Full wwPDB EM Validation Report ⓘ

Nov 15, 2023 – 03:39 am GMT

PDB ID	:	8PSF
EMDB ID	:	EMD-17851
Title	:	Asymmetric unit of the yeast fatty acid synthase in non-rotated state with ACP at the acetyl transferase domain (FASx sample)
Authors	:	Singh, K.; Bunzel, G.; Graf, B.; Yip, K.M.; Stark, H.; Chari, A.
Deposited on	:	2023-07-13
Resolution	:	2.80 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:

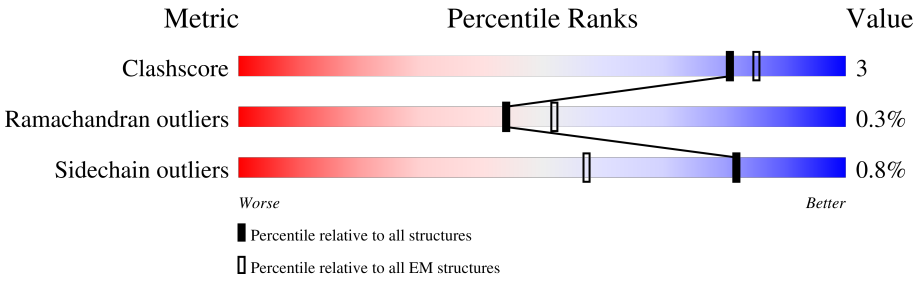
EMDB validation analysis	:	0.0.1.dev70
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.80 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	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	1887	78% 6% 16%
1	B	1887	7% 9% 91%
2	G	2051	91% 8%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 29204 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.

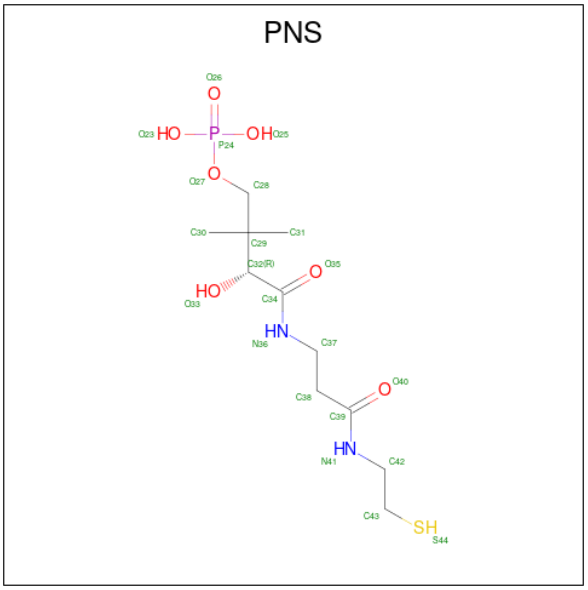
- Molecule 1 is a protein called Fatty acid synthase subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1579	Total	C	N	O	S	0	0
			12346	7817	2084	2398	47		
1	B	163	Total	C	N	O		0	0
			802	475	163	164			

- Molecule 2 is a protein called Fatty acid synthase subunit beta.

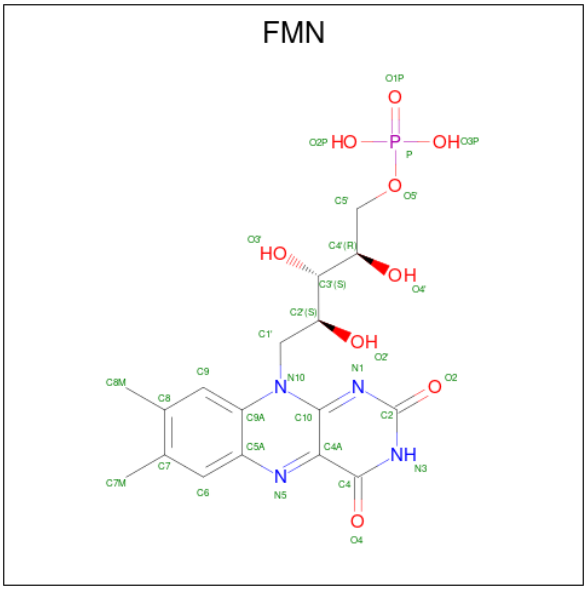
Mol	Chain	Residues	Atoms					AltConf	Trace
2	G	2034	Total	C	N	O	S	0	0
			16004	10258	2661	3029	56		

- Molecule 3 is 4'-PHOSPHOPANTETHEINE (three-letter code: PNS) (formula: $C_{11}H_{23}N_2O_7PS$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms						AltConf
3	B	1	Total	C	N	O	P	S	0
			21	11	2	6	1	1	

- Molecule 4 is FLAVIN MONONUCLEOTIDE (three-letter code: FMN) (formula: $C_{17}H_{21}N_4O_9P$).



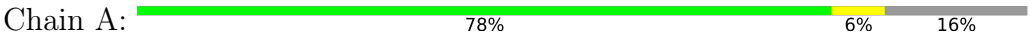
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
4	G	1	31	17	4	9	1	0

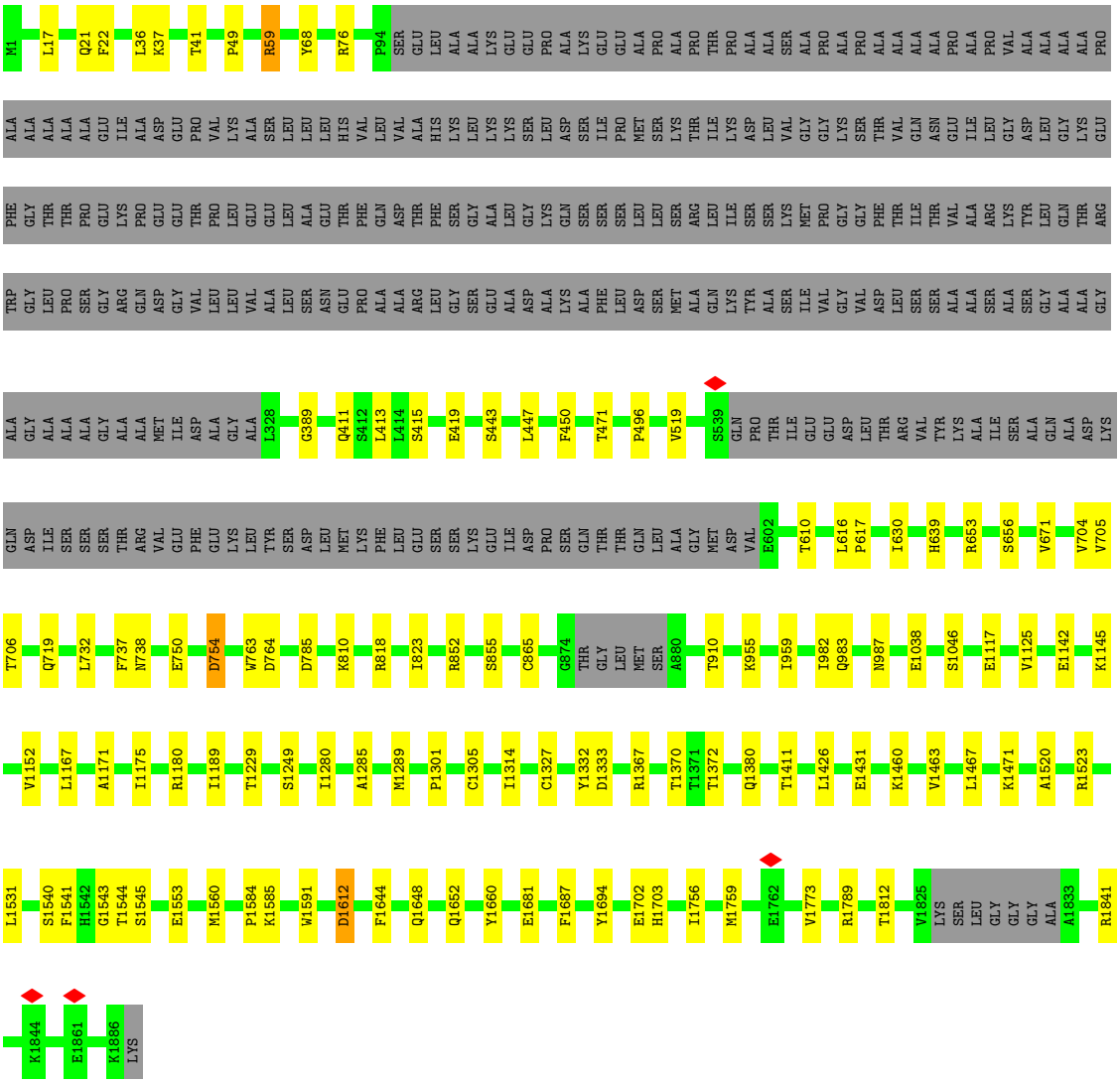
3 Residue-property plots (i)

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: Fatty acid synthase subunit alpha

Chain A:

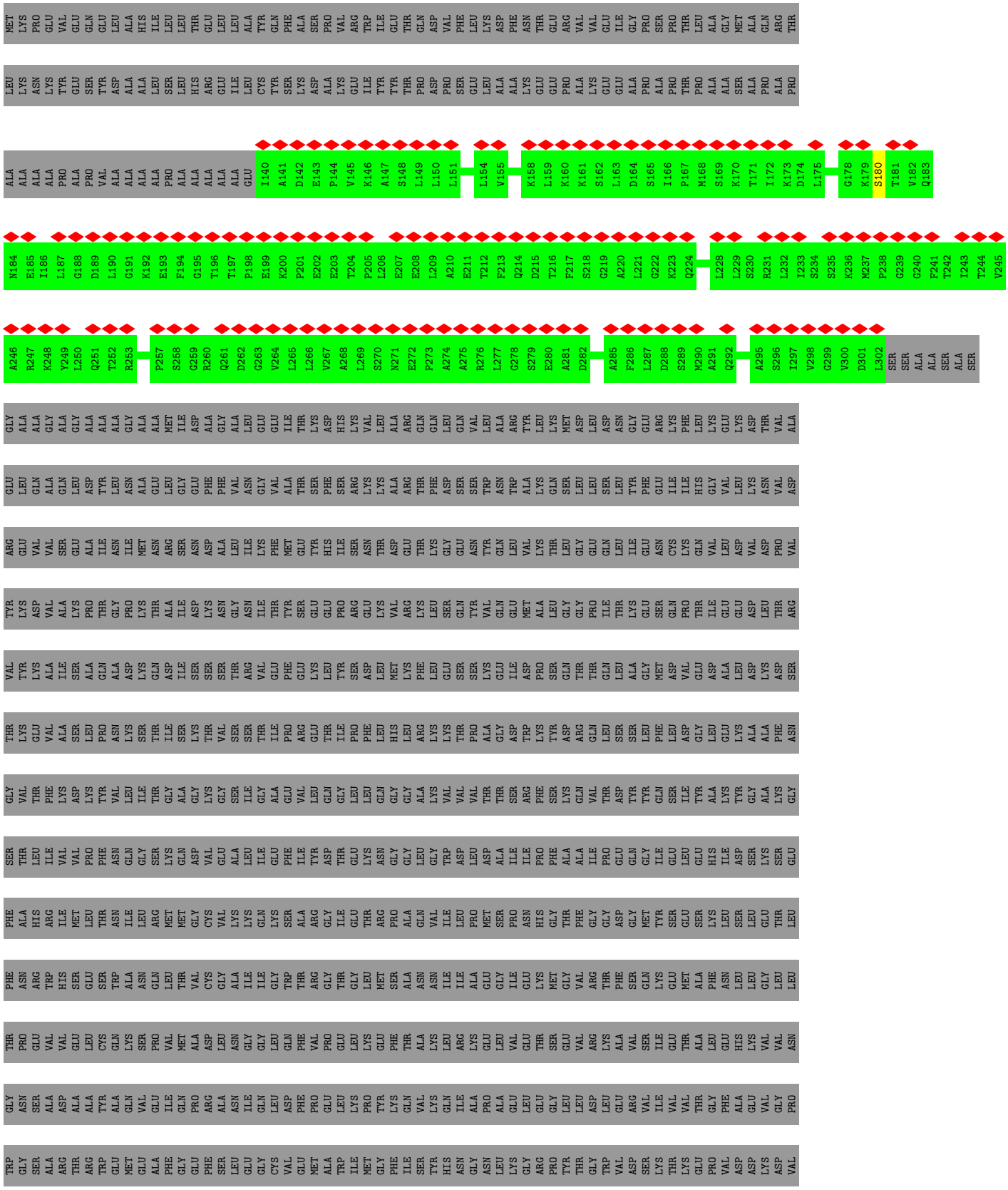


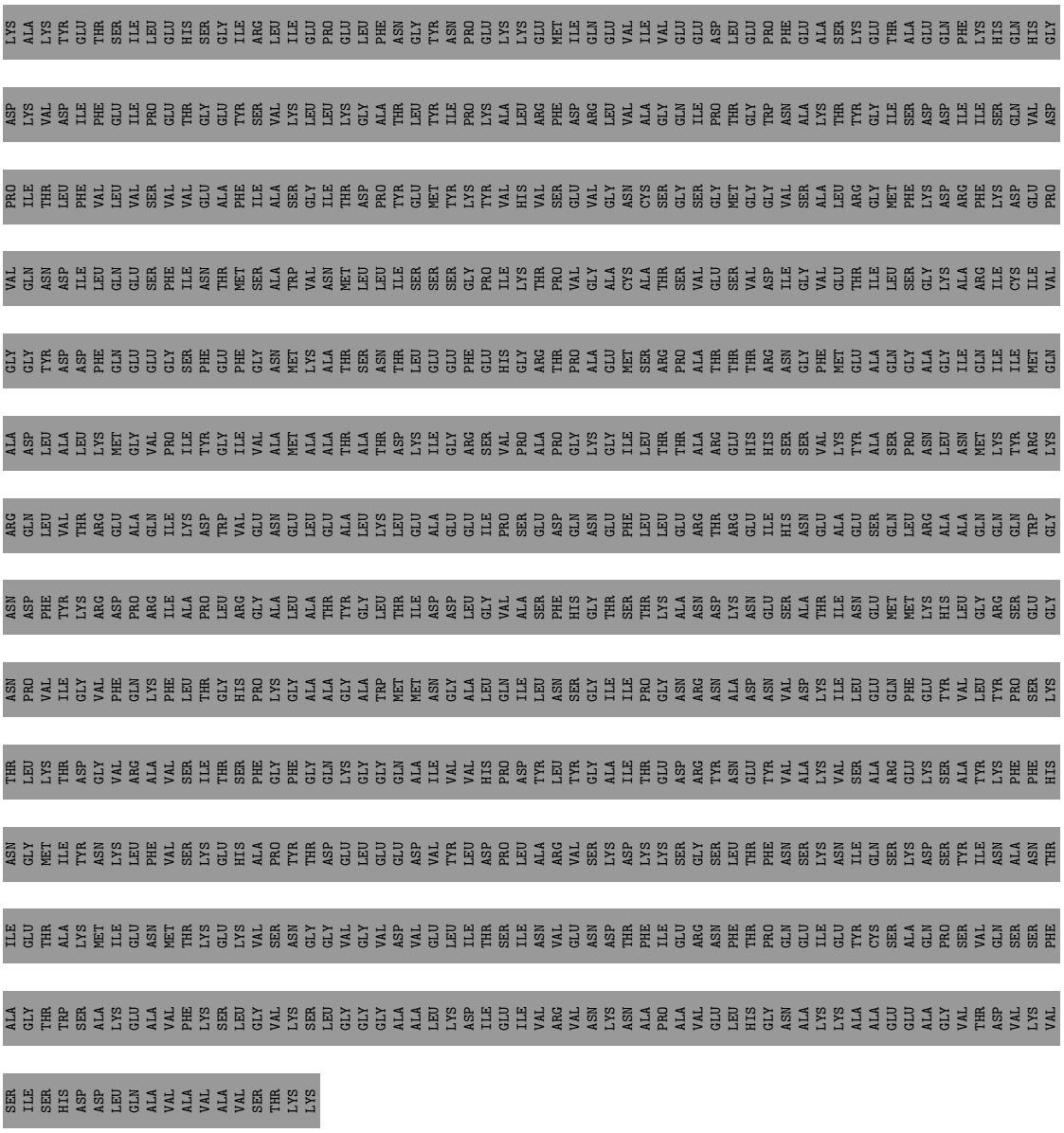


- Molecule 1: Fatty acid synthase subunit alpha

Chain B:

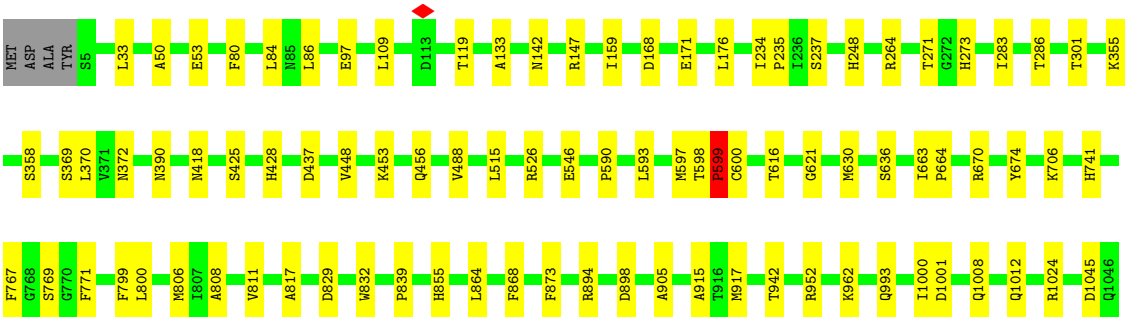

7%
9%
91%

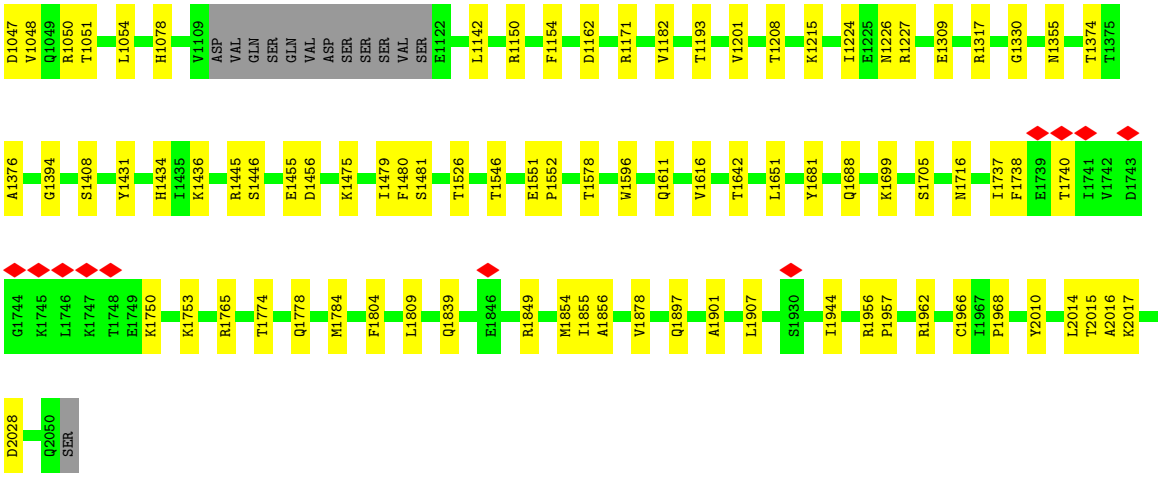

MET LYS PRO GLU VAL GLU GLN GLU LEU ALA HIS ILE LEU LEU THR GLU LEU LEU ALA TYR GLN PHE ALA SER PRO VAL ARG TRP ILE GLU THR GLN ASP VAL PHE LEU LYS ASP PHE ASN THR GLU ARG VAL VAL GLU ILE GLY PRO SER PRO THR LEU ALA GLY MET ALA GLN ARG THR
LEU LYS ASN LYS TYR GLU SER TYR ASP ALA ALA LEU SER LEU HIS ARG GLU ILE LEU CYS TYR SER LYS ASP ALA LYS GLU ILE TYR TYR THR PRO ASP PRO SER GLU LEU ALA ALA LYS GLU GLU PRO ALA LYS GLU GLU ALA PRO ALA PRO THR PRO ALA ALA SER ALA PRO ALA PRO
ALA ALA ALA ALA PRO ALA PRO VAL ALA ALA ALA ALA ALA PRO ALA ALA ALA ALA ALA GLU I140 A141 D142 E143 P144 V145 K146 A147 S148 L149 L150 L151 L154 V155 K158 L159 K160 K161 S162 L163 D164 S165 I166 P167 M168 S169 K170 T171 I172 K173 D174 L175 G178 K179 S180 T181 V182 Q183
N184 E185 I186 L187 G188 D189 L190 G191 K192 E193 F194 G195 T196 T197 P198 E199 K200 P201 E202 E203 T204 P205 L206 E207 E208 L209 A210 E211 T212 F213 Q214 D215 T216 F217 S218 G219 A220 L221 G222 K223 Q224 L228 L229 S230 R231 L232 I233 S234 S235 K236 M237 P238 G239 G240 F241 T242 I243 T244 V245
A246 R247 K248 Y249 L250 Q251 T252 R253 P257 S258 G259 R260 Q261 D262 G263 V264 L265 L266 V267 A268 L269 S270 N271 E272 P273 A274 A275 R276 L277 G278 S279 E280 A281 D282 A285 F286 L287 D288 S289 M290 A291 Q292 A295 S296 I297 V298 G299 V300 D301 L302 SER SER ALA ALA SER ALA SER
GLY ALA ALA GLY ALA GLY ALA ALA ALA GLY ALA ALA ALA MET ILE ASP ALA GLY ALA LEU GLU GLU ILE THR LYS ASP HIS LYS VAL LEU ALA ARG GLN GLN LEU GLN VAL LEU ALA ARG TYR LEU LYS MET ASP LEU ASP ASN GLY GLU ARG LYS PHE LEU LYS GLU LYS ASP THR VAL ALA
GLU LEU GLN ALA GLN LEU ASP TYR LEU ASN ALA GLU LEU GLY GLU PHE PHE VAL ASN GLY VAL ALA THR SER PHE SER ARG LYS LYS ALA ARG THR PHE ASP SER SER TRP ASN TRP ALA LYS GLN SER LEU LEU SER LEU SER LEU TYR PHE GLU ILE ILE HIS GLY VAL LEU LYS ASN VAL ASP
ARG GLU VAL VAL SER GLU ALA ILE ASN ILE MET ASN ARG SER ASN ASP ALA LEU ILE LYS PHE MET GLU TYR HIS ILE SER ASN THR ASP GLU THR LYS GLY GLU ASN TYR GLN LEU VAL LYS THR LEU GLY GLU GLN LEU ILE GLU ASN CYS LYS GLN VAL LEU ASP VAL ASP PRO VAL
TYR LYS ASP VAL ALA LYS PRO THR GLY PRO LYS THR ALA ILE ASP LYS ASN GLY ASN ILE THR TYR SER GLU GLU PRO ARG GLU LYS VAL ARG LYS LEU SER GLN TYR VAL GLN GLU MET ALA LEU GLY GLY GLY PRO ILE THR THR LYS GLU SER GLN PRO THR ILE GLU GLU ASP LEU THR ARG
VAL TYR LYS ALA ILE SER ALA GLN ALA ASP LYS GLN ASP ILE SER SER SER THR ARG VAL GLU PHE GLU LYS LEU TYR SER ASP LEU MET LYS PHE LEU GLU SER SER SER LYS GLU ILE ASP PRO SER GLN THR THR GLN LEU LEU ALA GLY MET ASP VAL GLU GLN ASP ALA LEU ASP VAL ASP SER
THR LYS GLU VAL ALA SER LEU PRO ASN LYS SER THR ILE SER LYS THR VAL SER SER THR ILE PRO ARG GLU THR ILE PRO PHE LEU HIS LEU ARG LYS LYS THR PRO ALA GLY ASP TRP LYS TYR ASP ARG GLN LEU SER SER LEU PHE LEU ASP GLY LEU GLU LYS ALA ALA PHE ASN
GLY VAL THR PHE LYS ASP LYS TYR VAL LEU ILE THR GLY GLY ALA GLY LYS SER GLY SER ILE GLY ALA GLU VAL LEU GLN GLY LEU LEU GLN GLY GLY ALA LYS VAL VAL VAL THR THR SER ARG PHE SER LYS GLN VAL THR ASP TYR TYR VAL GLN SER ILE TYR ALA LYS TYR GLY ALA LYS GLY
SER THR LEU ILE VAL VAL PRO PHE ASN GLN GLY SER LYS GLN ASP VAL GLU ALA LEU ILE GLU PHE ILE ILE TYR ASP THR GLU LYS ASN GLY GLY LEU GLY TRP ASP LEU ASP ALA ILE ILE PRO PHE ALA ALA ILE PRO GLU GLN GLY MET ILE GLU LEU GLU LEU GLU HIS ILE ASP SER LYS SER GLU
PHE ALA HIS ARG ILE MET LEU THR ASN ILE LEU ARG MET MET GLY CYS VAL LYS LYS GLN LYS SER ALA ARG GLY ILE GLU THR ARG PRO ALA GLN VAL ILE LEU LEU PRO MET SER PRO ASN HIS GLY THR PHE GLY GLY ASP GLY MET TYR SER GLU GLU SER LYS LEU SER LEU GLU LEU THR LEU
PHE ASN ARG TRP HIS SER GLU SER TRP ALA ASN GLN LEU THR VAL CYS GLY ALA ILE ILE GLY TRP THR ARG GLY THR GLY LEU MET SER ALA ASN ASN ILE ILE ALA GLU GLY GLY ILE GLU LYS MET GLY VAL ARG THR PHE SER GLN LYS GLU MET ALA PHE ASN LEU LEU GLY LEU LEU
THR PRO GLU VAL VAL GLU LEU CYS GLN LYS SER PRO VAL MET ALA ASP LEU ASN GLY GLY LEU GLN PHE VAL PRO GLU LEU LYS GLU PHE THR ALA LYS LEU ARG LYS GLU LEU VAL GLU THR SER GLU VAL ARG LYS ALA VAL SER ILE GLU THR ALA LEU GLU HIS LYS VAL VAL ASN
GLY ASN SER ALA ASP ALA ALA TYR LYS GLN VAL GLU LEU GLN PRO ARG ALA ASN ILE GLN LEU ASP PHE PRO GLU LEU LYS PRO TYR LYS GLN VAL LYS ALA ILE GLN LEU GLU GLU GLY LEU ILE LEU VAL THR GLY PRO
TRP GLY SER ALA ARG THR ARG TRP GLU MET GLU GLY PHE ILE SER TYR HIS ASN GLY ASN LEU LYS GLY ARG PRO TYR THR GLY TRP VAL ASP SER LYS THR LYS GLU PRO VAL ASP ASP LYS ASP VAL



• Molecule 2: Fatty acid synthase subunit beta

Chain G:




D1047 V1048 Q1049 R1050 T1051 L1054 H1078 V1109 ASP VAL GLN SER GLN VAL ASP SER SER SER VAL SER E1122 L1142 R1150 F1154 D1162 R1171 V1182 T1193 V1201 T1208 K1215 I1224 E1225 N1226 R1227 E1309 R1317 G1330 N1355 T1374 T1375
A1376 G1394 S1408 Y1431 H1434 I1435 K1436 R1445 S1446 E1455 D1456 K1475 I1479 F1480 S1481 T1526 T1546 E1551 P1552 T1578 W1596 Q1611 V1616 T1642 L1651 Y1681 Q1688 K1699 S1705 N1716 I1737 F1738 E1739 T1740 I1741 V1742 D1743
G1744 K1745 L1746 K1747 T1748 E1749 K1750 K1753 R1765 T1774 Q1778 M1784 F1804 L1809 Q1839 E1846 R1849 M1854 I1855 A1856 V1878 Q1897 A1901 L1907 S1930 I1944 R1956 P1957 R1962 C1966 I1967 P1968 Y2010 L2014 T2015 A2016 K2017
D2028 Q2050 SER

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	149476	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 ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	5000	Depositor
Maximum defocus (nm)	25000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.144	Depositor
Minimum map value	-0.057	Depositor
Average map value	-0.002	Depositor
Map value standard deviation	0.008	Depositor
Recommended contour level	0.0175	Depositor
Map size (Å)	253.19998, 253.19998, 253.19998	wwPDB
Map dimensions	240, 240, 240	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.055, 1.055, 1.055	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.67	0/12579	0.84	0/17001
1	B	0.84	0/801	0.83	0/1111
2	G	0.64	0/16369	0.82	1/22210 (0.0%)
All	All	0.66	0/29749	0.83	1/40322 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	G	599	PRO	N-CA-CB	-5.45	96.61	102.60

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	12346	0	12279	61	0
1	B	802	0	375	0	0
2	G	16004	0	15984	97	0
3	B	21	0	21	1	0
4	G	31	0	19	3	0
All	All	29204	0	28678	151	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 3.

All (151) 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:G:1855:ILE:HG23	2:G:1907:LEU:HD23	1.74	0.69
2:G:894:ARG:NH1	2:G:898:ASP:OD2	2.29	0.66
1:A:1471:LYS:HD3	1:A:1759:MET:SD	2.38	0.64
2:G:1142:LEU:HD22	2:G:1182:VAL:HG11	1.80	0.64
2:G:864:LEU:HD11	2:G:868:PHE:CZ	2.34	0.63
2:G:2015:THR:O	2:G:2017:LYS:N	2.33	0.62
1:A:1431:GLU:OE2	1:A:1523:ARG:NH1	2.34	0.60
2:G:1201:VAL:HG11	2:G:1226:ASN:HB2	1.83	0.60
2:G:355:LYS:O	2:G:358:SER:OG	2.20	0.59
2:G:1054:LEU:HB2	4:G:2101:FMN:HM72	1.85	0.58
2:G:526:ARG:NH2	2:G:546:GLU:OE2	2.36	0.58
2:G:1778:GLN:HG2	2:G:1809:LEU:HD12	1.86	0.58
1:A:1285:ALA:O	1:A:1289:MET:HG3	2.05	0.57
1:A:17:LEU:HD23	2:G:2014:LEU:HD23	1.87	0.57
2:G:283:ILE:O	2:G:286:THR:HG22	2.06	0.56
1:A:987:ASN:HD21	2:G:993:GLN:HE22	1.53	0.56
1:A:1189:ILE:H	1:A:1380:GLN:HE21	1.55	0.55
2:G:1878:VAL:HG22	2:G:1944:ILE:HG12	1.88	0.55
1:A:704:VAL:HG23	1:A:763:TRP:CZ3	2.42	0.54
2:G:369:SER:HB2	2:G:428:HIS:HB2	1.90	0.54
1:A:706:THR:HB	1:A:737:PHE:HB3	1.90	0.54
2:G:1856:ALA:O	2:G:1966:CYS:HA	2.08	0.53
2:G:390:ASN:OD1	2:G:418:ASN:ND2	2.42	0.53
2:G:593:LEU:HB3	2:G:616:THR:HG23	1.91	0.53
2:G:1445:ARG:NH1	2:G:1455:GLU:O	2.41	0.53
1:A:1426:LEU:HD12	1:A:1560:MET:HG3	1.91	0.53
2:G:1330:GLY:HA2	2:G:1374:THR:HG21	1.90	0.53
2:G:176:LEU:HD21	2:G:248:HIS:CE1	2.44	0.52
2:G:301:THR:HG21	2:G:448:VAL:HG21	1.91	0.52
2:G:600:CYS:SG	2:G:806:MET:HG2	2.49	0.52
2:G:597:MET:HA	4:G:2101:FMN:N5	2.24	0.52
2:G:234:ILE:N	2:G:235:PRO:CD	2.73	0.51
1:A:630:ILE:O	1:A:653:ARG:NH2	2.43	0.51
1:A:705:VAL:CG1	1:A:732:LEU:HD11	2.40	0.51
2:G:1738:PHE:HB3	2:G:1740:THR:HG23	1.92	0.51
2:G:898:ASP:O	2:G:1050:ARG:HA	2.10	0.51
1:A:443:SER:HA	1:A:447:LEU:HD23	1.92	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:415:SER:O	1:A:419:GLU:HG2	2.11	0.50
2:G:84:LEU:CD2	2:G:133:ALA:HB2	2.42	0.50
2:G:593:LEU:CB	2:G:616:THR:HG23	2.41	0.50
2:G:1854:MET:HG2	2:G:1901:ALA:HB2	1.93	0.50
1:A:41:THR:O	1:A:76:ARG:NH1	2.44	0.50
1:A:1431:GLU:OE1	1:A:1520:ALA:N	2.42	0.50
1:A:1411:THR:HA	1:A:1648:GLN:O	2.12	0.50
1:A:49:PRO:N	2:G:1784:MET:HE2	2.28	0.49
2:G:621:GLY:HA2	2:G:630:MET:CE	2.42	0.49
2:G:1778:GLN:HA	2:G:1809:LEU:HD11	1.94	0.49
2:G:50:ALA:HB3	2:G:53:GLU:OE1	2.11	0.49
2:G:159:ILE:HA	2:G:271:THR:O	2.12	0.49
1:A:719:GLN:HG3	1:A:1612:ASP:HA	1.94	0.49
2:G:593:LEU:O	2:G:800:LEU:HA	2.12	0.49
2:G:372:ASN:HB3	2:G:515:LEU:HD11	1.94	0.49
1:A:764:ASP:OD1	1:A:810:LYS:NZ	2.42	0.49
1:A:705:VAL:HG12	1:A:732:LEU:HD11	1.95	0.49
1:A:1463:VAL:HB	1:A:1773:VAL:HG21	1.95	0.48
2:G:767:PHE:HD2	2:G:771:PHE:CE2	2.32	0.48
1:A:955:LYS:O	1:A:959:ILE:HG12	2.14	0.48
2:G:1956:ARG:N	2:G:1957:PRO:HD2	2.28	0.48
1:A:389:GLY:O	1:A:738:ASN:ND2	2.45	0.47
1:A:1117:GLU:O	1:A:1180:ARG:HD3	2.15	0.47
2:G:621:GLY:HA2	2:G:630:MET:HE2	1.96	0.47
1:A:496:PRO:HG2	1:A:519:VAL:HG12	1.97	0.47
1:A:982:ILE:HD11	2:G:952:ARG:HD3	1.96	0.47
2:G:808:ALA:HB3	2:G:811:VAL:HG23	1.96	0.47
2:G:1355:ASN:ND2	2:G:1408:SER:OG	2.48	0.47
2:G:1804:PHE:CZ	2:G:2010:TYR:HB2	2.49	0.47
2:G:1045:ASP:HB2	2:G:1047:ASP:HB2	1.97	0.47
1:A:1531:LEU:HD21	1:A:1660:TYR:CZ	2.51	0.46
2:G:109:LEU:HG	2:G:119:THR:HG21	1.98	0.46
2:G:598:THR:HA	2:G:599:PRO:HA	1.76	0.46
2:G:264:ARG:CZ	2:G:456:GLN:HG3	2.46	0.46
2:G:817:ALA:HA	2:G:1048:VAL:HG21	1.96	0.46
2:G:829:ASP:O	2:G:832:TRP:HD1	1.98	0.46
1:A:983:GLN:HE22	2:G:962:LYS:HD2	1.80	0.46
1:A:1694:TYR:OH	2:G:1001:ASP:OD2	2.29	0.45
2:G:915:ALA:HA	2:G:1000:ILE:HD11	1.97	0.45
2:G:1154:PHE:O	2:G:1171:ARG:NH1	2.47	0.45
1:A:1584:PRO:HG3	1:A:1591:TRP:CE3	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:36:LEU:O	1:A:76:ARG:NH2	2.47	0.45
2:G:1048:VAL:O	2:G:1051:THR:OG1	2.29	0.45
1:A:1467:LEU:HD22	1:A:1756:ILE:HD11	1.97	0.45
2:G:142:ASN:O	2:G:147:ARG:NH2	2.49	0.45
2:G:168:ASP:OD1	2:G:171:GLU:HG2	2.16	0.45
2:G:1750:LYS:O	2:G:1753:LYS:NZ	2.41	0.45
2:G:33:LEU:HD21	2:G:80:PHE:CE1	2.52	0.45
2:G:767:PHE:O	2:G:799:PHE:HA	2.17	0.45
2:G:1434:HIS:HB3	2:G:1436:LYS:HE3	1.98	0.45
2:G:590:PRO:HG3	2:G:1078:HIS:CE1	2.51	0.45
1:A:1249:SER:HB3	1:A:1280:ILE:HG23	1.99	0.44
2:G:670:ARG:NH1	2:G:674:TYR:O	2.47	0.44
2:G:1309:GLU:O	2:G:1317:ARG:NH2	2.50	0.44
1:A:1541:PHE:CD2	1:A:1553:GLU:HG2	2.52	0.44
2:G:905:ALA:HA	2:G:917:MET:SD	2.57	0.44
2:G:1551:GLU:HB2	2:G:1552:PRO:HD3	1.99	0.44
1:A:1702:GLU:HG2	1:A:1703:HIS:CD2	2.52	0.44
1:A:1167:LEU:HD12	1:A:1171:ALA:HB1	2.00	0.44
1:A:1229:THR:HB	1:A:1687:PHE:CD1	2.53	0.44
2:G:1716:ASN:OD1	2:G:1765:ARG:HA	2.18	0.44
1:A:37:LYS:HE2	1:A:68:TYR:CE1	2.53	0.44
1:A:1460:LYS:HG3	1:A:1773:VAL:O	2.17	0.44
1:A:1038:GLU:OE1	1:A:1046:SER:OG	2.30	0.44
2:G:1150:ARG:HD2	2:G:1193:THR:HG21	1.99	0.44
2:G:741:HIS:CD2	2:G:855:HIS:ND1	2.86	0.43
2:G:1008:GLN:OE1	2:G:1024:ARG:NH1	2.50	0.43
2:G:1809:LEU:C	2:G:1809:LEU:HD23	2.39	0.43
1:A:1553:GLU:HG3	1:A:1644:PHE:HE2	1.83	0.43
2:G:1962:ARG:HG2	2:G:1968:PRO:HD2	2.00	0.43
2:G:1208:THR:O	2:G:1224:ILE:N	2.51	0.43
2:G:1611:GLN:O	2:G:1651:LEU:HD12	2.19	0.43
1:A:823:ILE:HD13	1:A:865:CYS:HB3	2.00	0.43
1:A:639:HIS:HB2	1:A:656:SER:OG	2.19	0.43
1:A:750:GLU:OE2	1:A:754:ASP:OD2	2.37	0.43
2:G:706:LYS:NZ	4:G:2101:FMN:O2'	2.52	0.42
2:G:1546:THR:HG21	2:G:1616:VAL:HG11	2.01	0.42
2:G:1699:LYS:HE3	2:G:1705:SER:HB2	2.01	0.42
2:G:1479:ILE:HG22	2:G:1480:PHE:O	2.19	0.42
2:G:273:HIS:CD2	2:G:488:VAL:HG11	2.54	0.42
1:A:471:THR:HG22	1:A:610:THR:HG21	2.01	0.42
2:G:84:LEU:HD22	2:G:133:ALA:HB2	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:616:LEU:N	1:A:617:PRO:CD	2.82	0.42
2:G:663:ILE:HB	2:G:664:PRO:HD3	2.02	0.42
2:G:1642:THR:HB	2:G:1651:LEU:HB3	2.02	0.42
2:G:1774:THR:HG22	2:G:1839:GLN:HE21	1.84	0.42
2:G:1376:ALA:HA	2:G:1394:GLY:HA2	2.01	0.42
2:G:1431:TYR:CE1	2:G:1526:THR:HG22	2.55	0.42
1:A:1145:LYS:HA	1:A:1152:VAL:CG1	2.51	0.41
1:A:1117:GLU:O	1:A:1180:ARG:HA	2.19	0.41
2:G:234:ILE:HA	2:G:237:SER:OG	2.20	0.41
1:A:1301:PRO:HB3	1:A:1314:ILE:HD12	2.02	0.41
1:A:1812:THR:OG1	1:A:1841:ARG:NH2	2.54	0.41
1:A:17:LEU:O	1:A:21:GLN:HB2	2.19	0.41
1:A:413:LEU:HD23	1:A:450:PHE:CE2	2.56	0.41
1:A:671:VAL:HG21	1:A:910:THR:HG22	2.02	0.41
1:A:1367:ARG:O	1:A:1370:THR:HB	2.21	0.41
1:A:1544:THR:O	1:A:1545:SER:HB3	2.20	0.41
3:B:1901:PNS:H421	2:G:370:LEU:HD11	2.03	0.41
2:G:1475:LYS:HB2	2:G:1481:SER:HB3	2.03	0.41
2:G:1854:MET:HG2	2:G:1901:ALA:CB	2.51	0.41
2:G:868:PHE:HB3	2:G:873:PHE:CE2	2.56	0.41
1:A:1560:MET:HE3	1:A:1652:GLN:OE1	2.21	0.41
2:G:767:PHE:HD2	2:G:771:PHE:CZ	2.39	0.41
2:G:1849:ARG:HH12	2:G:1957:PRO:HB3	1.86	0.41
2:G:942:THR:HB	2:G:1012:GLN:HB2	2.02	0.41
2:G:234:ILE:N	2:G:235:PRO:HD3	2.37	0.40
1:A:852:ARG:HA	1:A:855:SER:OG	2.22	0.40
2:G:1227:ARG:NE	2:G:1551:GLU:OE2	2.53	0.40
1:A:764:ASP:OD2	1:A:818:ARG:HD3	2.22	0.40
1:A:1370:THR:HG22	1:A:1372:THR:H	1.85	0.40
1:A:59:ARG:HH22	2:G:1897:GLN:HE22	1.70	0.40
1:A:1125:VAL:HG11	1:A:1175:ILE:HD12	2.03	0.40
2:G:1681:TYR:O	2:G:1688:GLN:HG3	2.20	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	1569/1887 (83%)	1503 (96%)	62 (4%)	4 (0%)	41 72
1	B	161/1887 (8%)	152 (94%)	9 (6%)	0	100 100
2	G	2030/2051 (99%)	1918 (94%)	105 (5%)	7 (0%)	41 72
All	All	3760/5825 (64%)	3573 (95%)	176 (5%)	11 (0%)	44 72

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	G	2016	ALA
2	G	769	SER
1	A	22	PHE
1	A	1543	GLY
2	G	1578	THR
1	A	785	ASP
1	A	1585	LYS
2	G	97	GLU
2	G	1162	ASP
2	G	1737	ILE
2	G	839	PRO

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	1336/1566 (85%)	1324 (99%)	12 (1%)	78 94
1	B	1/1566 (0%)	0	1 (100%)	0 0
2	G	1773/1789 (99%)	1762 (99%)	11 (1%)	86 96
All	All	3110/4921 (63%)	3086 (99%)	24 (1%)	82 94

All (24) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	59	ARG
1	A	411	GLN
1	A	754	ASP
1	A	1142	GLU
1	A	1305	CYS
1	A	1327	CYS
1	A	1332	TYR
1	A	1333	ASP
1	A	1540	SER
1	A	1612	ASP
1	A	1681	GLU
1	A	1789	ARG
1	B	180	SER
2	G	86	LEU
2	G	425	SER
2	G	437	ASP
2	G	453	LYS
2	G	599	PRO
2	G	636	SER
2	G	1215	LYS
2	G	1446	SER
2	G	1456	ASP
2	G	1596	TRP
2	G	2028	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	21	GLN
1	A	379	ASN
1	A	983	GLN
1	A	1380	GLN
1	A	1695	ASN
1	A	1703	HIS
2	G	245	GLN
2	G	330	ASN
2	G	440	ASN
2	G	456	GLN
2	G	718	ASN
2	G	747	HIS
2	G	993	GLN
2	G	1217	ASN
2	G	1241	ASN

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Mol	Chain	Res	Type
2	G	1352	HIS
2	G	1355	ASN
2	G	1432	GLN
2	G	1595	ASN
2	G	1839	GLN
2	G	1897	GLN
2	G	2013	ASN
2	G	2020	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

2 ligands are 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	$\#\|Z\| > 2$
4	FMN	G	2101	-	33,33,33	1.40	6 (18%)	48,50,50	1.35	7 (14%)
3	PNS	B	1901	1	14,20,21	0.44	0	18,26,29	1.46	4 (22%)

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
4	FMN	G	2101	-	-	1/18/18/18	0/3/3/3
3	PNS	B	1901	1	-	6/24/26/27	-

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	G	2101	FMN	C9A-C5A	3.67	1.47	1.41
4	G	2101	FMN	C4-N3	-2.57	1.34	1.38
4	G	2101	FMN	C5A-N5	-2.55	1.34	1.39
4	G	2101	FMN	C8-C7	2.53	1.47	1.40
4	G	2101	FMN	C2-N3	-2.17	1.34	1.39
4	G	2101	FMN	C6-C5A	-2.07	1.36	1.40

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	G	2101	FMN	C4-C4A-N5	4.12	124.10	118.23
3	B	1901	PNS	C38-C39-N41	3.54	122.38	116.42
4	G	2101	FMN	C4A-C10-N10	3.14	121.07	116.48
3	B	1901	PNS	O40-C39-C38	-2.90	116.72	122.02
4	G	2101	FMN	C10-N1-C2	2.86	122.62	116.90
4	G	2101	FMN	O2P-P-O5'	2.69	113.88	106.73
4	G	2101	FMN	O3P-P-O5'	-2.56	99.92	106.73
4	G	2101	FMN	C4A-C10-N1	-2.30	119.40	124.73
3	B	1901	PNS	C31-C29-C28	2.15	111.74	108.23
4	G	2101	FMN	C10-C4A-N5	-2.10	120.41	124.86
3	B	1901	PNS	C42-N41-C39	2.02	126.59	122.84

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	1901	PNS	O27-C28-C29-C30
3	B	1901	PNS	O27-C28-C29-C32
3	B	1901	PNS	N36-C37-C38-C39
3	B	1901	PNS	C38-C39-N41-C42
3	B	1901	PNS	O40-C39-N41-C42
3	B	1901	PNS	O27-C28-C29-C31
4	G	2101	FMN	C4'-C5'-O5'-P

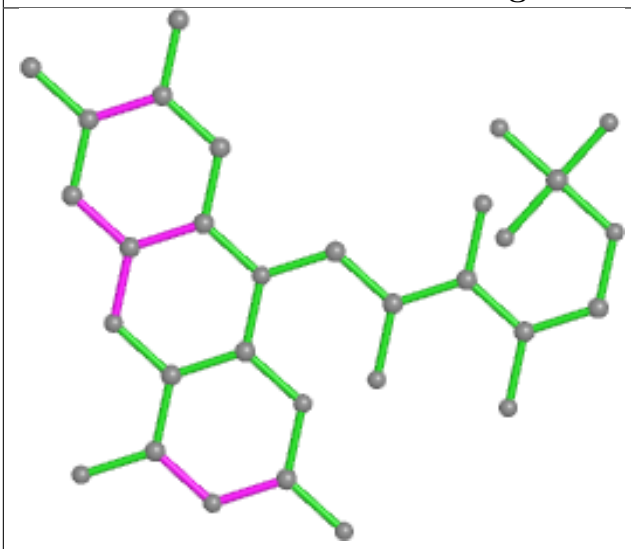
There are no ring outliers.

2 monomers are involved in 4 short contacts:

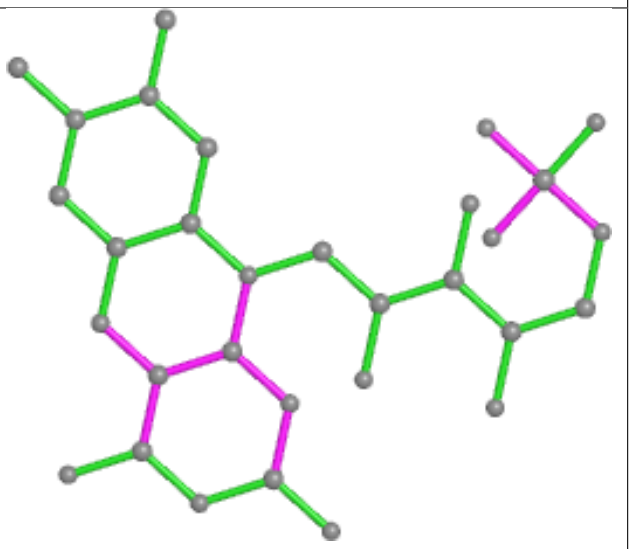
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	G	2101	FMN	3	0
3	B	1901	PNS	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

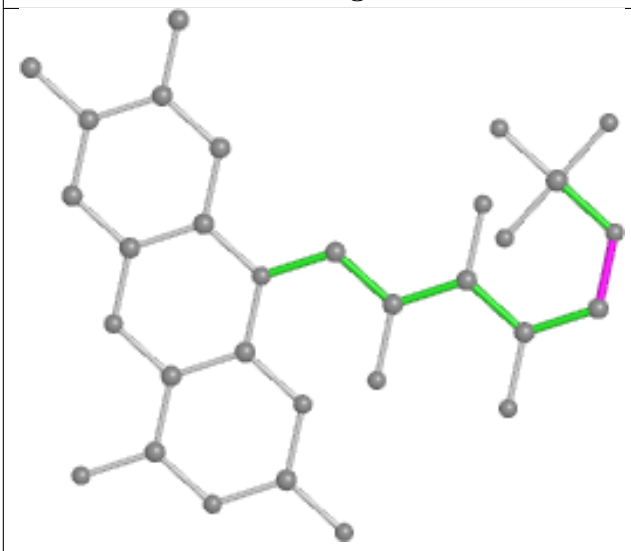
Ligand FMN G 2101



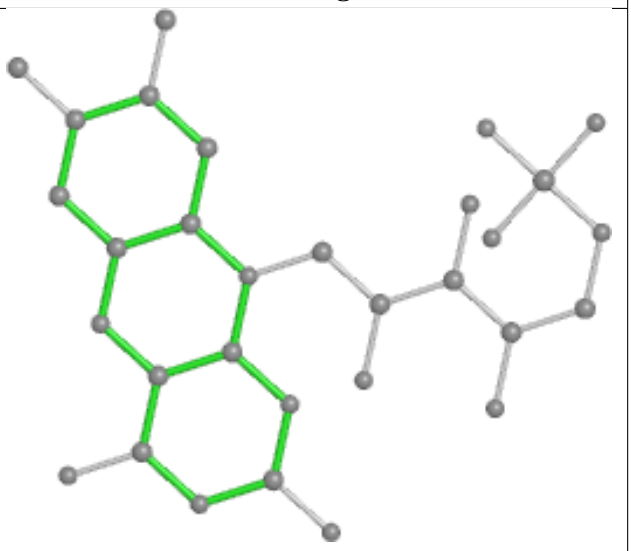
Bond lengths



Bond angles

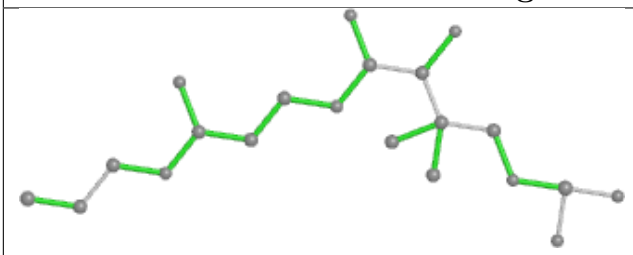


Torsions

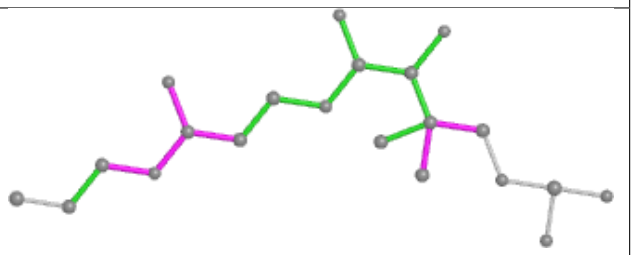


Rings

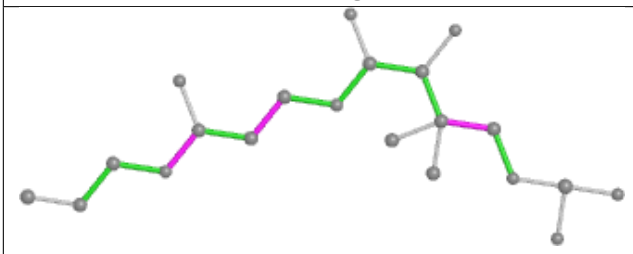
Ligand PNS B 1901



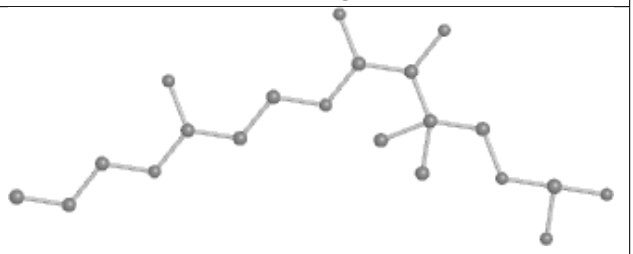
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

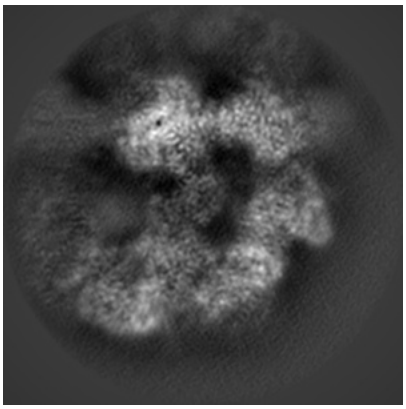
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-17851. These allow visual inspection of the internal detail of the map and identification of artifacts.

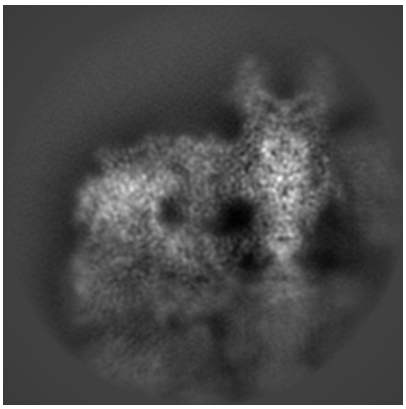
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

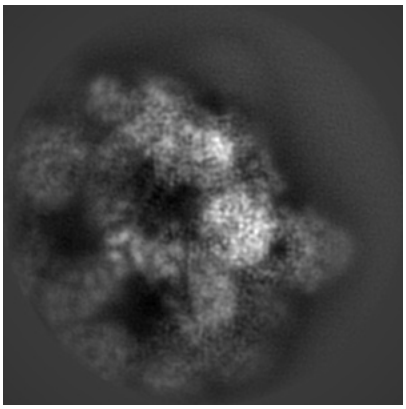
6.1.1 Primary map



X

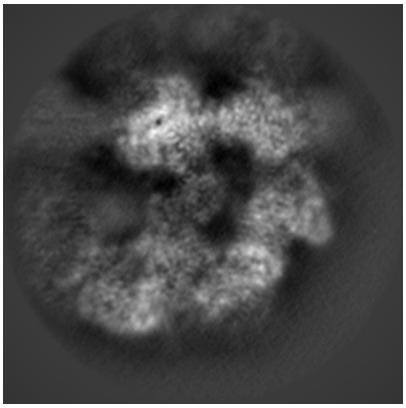


Y

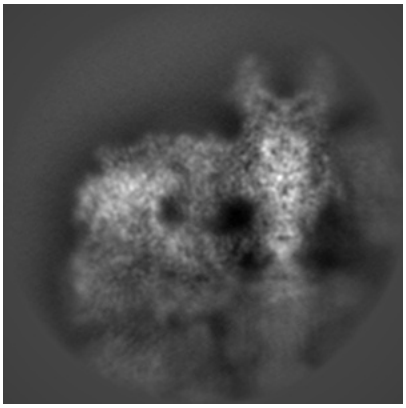


Z

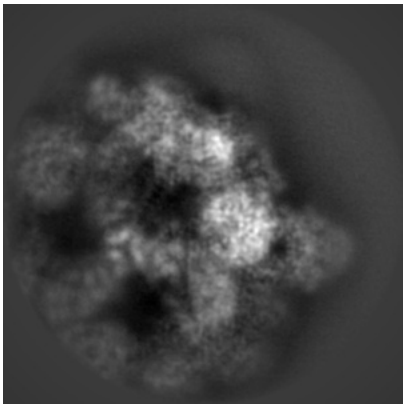
6.1.2 Raw map



X



Y

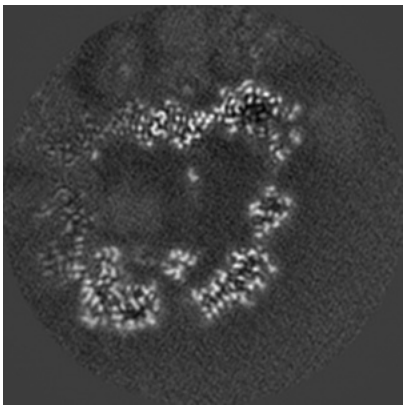


Z

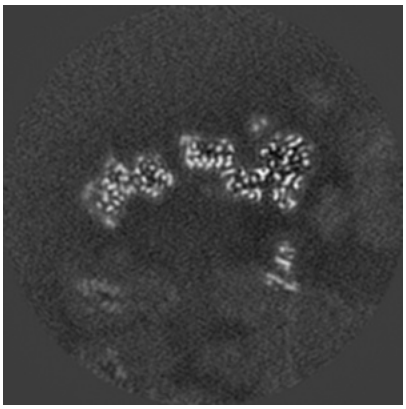
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

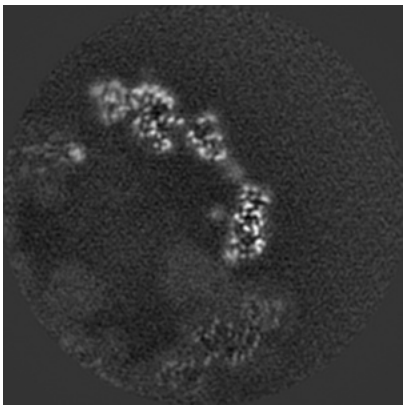
6.2.1 Primary map



X Index: 120

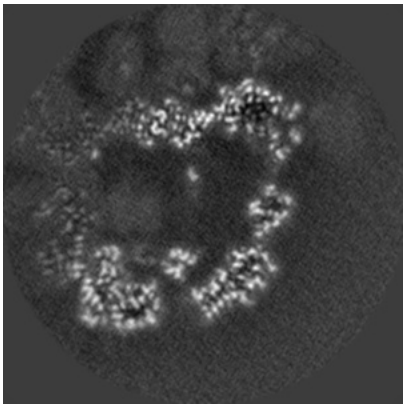


Y Index: 120

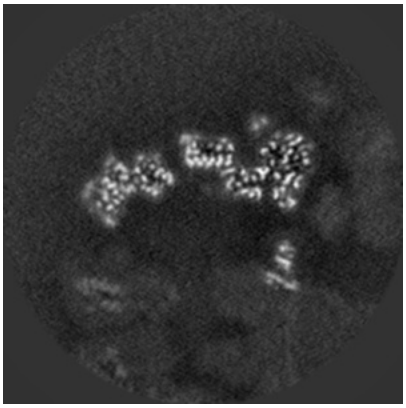


Z Index: 120

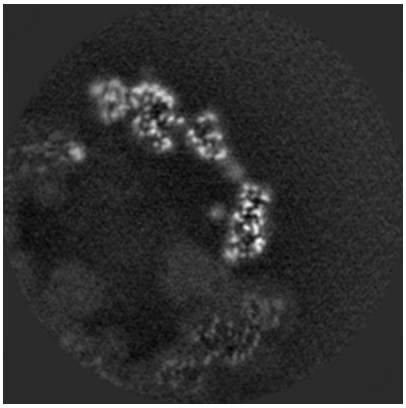
6.2.2 Raw map



X Index: 120



Y Index: 120

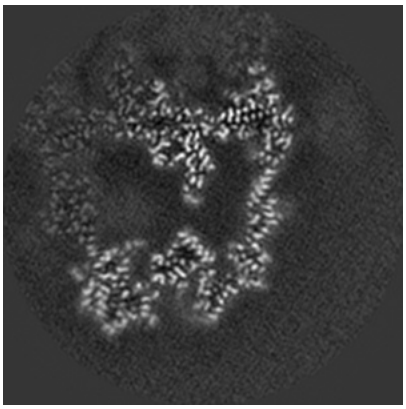


Z Index: 120

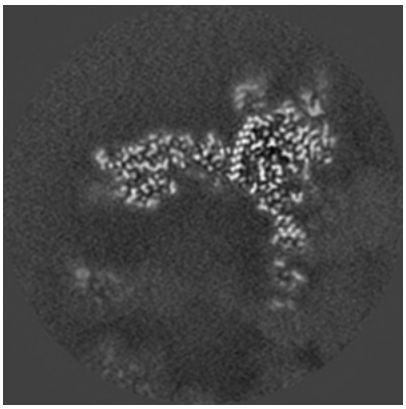
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

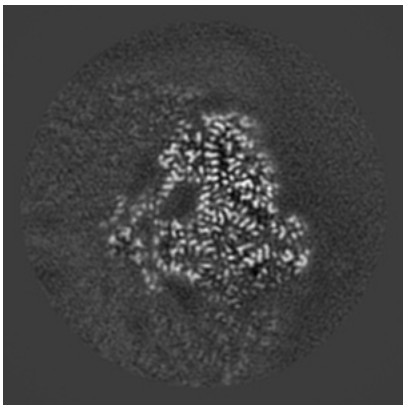
6.3.1 Primary map



X Index: 128

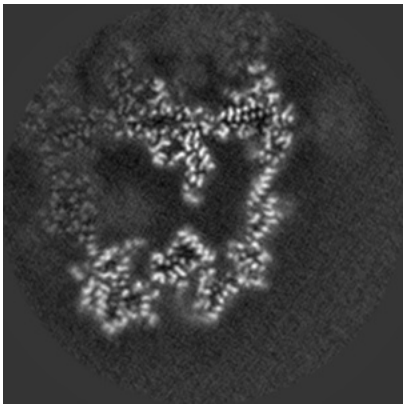


Y Index: 107

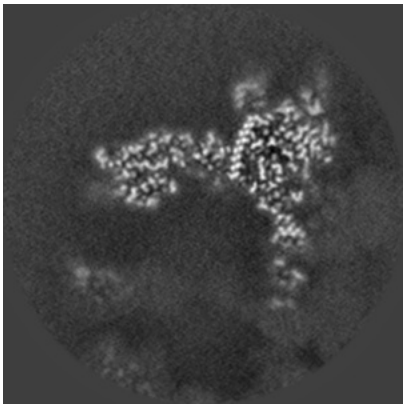


Z Index: 172

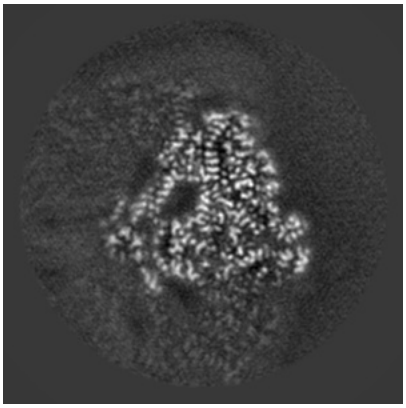
6.3.2 Raw map



X Index: 128



Y Index: 107

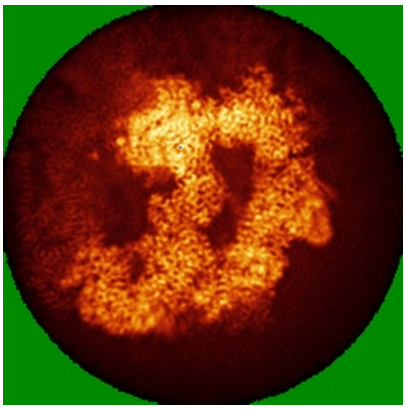


Z Index: 171

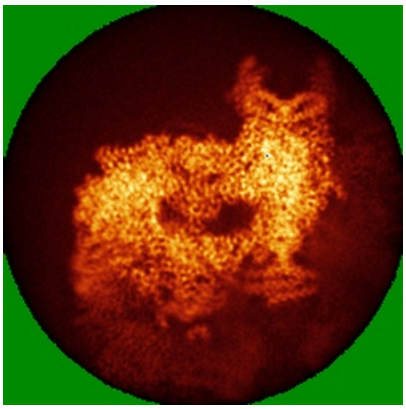
The images above show the largest variance slices of the map in three orthogonal directions.

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

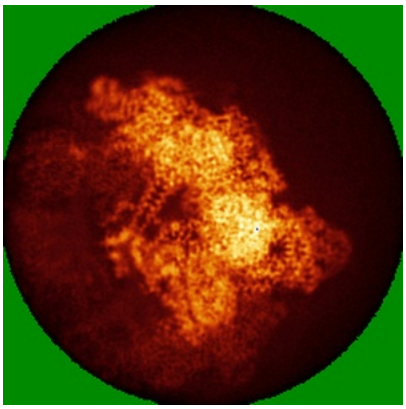
6.4.1 Primary map



X

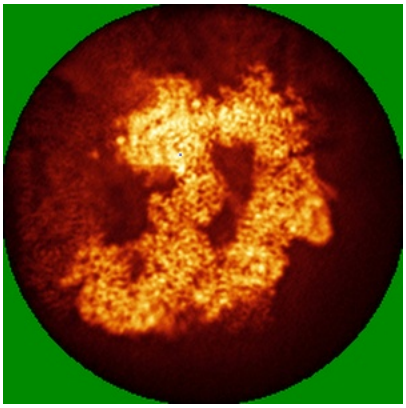


Y

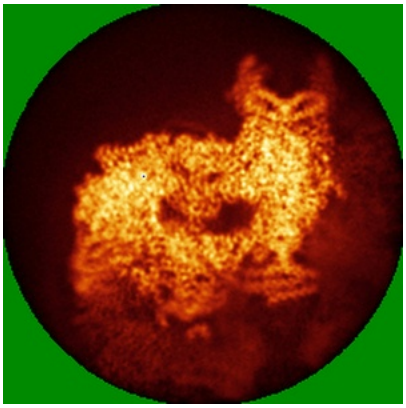


Z

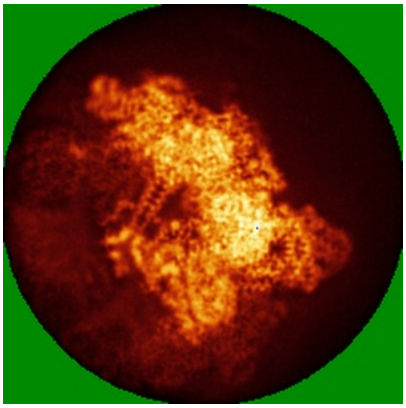
6.4.2 Raw map



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 0.0175. 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.

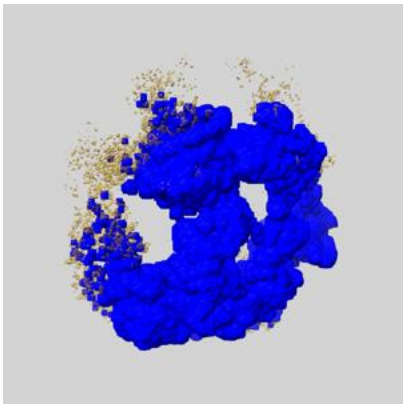
6.6 Mask visualisation (i)

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

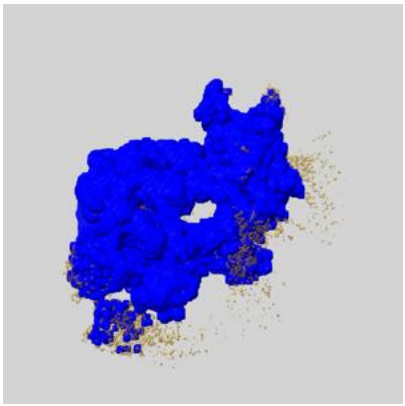
A mask typically either:

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

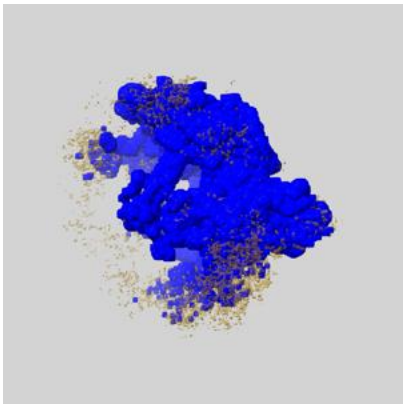
6.6.1 emd_17851_msk_1.map (i)



X



Y

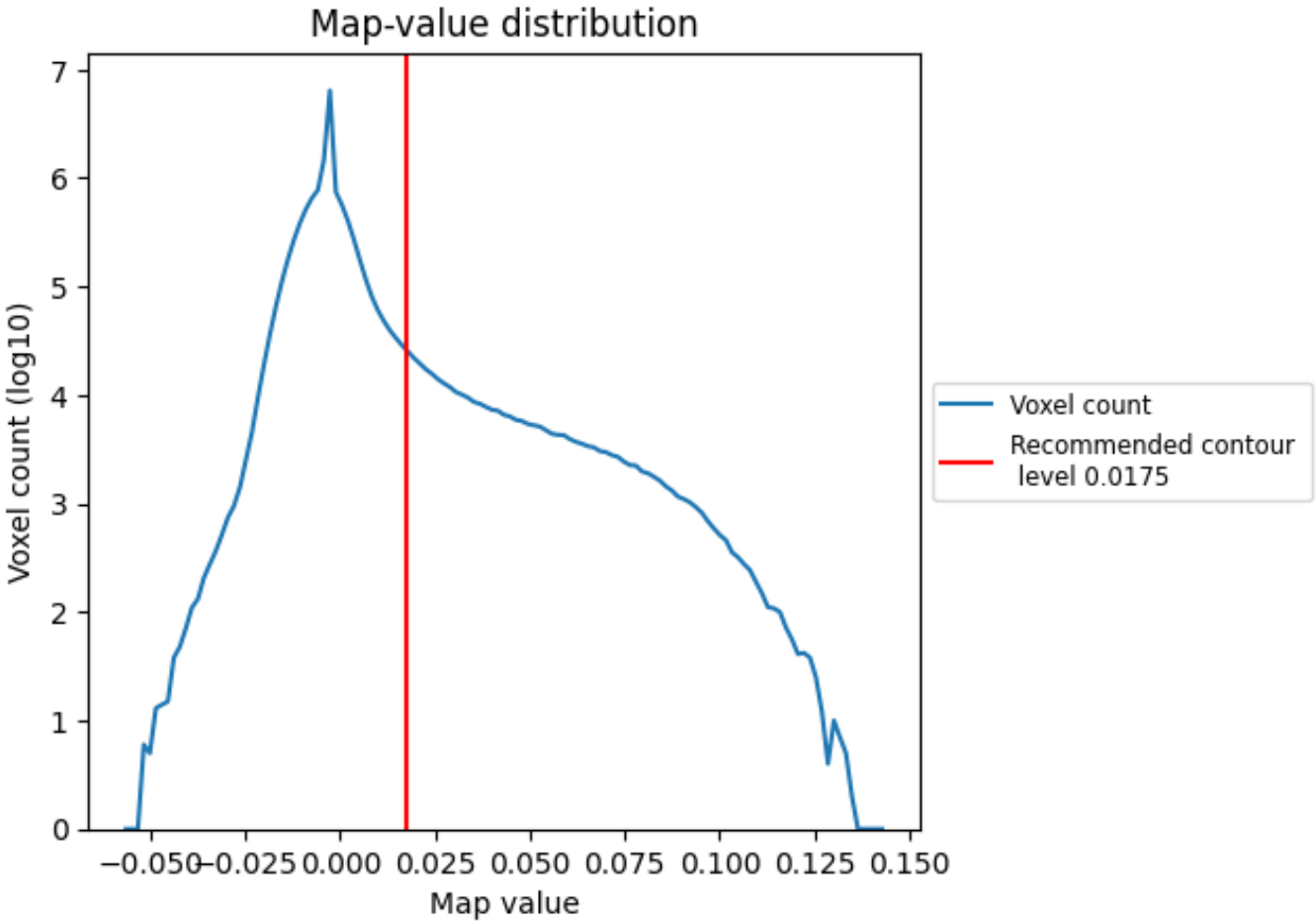


Z

7 Map analysis

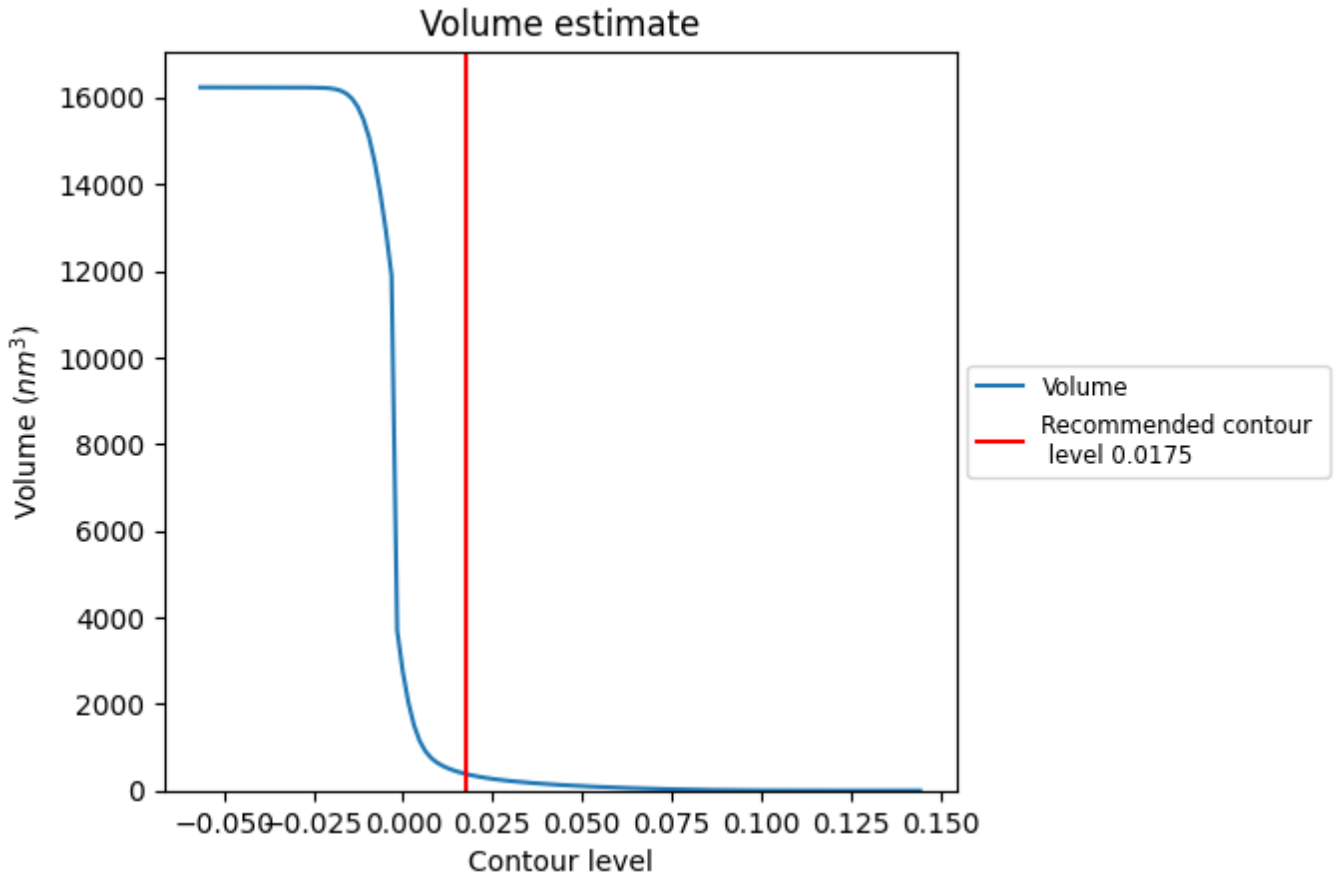
This section contains the results of statistical analysis of the map.

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.

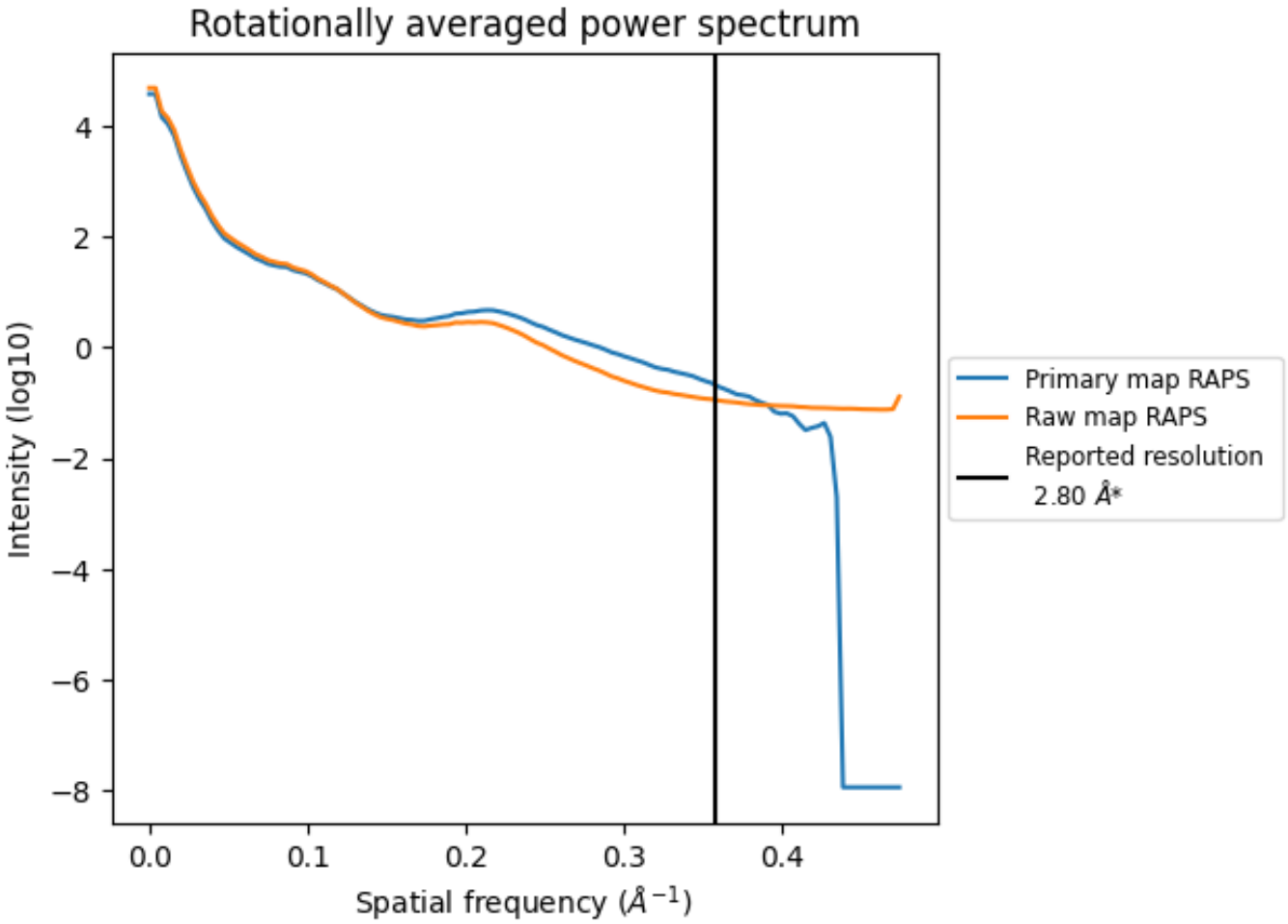
7.2 Volume estimate



The volume at the recommended contour level is 385 nm^3; this corresponds to an approximate mass of 348 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)

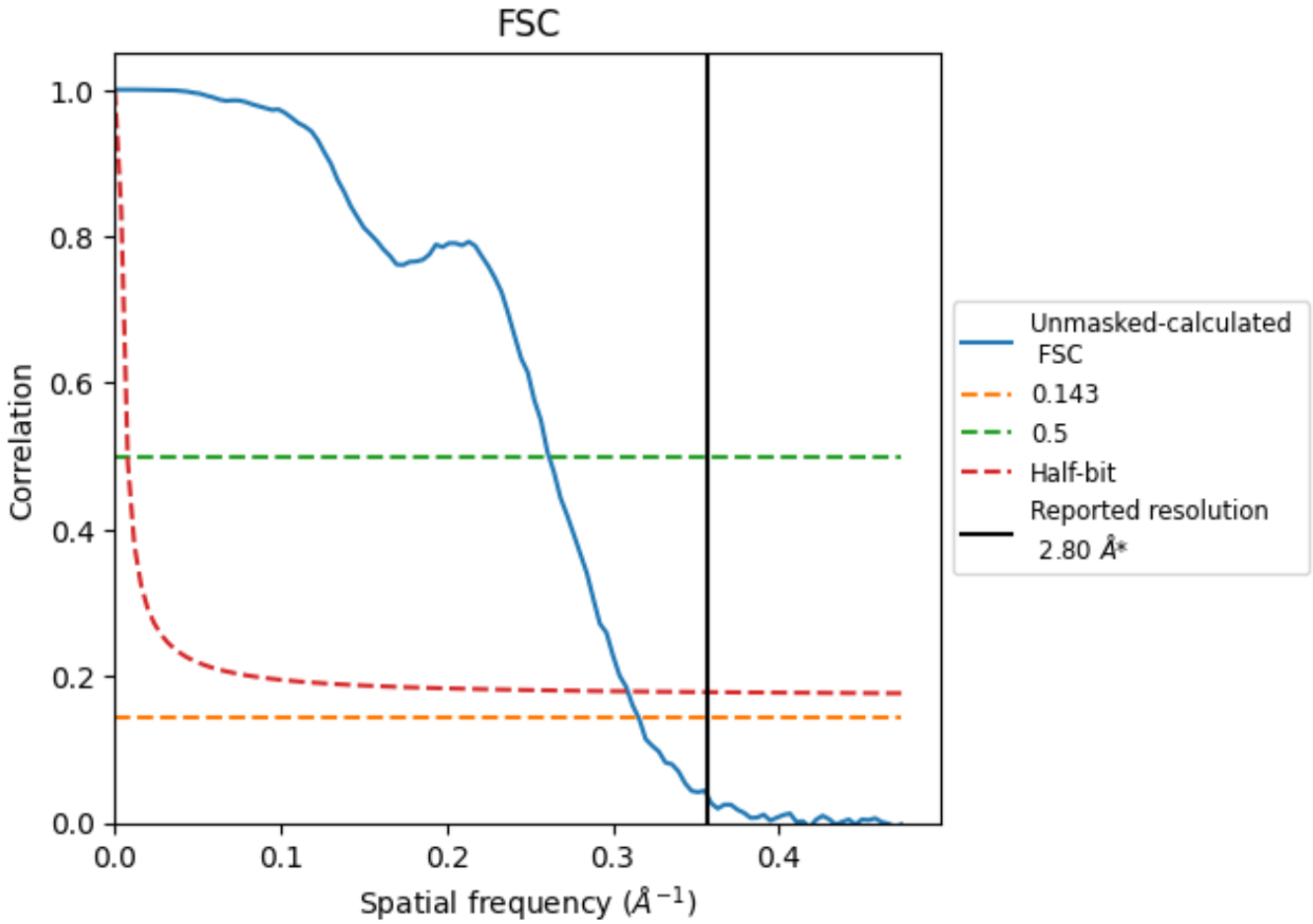


*Reported resolution corresponds to spatial frequency of 0.357 Å^{-1}

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 0.357 Å^{-1}

8.2 Resolution estimates (i)

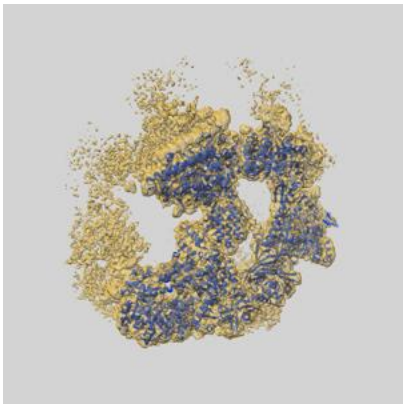
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.80	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.17	3.82	3.24

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.17 differs from the reported value 2.8 by more than 10 %

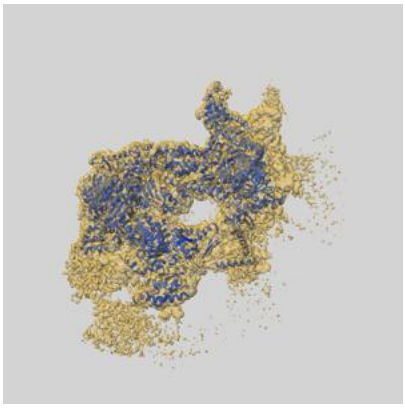
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-17851 and PDB model 8PSF. Per-residue inclusion information can be found in section 3 on page 5.

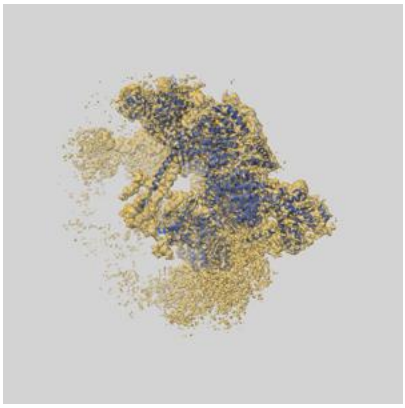
9.1 Map-model overlay



X



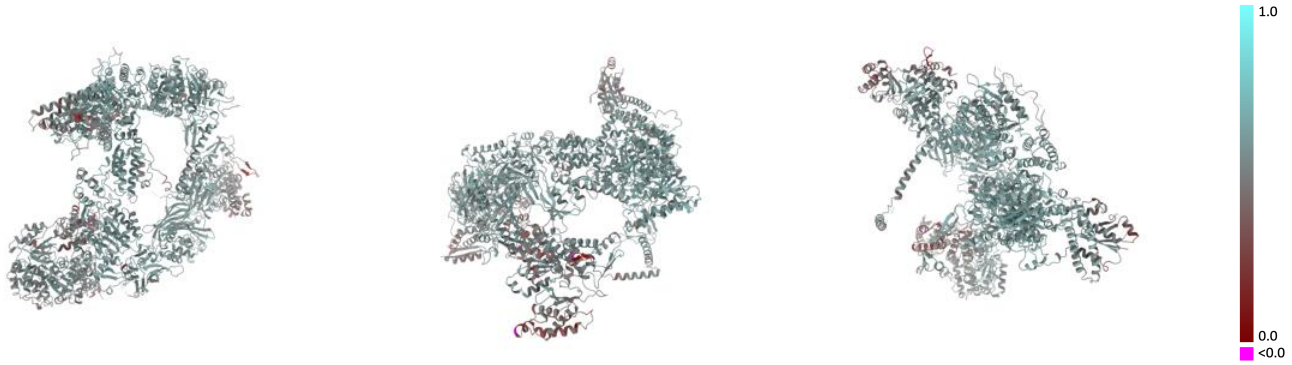
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.0175 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.

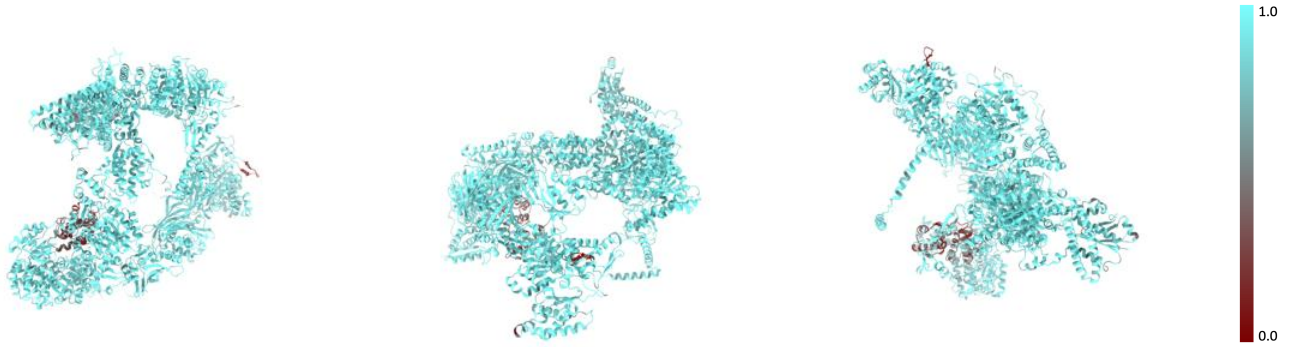
9.2 Q-score mapped to coordinate model (i)



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.

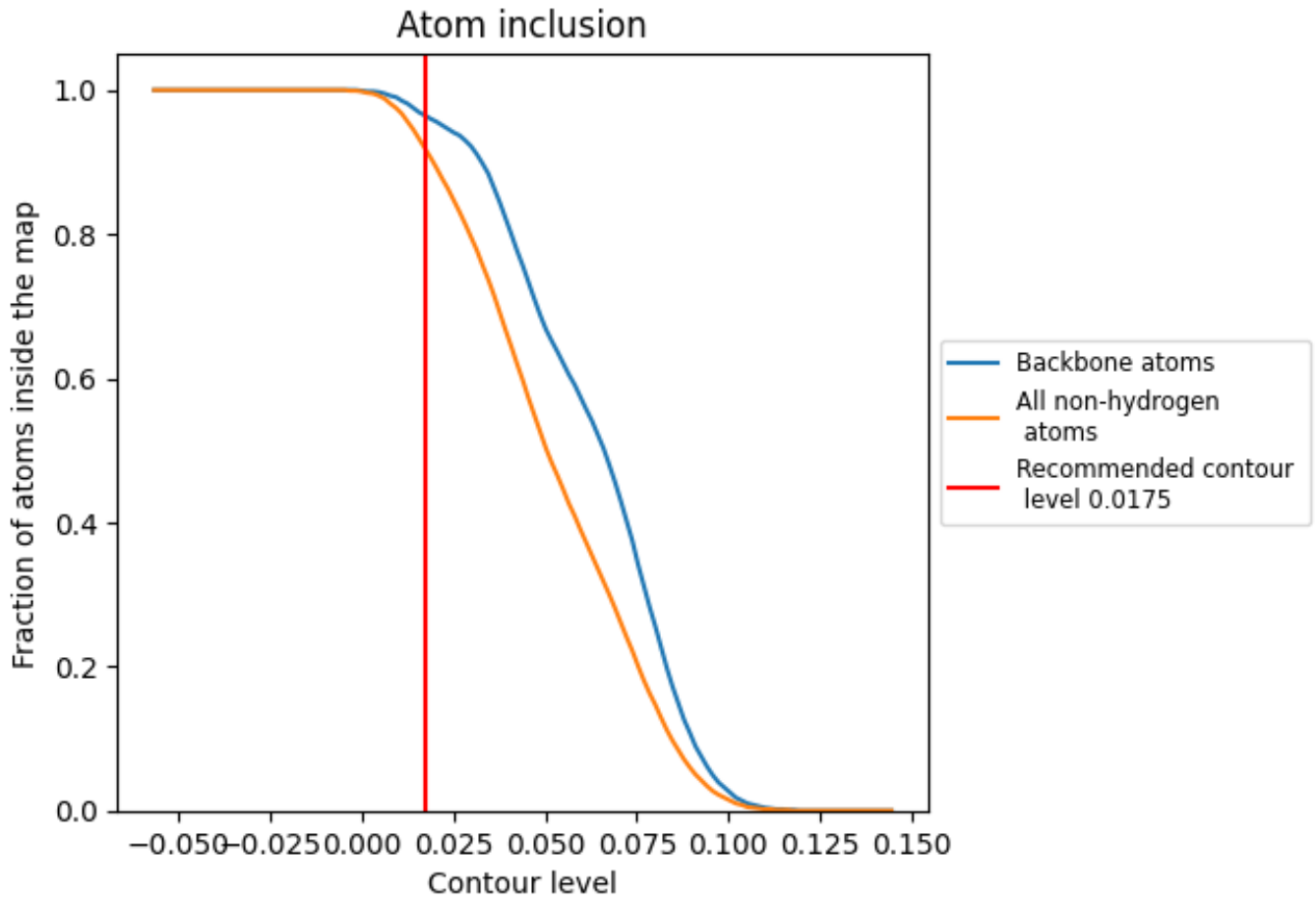
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.0175).

9.4 Atom inclusion (i)



At the recommended contour level, 96% of all backbone atoms, 92% 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 (0.0175) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9170	0.5410
A	0.9300	0.5640
B	0.2300	0.3340
G	0.9420	0.5350