Minimum map value	-1.791	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.054	Depositor
Recommended contour level	0.24	Depositor
Map size (Å)	343.5, 343.5, 343.5	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.145, 1.145, 1.145	Depositor

5 Model quality

5.1 Standard geometry

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	0.34	1/3510 (0.0%)	0.50	2/4778 (0.0%)
1	B	0.18	0/3483	0.39	0/4743
1	C	0.19	0/3492	0.43	0/4755
2	D	0.31	0/869	0.71	0/1178
2	F	0.29	0/849	0.68	0/1152
2	H	0.16	0/869	0.46	0/1178
3	E	0.26	0/999	0.70	3/1360 (0.2%)
3	G	0.24	0/999	0.62	0/1360
3	I	0.17	0/999	0.51	1/1360 (0.1%)
All	All	0.25	1/16069 (0.0%)	0.51	6/21864 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	241	ASP	C-N	15.22	1.53	1.33

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	I	101	TYR	N-CA-C	8.31	121.54	108.67
1	A	241	ASP	O-C-N	7.70	131.62	122.46
3	E	106	TYR	CB-CA-C	-7.07	100.95	111.70
3	E	5	GLN	CA-C-N	5.89	132.80	121.54
3	E	5	GLN	C-N-CA	5.89	132.80	121.54
1	A	220	LYS	N-CA-C	-5.40	100.10	108.90

There are no chirality outliers.

There are no planarity outliers.

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	3406	0	3230	53	0
1	B	3379	0	3206	67	0
1	C	3388	0	3211	69	0
2	D	849	0	794	47	0
2	F	829	0	777	50	0
2	H	849	0	794	28	0
3	E	971	0	909	55	0
3	G	971	0	909	51	0
3	I	971	0	909	49	0
All	All	15613	0	14739	447	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 15.

All (447) 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)
3:G:12:VAL:HG12	3:G:16:GLN:OE1	1.16	1.29
3:G:12:VAL:CG1	3:G:16:GLN:OE1	1.81	1.28
3:G:12:VAL:CG1	3:G:16:GLN:CD	2.25	1.10
3:G:12:VAL:HG12	3:G:16:GLN:CD	1.89	0.95
2:D:90:GLN:HE22	2:D:93:SER:H	1.03	0.93
1:B:249:ARG:HH21	3:G:59:ASN:HA	1.35	0.92
2:D:90:GLN:NE2	2:D:93:SER:H	1.69	0.91
2:D:78:VAL:HG12	2:D:80:SER:H	1.36	0.90
3:G:88:THR:H	3:G:120:VAL:HG21	1.40	0.86
2:D:46:LEU:HD11	3:E:108:ALA:HB1	1.56	0.86
3:I:67:ARG:HG2	3:I:84:ASN:HB2	1.58	0.85
3:G:12:VAL:HG11	3:G:16:GLN:CD	2.03	0.84
3:I:69:SER:O	3:I:82:GLN:HB3	1.78	0.84
1:A:68:CYS:SG	1:A:69:ASP:N	2.51	0.83
2:D:90:GLN:HE22	2:D:93:SER:N	1.77	0.81
3:I:33:TYR:HB3	3:I:98:ARG:HG2	1.63	0.81
2:D:46:LEU:CD1	3:E:108:ALA:HB1	2.12	0.80
1:C:242:LYS:HA	1:C:245:PHE:HB3	1.64	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:107:TYR:O	3:E:108:ALA:C	2.24	0.79
2:F:86:TYR:HD2	2:F:103:ARG:HA	1.46	0.79
2:F:86:TYR:HB3	2:F:102:THR:O	1.83	0.78
3:I:6:GLU:HA	3:I:22:CYS:HA	1.67	0.75
2:D:29:VAL:HG23	2:D:92:SER:HB3	1.68	0.75
1:A:47:LYS:HG3	1:A:182:ILE:HD13	1.70	0.74
1:C:114:CYS:SG	1:C:120:THR:HG23	2.27	0.73
2:D:34:ALA:H	2:D:89:GLN:HB3	1.53	0.73
3:I:52:ILE:HG21	3:I:72:ARG:HD3	1.70	0.73
1:C:357:TRP:NE1	1:C:359:ASP:O	2.21	0.72
2:F:59:PRO:HD2	2:F:62:PHE:HE1	1.54	0.72
2:F:86:TYR:CD2	2:F:103:ARG:HA	2.24	0.72
1:A:219:CYS:SG	1:A:253:CYS:N	2.62	0.72
3:I:28:SER:HA	3:I:76:LYS:HG3	1.72	0.71
3:I:70:ILE:HG12	3:I:81:LEU:HA	1.73	0.68
1:C:41:LEU:HD13	1:C:188:PHE:HB3	1.76	0.68
3:G:12:VAL:HG11	3:G:16:GLN:NE2	2.08	0.68
3:E:12:VAL:HB	3:E:16:GLN:HE22	1.59	0.68
3:I:24:VAL:O	3:I:76:LYS:NZ	2.27	0.68
3:I:70:ILE:HD11	3:I:81:LEU:HD12	1.75	0.68
2:D:31:ASN:HA	2:D:71:PHE:HZ	1.60	0.67
1:B:195:LEU:HD22	1:B:244:LEU:HD21	1.76	0.67
3:I:86:VAL:HG13	3:I:90:ASP:HB2	1.76	0.67
3:E:39:ARG:NH1	3:E:90:ASP:OD1	2.28	0.67
2:D:94:TYR:O	2:D:96:PHE:N	2.27	0.66
2:D:46:LEU:HD13	3:E:108:ALA:O	1.95	0.66
3:I:107:TYR:HD1	3:I:108:ALA:H	1.43	0.66
3:G:28:SER:HA	3:G:76:LYS:HG3	1.78	0.65
3:G:67:ARG:NH1	3:G:84:ASN:O	2.28	0.65
3:I:13:LYS:HD3	3:I:14:PRO:HD2	1.77	0.65
1:C:42:GLN:HE22	1:C:240:ALA:H	1.44	0.65
1:C:375:ARG:HG3	1:C:380:TYR:CE1	2.32	0.65
3:E:42:PRO:HD3	3:E:92:ALA:HB2	1.80	0.64
3:G:12:VAL:CG1	3:G:16:GLN:NE2	2.61	0.64
3:E:9:PRO:HD2	3:E:20:LEU:HD13	1.79	0.64
1:A:213:GLU:OE2	1:A:233:SER:N	2.31	0.63
2:D:83:LEU:HD11	2:D:106:ILE:HG22	1.79	0.63
1:A:381:LYS:NZ	1:A:395:ASP:OD2	2.30	0.63
2:F:49:TYR:HB2	2:F:53:THR:HB	1.80	0.63
2:F:76:SER:OG	2:F:77:ASP:OD1	2.16	0.63
1:C:237:PHE:HE1	1:C:239:MET:HE2	1.64	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:39:LYS:H	2:H:39:LYS:HD2	1.64	0.63
2:D:4:MET:HE3	2:D:88:CYS:HB3	1.81	0.63
1:B:65:VAL:HG11	1:B:83:ARG:HH22	1.63	0.63
1:A:68:CYS:O	1:A:69:ASP:HB2	1.98	0.62
1:B:298:SER:OG	1:B:301:ASP:OD2	2.16	0.62
2:H:90:GLN:HE22	2:H:97:THR:H	1.45	0.62
1:B:275:VAL:HG11	1:C:276:GLU:HG2	1.81	0.62
2:D:17:ASP:HA	2:D:78:VAL:H	1.64	0.62
2:D:50:TRP:HB3	2:D:91:TYR:OH	2.00	0.62
2:D:6:GLN:NE2	2:D:99:GLY:O	2.32	0.62
1:C:66:THR:HG23	1:C:80:HIS:HE1	1.64	0.62
2:F:84:SER:OG	2:F:103:ARG:NH2	2.32	0.62
2:H:62:PHE:HE1	2:H:73:LEU:HB3	1.65	0.62
2:H:61[B]:ARG:HH21	2:H:62:PHE:HD2	1.47	0.62
1:A:68:CYS:HA	1:A:77:TYR:HB2	1.82	0.62
1:C:231:LEU:HD13	1:C:235:VAL:HG13	1.81	0.62
1:B:162:HIS:HB3	1:B:165:THR:HG22	1.81	0.61
3:E:102:ASP:OD1	3:E:102:ASP:N	2.33	0.61
1:C:267:VAL:HG11	1:C:309:ASN:HD22	1.62	0.61
1:A:16:ASN:OD1	1:A:324:LYS:NZ	2.28	0.61
2:H:75:ILE:HG12	2:H:77:ASP:H	1.66	0.61
3:G:73:HIS:NE2	3:G:75:SER:HB3	2.16	0.60
3:I:49:MET:HE1	3:I:64:LEU:HD12	1.84	0.60
2:D:54:ARG:HB2	2:D:58:VAL:HG21	1.84	0.60
2:D:64:GLY:HA3	2:D:73:LEU:HB2	1.82	0.59
1:A:230:ARG:NH1	1:A:258:SER:O	2.35	0.59
2:H:50:TRP:CD1	2:H:53:THR:HG1	2.20	0.59
1:A:26:SER:OG	1:A:264:GLN:O	2.19	0.59
1:C:244:LEU:HB2	3:I:53:HIS:CE1	2.37	0.59
2:F:25:ALA:HB3	2:F:69:THR:HA	1.85	0.59
2:F:50:TRP:CD1	2:F:91:TYR:HH	2.20	0.59
1:C:186:ILE:HG22	1:C:207:SER:HB2	1.85	0.59
2:D:38:GLN:HB2	2:D:85:ASP:HB2	1.85	0.59
3:I:36:HIS:HA	3:I:50:GLY:O	2.02	0.59
1:C:247:ALA:HB2	3:I:59:ASN:HB2	1.85	0.58
2:H:27:GLN:NE2	2:H:28:ASP:O	2.37	0.58
1:A:249:ARG:HH22	3:E:59:ASN:HA	1.68	0.58
2:F:19:VAL:HG21	2:F:104:LEU:HD13	1.85	0.58
2:F:17:ASP:OD1	2:F:18:ARG:N	2.34	0.58
1:A:364:GLU:O	1:A:365:ASP:HB3	2.04	0.58
1:B:367:GLU:OE1	1:B:375:ARG:NH1	2.32	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:2:ILE:HG13	2:D:27:GLN:HB3	1.85	0.58
3:E:88:THR:HA	3:E:120:VAL:HG21	1.85	0.58
2:H:2:ILE:HG13	2:H:93:SER:HB3	1.84	0.58
1:A:192:ASP:N	1:A:192:ASP:OD1	2.37	0.58
2:D:16:GLY:O	2:D:78:VAL:HB	2.04	0.58
1:B:252:GLU:OE2	1:B:253:CYS:N	2.37	0.57
3:E:51:TYR:CE1	3:E:59:ASN:HB3	2.39	0.57
3:E:54:TYR:CE1	3:E:55:SER:OG	2.58	0.57
1:B:339:ILE:HG12	1:B:381:LYS:HG2	1.87	0.57
3:E:20:LEU:HB2	3:E:81:LEU:HB3	1.86	0.57
3:G:68:ILE:HD13	3:G:83:LEU:HD13	1.87	0.57
2:D:14:SER:OG	2:D:15:VAL:N	2.38	0.57
3:G:107:TYR:O	3:G:108:ALA:C	2.48	0.57
1:C:231:LEU:HD11	1:C:237:PHE:HE2	1.69	0.56
3:E:28:SER:O	3:E:31:SER:OG	2.22	0.56
2:F:62:PHE:HB2	2:F:75:ILE:HA	1.87	0.56
1:B:355:GLU:O	1:B:357:TRP:N	2.37	0.56
3:G:13:LYS:HB3	3:G:16:GLN:HB2	1.86	0.56
1:B:247:ALA:HB1	3:G:57:LEU:HB3	1.87	0.56
1:B:269:VAL:HA	1:B:272:ILE:HD12	1.87	0.56
3:G:2:VAL:HG22	3:G:27:TYR:HB2	1.87	0.56
1:B:189:PHE:HE2	1:B:206:ARG:HG2	1.71	0.56
3:E:49:MET:HE1	3:E:81:LEU:HD11	1.86	0.56
1:C:65:VAL:HG12	1:C:123:GLU:HA	1.88	0.56
2:F:34:ALA:N	2:F:89:GLN:O	2.39	0.56
1:B:319:ILE:HD12	1:B:324:LYS:HG3	1.88	0.56
1:B:375:ARG:HG3	1:B:380:TYR:CE1	2.41	0.56
3:E:13:LYS:HD3	3:E:14:PRO:HD2	1.87	0.56
3:E:90:ASP:OD1	3:E:94:TYR:OH	2.24	0.55
3:E:54:TYR:CD1	3:E:55:SER:N	2.74	0.55
1:B:247:ALA:O	1:B:249:ARG:HG2	2.06	0.55
1:B:249:ARG:NH2	3:G:59:ASN:HA	2.14	0.55
1:B:381:LYS:NZ	1:B:395:ASP:OD2	2.37	0.55
1:A:340:LEU:HB2	1:A:380:TYR:HB2	1.87	0.55
2:D:63:THR:OG1	2:D:64:GLY:N	2.40	0.55
2:F:91:TYR:HD1	2:F:91:TYR:O	1.89	0.55
1:A:363:TYR:CE1	1:A:400:SER:HB3	2.42	0.54
2:D:52:SER:OG	2:D:53:THR:N	2.38	0.54
3:E:18:LEU:O	3:E:83:LEU:N	2.32	0.54
2:F:38:GLN:NE2	2:F:42:GLN:O	2.40	0.54
2:F:63:THR:OG1	2:F:64:GLY:N	2.37	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:160:THR:OG1	1:B:165:THR:O	2.25	0.54
3:E:67:ARG:HG2	3:E:83:LEU:HD12	1.89	0.54
1:B:96:ILE:HG13	1:B:129:VAL:HG11	1.89	0.54
2:H:96:PHE:HB2	3:I:48:TRP:CE3	2.43	0.54
1:A:419:ASP:OD1	1:A:420:ASP:N	2.41	0.54
1:B:70:PHE:CE1	1:B:74:GLY:HA2	2.43	0.54
1:C:60:HIS:CD2	1:C:408:PRO:HB2	2.43	0.54
3:I:1:ASP:O	3:I:3:GLN:N	2.32	0.54
2:D:61[A]:ARG:HD3	2:D:79:GLN:HG3	1.90	0.53
3:G:72:ARG:HA	3:G:79:PHE:HA	1.91	0.53
1:B:68:CYS:HB3	1:B:78:ILE:HD12	1.91	0.53
1:B:307:PRO:HG2	1:B:330:TYR:CZ	2.43	0.53
2:H:89:GLN:NE2	2:H:90:GLN:O	2.42	0.53
2:F:46:LEU:HB3	2:F:55:HIS:CD2	2.44	0.53
1:A:81:SER:HB2	1:A:426:GLY:H	1.73	0.53
2:D:1:ASP:HB2	2:D:2:ILE:HD12	1.91	0.53
2:F:64:GLY:HA3	2:F:73:LEU:HA	1.90	0.53
1:B:7:PRO:HB3	1:B:328:THR:HG21	1.91	0.52
2:F:9:LYS:HA	2:F:102:THR:HG22	1.91	0.52
3:G:12:VAL:HG13	3:G:16:GLN:OE1	1.95	0.52
1:C:221:MET:HE2	1:C:230:ARG:HD2	1.91	0.52
2:D:62:PHE:HB2	2:D:75:ILE:HG12	1.91	0.52
1:C:138:GLU:OE1	1:C:329:ARG:NH2	2.37	0.52
2:D:87:PHE:CE2	2:D:101:GLY:HA2	2.45	0.52
1:C:58:MET:HE1	1:C:160:THR:HG21	1.92	0.52
1:C:44:LYS:N	1:C:238:GLU:O	2.42	0.52
1:C:201:GLU:OE1	1:C:201:GLU:N	2.36	0.52
1:C:47:LYS:HG2	1:C:50:LYS:HD3	1.92	0.52
2:F:37:GLN:NE2	2:F:84:SER:O	2.43	0.52
3:E:108:ALA:O	3:E:109:MET:C	2.52	0.52
2:F:33:VAL:HG12	2:F:34:ALA:H	1.75	0.51
3:E:6:GLU:HA	3:E:22:CYS:HA	1.91	0.51
3:I:76:LYS:O	3:I:76:LYS:HG2	2.09	0.51
1:A:78:ILE:HG22	1:A:78:ILE:O	2.09	0.51
3:I:36:HIS:ND1	3:I:51:TYR:HB3	2.25	0.51
3:G:67:ARG:O	3:G:83:LEU:HA	2.11	0.51
1:B:357:TRP:NE1	1:B:370:PRO:HD3	2.26	0.51
1:A:198:LEU:HD22	1:A:239:MET:HE1	1.92	0.51
3:I:35:TRP:CZ3	3:I:98:ARG:HG3	2.46	0.51
1:B:58:MET:HE2	1:B:167:TRP:HB2	1.93	0.51
1:C:57:TRP:NE1	1:C:170:ASP:OD2	2.43	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:350:THR:HG22	1:C:352:THR:H	1.76	0.51
1:B:65:VAL:HG21	1:B:83:ARG:HH12	1.75	0.51
3:E:110:ASP:OD1	3:E:110:ASP:N	2.33	0.51
1:C:146:SER:OG	1:C:327:GLU:OE1	2.24	0.50
2:D:74:THR:O	2:D:74:THR:OG1	2.22	0.50
3:I:12:VAL:HG21	3:I:18:LEU:HD13	1.93	0.50
3:I:98:ARG:HE	3:I:110:ASP:CG	2.18	0.50
1:A:323:LEU:HB2	1:A:402[A]:ALA:HB1	1.92	0.50
2:F:93:SER:O	2:F:96:PHE:HE1	1.94	0.50
3:I:2:VAL:HB	3:I:24:VAL:HG13	1.93	0.50
1:C:315:ALA:O	1:C:325:TYR:HA	2.10	0.50
2:F:50:TRP:CG	2:F:91:TYR:HH	2.30	0.50
3:I:93:THR:HA	3:I:117:SER:HA	1.92	0.50
1:B:299:PRO:HG2	1:B:374:LEU:HD11	1.94	0.50
3:I:29:ILE:HG13	3:I:35:TRP:NE1	2.26	0.50
1:C:6:PHE:HE2	1:C:357:TRP:HB2	1.77	0.50
1:B:334:ASP:N	1:B:346:MET:O	2.38	0.50
1:C:114:CYS:SG	1:C:115:GLY:N	2.84	0.50
2:D:64:GLY:HA2	2:D:74:THR:HG22	1.94	0.50
2:H:38:GLN:HB2	2:H:85:ASP:OD1	2.12	0.50
2:H:104:LEU:HD22	2:H:105:GLU:H	1.75	0.50
1:A:269:VAL:HA	1:A:272:ILE:HD12	1.92	0.50
3:E:72:ARG:HA	3:E:79:PHE:HA	1.94	0.50
2:H:2:ILE:O	2:H:90:GLN:NE2	2.45	0.50
1:B:243:ASP:N	3:G:107:TYR:OH	2.44	0.50
3:G:97:VAL:HG21	3:G:109:MET:HE2	1.93	0.50
1:B:42:GLN:HG2	1:B:240:ALA:CB	2.42	0.49
1:C:246:ALA:C	1:C:248:ALA:H	2.21	0.49
1:C:50:LYS:HE3	1:C:329:ARG:HD3	1.93	0.49
2:D:17:ASP:N	2:D:18:ARG:HD3	2.27	0.49
2:D:62:PHE:HB3	2:D:75:ILE:HG23	1.93	0.49
1:B:70:PHE:HB2	1:B:76:LYS:HE2	1.93	0.49
2:H:17:ASP:O	2:H:78:VAL:HG22	2.12	0.49
2:F:61:ARG:NH2	2:F:77:ASP:O	2.44	0.49
3:G:63:SER:O	3:G:65:LYS:N	2.41	0.49
1:B:42:GLN:HG2	1:B:240:ALA:HB3	1.95	0.49
1:B:357:TRP:CD1	1:B:370:PRO:HD3	2.47	0.49
1:C:375:ARG:HG3	1:C:380:TYR:HE1	1.75	0.49
3:G:61:ASN:HB3	3:G:64:LEU:HG	1.94	0.49
3:I:49:MET:HE3	3:I:83:LEU:HD21	1.95	0.49
3:E:85:SER:O	3:E:85:SER:OG	2.26	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:101:TYR:HA	3:E:105:ASP:HA	1.95	0.49
3:G:61:ASN:O	3:G:65:LYS:HD3	2.12	0.49
3:G:105:ASP:OD1	3:G:107:TYR:HD1	1.96	0.49
1:C:248:ALA:O	1:C:250:PHE:N	2.44	0.49
1:C:7:PRO:HB3	1:C:328:THR:HG21	1.94	0.49
2:F:19:VAL:HG13	2:F:75:ILE:HG23	1.95	0.49
2:F:49:TYR:HE1	2:F:55:HIS:HA	1.77	0.49
2:H:54:ARG:NH2	2:H:59:PRO:O	2.45	0.48
2:H:9:LYS:HA	2:H:102:THR:HG23	1.95	0.48
1:B:343:MET:HG2	1:B:380:TYR:CG	2.48	0.48
1:C:386:MET:HE2	1:C:396:LEU:HD11	1.95	0.48
3:E:36:HIS:HB2	3:E:97:VAL:CG2	2.43	0.48
3:E:37:TRP:CD2	3:E:81:LEU:HD12	2.48	0.48
2:H:29:VAL:HG21	2:H:90:GLN:HB2	1.96	0.48
3:E:60:TYR:CE1	3:E:70:ILE:HD12	2.48	0.48
3:G:36:HIS:HB2	3:G:97:VAL:CG2	2.43	0.48
2:F:91:TYR:O	2:F:91:TYR:CD1	2.67	0.48
3:G:2:VAL:HG12	3:G:2:VAL:O	2.12	0.48
3:G:13:LYS:HE3	3:G:16:GLN:HB2	1.96	0.48
1:C:71:ARG:HD3	1:C:71:ARG:HA	1.72	0.48
2:D:36:TYR:HD1	2:D:46:LEU:HA	1.79	0.48
3:G:37:TRP:CD1	3:G:81:LEU:HD13	2.48	0.48
1:B:407:HIS:HB3	1:B:410:ILE:HG13	1.94	0.48
2:F:59:PRO:HD2	2:F:62:PHE:CE1	2.42	0.48
3:I:18:LEU:HG	3:I:19:SER:H	1.78	0.48
3:I:32:GLY:HA2	3:I:54:TYR:CD2	2.49	0.48
1:A:242:LYS:O	1:A:243:ASP:C	2.55	0.48
1:B:29:ASP:OD2	1:B:332:ARG:NH2	2.46	0.48
2:F:55:HIS:CG	2:F:56:THR:H	2.31	0.48
3:G:75:SER:OG	3:G:77:ASN:OD1	2.31	0.48
1:A:387:ILE:O	1:C:277:ARG:NH1	2.44	0.47
1:C:242:LYS:HD3	2:H:94:TYR:HE1	1.78	0.47
2:D:59:PRO:HD2	2:D:62:PHE:CE1	2.49	0.47
3:I:29:ILE:HG12	3:I:72:ARG:HH11	1.78	0.47
3:G:88:THR:HA	3:G:120:VAL:HG11	1.94	0.47
1:C:70:PHE:CD2	1:C:116:TYR:HB2	2.48	0.47
2:H:84:SER:OG	2:H:85:ASP:N	2.47	0.47
3:I:20:LEU:HB2	3:I:81:LEU:HB3	1.97	0.47
2:D:4:MET:CE	2:D:88:CYS:HB3	2.43	0.47
1:C:213:GLU:OE2	1:C:233:SER:HB3	2.14	0.47
2:D:45:LYS:HB2	2:D:45:LYS:HE2	1.62	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:51:ALA:HB2	2:D:71:PHE:HE1	1.78	0.47
3:E:67:ARG:HG3	3:E:84:ASN:O	2.14	0.47
3:E:87:THR:OG1	3:E:88:THR:N	2.47	0.47
2:F:36:TYR:HE2	2:F:89:GLN:HG2	1.78	0.47
1:A:73:TYR:HB2	1:A:75:PRO:HD3	1.97	0.47
2:F:38:GLN:H	2:F:86:TYR:HE1	1.62	0.47
3:G:18:LEU:HD22	3:G:86:VAL:HG21	1.97	0.47
3:E:13:LYS:O	3:E:16:GLN:NE2	2.43	0.47
1:C:42:GLN:NE2	1:C:240:ALA:H	2.13	0.46
1:C:230:ARG:HG2	1:C:230:ARG:HH11	1.80	0.46
3:G:63:SER:OG	3:G:64:LEU:N	2.48	0.46
1:B:70:PHE:HE1	1:B:74:GLY:HA2	1.80	0.46
1:A:338:PRO:HB2	1:A:386:MET:HG2	1.98	0.46
1:B:391:MET:HE2	1:B:391:MET:HB2	1.73	0.46
1:A:196:SER:HA	3:E:57:LEU:HD11	1.97	0.46
1:B:407:HIS:ND1	1:B:409:HIS:HB2	2.30	0.46
3:I:20:LEU:N	3:I:81:LEU:O	2.48	0.46
1:B:107:PRO:HD2	1:B:126:ILE:HG12	1.97	0.46
2:F:39:LYS:HB2	2:F:42:GLN:CD	2.40	0.46
1:A:47:LYS:HA	1:A:50:LYS:HG3	1.98	0.46
1:C:120:THR:OG1	1:C:121:ASP:N	2.47	0.46
3:E:40:GLN:HG3	3:E:41:PHE:H	1.80	0.46
3:E:40:GLN:HB2	3:E:95:TYR:HE1	1.80	0.46
1:C:65:VAL:HG11	1:C:83:ARG:NH1	2.31	0.46
1:C:100:LYS:HG3	1:C:101:GLN:H	1.80	0.46
1:C:343:MET:HE1	1:C:373:VAL:HG11	1.97	0.46
3:E:56:GLY:O	3:E:57:LEU:HB2	2.16	0.46
1:A:80:HIS:HB3	1:A:109:PHE:CE1	2.51	0.46
1:C:65:VAL:HG11	1:C:83:ARG:HH12	1.79	0.46
1:B:343:MET:HG3	1:B:360:TRP:HZ2	1.80	0.45
1:C:338:PRO:HB3	1:C:386:MET:HG2	1.97	0.45
2:D:78:VAL:HG12	2:D:80:SER:N	2.17	0.45
1:A:242:LYS:HB2	3:E:107:TYR:OH	2.17	0.45
1:A:191:GLU:H	1:A:191:GLU:CD	2.25	0.45
1:B:71:ARG:HG2	1:B:72:TRP:HD1	1.81	0.45
3:E:18:LEU:HD23	3:E:83:LEU:HD23	1.98	0.45
1:A:195:LEU:O	1:A:198:LEU:HD12	2.16	0.45
3:E:18:LEU:N	3:E:83:LEU:O	2.47	0.45
3:G:36:HIS:ND1	3:G:51:TYR:HB3	2.32	0.45
1:C:47:LYS:HB3	1:C:47:LYS:HE2	1.73	0.45
1:C:80:HIS:CD2	1:C:417:LEU:HD11	2.52	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:33:TYR:CE2	3:G:100:GLY:HA2	2.51	0.45
1:A:97:GLU:HG2	1:A:101:GLN:OE1	2.16	0.45
2:F:62:PHE:HD2	2:F:75:ILE:HA	1.82	0.45
1:B:243:ASP:OD1	2:F:94:TYR:OH	2.26	0.45
1:C:343:MET:O	1:C:343:MET:HG3	2.17	0.45
1:A:112[B]:GLN:CD	1:A:112[B]:GLN:H	2.25	0.45
3:I:39:ARG:NH1	3:I:94:TYR:OH	2.50	0.45
1:B:89:VAL:O	1:B:93:LYS:HG3	2.17	0.45
2:F:6:GLN:NE2	2:F:88:CYS:SG	2.80	0.45
2:F:35:TRP:CD2	2:F:73:LEU:HD22	2.52	0.45
1:A:375:ARG:HG3	1:A:380:TYR:CE1	2.52	0.44
1:B:230:ARG:HG3	1:B:259:ILE:CD1	2.47	0.44
1:C:60:HIS:HE1	1:C:130:THR:HG23	1.82	0.44
3:E:36:HIS:HB2	3:E:97:VAL:HG23	1.99	0.44
1:C:72:TRP:HA	1:C:72:TRP:CE3	2.53	0.44
1:C:264:GLN:CD	1:C:307:PRO:HB3	2.42	0.44
2:F:73:LEU:HD23	2:F:85:ASP:OD2	2.18	0.44
3:I:33:TYR:CE2	3:I:102:ASP:HB2	2.52	0.44
1:A:70:PHE:HB3	1:A:75:PRO:O	2.16	0.44
1:A:368:ILE:HD11	1:A:372:GLY:HA2	1.99	0.44
2:D:94:TYR:O	2:D:96:PHE:CD1	2.70	0.44
2:H:54:ARG:NH1	2:H:62:PHE:O	2.50	0.44
2:H:85:ASP:HB2	2:H:102:THR:O	2.18	0.44
1:B:34:ASN:O	1:B:36:LEU:HD13	2.18	0.44
1:B:65:VAL:HG21	1:B:83:ARG:NH1	2.32	0.44
1:C:237:PHE:CE1	1:C:239:MET:HE2	2.50	0.44
1:C:382:PHE:O	1:C:386:MET:HG3	2.16	0.44
3:I:101:TYR:HA	3:I:105:ASP:HA	2.00	0.44
2:F:44:PRO:HG2	3:G:112:TRP:CZ3	2.53	0.44
1:A:68:CYS:O	1:A:69:ASP:CB	2.65	0.44
1:B:242:LYS:HE3	3:G:107:TYR:CE1	2.53	0.44
1:C:200:LYS:HB3	1:C:200:LYS:HE3	1.74	0.44
3:E:26:GLY:H	3:E:76:LYS:NZ	2.16	0.44
2:H:61[A]:ARG:NH1	2:H:79:GLN:OE1	2.51	0.44
3:I:67:ARG:O	3:I:83:LEU:HA	2.18	0.44
1:A:361:ALA:O	1:A:367:GLU:HA	2.18	0.43
1:B:283:LEU:HD22	1:B:304:TYR:CZ	2.53	0.43
1:B:315:ALA:O	1:B:325:TYR:HA	2.17	0.43
1:B:70:PHE:CD2	1:B:116:TYR:HB3	2.52	0.43
1:C:142:GLU:OE2	1:C:152:LYS:NZ	2.40	0.43
1:C:185:ASP:OD1	1:C:185:ASP:N	2.50	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:306:ALA:HB2	1:C:371:ASN:HB3	1.99	0.43
1:C:363:TYR:CE1	1:C:400:SER:HB3	2.53	0.43
3:E:37:TRP:CG	3:E:81:LEU:HD12	2.52	0.43
3:E:86:VAL:HG13	3:E:90:ASP:HB2	1.99	0.43
1:A:209:TYR:CD1	1:A:331:ILE:HD12	2.54	0.43
2:D:20:SER:C	2:D:21:ILE:HD12	2.43	0.43
2:D:98:PHE:CE1	3:E:46:LEU:HD22	2.53	0.43
3:I:22:CYS:SG	3:I:23:THR:N	2.90	0.43
3:I:22:CYS:HB2	3:I:37:TRP:CZ2	2.54	0.43
3:G:90:ASP:OD1	3:G:90:ASP:N	2.51	0.43
1:A:420:ASP:CG	1:A:421:GLU:H	2.25	0.43
3:I:33:TYR:HD1	3:I:99:GLY:O	2.01	0.43
2:D:50:TRP:O	2:D:51:ALA:C	2.62	0.43
3:E:12:VAL:O	3:E:121:SER:N	2.52	0.43
2:F:35:TRP:CG	2:F:73:LEU:HD22	2.53	0.43
3:I:63:SER:O	3:I:65:LYS:HE2	2.18	0.43
1:A:222:GLN:HA	1:A:226:HIS:O	2.18	0.43
3:G:48:TRP:HZ2	3:G:51:TYR:HD2	1.66	0.43
2:F:50:TRP:CD1	2:F:91:TYR:OH	2.72	0.43
3:G:23:THR:HA	3:G:77:ASN:O	2.19	0.43
1:B:342:ARG:HB3	1:B:344:VAL:HG23	2.01	0.43
3:G:2:VAL:CG2	3:G:27:TYR:HB2	2.48	0.43
3:G:19:SER:O	3:G:20:LEU:HD23	2.18	0.43
3:E:10:ASP:O	3:E:118:VAL:HA	2.19	0.42
2:F:4:MET:HB3	2:F:99:GLY:HA2	2.00	0.42
2:F:6:GLN:HA	2:F:6:GLN:OE1	2.18	0.42
3:G:24:VAL:H	3:G:77:ASN:HB2	1.83	0.42
3:G:86:VAL:HG12	3:G:120:VAL:HG23	2.01	0.42
3:E:5:GLN:O	3:E:6:GLU:HG3	2.19	0.42
3:G:14:PRO:HD3	3:G:121:SER:HA	2.01	0.42
1:A:175:GLY:O	1:A:176:LEU:HB2	2.19	0.42
2:H:46:LEU:HB3	2:H:55:HIS:CD2	2.54	0.42
2:H:80:SER:OG	2:H:81[B]:GLU:OE1	2.36	0.42
2:H:90:GLN:NE2	2:H:97:THR:H	2.15	0.42
3:I:2:VAL:O	3:I:25:THR:N	2.52	0.42
3:I:23:THR:HA	3:I:77:ASN:O	2.20	0.42
1:A:249:ARG:NH2	3:E:59:ASN:HA	2.33	0.42
1:B:45:MET:HE3	1:B:184:MET:SD	2.60	0.42
2:D:48:ILE:HG23	2:D:50:TRP:O	2.19	0.42
3:E:60:TYR:HE1	3:E:70:ILE:HD12	1.84	0.42
3:E:75:SER:OG	3:E:77:ASN:OD1	2.38	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:62:PHE:CD2	2:F:75:ILE:HG13	2.54	0.42
3:I:68:ILE:O	3:I:70:ILE:HG13	2.19	0.42
1:B:221:MET:SD	1:B:259:ILE:HD11	2.58	0.42
1:B:172:LYS:HE3	1:B:172:LYS:HB2	1.63	0.42
1:B:407:HIS:HB2	1:B:425:PHE:CE1	2.55	0.42
1:C:41:LEU:CD1	1:C:188:PHE:HB3	2.48	0.42
3:G:110:ASP:OD1	3:G:111:PHE:N	2.51	0.42
3:I:52:ILE:HD13	3:I:72:ARG:HB3	2.02	0.42
1:C:223:TYR:HD2	1:C:259:ILE:HD13	1.85	0.42
2:D:54:ARG:HG2	2:D:54:ARG:HH11	1.85	0.42
1:A:264:GLN:CD	1:A:307:PRO:HB3	2.45	0.42
2:H:25:ALA:HB3	2:H:71:PHE:CE1	2.54	0.42
1:A:66:THR:HG23	1:A:80:HIS:NE2	2.35	0.42
1:B:160:THR:OG1	1:B:165:THR:HG23	2.20	0.42
1:C:140:THR:OG1	1:C:142:GLU:HG2	2.20	0.42
3:E:91:THR:HA	3:E:118:VAL:O	2.20	0.42
2:F:94:TYR:H	2:F:95:PRO:HD2	1.84	0.42
2:F:86:TYR:CD1	2:F:86:TYR:N	2.85	0.41
3:I:14:PRO:HD3	3:I:121:SER:HA	2.02	0.41
1:B:197:SER:HB3	1:B:200:LYS:HE3	2.02	0.41
1:B:297:ILE:HD11	1:B:318:ILE:HD11	2.02	0.41
1:C:69:ASP:OD1	1:C:71:ARG:NH1	2.53	0.41
3:E:100:GLY:O	3:E:101:TYR:HB3	2.19	0.41
3:I:11:LEU:HD12	3:I:119:THR:HG22	2.02	0.41
1:B:241:ASP:OD1	1:B:243:ASP:HB2	2.20	0.41
1:A:209:TYR:CE1	1:A:331:ILE:HD12	2.56	0.41
1:B:242:LYS:HA	1:B:245:PHE:HB3	2.02	0.41
2:F:9:LYS:HE2	2:F:10:PHE:HB2	2.02	0.41
3:I:20:LEU:HD23	3:I:20:LEU:HA	1.84	0.41
1:B:21:TYR:CE2	1:C:391:MET:HE1	2.55	0.41
3:G:52:ILE:HD13	3:G:72:ARG:HD3	2.02	0.41
1:A:65:VAL:HG23	1:A:123:GLU:OE1	2.21	0.41
1:B:367:GLU:O	1:B:375:ARG:N	2.44	0.41
2:F:18:ARG:O	2:F:18:ARG:HG3	2.21	0.41
3:G:43:GLY:HA3	3:G:45:LYS:NZ	2.36	0.41
1:A:66:THR:HG23	1:A:80:HIS:CD2	2.56	0.41
1:A:323:LEU:HB2	1:A:402[B]:ALA:HB1	2.03	0.41
1:B:21:TYR:O	1:B:292:ARG:NH2	2.50	0.41
3:E:91:THR:HG23	3:E:119:THR:HA	2.01	0.41
1:C:222:GLN:NE2	1:C:225:LYS:HA	2.36	0.41
3:G:28:SER:HB2	3:G:31:SER:HB3	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:I:19:SER:HA	3:I:82:GLN:HA	2.02	0.41
1:A:364:GLU:O	1:A:365:ASP:CB	2.67	0.41
2:F:49:TYR:CE1	2:F:55:HIS:HA	2.54	0.41
2:F:54:ARG:CZ	2:F:63:THR:HB	2.51	0.41
2:H:85:ASP:HB2	2:H:103:ARG:HA	2.03	0.41
1:A:242:LYS:HB2	1:A:242:LYS:HE2	1.70	0.40
1:C:62:SER:HB3	1:C:407:HIS:CE1	2.56	0.40
2:F:73:LEU:HA	2:F:73:LEU:HD12	1.77	0.40
1:A:247:ALA:HA	1:A:249:ARG:NH1	2.36	0.40
2:H:2:ILE:HG23	2:H:27:GLN:HG2	2.02	0.40
1:B:149:ILE:HG22	1:B:150:ASN:OD1	2.21	0.40
1:C:358:ASP:O	1:C:358:ASP:CG	2.64	0.40
2:D:8:HIS:HD2	2:D:11:MET:HB2	1.86	0.40
2:D:36:TYR:O	2:D:86:TYR:HA	2.20	0.40
1:B:118:THR:HG22	1:B:119:VAL:HG13	2.02	0.40
3:E:105:ASP:OD1	3:E:107:TYR:CE2	2.75	0.40
1:A:163:ASN:OD1	1:A:163:ASN:C	2.65	0.40
2:D:17:ASP:HB3	2:D:77:ASP:HB3	2.03	0.40
3:I:67:ARG:O	3:I:83:LEU:HD23	2.22	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	429/495 (87%)	390 (91%)	36 (8%)	3 (1%)	19 41
1	B	426/495 (86%)	396 (93%)	29 (7%)	1 (0%)	44 66
1	C	427/495 (86%)	393 (92%)	30 (7%)	4 (1%)	14 35
2	D	106/214 (50%)	78 (74%)	27 (26%)	1 (1%)	14 35
2	F	104/214 (49%)	80 (77%)	22 (21%)	2 (2%)	6 18

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
2	H	106/214 (50%)	86 (81%)	20 (19%)	0	100 100
3	E	119/229 (52%)	93 (78%)	23 (19%)	3 (2%)	4 13
3	G	119/229 (52%)	92 (77%)	24 (20%)	3 (2%)	4 13
3	I	119/229 (52%)	93 (78%)	25 (21%)	1 (1%)	16 38
All	All	1955/2814 (70%)	1701 (87%)	236 (12%)	18 (1%)	17 35

All (18) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	356	LEU
3	E	101	TYR
3	E	107	TYR
2	F	76	SER
1	A	69	ASP
1	C	113	SER
1	C	114	CYS
1	A	68	CYS
3	E	109	MET
3	G	64	LEU
1	C	115	GLY
1	C	250	PHE
3	G	63	SER
2	D	95	PRO
1	A	78	ILE
3	G	2	VAL
3	I	2	VAL
2	F	94	TYR

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	376/434 (87%)	359 (96%)	17 (4%)	23 47
1	B	373/434 (86%)	359 (96%)	14 (4%)	28 52

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	C	374/434 (86%)	352 (94%)	22 (6%)	16 36
2	D	96/193 (50%)	85 (88%)	11 (12%)	4 12
2	F	94/193 (49%)	79 (84%)	15 (16%)	2 5
2	H	96/193 (50%)	88 (92%)	8 (8%)	9 22
3	E	108/203 (53%)	99 (92%)	9 (8%)	9 22
3	G	108/203 (53%)	102 (94%)	6 (6%)	17 39
3	I	108/203 (53%)	99 (92%)	9 (8%)	9 22
All	All	1733/2490 (70%)	1622 (94%)	111 (6%)	18 33

All (111) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	LYS
1	A	8[A]	HIS
1	A	8[B]	HIS
1	A	47	LYS
1	A	69	ASP
1	A	112[A]	GLN
1	A	112[B]	GLN
1	A	130	THR
1	A	154	SER
1	A	198	LEU
1	A	220	LYS
1	A	242	LYS
1	A	253	CYS
1	A	339	ILE
1	A	355[A]	GLU
1	A	355[B]	GLU
1	A	365	ASP
1	B	19	SER
1	B	36	LEU
1	B	114	CYS
1	B	130	THR
1	B	154	SER
1	B	173	VAL
1	B	190	SER
1	B	197	SER
1	B	242	LYS
1	B	312	THR
1	B	325	TYR

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Mol	Chain	Res	Type
1	B	378	SER
1	B	397	HIS
1	B	419	ASP
1	C	8[A]	HIS
1	C	8[B]	HIS
1	C	26	SER
1	C	35	ASP
1	C	65	VAL
1	C	66	THR
1	C	88	SER
1	C	114	CYS
1	C	121	ASP
1	C	140	THR
1	C	161	VAL
1	C	169	SER
1	C	181	LEU
1	C	253	CYS
1	C	298	SER
1	C	302	LEU
1	C	308	LYS
1	C	325	TYR
1	C	355[A]	GLU
1	C	355[B]	GLU
1	C	378	SER
1	C	397	HIS
2	D	7	SER
2	D	17	ASP
2	D	29	VAL
2	D	61[A]	ARG
2	D	61[B]	ARG
2	D	62	PHE
2	D	74	THR
2	D	75	ILE
2	D	81[A]	GLU
2	D	81[B]	GLU
2	D	85	ASP
3	E	13	LYS
3	E	19	SER
3	E	31	SER
3	E	69	SER
3	E	78	GLN
3	E	85	SER

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Mol	Chain	Res	Type
3	E	102	ASP
3	E	105	ASP
3	E	110	ASP
2	F	8	HIS
2	F	19	VAL
2	F	20	SER
2	F	23	CYS
2	F	33	VAL
2	F	56	THR
2	F	72	THR
2	F	77	ASP
2	F	83	LEU
2	F	86	TYR
2	F	92	SER
2	F	93	SER
2	F	98	PHE
2	F	103	ARG
2	F	104	LEU
3	G	18	LEU
3	G	34	SER
3	G	64	LEU
3	G	65	LYS
3	G	91	THR
3	G	95	TYR
2	H	5	THR
2	H	9	LYS
2	H	28	ASP
2	H	55	HIS
2	H	56	THR
2	H	61[A]	ARG
2	H	61[B]	ARG
2	H	76	SER
3	I	31	SER
3	I	38	ASN
3	I	39	ARG
3	I	45	LYS
3	I	55	SER
3	I	76	LYS
3	I	78	GLN
3	I	81	LEU
3	I	97	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27)

such sidechains are listed below:

Mol	Chain	Res	Type
1	A	13	ASN
1	A	31	ASN
1	A	128	GLN
1	A	133	HIS
1	A	168	HIS
1	B	34	ASN
1	B	133	HIS
1	B	147	GLN
1	C	42	GLN
1	C	49	HIS
1	C	60	HIS
1	C	80	HIS
1	C	112	GLN
1	C	128	GLN
1	C	222	GLN
1	C	371	ASN
1	C	389	HIS
1	C	407	HIS
2	D	90	GLN
3	E	16	GLN
2	F	38	GLN
2	F	79	GLN
3	G	38	ASN
3	G	53	HIS
2	H	89	GLN
3	I	16	GLN
3	I	82	GLN

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 (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.

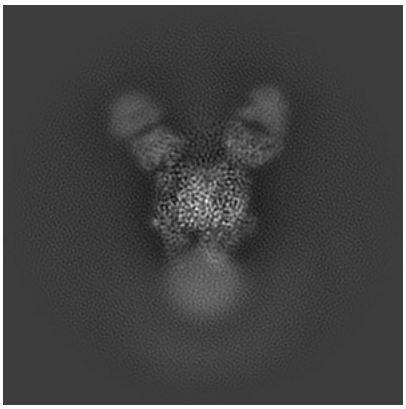
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-52169. These allow visual inspection of the internal detail of the map and identification of artifacts.

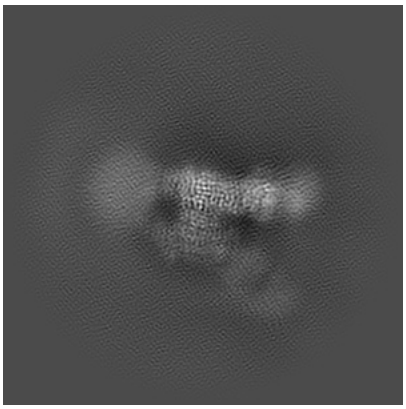
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

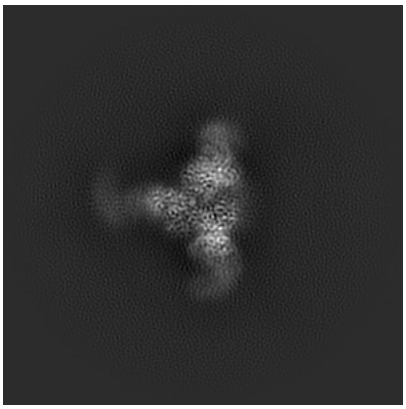
6.1.1 Primary map



X

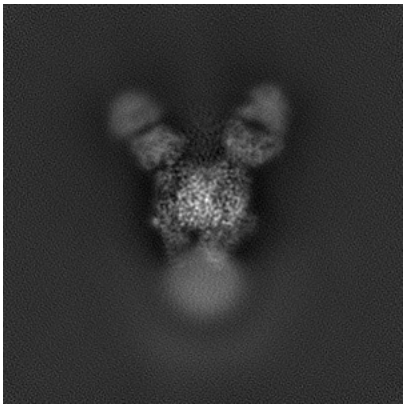


Y

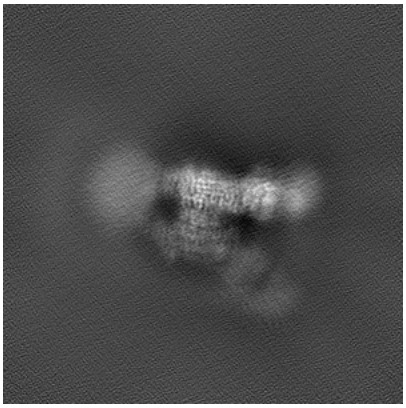


Z

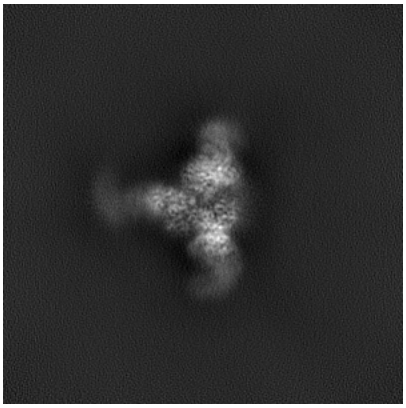
6.1.2 Raw map



X



Y

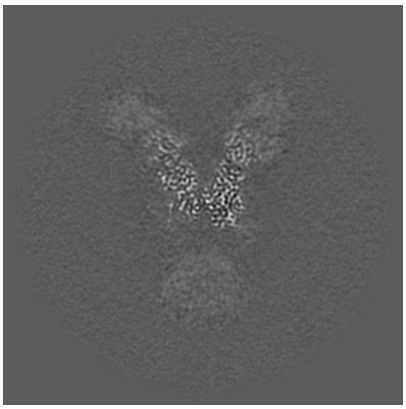


Z

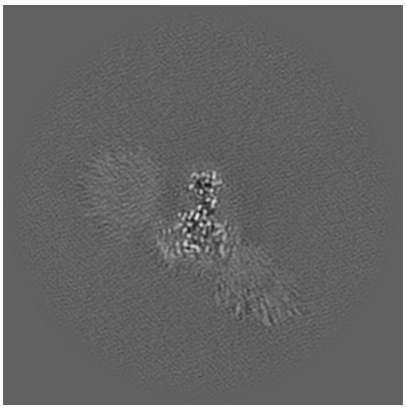
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

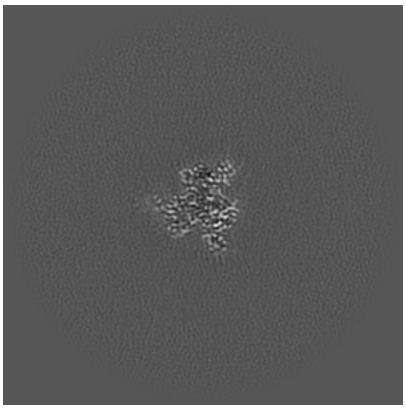
6.2.1 Primary map



X Index: 150

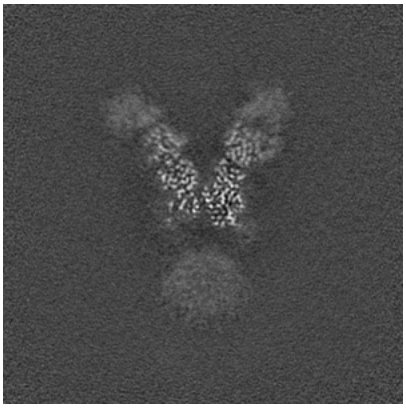


Y Index: 150

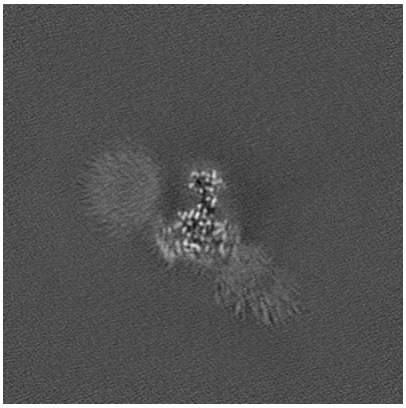


Z Index: 150

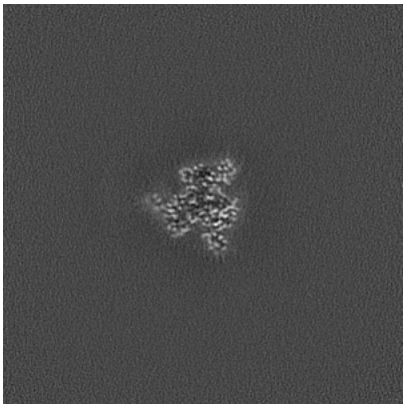
6.2.2 Raw map



X Index: 150



Y Index: 150

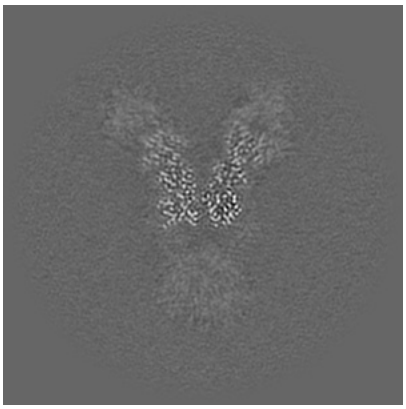


Z Index: 150

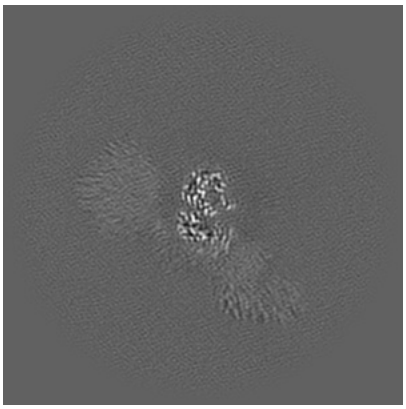
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

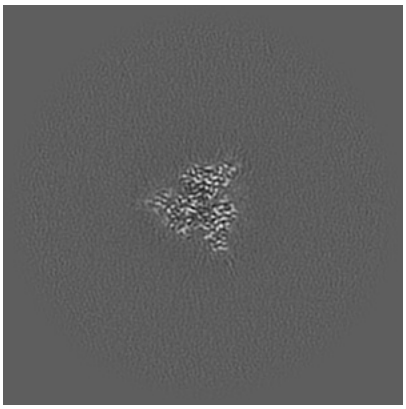
6.3.1 Primary map



X Index: 154

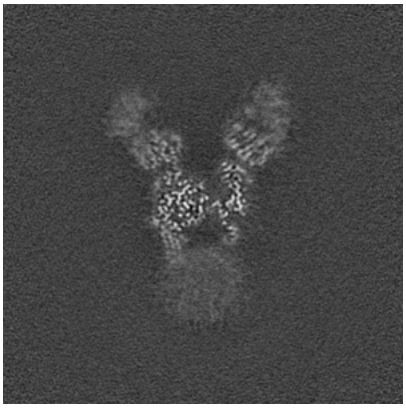


Y Index: 144

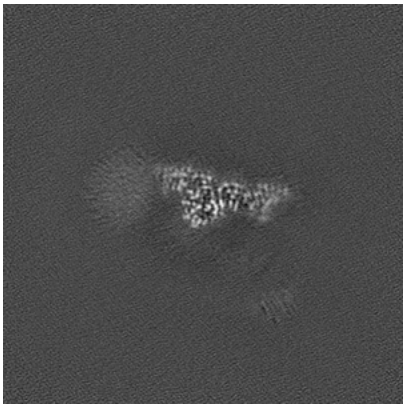


Z Index: 146

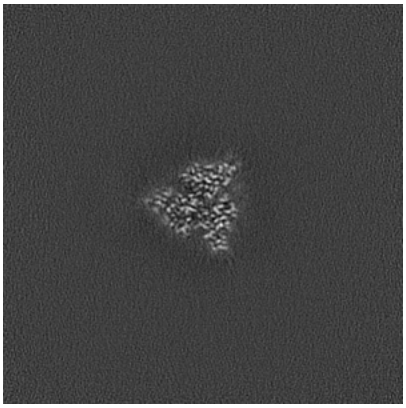
6.3.2 Raw map



X Index: 162



Y Index: 171

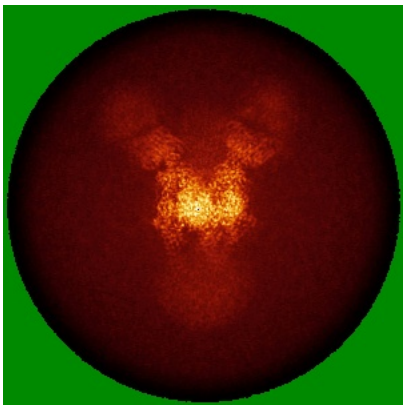


Z Index: 146

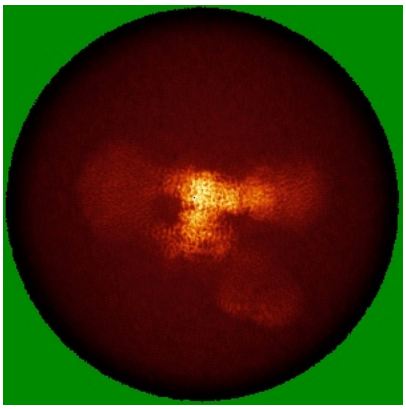
The images above show the largest variance slices of the map in three orthogonal directions.

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

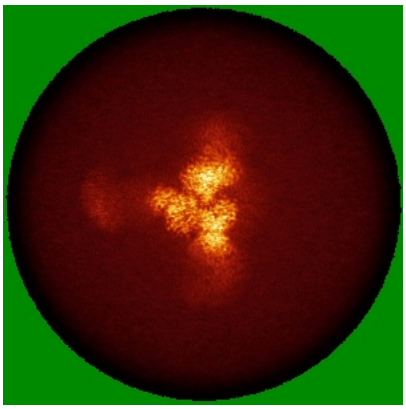
6.4.1 Primary map



X

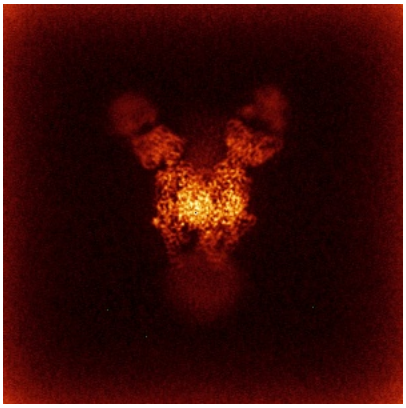


Y

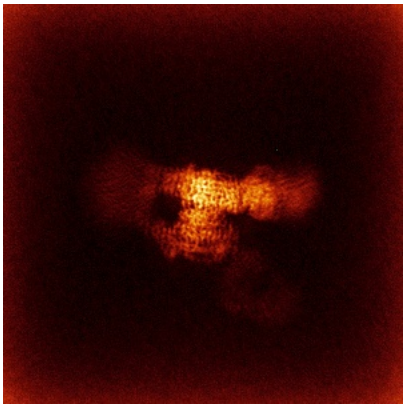


Z

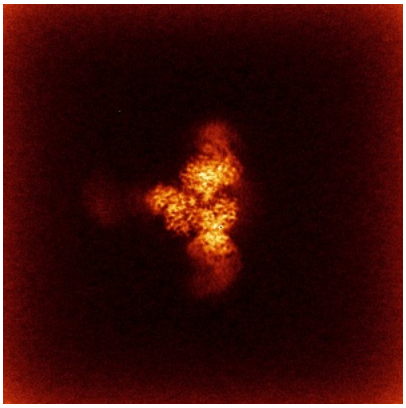
6.4.2 Raw map



X



Y



Z

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

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X

Y

Z

The images above show the 3D surface view of the map at the recommended contour level 0.24. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

X

Y

Z

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

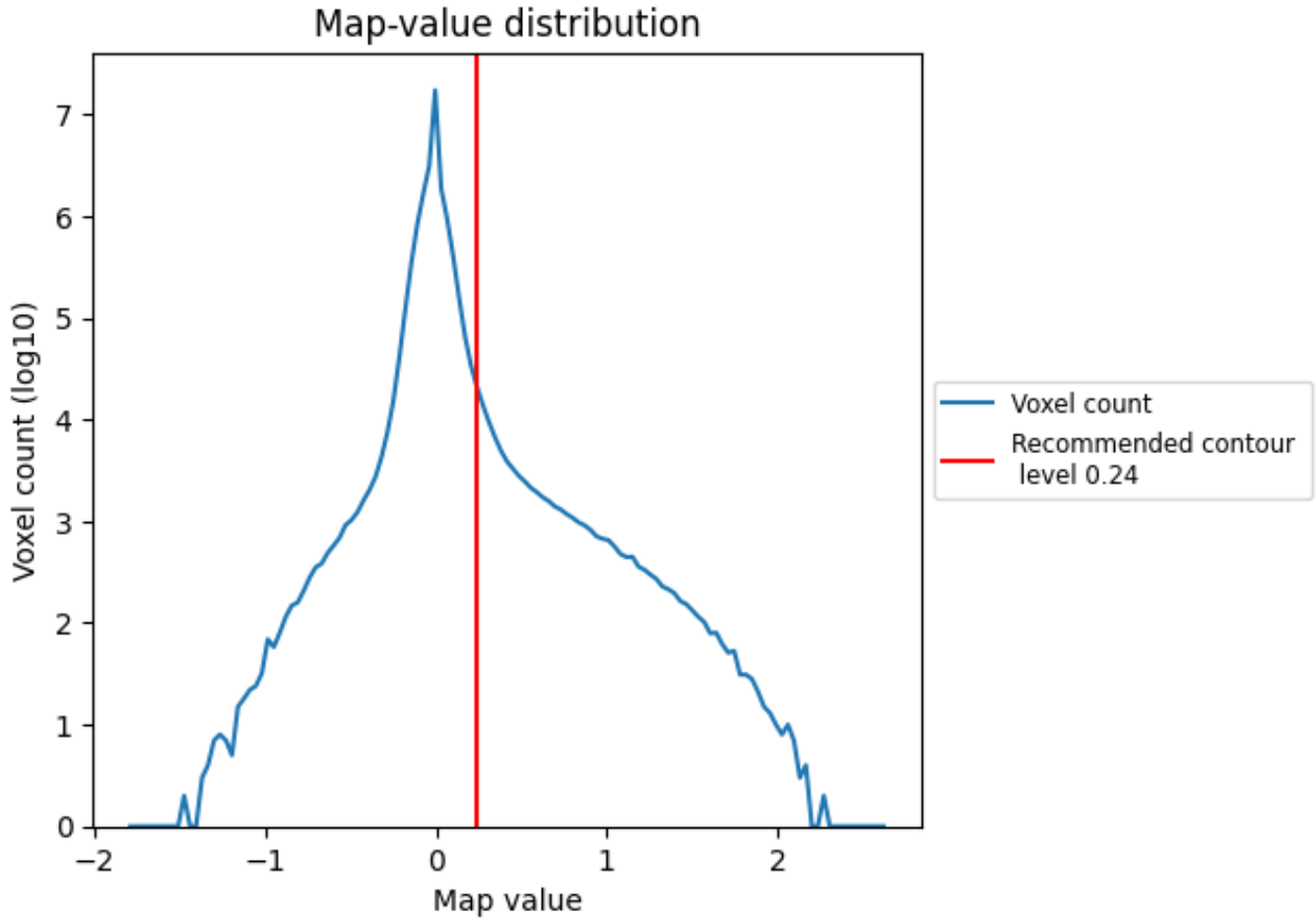
6.6 Mask visualisation (i)

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

7 Map analysis

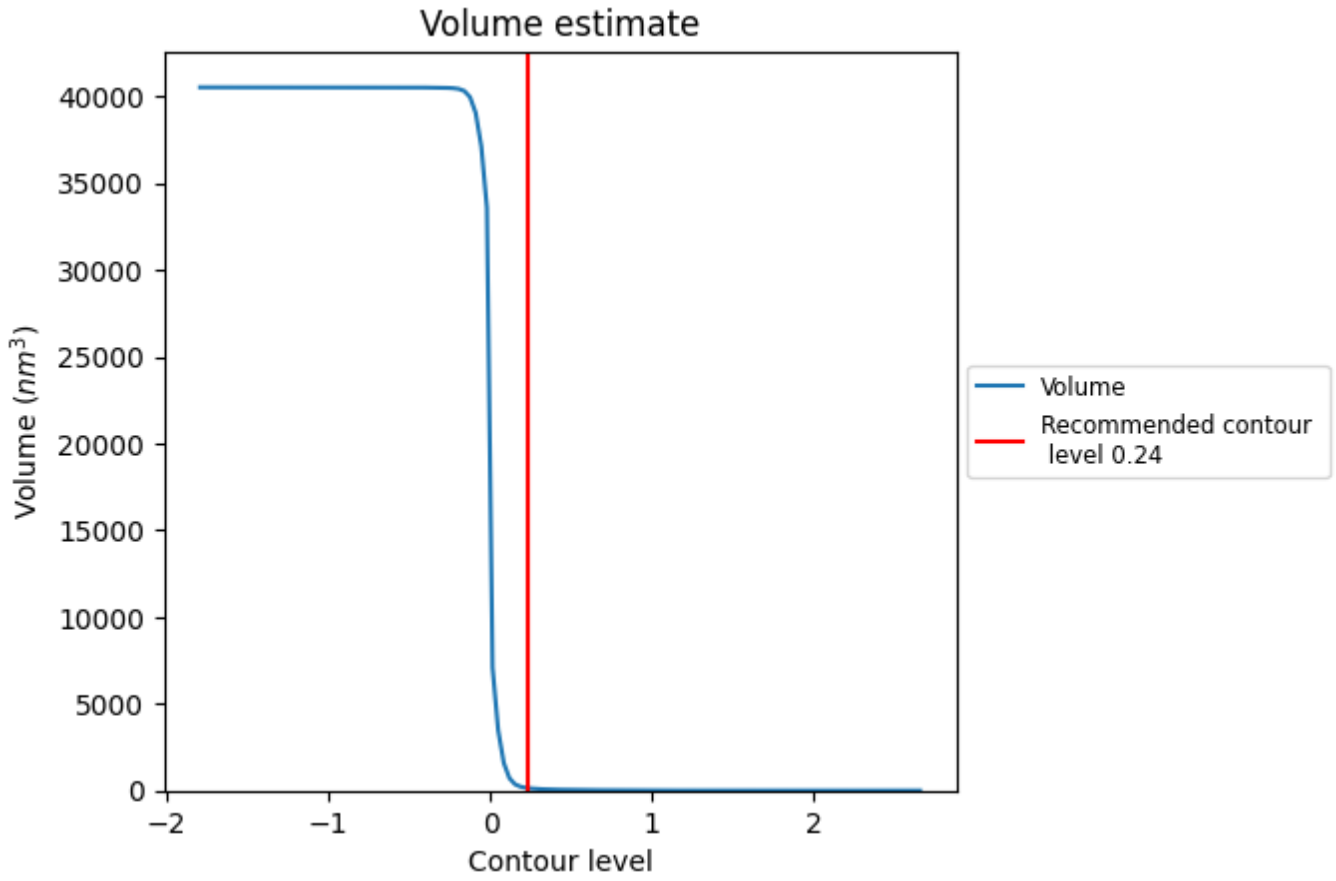
This section contains the results of statistical analysis of the map.

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.

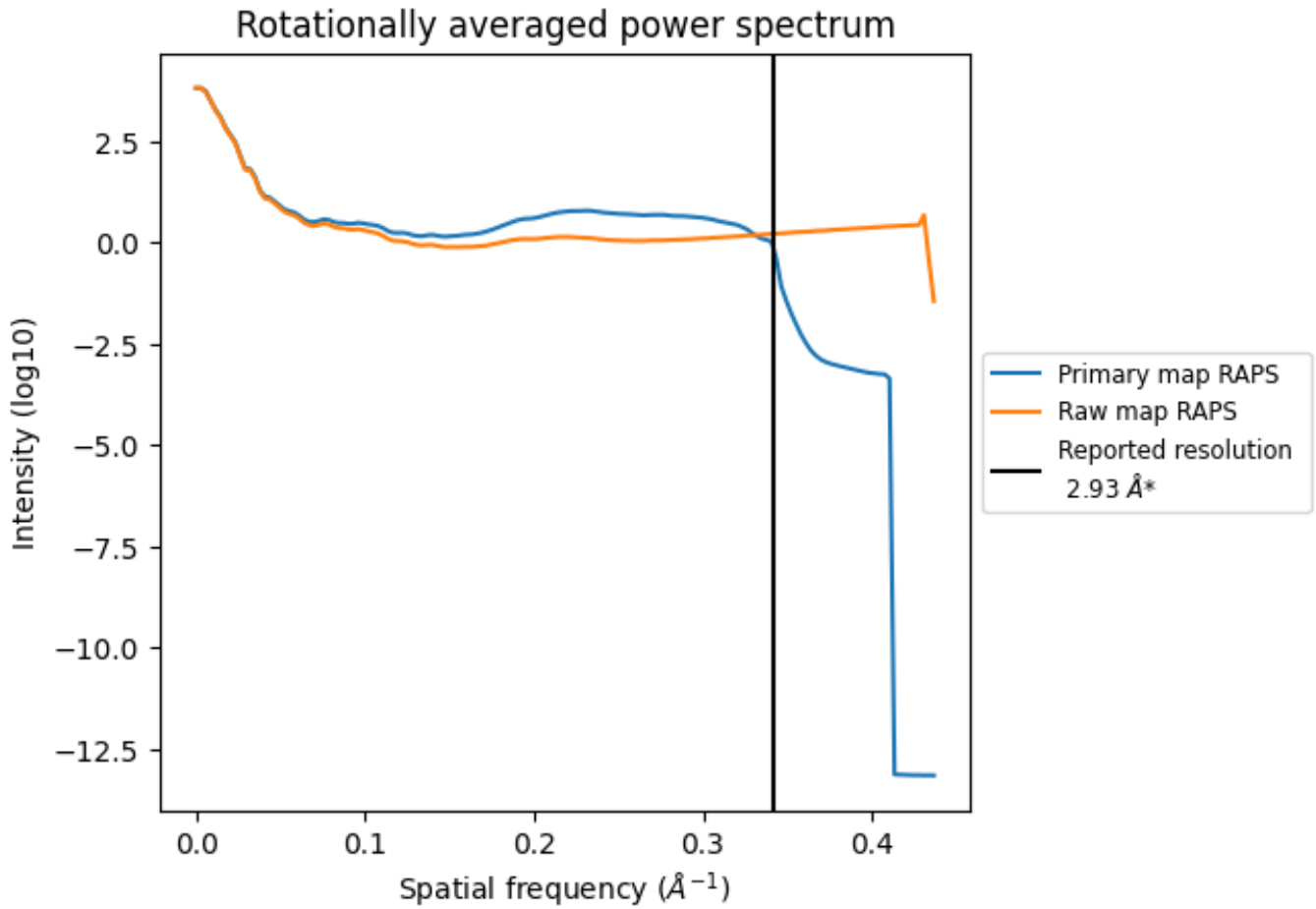
7.2 Volume estimate



The volume at the recommended contour level is 138 nm^3; this corresponds to an approximate mass of 124 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)

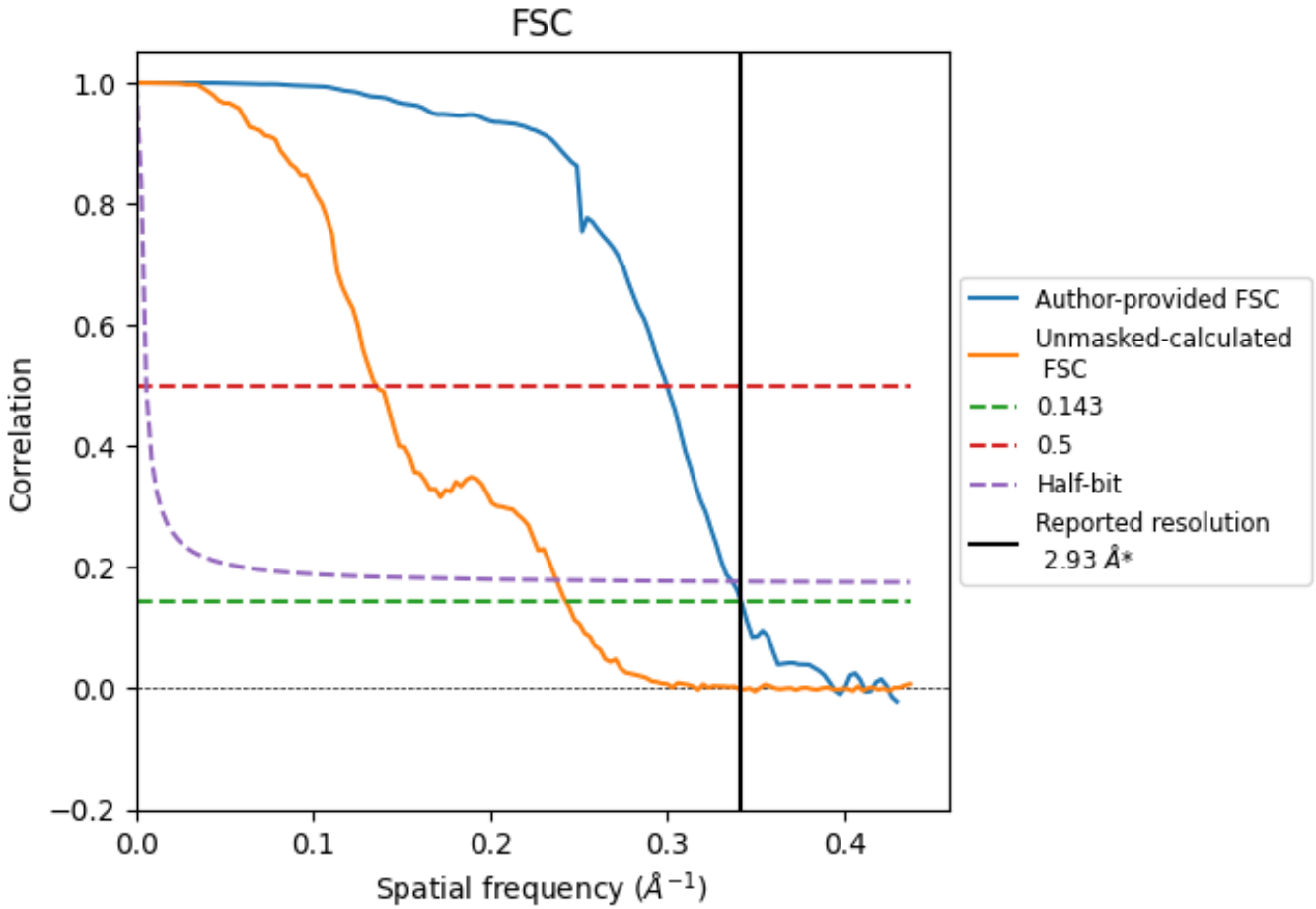


*Reported resolution corresponds to spatial frequency of 0.341 $Å^{-1}$

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 0.341 Å^{-1}

8.2 Resolution estimates (i)

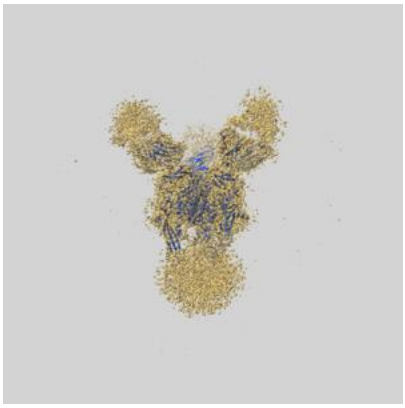
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.93	-	-
Author-provided FSC curve	2.93	3.34	2.97
Unmasked-calculated*	4.12	7.37	4.21

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.12 differs from the reported value 2.93 by more than 10 %

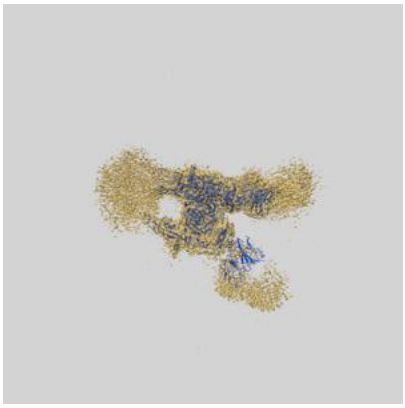
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-52169 and PDB model 9HH9. Per-residue inclusion information can be found in section 3 on page 5.

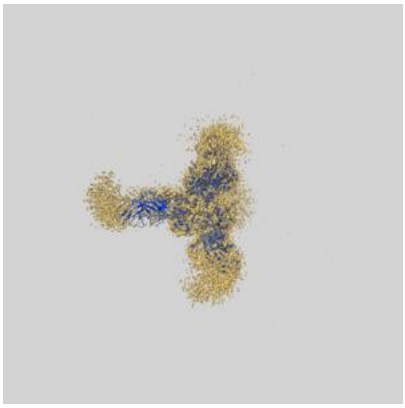
9.1 Map-model overlay



X



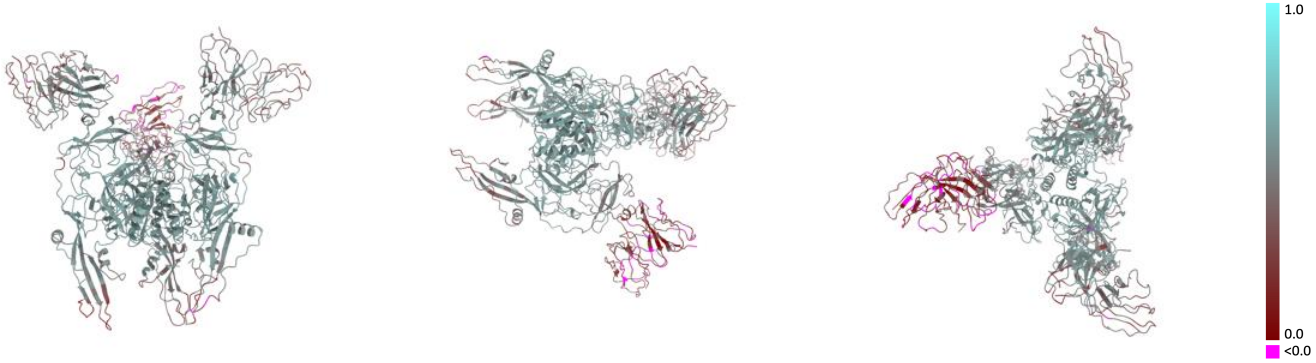
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.24 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.

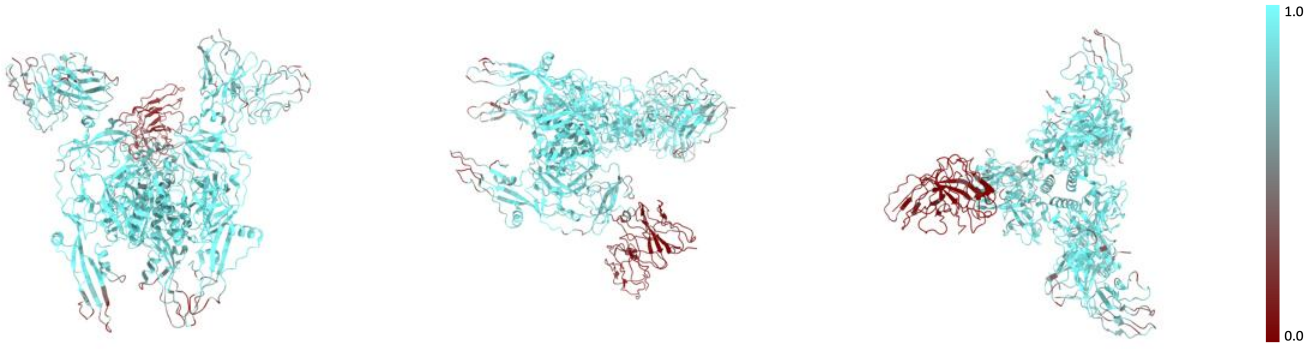
9.2 Q-score mapped to coordinate model (i)



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.

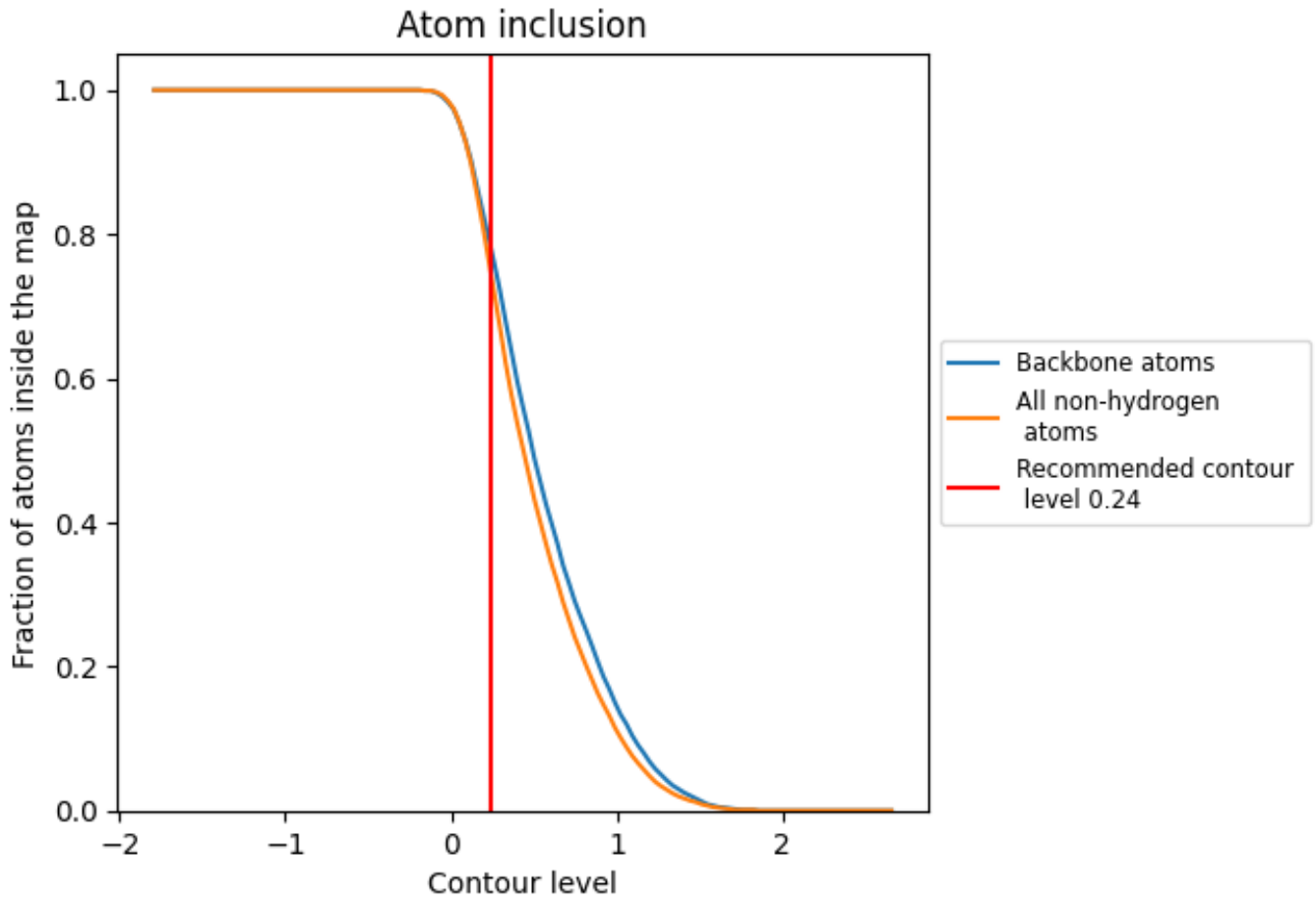
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.24).

9.4 Atom inclusion (i)



At the recommended contour level, 78% of all backbone atoms, 75% 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 (0.24) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7460	0.4750
A	0.8910	0.5540
B	0.8900	0.5500
C	0.8180	0.5130
D	0.7250	0.4230
E	0.7920	0.4700
F	0.6730	0.4120
G	0.7740	0.4610
H	0.0950	0.1780
I	0.0560	0.1750