Full wwPDB EM Validation Report ⓘ

Feb 22, 2025 – 04:21 PM EST

PDB ID	:	9BD8
EMDB ID	:	EMD-44446
Title	:	ApoB 100 beta barrel bound to LDLR beta propeller
Authors	:	Dearborn, A.D.; Reimund, M.; Graziano, G.; Lei, H.; Kumar, A.; Neufeld, E.B.; Remaley, A.T.; Marcotrigiano, J.
Deposited on	:	2024-04-11
Resolution	:	4.80 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:

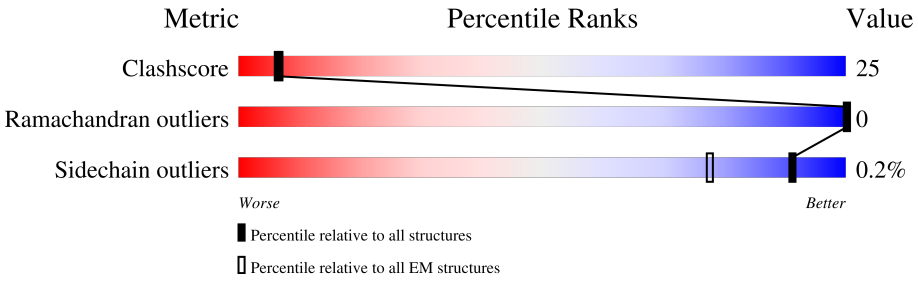
EMDB validation analysis	:	0.0.1.dev117
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.4

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 4.80 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	4563	6% · 90%
2	B	860	15% 16% 69%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 5369 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.

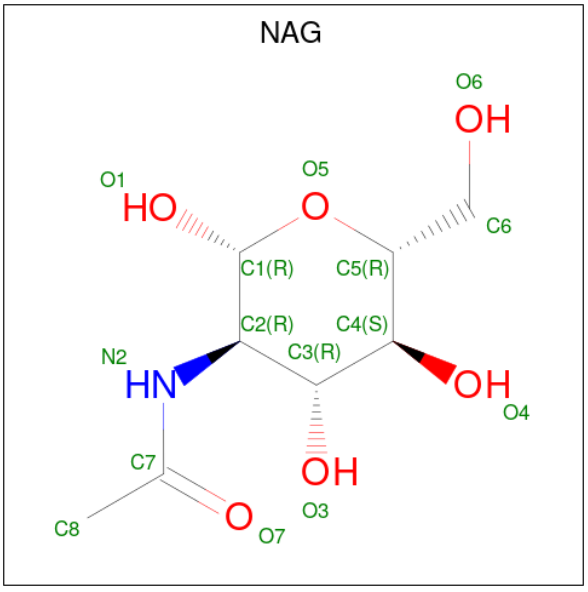
- Molecule 1 is a protein called Apolipoprotein B-100.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	462	3423	2163	565	680	15	0	0

- Molecule 2 is a protein called Low-density lipoprotein receptor.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	264	1932	1235	314	378	5	0	0

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



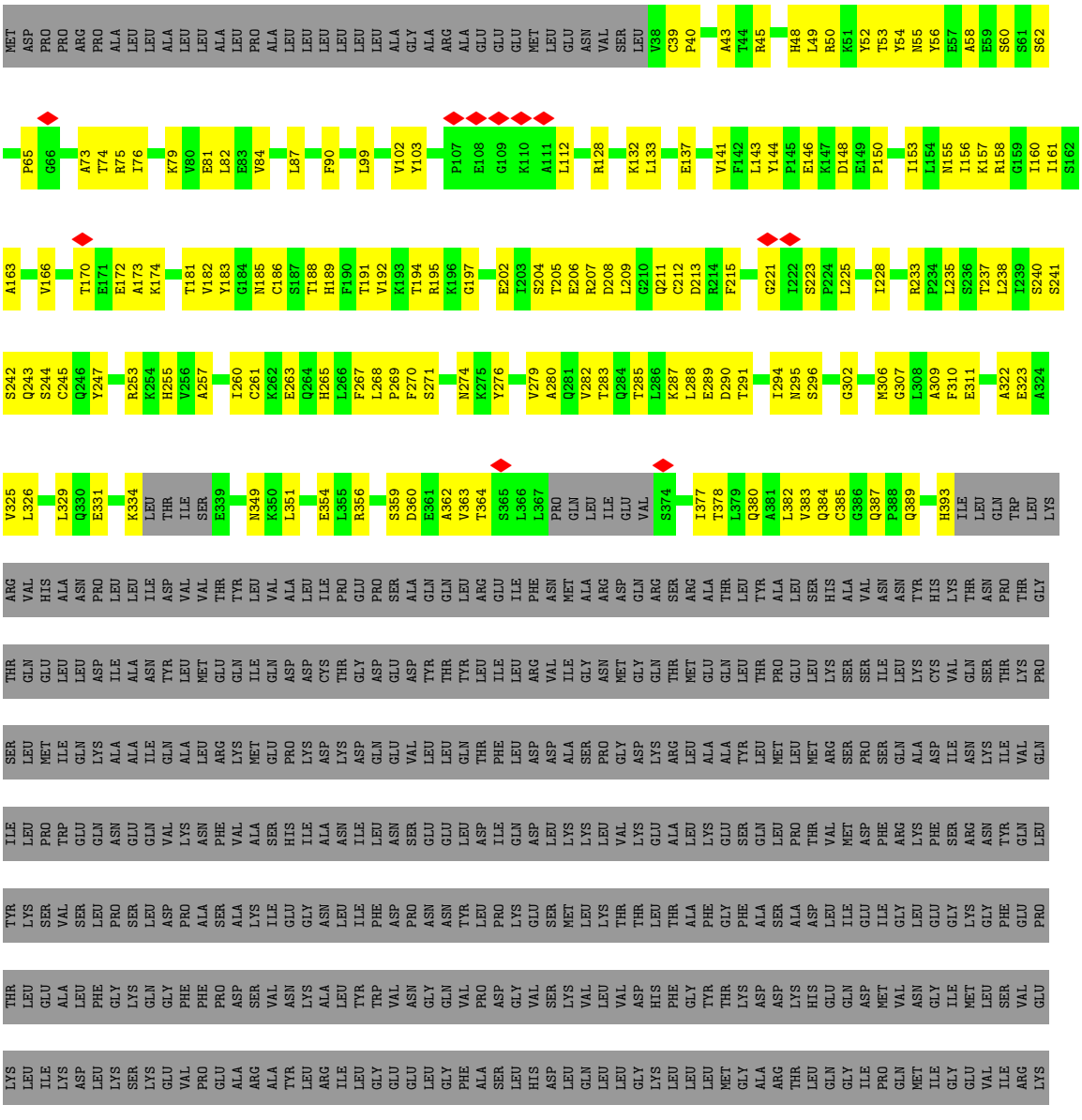
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
3	A	1	14	8	1	5	0

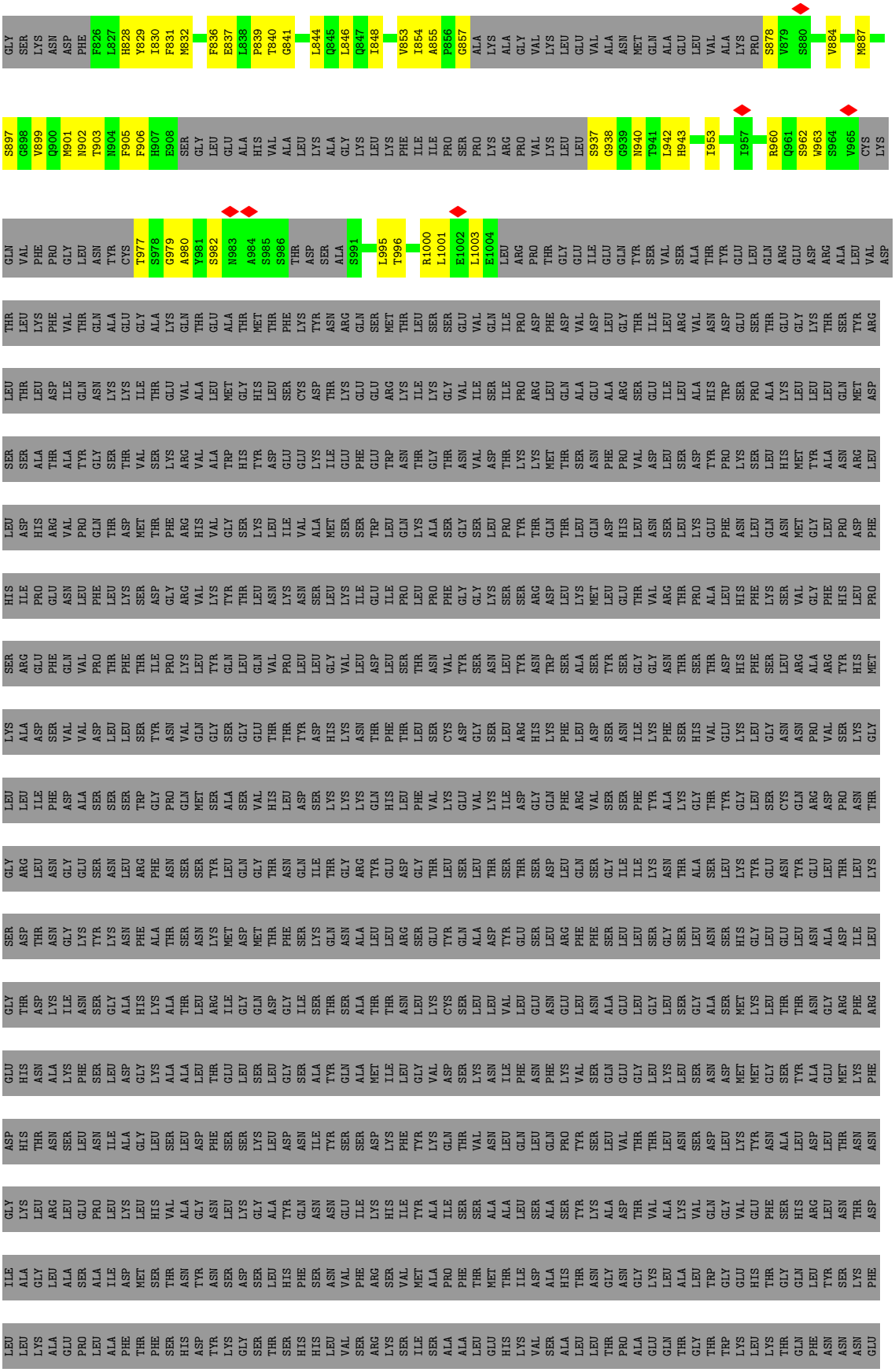
3 Residue-property plots (i)

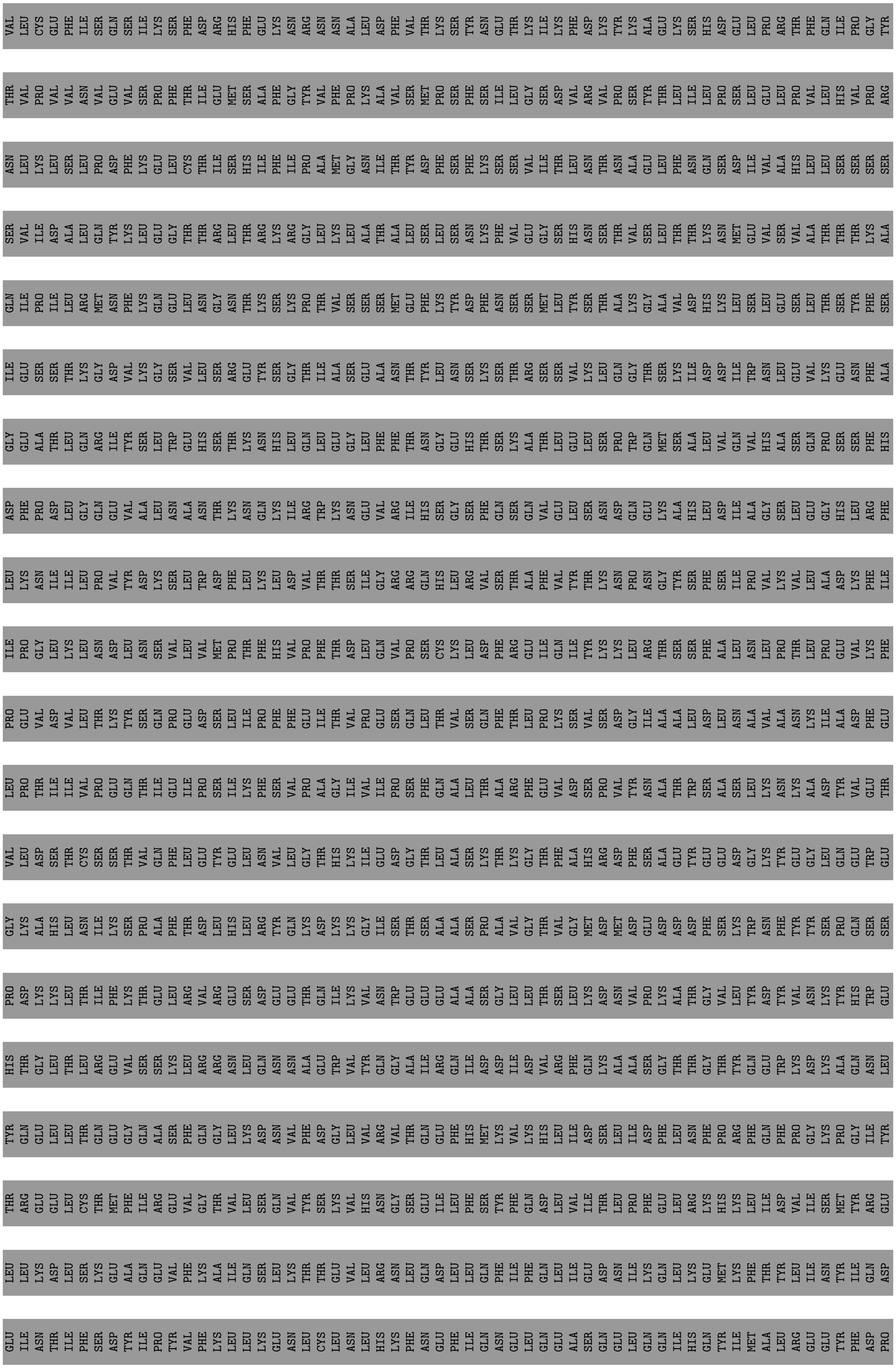
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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.

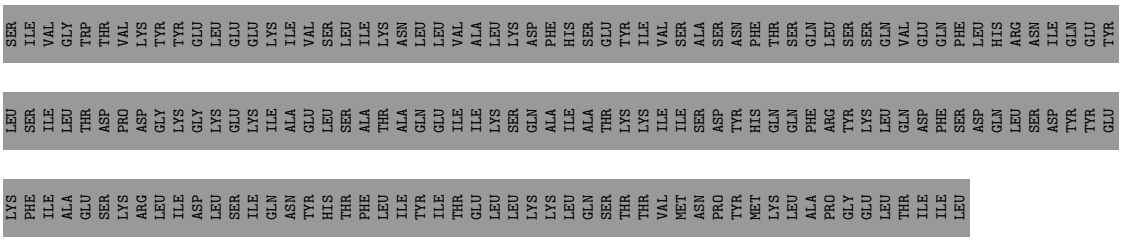
- Molecule 1: Apolipoprotein B-100

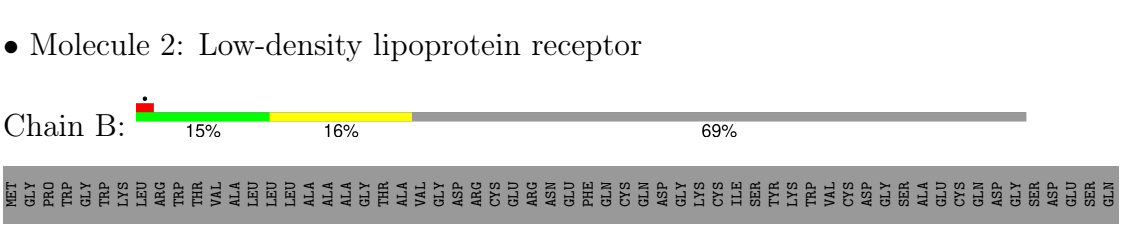
Chain A: 6% 90%

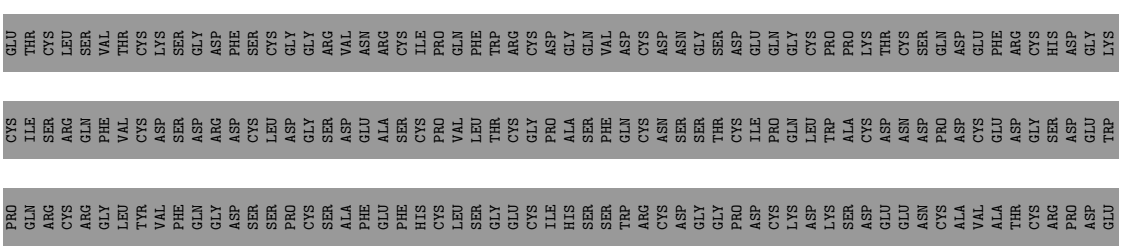





VAL LEU CYS GLU PHE ILE SER GLN SER ILE LYS SER PHE ASP ARG HIS PHE GLU LYS ASN ARG ASN ASN ALA LEU ASP PHE VAL THR LYS SER TYR ASN GLU THR LYS ILE LYS PHE ASP LYS TYR LYS ALA GLU LYS SER HIS ASP GLU LEU PRO ARG THR PHE GLN ILE PRO GLY TYR
THR VAL PRO VAL VAL ASN VAL GLU VAL SER PRO PHE THR ILE GLU MET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







• Molecule 2: Low-density lipoprotein receptor

Chain B:

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	522863	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 ($e^-/Å^2$)	51.38	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOCONTINUUM (6k x 4k)	Depositor
Maximum map value	0.366	Depositor
Minimum map value	-0.134	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	557.76, 557.76, 557.76	wwPDB
Map dimensions	336, 336, 336	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.6600001, 1.6600001, 1.6600001	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.26	0/3483	0.49	0/4744
2	B	0.25	0/1978	0.52	0/2723
All	All	0.26	0/5461	0.50	0/7467

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	3423	0	3243	153	0
2	B	1932	0	1728	107	0
3	A	14	0	13	0	0
All	All	5369	0	4984	257	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 25.

All (257) 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)
2:B:468:VAL:HG12	2:B:469:ILE:HG12	1.60	0.81
2:B:540:ALA:HB1	2:B:562:TRP:H	1.47	0.80
1:A:294:ILE:HG22	1:A:296:SER:H	1.53	0.74
2:B:480:ALA:HB3	2:B:489:TYR:HB2	1.70	0.74
1:A:238:LEU:HB2	1:A:269:PRO:HD3	1.69	0.73
2:B:470:SER:O	2:B:508:ARG:NH1	2.21	0.73
2:B:570:LEU:HD13	2:B:658:LEU:HD23	1.71	0.72
2:B:404:THR:HG21	2:B:432:LEU:HD21	1.70	0.72
2:B:536:TRP:HA	2:B:540:ALA:HA	1.74	0.69
1:A:158:ARG:NH1	1:A:307:GLY:O	2.26	0.69
2:B:477:ASP:HB2	2:B:491:THR:HG23	1.74	0.69
1:A:977:THR:HG22	1:A:1003:LEU:HA	1.75	0.69
1:A:82:LEU:HD11	1:A:90:PHE:HB3	1.76	0.67
1:A:45:ARG:HB3	1:A:255:HIS:HA	1.77	0.67
1:A:158:ARG:HG3	1:A:182:VAL:HG12	1.78	0.66
1:A:942:LEU:HB3	1:A:953:ILE:HD12	1.76	0.66
1:A:980:ALA:HB3	1:A:1000:ARG:HB2	1.78	0.66
1:A:60:SER:HA	1:A:282:VAL:HG12	1.78	0.65
1:A:906:PHE:O	1:A:937:SER:N	2.30	0.65
1:A:163:ALA:O	1:A:247:TYR:OH	2.15	0.64
1:A:828:HIS:HD2	1:A:855:ALA:HB1	1.61	0.64
1:A:287:LYS:NZ	1:A:288:LEU:O	2.31	0.64
2:B:574:ARG:HH11	2:B:588:ILE:HA	1.63	0.64
1:A:221:GLY:O	1:A:356:ARG:NH1	2.31	0.63
2:B:484:ILE:O	2:B:665:ASN:ND2	2.31	0.63
1:A:54:TYR:HA	1:A:288:LEU:HA	1.81	0.63
2:B:452:CYS:HA	2:B:468:VAL:HB	1.79	0.63
2:B:630:SER:HB3	2:B:640:ASN:HB2	1.81	0.63
1:A:243:GLN:HE22	1:A:245:CYS:HB2	1.64	0.62
1:A:884:VAL:HG22	1:A:902:ASN:HD22	1.63	0.62
1:A:325:VAL:HG22	1:A:354:GLU:HB3	1.81	0.62
1:A:265:HIS:HB2	1:A:280:ALA:HB3	1.81	0.62
2:B:499:SER:HA	2:B:510:THR:HA	1.82	0.62
1:A:288:LEU:HD21	1:A:291:THR:HG23	1.81	0.62
1:A:189:HIS:ND1	1:A:206:GLU:O	2.33	0.62
2:B:622:ASP:HB3	2:B:625:ASN:HB2	1.82	0.62
1:A:60:SER:OG	1:A:74:THR:OG1	2.18	0.61
2:B:488:ILE:N	2:B:501:ALA:O	2.23	0.61
1:A:156:ILE:O	1:A:160:ILE:HG12	2.00	0.61
1:A:331:GLU:OE1	1:A:331:GLU:N	2.31	0.61
1:A:207:ARG:NE	1:A:243:GLN:OE1	2.30	0.61
1:A:857:GLY:N	1:A:878:SER:O	2.34	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:960:ARG:HA	1:A:982:SER:HA	1.81	0.60
1:A:50:ARG:NH1	1:A:291:THR:O	2.34	0.60
1:A:902:ASN:OD1	1:A:943:HIS:ND1	2.34	0.60
2:B:521:ALA:H	2:B:534:THR:HB	1.66	0.60
1:A:831:PHE:HD2	1:A:854:ILE:HG12	1.67	0.60
2:B:563:PRO:HA	2:B:579:ASP:HA	1.84	0.60
1:A:158:ARG:NH1	1:A:309:ALA:O	2.35	0.59
1:A:192:VAL:HG11	1:A:195:ARG:HB2	1.85	0.59
2:B:518:LYS:NZ	2:B:519:PRO:O	2.32	0.58
1:A:144:TYR:HB3	1:A:302:GLY:HA3	1.85	0.58
1:A:55:ASN:N	1:A:287:LYS:O	2.35	0.58
1:A:143:LEU:HB2	1:A:306:MET:HB2	1.84	0.58
1:A:380:GLN:OE1	1:A:380:GLN:N	2.37	0.57
1:A:155:ASN:HD21	1:A:311:GLU:HG2	1.69	0.57
1:A:208:ASP:O	1:A:211:GLN:NE2	2.37	0.57
1:A:209:LEU:HB2	1:A:241:SER:HB2	1.86	0.57
1:A:133:LEU:HD12	1:A:141:VAL:HG21	1.87	0.57
1:A:840:THR:HB	1:A:844:LEU:H	1.69	0.57
2:B:564:ASN:HB3	2:B:609:PHE:HA	1.86	0.57
1:A:48:HIS:CE1	2:B:648:SER:HA	2.40	0.56
2:B:519:PRO:HA	2:B:535:ASP:HA	1.88	0.56
2:B:620:TRP:NE1	2:B:629:PHE:HB3	2.20	0.56
2:B:623:ILE:HG13	2:B:624:ILE:HG23	1.87	0.56
2:B:401:LEU:HD12	2:B:652:MET:HG3	1.87	0.56
2:B:617:LYS:N	2:B:633:ARG:HB2	2.21	0.56
1:A:206:GLU:OE2	1:A:242:SER:OG	2.24	0.55
2:B:404:THR:HG22	2:B:409:VAL:HG22	1.87	0.55
1:A:195:ARG:HG3	1:A:197:GLY:H	1.70	0.55
2:B:402:PHE:HD2	2:B:653:VAL:HG23	1.72	0.55
1:A:183:TYR:HD2	1:A:207:ARG:HH12	1.53	0.55
2:B:579:ASP:HB2	2:B:582:LEU:HB2	1.90	0.54
2:B:586:SER:HB3	2:B:597:THR:HG22	1.89	0.54
1:A:937:SER:OG	1:A:1001:LEU:O	2.14	0.54
1:A:209:LEU:HD12	1:A:241:SER:HB3	1.90	0.54
2:B:654:LEU:HG	2:B:655:PHE:H	1.73	0.54
1:A:356:ARG:NH1	1:A:385:CYS:O	2.41	0.53
2:B:432:LEU:HA	2:B:479:LEU:HD22	1.89	0.53
2:B:444:SER:HB3	2:B:479:LEU:HD11	1.89	0.53
1:A:181:THR:HG23	1:A:183:TYR:H	1.74	0.53
1:A:65:PRO:HD3	1:A:279:VAL:HB	1.90	0.53
1:A:963:TRP:N	1:A:979:GLY:O	2.42	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:398:ILE:O	2:B:656:HIS:ND1	2.41	0.53
2:B:578:VAL:HG22	2:B:611:LEU:HD22	1.91	0.53
1:A:213:ASP:N	1:A:213:ASP:OD1	2.41	0.53
1:A:263:GLU:HB3	1:A:282:VAL:HG22	1.91	0.52
1:A:377:ILE:O	1:A:380:GLN:NE2	2.33	0.52
1:A:830:ILE:HD13	1:A:853:VAL:HG13	1.91	0.52
1:A:241:SER:HB3	1:A:265:HIS:CD2	2.44	0.52
1:A:209:LEU:HD11	1:A:263:GLU:HG3	1.92	0.52
1:A:905:PHE:CD2	1:A:938:GLY:HA2	2.44	0.52
1:A:212:CYS:HB2	1:A:215:PHE:CD2	2.45	0.52
1:A:828:HIS:CD2	1:A:855:ALA:HB1	2.45	0.51
1:A:128:ARG:HH22	1:A:150:PRO:HG3	1.75	0.51
1:A:188:THR:HG22	1:A:207:ARG:HG2	1.93	0.51
1:A:40:PRO:HB2	1:A:43:ALA:HB2	1.93	0.51
2:B:628:ILE:O	2:B:641:LEU:HA	2.11	0.51
1:A:155:ASN:O	1:A:158:ARG:HG2	2.10	0.51
1:A:979:GLY:HA2	1:A:1001:LEU:HA	1.92	0.51
2:B:400:TYR:HE1	2:B:413:THR:HG22	1.75	0.51
2:B:398:ILE:HG22	2:B:655:PHE:HE2	1.76	0.51
2:B:543:LYS:HA	2:B:554:SER:HA	1.93	0.51
1:A:76:ILE:HD13	1:A:99:LEU:HB3	1.92	0.51
2:B:400:TYR:H	2:B:655:PHE:HB3	1.76	0.50
1:A:103:TYR:CZ	1:A:112:LEU:HB3	2.45	0.50
1:A:183:TYR:OH	1:A:841:GLY:N	2.43	0.50
1:A:263:GLU:HB3	1:A:282:VAL:CG2	2.41	0.50
1:A:53:THR:O	1:A:289:GLU:N	2.34	0.50
2:B:435:GLU:HG3	2:B:438:SER:HB2	1.92	0.50
2:B:655:PHE:CG	2:B:656:HIS:N	2.80	0.50
2:B:401:LEU:HB3	2:B:652:MET:SD	2.51	0.50
2:B:436:VAL:HG22	2:B:657:ASN:HA	1.94	0.50
2:B:618:VAL:HG13	2:B:620:TRP:HZ3	1.76	0.50
1:A:186:CYS:SG	1:A:207:ARG:NH1	2.84	0.50
1:A:276:TYR:CZ	1:A:996:THR:HG22	2.47	0.50
2:B:450:MET:HB2	2:B:469:ILE:O	2.12	0.50
2:B:538:THR:OG1	2:B:539:PRO:HD3	2.12	0.50
1:A:271:SER:HB2	1:A:276:TYR:HB3	1.93	0.50
1:A:50:ARG:HD2	1:A:291:THR:HB	1.93	0.49
1:A:49:LEU:N	1:A:84:VAL:O	2.37	0.49
1:A:389:GLN:O	1:A:393:HIS:ND1	2.41	0.49
1:A:172:GLU:OE1	1:A:174:LYS:N	2.46	0.49
2:B:405:ASN:ND2	2:B:408:GLU:HB3	2.28	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:290:ASP:OD1	1:A:291:THR:N	2.45	0.49
2:B:483:TRP:HB3	2:B:660:GLN:NE2	2.27	0.49
1:A:243:GLN:NE2	1:A:261:CYS:HB3	2.27	0.49
2:B:577:TRP:NE1	2:B:586:SER:OG	2.40	0.49
2:B:408:GLU:OE1	2:B:409:VAL:N	2.45	0.49
1:A:323:GLU:O	1:A:326:LEU:HG	2.12	0.49
2:B:492:ASP:OD1	2:B:493:SER:N	2.46	0.49
1:A:905:PHE:HD2	1:A:938:GLY:HA2	1.77	0.48
1:A:240:SER:HB3	1:A:268:LEU:HD21	1.95	0.48
2:B:482:ASP:OD1	2:B:485:HIS:N	2.46	0.48
1:A:223:SER:HB2	1:A:384:GLN:O	2.13	0.48
2:B:487:ASN:HA	2:B:502:ASP:HA	1.95	0.48
1:A:322:ALA:O	1:A:325:VAL:HB	2.13	0.48
2:B:626:GLU:HG2	2:B:646:LEU:N	2.29	0.48
1:A:363:VAL:HG11	1:A:389:GLN:HB2	1.96	0.48
1:A:906:PHE:N	1:A:937:SER:HB3	2.28	0.48
2:B:402:PHE:HD1	2:B:411:LYS:HA	1.79	0.48
1:A:378:THR:HG22	1:A:382:LEU:HD23	1.95	0.48
1:A:310:PHE:CD2	1:A:839:PRO:HB3	2.48	0.47
1:A:295:ASN:ND2	2:B:563:PRO:O	2.47	0.47
2:B:534:THR:HA	2:B:542:ILE:HD12	1.95	0.47
1:A:837:GLU:OE2	1:A:846:LEU:N	2.40	0.47
2:B:403:PHE:CZ	2:B:646:LEU:HB3	2.49	0.47
2:B:643:ALA:HB3	2:B:646:LEU:HD11	1.95	0.47
2:B:405:ASN:HD21	2:B:408:GLU:HB3	1.80	0.47
2:B:522:ILE:HD12	2:B:532:TYR:O	2.14	0.47
1:A:75:ARG:O	1:A:99:LEU:HA	2.15	0.47
2:B:523:VAL:O	2:B:531:MET:HB2	2.15	0.47
1:A:132:LYS:NZ	1:A:133:LEU:O	2.48	0.47
1:A:267:PHE:CZ	1:A:269:PRO:HG2	2.50	0.47
2:B:472:ASP:HB3	2:B:473:ILE:H	1.58	0.47
1:A:225:LEU:HD11	1:A:383:VAL:HG22	1.97	0.46
1:A:39:CYS:HA	1:A:137:GLU:HA	1.97	0.46
1:A:225:LEU:O	1:A:829:TYR:OH	2.24	0.46
2:B:483:TRP:CG	2:B:660:GLN:HB3	2.50	0.46
1:A:205:THR:HG23	1:A:245:CYS:HB3	1.97	0.46
1:A:52:TYR:HB3	1:A:54:TYR:CE1	2.50	0.46
2:B:588:ILE:HG23	2:B:593:GLY:H	1.80	0.46
1:A:191:THR:N	1:A:204:SER:O	2.48	0.46
1:A:884:VAL:HA	1:A:901:MET:O	2.16	0.46
1:A:906:PHE:H	1:A:937:SER:HB3	1.81	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:53:THR:HG23	1:A:81:GLU:HG3	1.97	0.46
1:A:228:ILE:HB	1:A:832:MET:HA	1.98	0.46
2:B:492:ASP:HB3	2:B:494:VAL:HG12	1.98	0.46
1:A:173:ALA:O	1:A:192:VAL:N	2.37	0.45
1:A:937:SER:HA	1:A:1001:LEU:HG	1.98	0.45
1:A:39:CYS:SG	1:A:87:LEU:HB3	2.56	0.45
1:A:235:LEU:HA	1:A:238:LEU:HG	1.98	0.45
1:A:255:HIS:CD2	1:A:257:ALA:H	2.34	0.45
2:B:473:ILE:HB	2:B:492:ASP:OD2	2.15	0.45
2:B:530:PHE:HA	2:B:545:GLY:O	2.16	0.45
2:B:442:TYR:CD1	2:B:453:SER:HB3	2.52	0.45
2:B:656:HIS:HB3	2:B:658:LEU:HD13	1.99	0.44
1:A:153:ILE:HG22	1:A:157:LYS:HD2	1.99	0.44
1:A:260:ILE:HG12	1:A:285:THR:HG23	1.98	0.44
2:B:445:ASP:OD1	2:B:446:LEU:N	2.51	0.44
1:A:887:MET:SD	1:A:899:VAL:HG12	2.58	0.44
1:A:962:SER:HA	1:A:980:ALA:HA	1.98	0.44
1:A:45:ARG:HH11	1:A:166:VAL:HG13	1.83	0.44
1:A:174:LYS:HA	1:A:191:THR:HA	1.99	0.44
2:B:496:GLY:N	2:B:517:SER:O	2.51	0.44
1:A:243:GLN:NE2	1:A:244:SER:O	2.51	0.44
2:B:453:SER:O	2:B:466:ASP:HA	2.18	0.44
2:B:656:HIS:O	2:B:658:LEU:HD12	2.17	0.43
1:A:56:TYR:CE2	1:A:58:ALA:HB2	2.53	0.43
2:B:607:HIS:HB3	2:B:609:PHE:HE1	1.82	0.43
2:B:441:ILE:O	2:B:453:SER:HA	2.18	0.43
1:A:45:ARG:NH1	1:A:166:VAL:HG13	2.33	0.43
2:B:495:LEU:HB2	2:B:515:ASN:HA	1.99	0.43
1:A:831:PHE:CE2	1:A:854:ILE:HG23	2.53	0.43
1:A:170:THR:O	1:A:195:ARG:NH2	2.37	0.43
1:A:329:LEU:HD13	1:A:351:LEU:HG	2.01	0.43
2:B:632:ASN:OD1	2:B:633:ARG:N	2.51	0.43
1:A:45:ARG:HD2	1:A:166:VAL:HG11	2.00	0.43
1:A:189:HIS:O	1:A:205:THR:HA	2.19	0.43
1:A:233:ARG:O	1:A:237:THR:HG23	2.19	0.43
1:A:270:PHE:HB2	1:A:995:LEU:HD22	2.00	0.42
2:B:559:ASN:O	2:B:582:LEU:HD11	2.18	0.42
1:A:228:ILE:HD13	1:A:832:MET:HB2	2.02	0.42
1:A:268:LEU:HD22	1:A:274:ASN:HB2	2.01	0.42
2:B:407:HIS:H	2:B:427:ARG:HA	1.84	0.42
2:B:545:GLY:HA2	2:B:551:ASP:O	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:58:ALA:HB3	1:A:76:ILE:CG2	2.49	0.42
1:A:194:THR:OG1	1:A:202:GLU:OE1	2.35	0.42
1:A:356:ARG:HA	1:A:387:GLN:HG3	2.02	0.42
2:B:428:ASN:HD22	2:B:447:SER:HB3	1.84	0.42
2:B:607:HIS:HB3	2:B:609:PHE:CE1	2.55	0.42
1:A:48:HIS:NE2	2:B:648:SER:HA	2.35	0.42
1:A:74:THR:HG23	1:A:897:SER:HB3	2.01	0.42
1:A:185:ASN:N	1:A:213:ASP:OD1	2.52	0.42
1:A:48:HIS:CD2	1:A:48:HIS:H	2.36	0.42
2:B:404:THR:OG1	2:B:650:GLU:HB2	2.19	0.42
2:B:583:HIS:CE1	2:B:606:ALA:HA	2.54	0.42
1:A:52:TYR:HE2	1:A:255:HIS:HB2	1.84	0.42
1:A:62:SER:HB3	1:A:887:MET:SD	2.60	0.42
1:A:334:LYS:HB2	1:A:334:LYS:HE2	1.87	0.42
1:A:903:THR:HA	1:A:940:ASN:HA	2.01	0.42
2:B:495:LEU:HD13	2:B:516:GLY:H	1.84	0.42
1:A:212:CYS:HB2	1:A:215:PHE:HD2	1.85	0.41
2:B:483:TRP:NE1	2:B:662:ARG:O	2.51	0.41
2:B:555:LEU:HD12	2:B:556:VAL:N	2.35	0.41
2:B:582:LEU:O	2:B:584:SER:N	2.53	0.41
1:A:50:ARG:HG2	1:A:253:ARG:HH12	1.85	0.41
1:A:181:THR:HG23	1:A:183:TYR:N	2.33	0.41
1:A:359:SER:OG	1:A:362:ALA:N	2.46	0.41
2:B:480:ALA:HB2	2:B:522:ILE:HG23	2.01	0.41
1:A:73:ALA:H	1:A:102:VAL:HG12	1.86	0.41
2:B:450:MET:SD	2:B:450:MET:N	2.93	0.41
2:B:578:VAL:HG12	2:B:585:ILE:HG13	2.01	0.41
2:B:616:ASP:HA	2:B:633:ARG:HB3	2.03	0.41
2:B:622:ASP:OD1	2:B:623:ILE:N	2.54	0.41
1:A:58:ALA:HA	1:A:283:THR:O	2.21	0.41
1:A:836:PHE:CE2	1:A:848:ILE:HB	2.56	0.41
2:B:491:THR:HA	2:B:497:THR:O	2.20	0.41
2:B:569:ASP:N	2:B:569:ASP:OD1	2.54	0.41
1:A:53:THR:HG21	1:A:79:LYS:HE3	2.03	0.41
2:B:643:ALA:HB1	2:B:646:LEU:HD21	2.03	0.41
1:A:50:ARG:HH11	1:A:291:THR:HB	1.86	0.41
1:A:146:GLU:OE1	1:A:148:ASP:N	2.47	0.41
2:B:490:TRP:O	2:B:499:SER:OG	2.38	0.41
2:B:518:LYS:HG3	2:B:536:TRP:NE1	2.36	0.41
1:A:980:ALA:N	1:A:1000:ARG:O	2.50	0.40
2:B:520:ARG:HA	2:B:520:ARG:HD2	1.84	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:522:ILE:HD13	2:B:533:TRP:HB3	2.03	0.40
1:A:243:GLN:NE2	1:A:245:CYS:HB2	2.34	0.40
1:A:831:PHE:CD2	1:A:854:ILE:HG12	2.53	0.40
2:B:551:ASP:OD1	2:B:551:ASP:N	2.44	0.40
2:B:621:THR:HG23	2:B:627:ALA:O	2.22	0.40
1:A:360:ASP:O	1:A:364:THR:OG1	2.31	0.40
2:B:480:ALA:O	2:B:489:TYR:N	2.38	0.40
2:B:534:THR:HA	2:B:542:ILE:HG23	2.03	0.40
1:A:158:ARG:HA	1:A:161:ILE:HG12	2.02	0.40
2:B:496:GLY:O	2:B:513:ARG:HA	2.21	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	446/4563 (10%)	425 (95%)	21 (5%)	0	100	100
2	B	260/860 (30%)	225 (86%)	35 (14%)	0	100	100
All	All	706/5423 (13%)	650 (92%)	56 (8%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	366/4080 (9%)	365 (100%)	1 (0%)	91 92
2	B	193/755 (26%)	193 (100%)	0	100 100
All	All	559/4835 (12%)	558 (100%)	1 (0%)	91 94

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	349	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	48	HIS
1	A	902	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

1 ligand is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	NAG	A	4601	1	14,14,15	0.70	0	17,19,21	0.79	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	A	4601	1	-	1/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	4601	NAG	O5-C5-C6-O6

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.

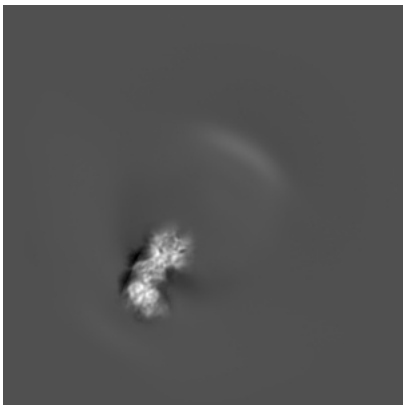
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-44446. These allow visual inspection of the internal detail of the map and identification of artifacts.

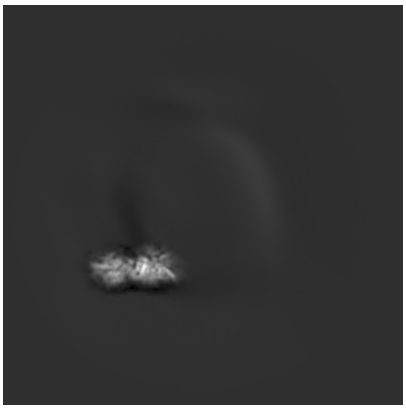
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

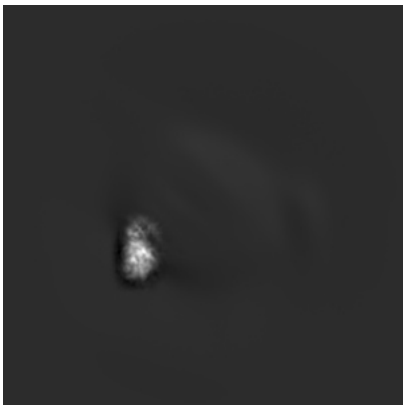
6.1.1 Primary map



X

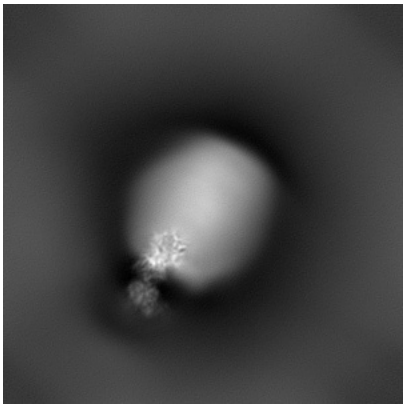


Y

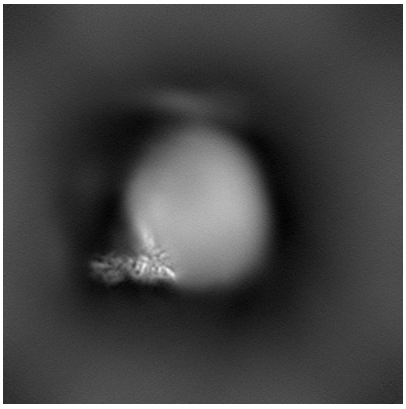


Z

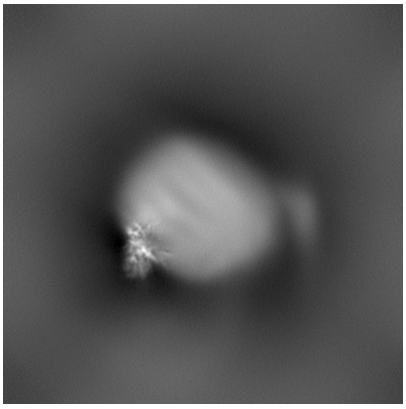
6.1.2 Raw map



X



Y

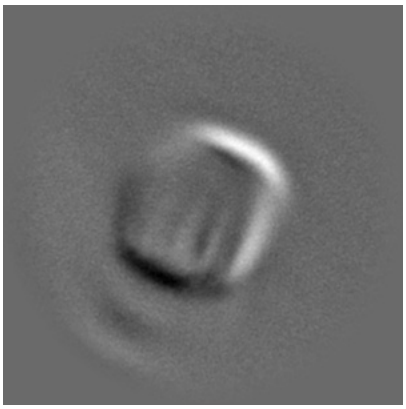


Z

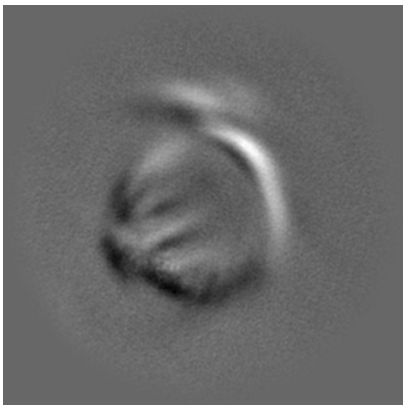
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

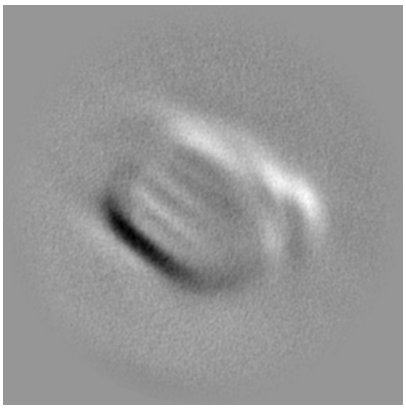
6.2.1 Primary map



X Index: 168

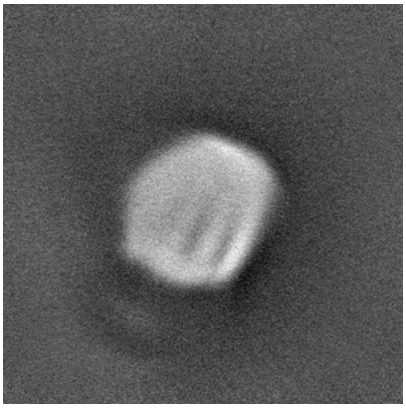


Y Index: 168

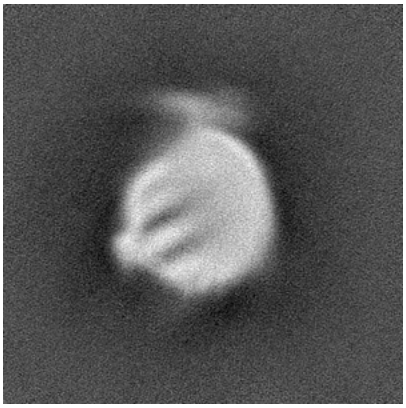


Z Index: 168

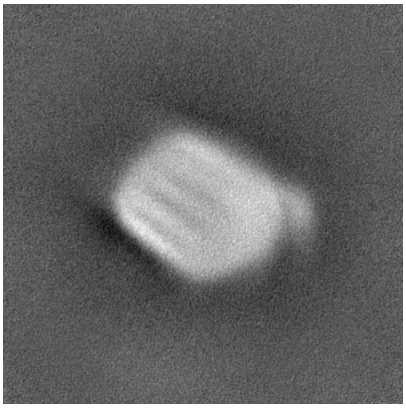
6.2.2 Raw map



X Index: 168



Y Index: 168

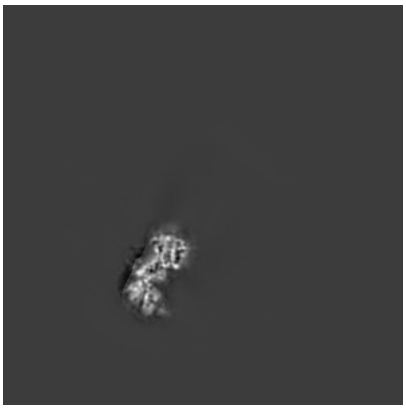


Z Index: 168

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

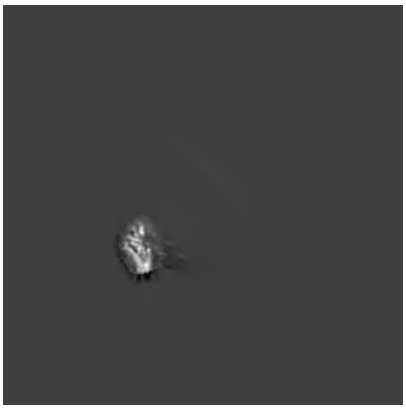
6.3 Largest variance slices (i)

6.3.1 Primary map



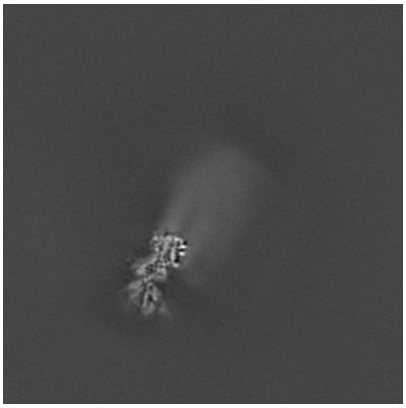
X Index: 111

Y Index: 122

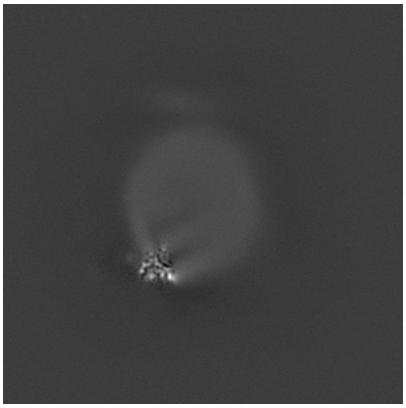


Z Index: 118

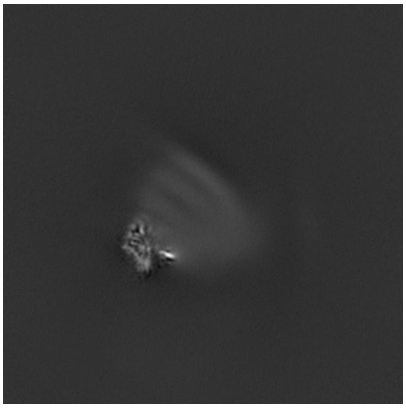
6.3.2 Raw map



X Index: 112



Y Index: 144

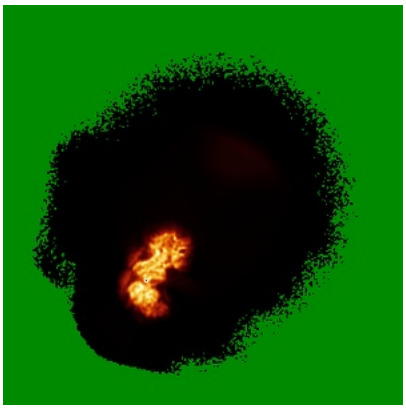


Z Index: 119

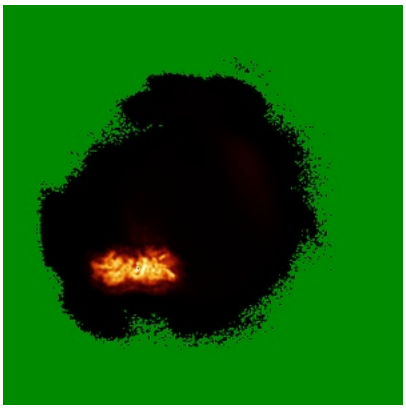
The images above show the largest variance slices of the map in three orthogonal directions.

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

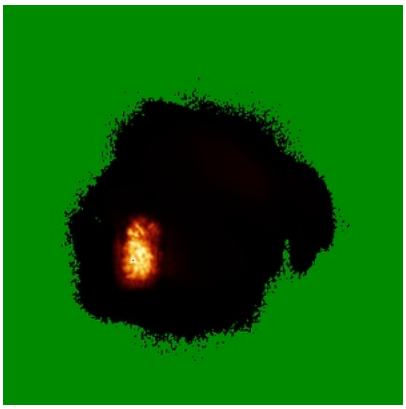
6.4.1 Primary map



X

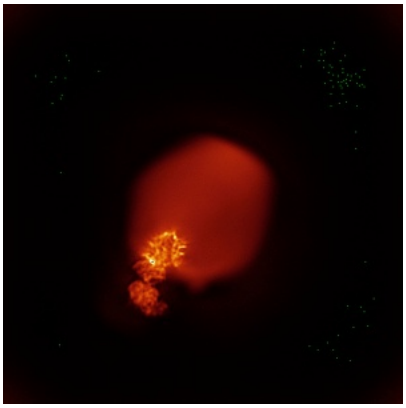


Y

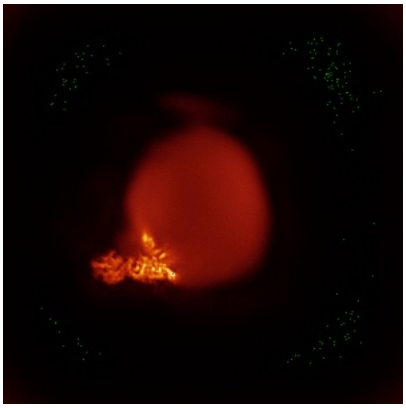


Z

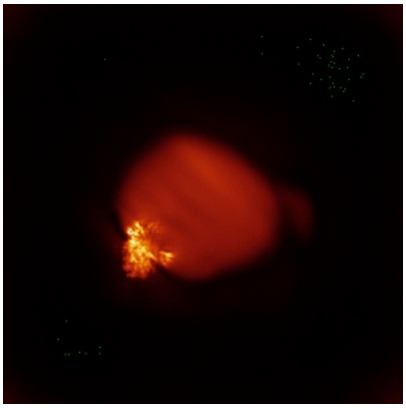
6.4.2 Raw map



X



Y

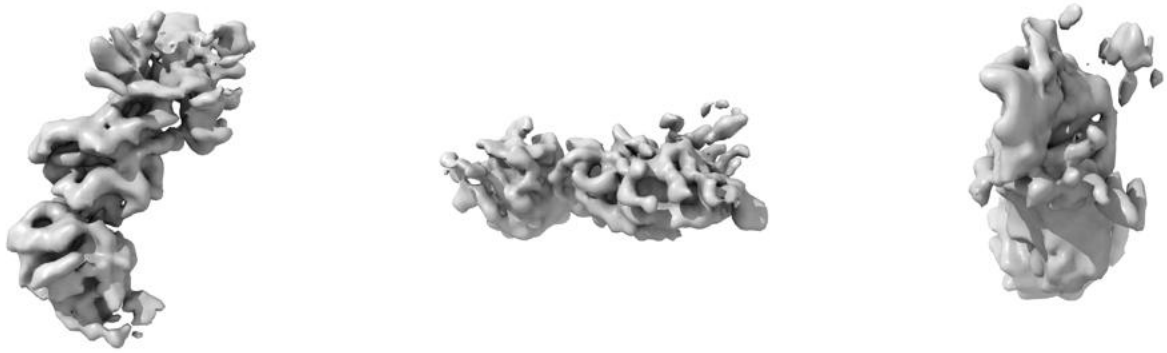


Z

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)

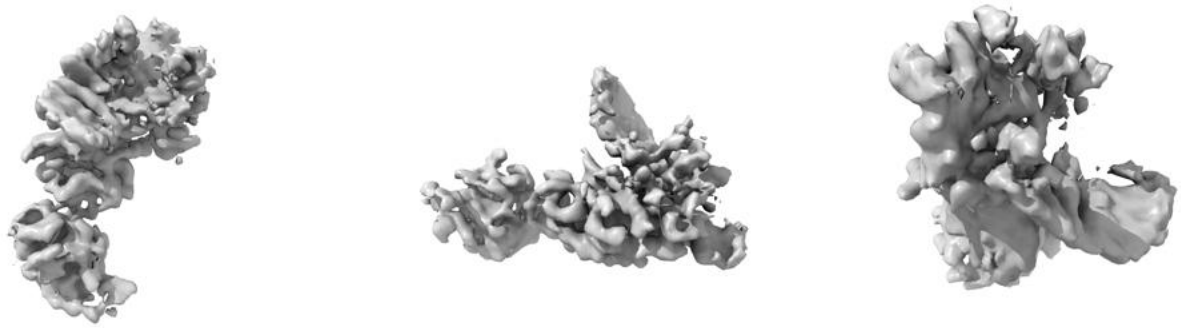
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.1. 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.

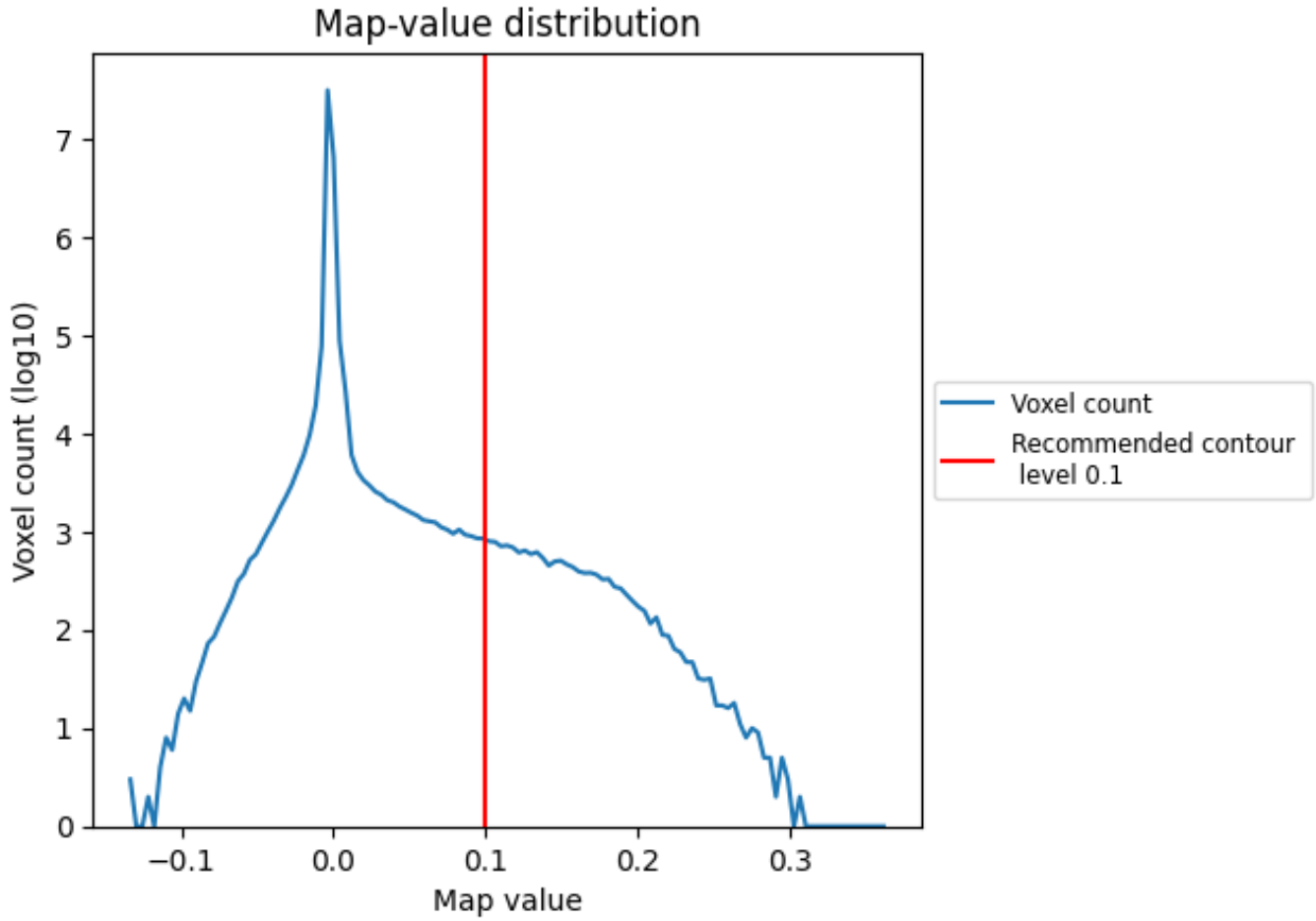
6.6 Mask visualisation (i)

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

7 Map analysis

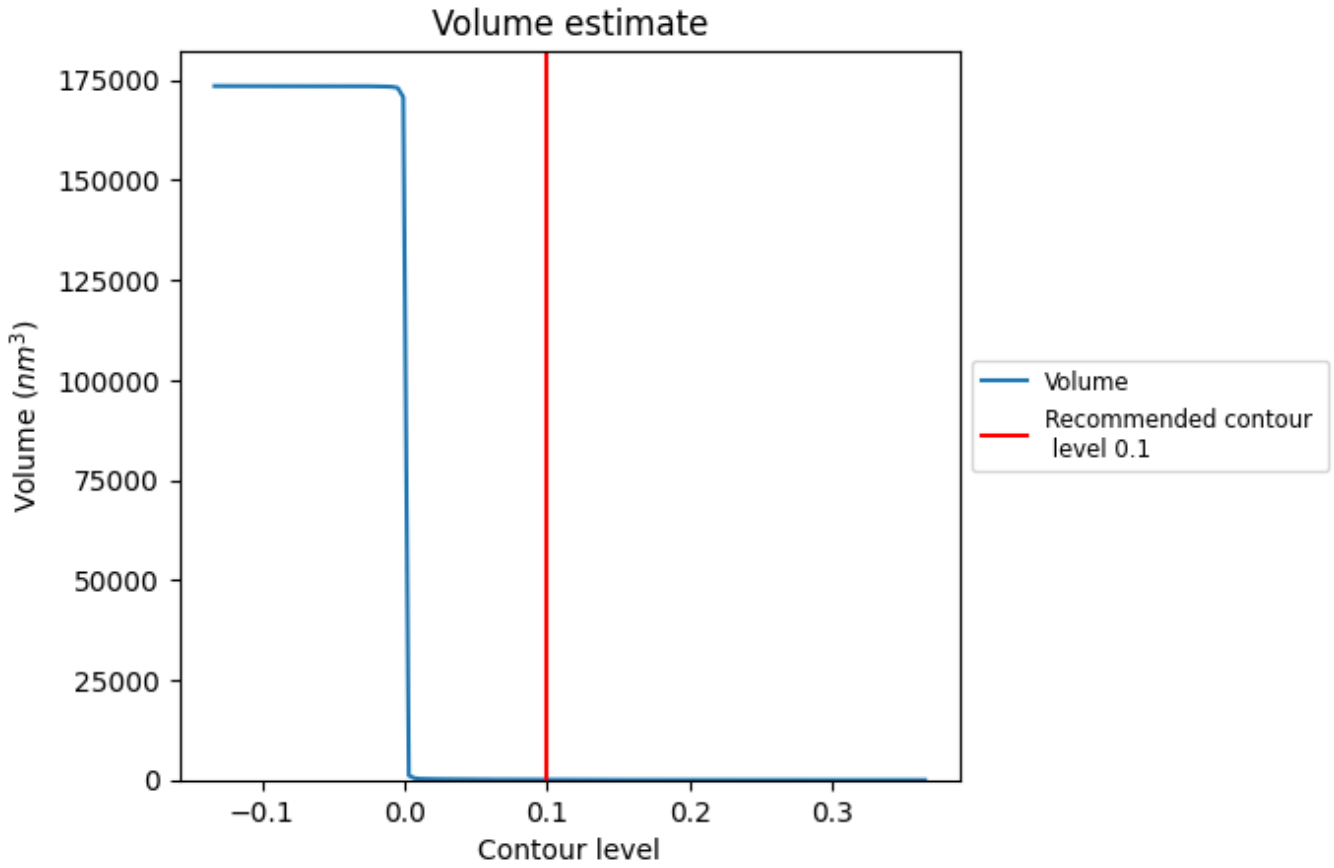
This section contains the results of statistical analysis of the map.

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.

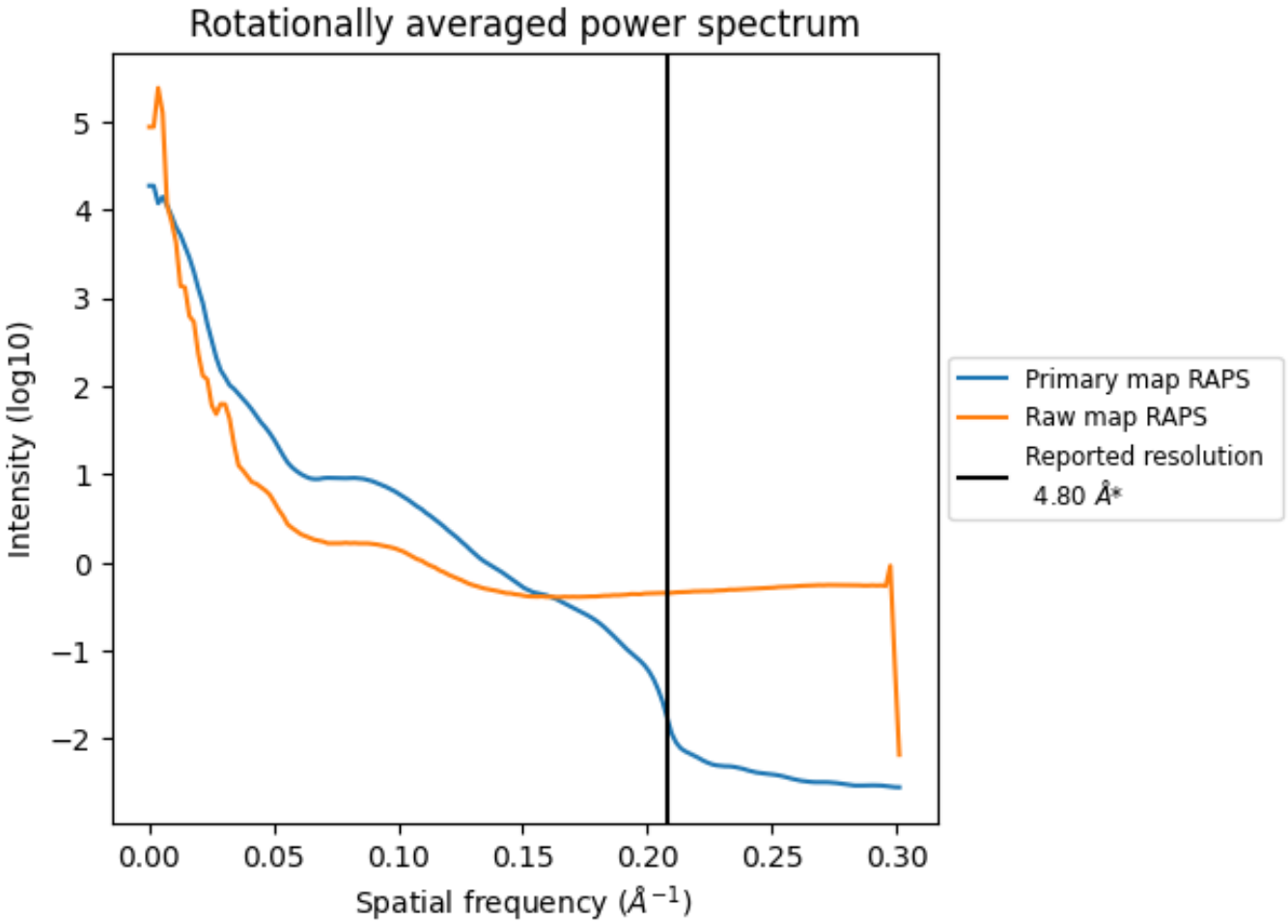
7.2 Volume estimate



The volume at the recommended contour level is 63 nm^3; this corresponds to an approximate mass of 57 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)

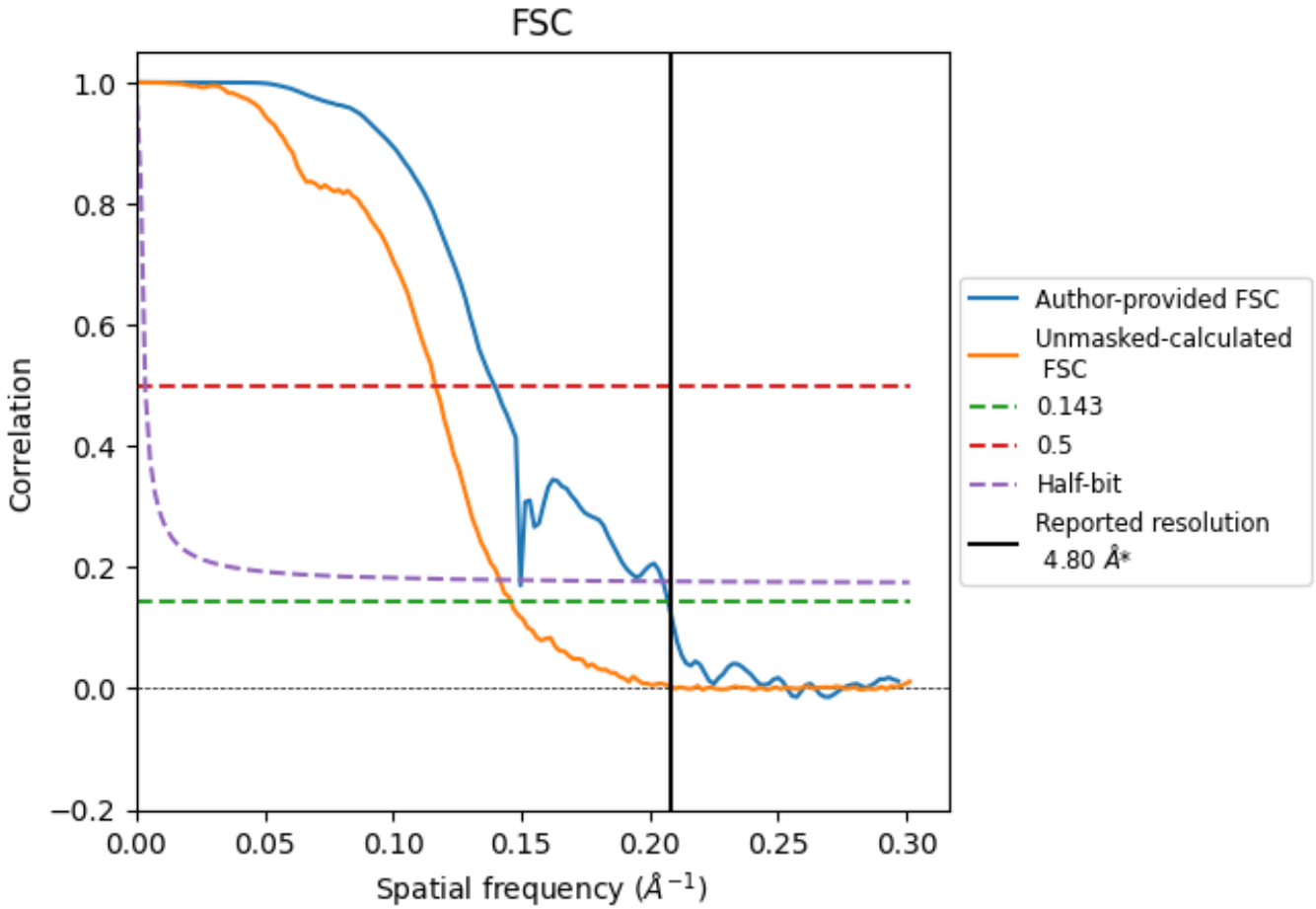


*Reported resolution corresponds to spatial frequency of 0.208 Å^{-1}

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 0.208 Å^{-1}

8.2 Resolution estimates (i)

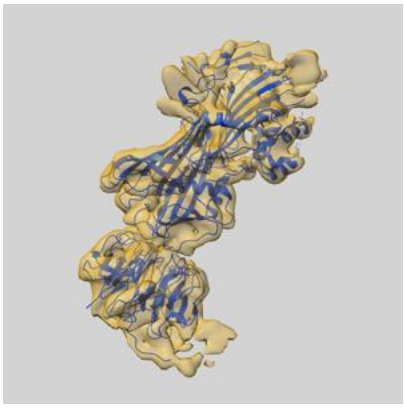
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.80	-	-
Author-provided FSC curve	4.83	7.16	6.68
Unmasked-calculated*	6.85	8.58	7.06

*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 6.85 differs from the reported value 4.8 by more than 10 %

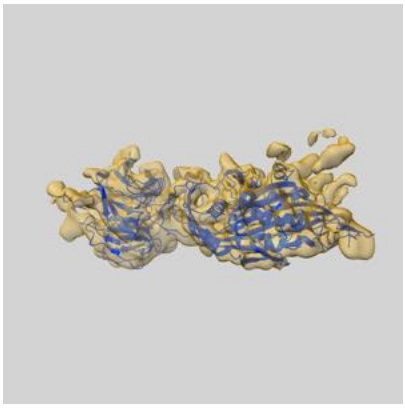
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-44446 and PDB model 9BD8. Per-residue inclusion information can be found in section 3 on page 4.

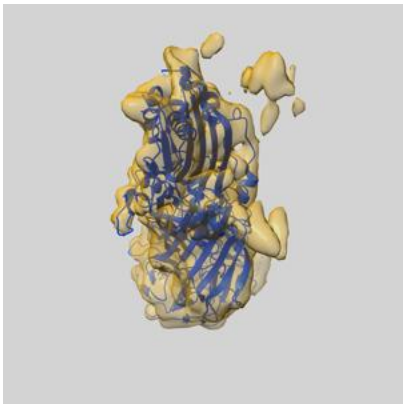
9.1 Map-model overlay



X



Y



Z

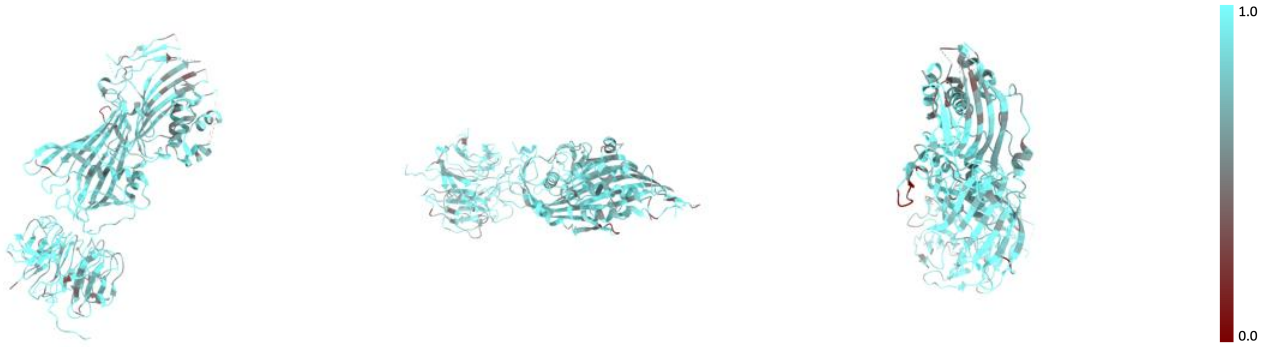
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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.

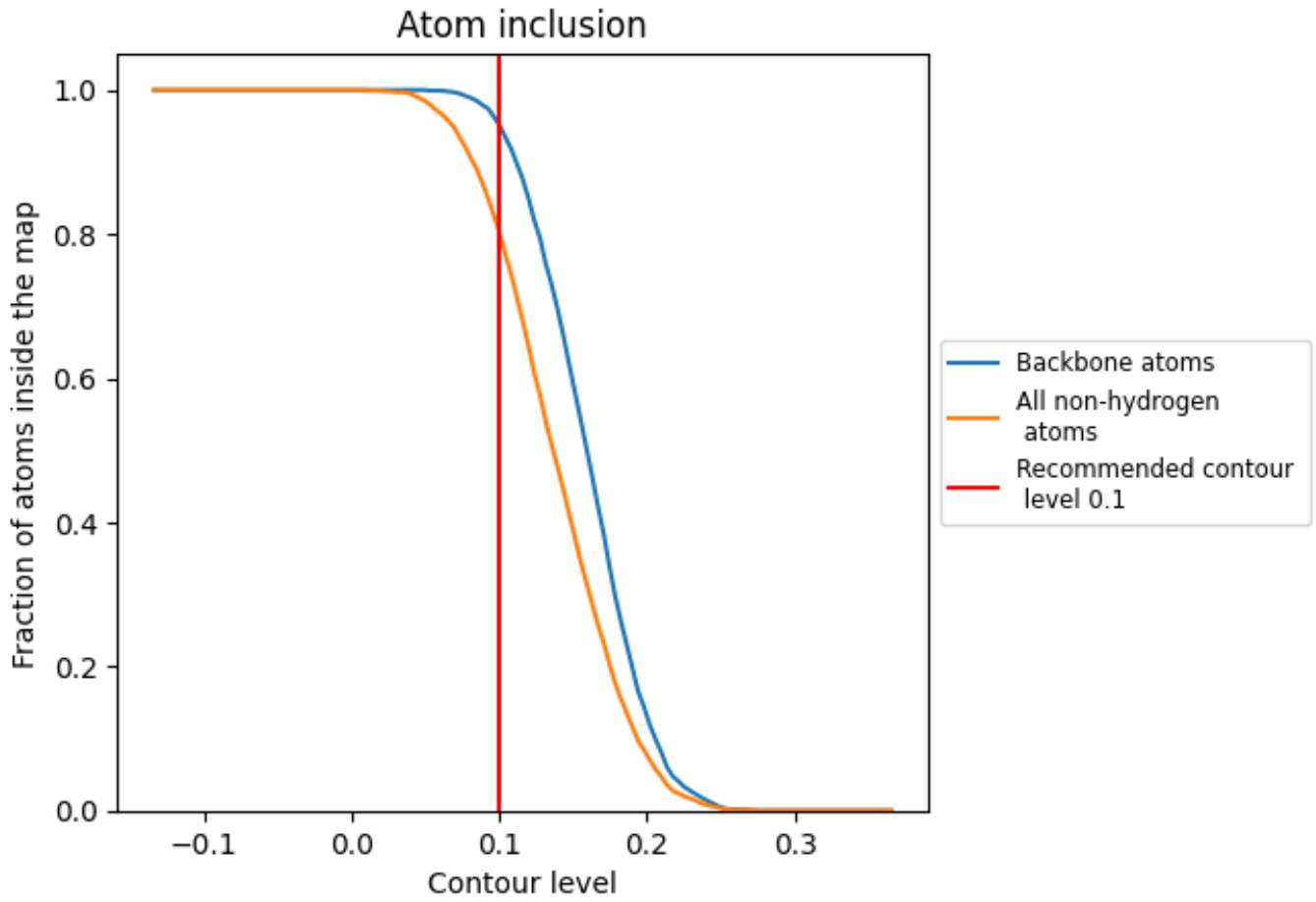
9.3 Atom inclusion mapped to coordinate model (i)



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, 95% of all backbone atoms, 80% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8040	0.2410
A	0.8000	0.2480
B	0.8100	0.2270