Full wwPDB EM Validation Report (i)

May 26, 2025 – 02:19 AM EDT

PDB ID	:	8HMA / pdb_00008hma
EMDB ID	:	EMD-34891
Title	:	Cryo-EM structure of human high-voltage activated L-type calcium channel CaV1.2 in complex with tetrandrine (TET)
Authors	:	Wei, Y.; Yu, Z.; Zhao, Y.
Deposited on	:	2022-12-02
Resolution	:	3.40 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 (1)) were used in the production of this report:

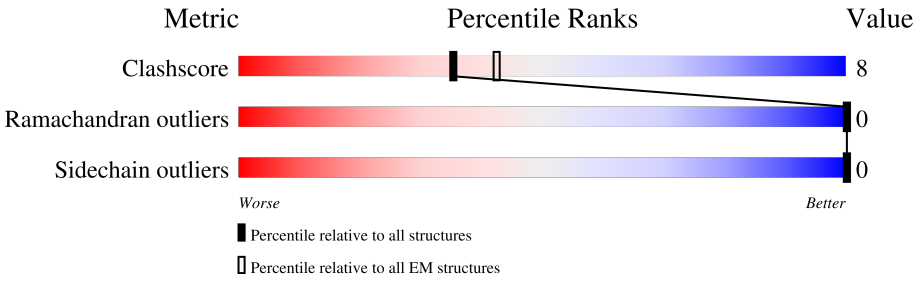
EMDB validation analysis	:	0.0.1.dev118
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0rc1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.40 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	E	2173	18% 50% 8% 42%
2	H	632	22% 18% 8% 74%
3	F	1071	10% 71% 15% 15%

2 Entry composition (i)

There are 9 unique types of molecules in this entry. The entry contains 19101 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 Voltage-dependent L-type calcium channel subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	E	1253	10151	6689	1656	1744	62	0	0

There are 13 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	372	VAL	MET	conflict	UNP A0A0A0MSA1
E	373	ASN	GLN	conflict	UNP A0A0A0MSA1
E	376	VAL	MET	conflict	UNP A0A0A0MSA1
E	378	ARG	TYR	conflict	UNP A0A0A0MSA1
E	379	ASP	GLU	conflict	UNP A0A0A0MSA1
E	380	TRP	LEU	conflict	UNP A0A0A0MSA1
E	383	ILE	VAL	conflict	UNP A0A0A0MSA1
E	387	THR	SER	conflict	UNP A0A0A0MSA1
E	389	ILE	VAL	conflict	UNP A0A0A0MSA1
E	391	ILE	PHE	conflict	UNP A0A0A0MSA1
E	966	LEU	ILE	conflict	UNP A0A0A0MSA1
E	969	ILE	ALA	conflict	UNP A0A0A0MSA1
E	1351	VAL	THR	conflict	UNP A0A0A0MSA1

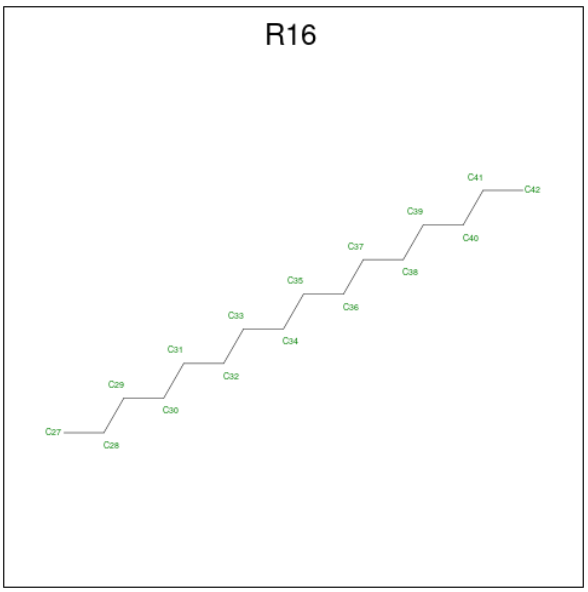
- Molecule 2 is a protein called Isoform 2c of Voltage-dependent L-type calcium channel subunit beta-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	H	165	1305	835	223	241	6	0	0

- Molecule 3 is a protein called Voltage-dependent calcium channel subunit alpha-2/delta-1.

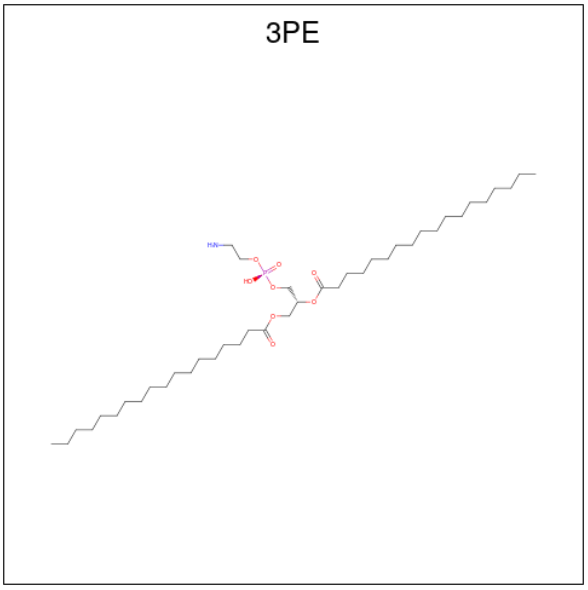
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	F	915	7352	4680	1229	1416	27	0	0

- Molecule 4 is HEXADECANE (CCD ID: R16) (formula: $C_{16}H_{34}$).



Mol	Chain	Residues	Atoms		AltConf
			Total	C	
4	E	1	14	14	0

- Molecule 5 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (CCD ID: 3PE) (formula: $C_{41}H_{82}NO_8P$).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
5	E	1	35	25	1	8	1	0

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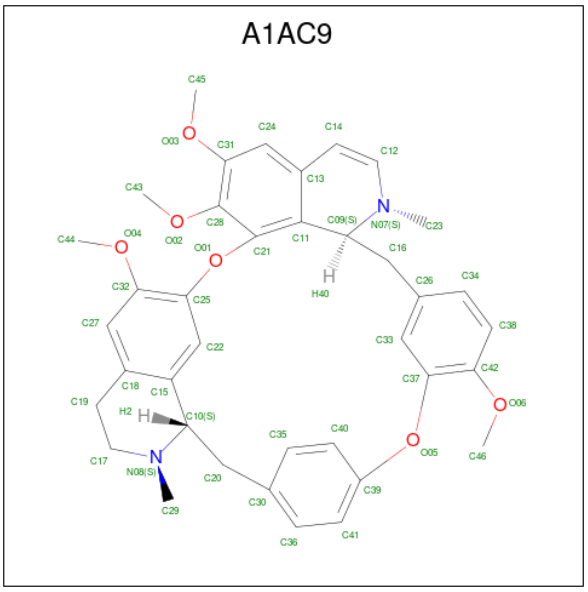
Mol	Chain	Residues	Atoms	AltConf
5	E	1	Total C 20 20	0
5	E	1	Total C 11 11	0

- Molecule 6 is 6,6',7,12-tetramethoxy-2,2'-dimethyl-1beta-3,4-didehydroberbaman (CCD ID: A1AC9) (formula: $C_{38}H_{40}N_2O_6$) (labeled as "Ligand of Interest" by depositor).

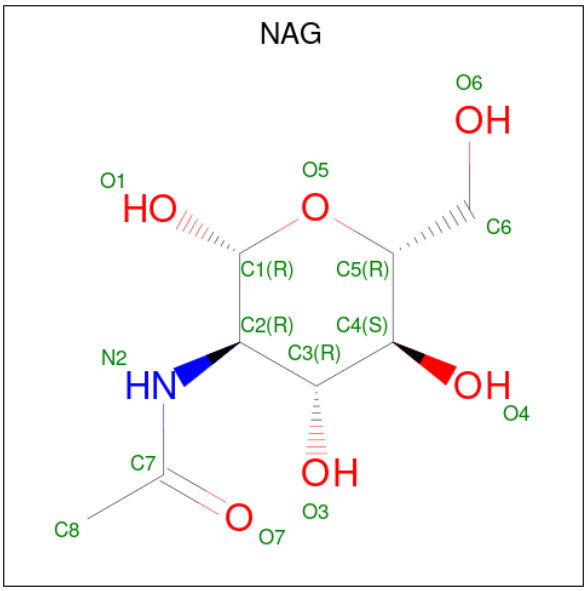


Mol	Chain	Residues	Atoms	AltConf
6	E	1	Total C N O 46 38 2 6	0

- Molecule 7 is CALCIUM ION (CCD ID: CA) (formula: Ca).

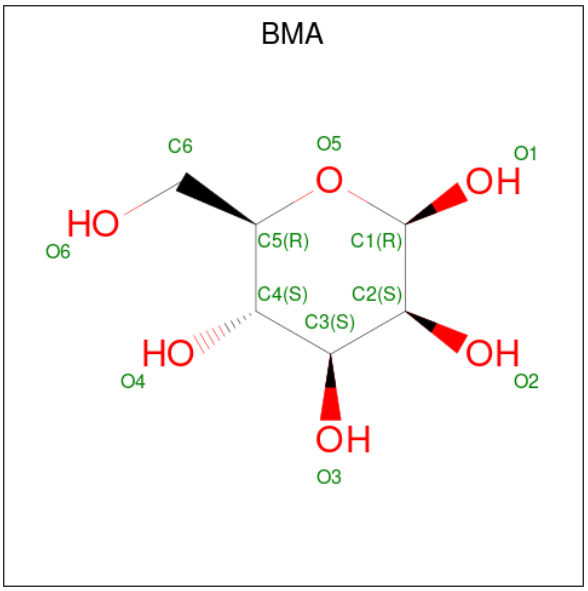
Mol	Chain	Residues	Atoms	AltConf
7	E	2	Total Ca 2 2	0

- Molecule 8 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



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

- Molecule 9 is beta-D-mannopyranose (CCD ID: BMA) (formula: $C_6H_{12}O_6$).



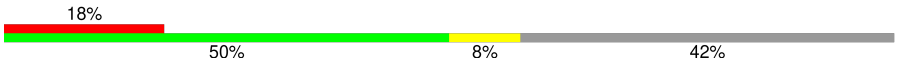
Mol	Chain	Residues	Atoms			AltConf
			Total	C	O	
9	F	1	11	6	5	0

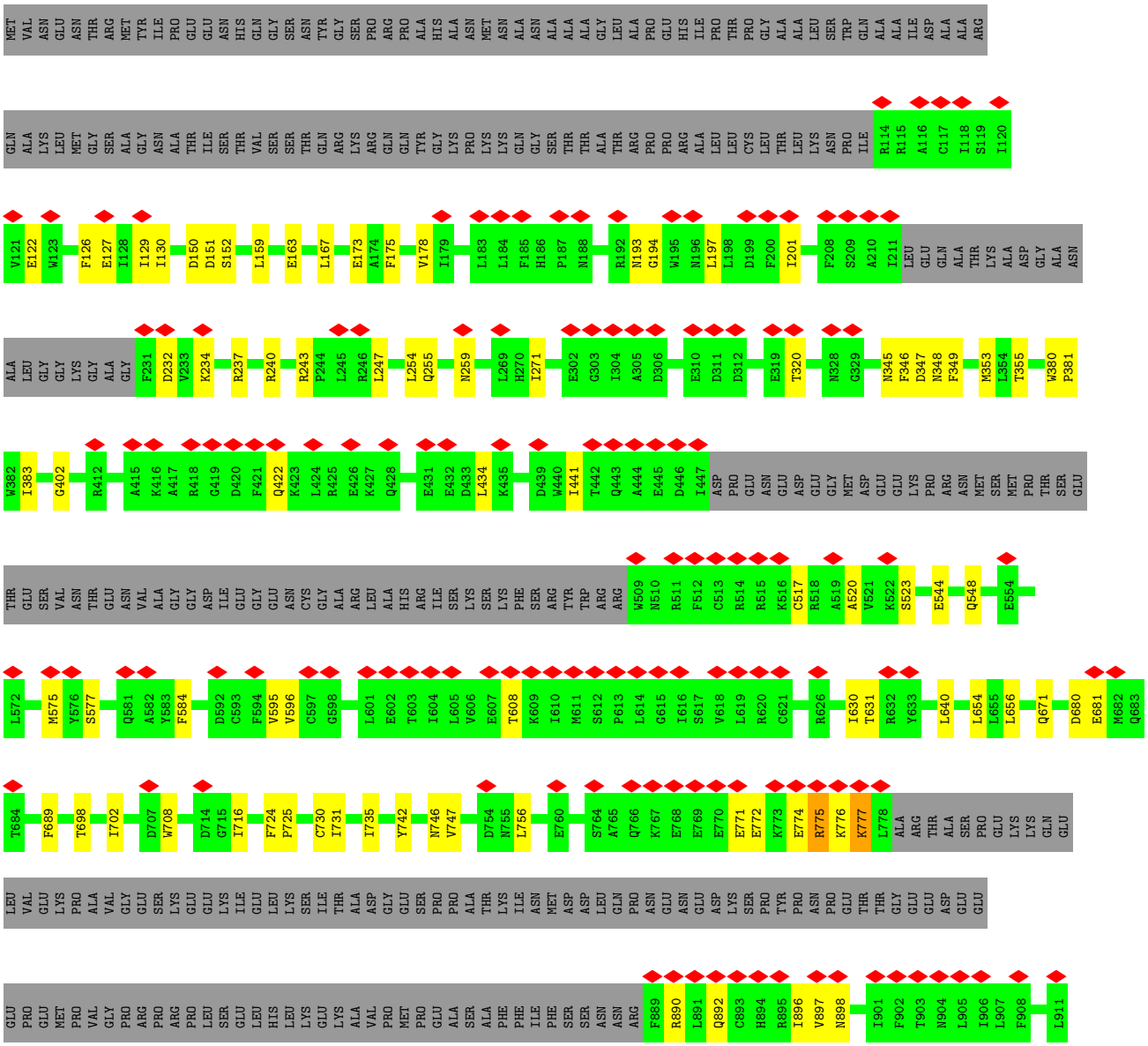
3 Residue-property plots (i)

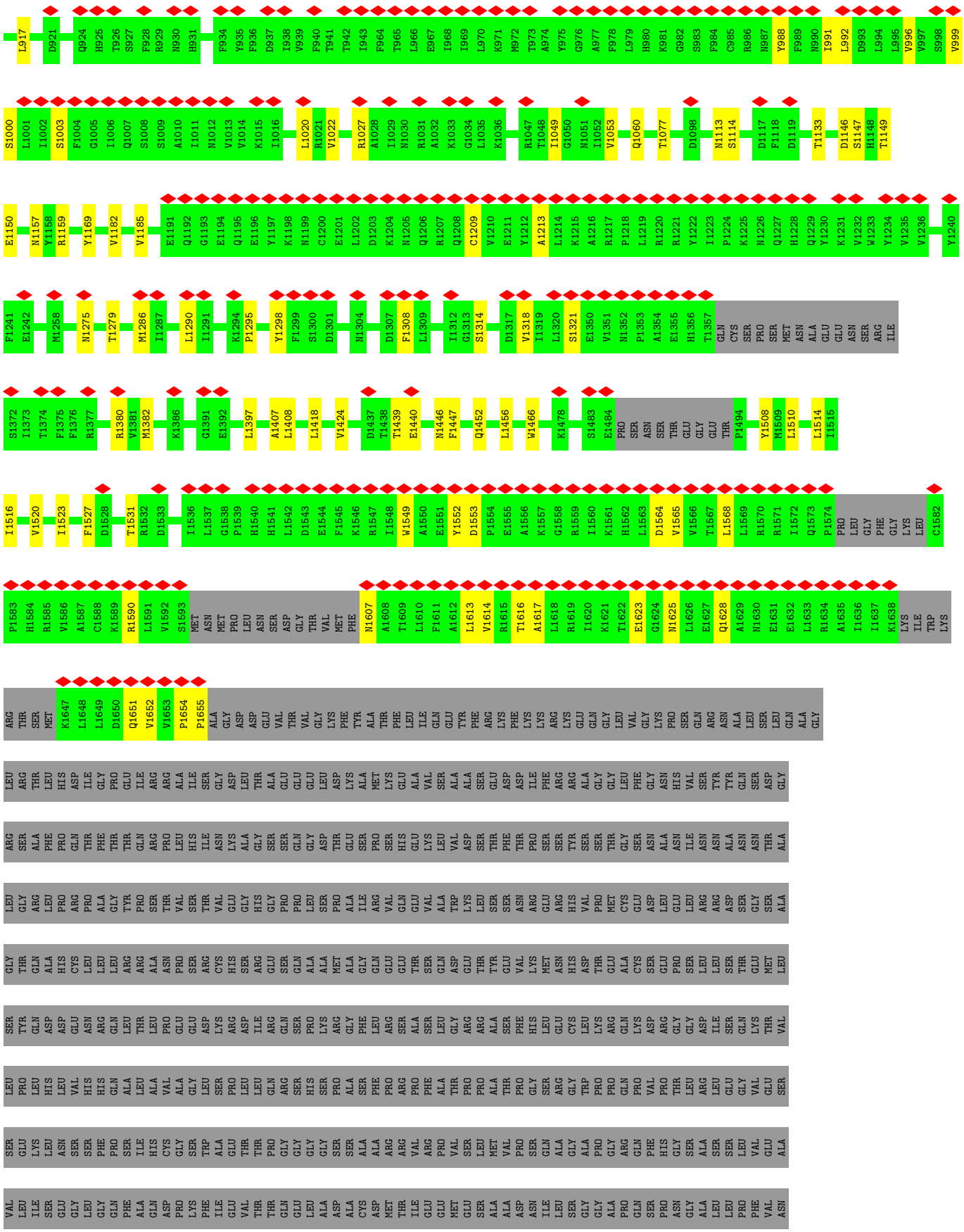
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: Voltage-dependent L-type calcium channel subunit alpha

Chain E:

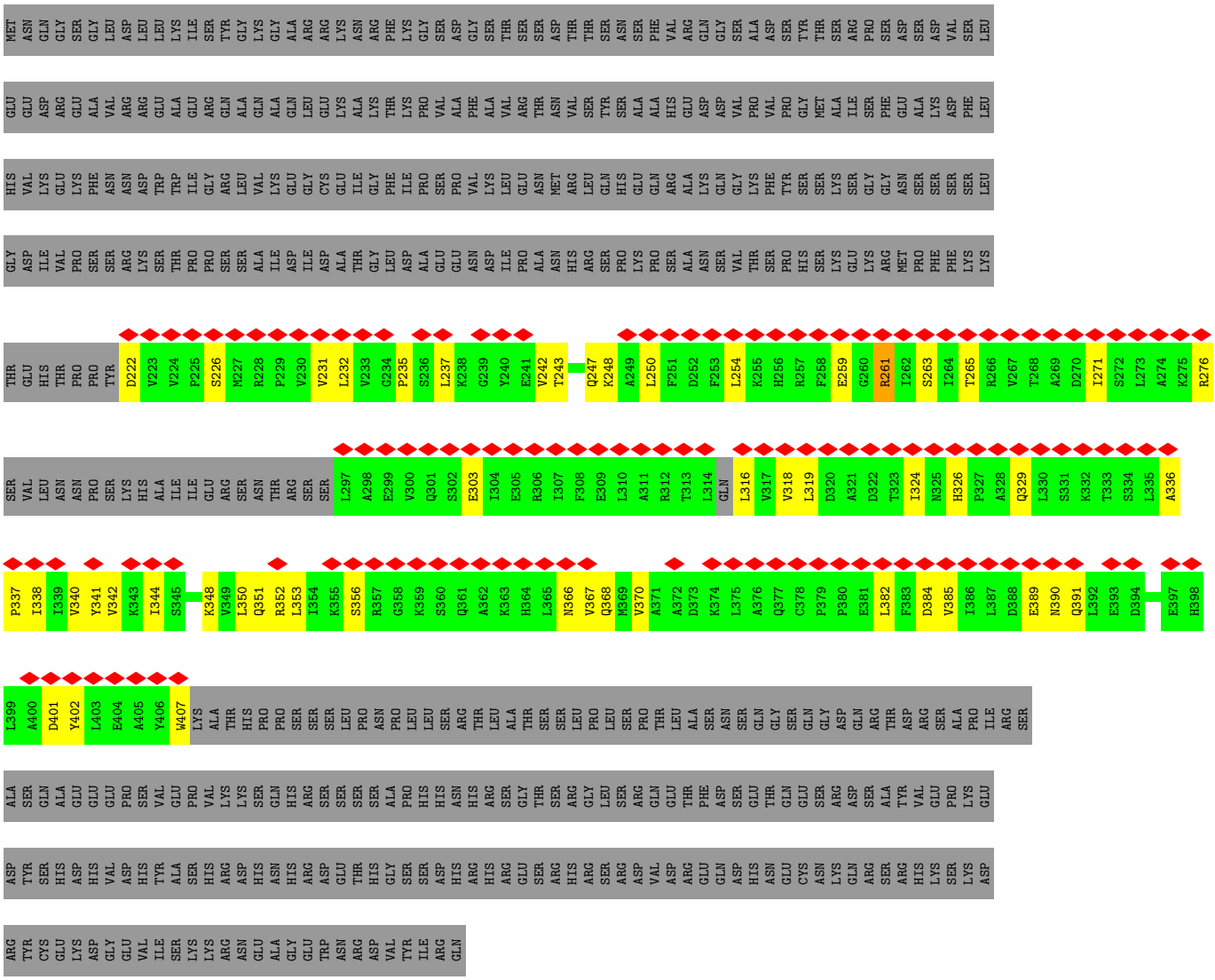





L917 D921 Q924 H925 T926 S927 F928 R929 N930 H931 F934 Y935 F936 D937 I938 V939 F940 T941 T942 I943 F964 T965 L966 E967 I968 I969 L970 K971 M972 T973 A974 Y975 G976 A977 F978 L979 H980 K981 G982 S983 F984 C985 R986 N987 Y988 F989 N990 I991 L992 D993 L994 L995 V996 V997 S998 V999
S1000 L1001 I1002 S1003 F1004 G1005 I1006 Q1007 S1008 S1009 A1010 I1011 N1012 V1013 V1014 K1015 I1016 L1020 R1021 V1022 R1027 A1028 I1029 N1030 R1031 A1032 K1033 G1034 L1035 K1036 R1047 T1048 I1049 G1050 N1051 I1052 V1053 Q1060 T1077 D1098 N1113 S1114 D1117 F1118 D1119 T1133 D1146 S1147 H1148 T1149
E1150 N1157 Y1158 R1159 Y1169 V1182 V1185 E1191 Q1192 G1193 E1194 Q1195 E1196 Y1197 K1198 N1199 C1200 E1201 L1202 D1203 K1204 N1205 Q1206 R1207 Q1208 C1209 V1210 E1211 Y1212 A1213 L1214 K1215 A1216 R1217 P1218 L1219 R1220 R1221 Y1222 I1223 P1224 K1225 N1226 Q1227 H1228 Q1229 Y1230 K1231 V1232 W1233 Y1234 V1235 V1236 Y1240
F1241 E1242 M1258 N1275 T1279 M1286 I1287 L1290 I1291 K1294 P1295 Y1298 F1299 S1300 D1301 N1304 D1307 F1308 L1309 I1312 G1313 S1314 D1317 V1318 I1319 L1320 S1321 E1350 V1351 N1352 P1353 A1354 E1355 H1356 T1357 GLN CYS SER PRO SER MET ASN ALA GLU GLU ASN SER ARG ILE
S1372 T1373 T1374 F1375 F1376 R1377 R1380 V1381 M1382 K1386 G1391 E1392 L1397 A1407 L1408 L1418 V1424 D1437 T1438 T1439 E1440 N1446 F1447 Q1452 L1456 W1466 K1478 S1483 E1484 PRO SER ASN SER THR GLU GLY GLU THR P1494 Y1508 M1509 L1510 L1514 I1515
I1516 V1520 I1523 F1527 D1528 T1531 R1532 D1533 I1536 L1537 G1538 P1539 H1540 H1541 L1542 D1543 E1544 F1545 K1546 R1547 I1548 W1549 A1550 E1551 Y1552 D1553 P1554 E1555 A1556 K1557 G1558 R1559 I1560 K1561 H1562 L1563 D1564 V1565 V1566 T1567 L1568 L1569 R1570 R1571 I1572 Q1573 P1574 PRO LEU GLY PHE GLY LYS LEU C1582
P1583 H1584 R1585 V1586 A1587 C1588 K1589 R1590 L1591 V1592 S1593 MET ASN MET PRO LEU ASN SER ASP GLY THR VAL MET PHE N1607 A1608 T1609 L1610 F1611 A1612 L1613 V1614 R1615 T1616 A1617 L1618 R1619 I1620 K1621 T1622 E1623 G1624 N1625 L1626 E1627 Q1628 A1629 N1630 E1631 E1632 L1633 R1634 A1635 I1636 I1637 K1638 LYS ILE TRP LYS
ARG THR SER MET K1647 L1648 L1649 D1650 Q1651 V1652 V1653 P1654 P1655 ALA GLY ASP ASP GLU VAL THR VAL GLY LYS PHE TYR ALA THR PHE LEU ILE GLN GLU TYR PHE ARG LYS PHE LYS LYS ARG LYS GLU GLN GLY LEU VAL GLY LYS PRO SER GLN ARG ASN ALA LEU SER LEU GLN ALA GLY
LEU ARG THR LEU HIS ASP ILE GLY PRO GLU ILE ARG ARG ALA ILE SER GLY ASP LEU THR ALA GLU GLU GLU LEU ASP LYS ALA MET LYS GLU ALA VAL SER ALA ALA SER GLU ASP ASP ILE PHE ARG ARG ALA GLY GLY LEU PHE GLY ASN HIS VAL SER TYR TYR GLN SER ASP GLY
ARG SER ALA PHE PRO GLN THR PHE THR THR GLN ARG PRO LEU HIS ILE ASN LYS ALA GLY SER SER GLY ASP THR GLU SER PRO SER HIS GLU LYS LEU VAL ASP SER THR PHE THR PRO SER SER TYR SER SER THR GLY SER ASN ALA ASN ILE ASN ASN ALA ASN ASN THR ALA
LEU GLY ARG LEU PRO ARG PRO ALA GLY TYR PRO SER THR VAL SER THR VAL GLU GLY HIS GLY PRO PRO LEU SER PRO ALA ILE ARG VAL GLN GLU VAL ALA TRP LYS LEU SER SER SER ASN ARG GLU ARG HIS VAL PRO MET CYS GLU ASP LEU GLU LEU ARG ARG ASP SER ASN GLY SER
GLY THR GLN ALA HIS CYS LEU LEU LEU ARG ARG ALA ALA ASN PRO SER ARG CYS HIS SER ARG GLU SER GLN ALA ALA MET ALA GLY GLN GLU GLU THR SER GLN ASP GLU THR TYR GLU VAL LYS MET ASN HIS ASP THR GLU ALA CYS SER GLU PRO LEU SER LEU LEU SER THR GLU MET LEU
SER TYR GLN ASP GLU ASN ARG GLN LEU THR LEU PRO GLU GLU ASP LYS ARG ASP ILE ARG GLN SER PRO LYS ARG GLY PHE LEU ARG SER ALA SER LEU GLU ARG GLN LYS ASP ARG GLY GLY ASP ILE SER GLN LYS THR VAL
LEU PRO LEU HIS HIS GLN ALA LEU ALA VAL ALA GLY LEU SER PRO LEU LEU LEU GLN ARG SER PRO ALA SER PHE PRO ARG PRO PHE ALA THR PRO GLY SER ARG GLY TRP PRO PRO GLN PRO VAL PRO THR LEU ARG LEU GLU GLY GLY SER
SER GLU LYS LEU ASN SER SER PHE PRO SER ILE HIS CYS GLY SER TRP ALA GLU THR THR PRO GLY GLY GLY GLY ALA PRO GLY ALA ALA ARG ARG ARG VAL ARG PRO VAL VAL SER LEU MET VAL PRO SER GLN ALA GLY ALA PRO GLY GLN PHE HIS GLY SER ALA SER SER LEU GLU GLU
VAL LEU ILE SER GLU GLY GLN PHE ALA GLN ASP PRO LYS PHE ILE GLU VAL THR THR GLN GLU LEU ALA ASP ALA CYS ASP MET THR ILE GLU GLU MET GLU SER ALA ALA ASP ASN ILE LEU SER GLY GLY ALA PRO GLN SER PRO ASN GLY ALA LEU LEU LEU PRO PHE VAL ASN

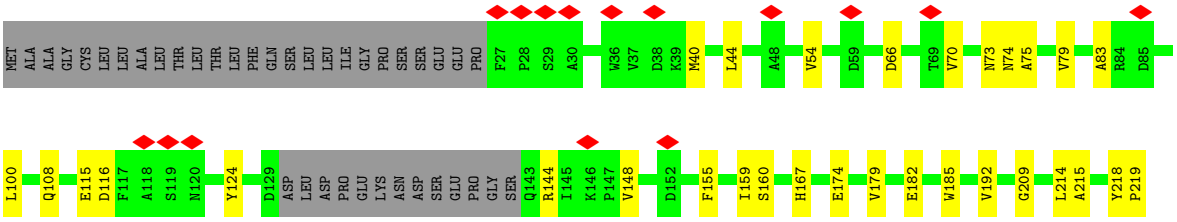
• Molecule 2: Isoform 2c of Voltage-dependent L-type calcium channel subunit beta-2

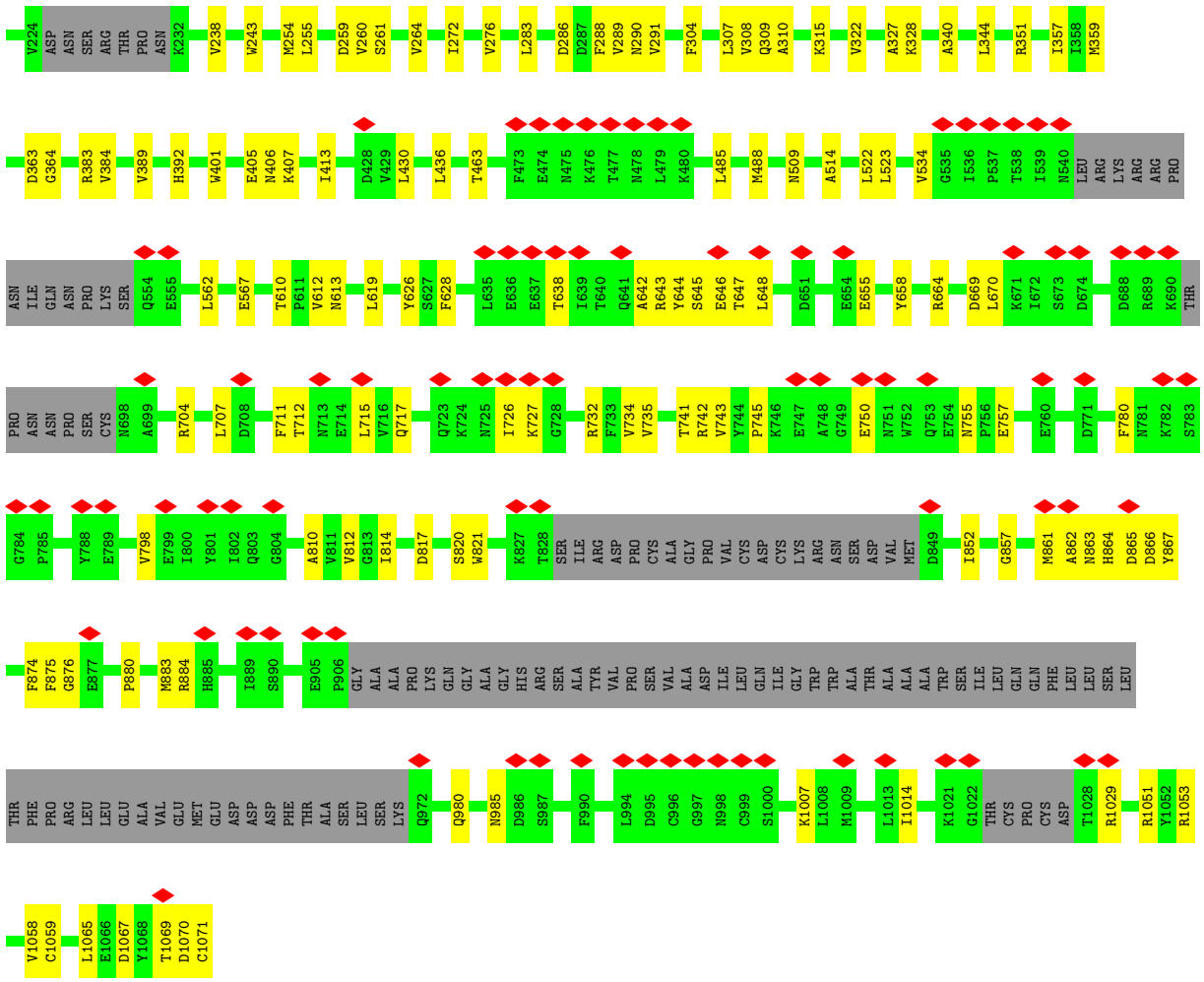
Chain H:



• Molecule 3: Voltage-dependent calcium channel subunit alpha-2/delta-1

Chain F:




V224 ASP ASN SER ARG THR PRO ASN K232 V238 W243 M254 L255 D259 V260 S261 V264 I272 V276 L283 D286 D287 F288 V289 N290 V291 F304 L307 V308 Q309 A310 K315 V322 A327 K328 A340 L344 R351 I357 I358 M359
D363 G364 R383 V384 V389 H392 W401 E405 N406 K407 I413 D428 V429 L430 L436 T463 F473 E474 N475 K476 T477 N478 L479 K480 L485 M488 N509 A514 L522 L523 V534 G535 I536 P537 T538 I539 N540 LEU ARG LYS ARG ARG PRO
ASN ILE GLN ASN PRO LYS SER Q554 E555 L562 E567 T610 P611 V612 N613 L619 Y626 S627 F628 L635 E636 E637 T638 I639 T640 Q641 A642 R643 Y644 S645 E646 T647 L648 D651 E654 E655 Y658 R664 D669 L670 K671 I672 S673 D674 D688 R689 K690 THR
PRO ASN ASN PRO SER CYS N698 A699 R704 L707 D708 F711 T712 N713 E714 L715 V716 Q717 Q723 K724 N725 I726 K727 G728 R732 F733 V734 V735 T741 R742 V743 Y744 P745 K746 E747 A748 G749 E750 N751 W752 Q753 E754 N755 P756 E757 E760 D771 F780 N781 K782 S783
G784 P785 Y788 E789 V798 E799 I800 Y801 I802 Q803 G804 A810 V811 V812 G813 I814 D817 S820 W821 K827 T828 SER ILE ARG ASP PRO CYS ALA GLY PRO VAL CYS ASP CYS LYS ARG ASN SER ASP VAL MET D849 I852 G857 M861 A862 N863 H864 D865 D866 Y867
F874 F875 G876 E877 P880 M883 R884 H885 I889 S890 E905 P906 GLY ALA ALA PRO LYS GLN GLY ALA GLY HIS ARG SER ALA TYR VAL PRO SER VAL ALA ASP ILE LEU GLN ILE GLY TRP TRP ALA THR ALA ALA ALA TRP SER ILE LEU GLN GLN PHE LEU LEU SER LEU
THR PHE PRO ARG LEU LEU GLU ALA VAL GLU MET GLU ASP ASP ASP PHE THR ALA SER LEU SER LYS Q972 Q980 N985 D986 S987 F990 L994 D995 C996 G997 N998 C999 S1000 K1007 L1008 M1009 L1013 I1014 K1021 G1022 THR CYS PRO CYS ASP T1028 R1029 R1051 Y1052 R1053
V1058 C1059 L1065 E1066 D1067 Y1068 T1069 D1070 C1071

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	37051	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	9.6	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	2.961	Depositor
Minimum map value	-1.575	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.070	Depositor
Recommended contour level	0.5	Depositor
Map size (Å)	332.8, 332.8, 332.8	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.04, 1.04, 1.04	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: R16, 3PE, CA, A1AC9, NAG, BMA

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	E	0.12	0/10389	0.29	4/14079 (0.0%)
2	H	0.12	0/1325	0.38	1/1792 (0.1%)
3	F	0.13	0/7504	0.28	0/10169
All	All	0.12	0/19218	0.29	5/26040 (0.0%)

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	771	GLU	N-CA-C	-8.37	103.51	114.31
1	E	777	LYS	N-CA-C	-7.15	102.53	111.11
2	H	261	ARG	CB-CA-C	5.98	120.37	110.81
1	E	772	GLU	N-CA-C	-5.79	105.05	111.36
1	E	775	ARG	N-CA-C	-5.14	106.17	112.90

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	E	10151	0	10357	118	0
2	H	1305	0	1350	43	0
3	F	7352	0	7177	133	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	E	14	0	27	0	0
5	E	66	0	94	0	0
6	E	46	0	0	1	0
7	E	2	0	0	0	0
8	F	154	0	143	4	0
9	F	11	0	10	1	0
All	All	19101	0	19158	294	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 8.

All (294) 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:F:644:TYR:O	3:F:647:THR:HG22	1.40	1.19
1:E:774:GLU:HG3	1:E:777:LYS:HE3	1.38	1.01
3:F:327:ALA:O	3:F:328:LYS:HG3	1.72	0.89
1:E:774:GLU:CG	1:E:777:LYS:HE3	2.03	0.86
1:E:774:GLU:O	1:E:777:LYS:HG3	1.79	0.81
1:E:345:ASN:ND2	1:E:347:ASP:OD2	2.20	0.75
3:F:644:TYR:O	3:F:647:THR:CG2	2.31	0.73
3:F:363:ASP:O	3:F:392:HIS:NE2	2.21	0.73
3:F:383:ARG:NH1	3:F:407:LYS:O	2.22	0.73
1:E:1113:ASN:OD1	1:E:1114:SER:N	2.20	0.72
3:F:509:ASN:ND2	3:F:626:TYR:OH	2.22	0.72
3:F:821:TRP:CZ3	3:F:861:MET:HE1	2.26	0.71
2:H:261:ARG:NH1	2:H:407:TRP:O	2.24	0.70
3:F:884:ARG:HH21	3:F:1029:ARG:C	2.00	0.70
3:F:182:GLU:OE2	8:F:1103:NAG:H81	1.91	0.70
1:E:1623:GLU:N	1:E:1623:GLU:OE1	2.25	0.69
2:H:232:LEU:HD13	2:H:340:VAL:HG23	1.73	0.69
3:F:523:LEU:HD23	3:F:523:LEU:O	1.93	0.69
1:E:1613:LEU:O	1:E:1617:ALA:N	2.24	0.69
3:F:655:GLU:OE1	3:F:717:GLN:NE2	2.24	0.69
1:E:774:GLU:HG3	1:E:777:LYS:CE	2.19	0.69
3:F:327:ALA:O	3:F:328:LYS:CG	2.40	0.68
3:F:734:VAL:HG23	3:F:812:VAL:HG12	1.76	0.68
3:F:798:VAL:HG12	3:F:810:ALA:O	1.94	0.67
3:F:655:GLU:O	3:F:717:GLN:NE2	2.26	0.67
1:E:1652:VAL:O	1:E:1655:PRO:HD2	1.95	0.67
3:F:307:LEU:HD12	3:F:351:ARG:HG2	1.76	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:664:ARG:NH1	3:F:757:GLU:OE2	2.29	0.65
1:E:1146:ASP:OD1	1:E:1157:ASN:N	2.28	0.65
1:E:1625:ASN:ND2	1:E:1628:GLN:OE1	2.29	0.65
1:E:151:ASP:OD1	1:E:152:SER:N	2.30	0.64
2:H:232:LEU:CD1	2:H:340:VAL:HG23	2.27	0.64
1:E:680:ASP:OD1	1:E:681:GLU:N	2.31	0.64
3:F:863:ASN:OD1	3:F:864:HIS:N	2.31	0.64
2:H:261:ARG:HH11	2:H:407:TRP:HB3	1.64	0.63
1:E:654:LEU:HB3	1:E:747:VAL:HG23	1.80	0.63
3:F:357:ILE:HD11	3:F:430:LEU:HD21	1.81	0.63
2:H:231:VAL:O	2:H:340:VAL:HG22	1.99	0.63
3:F:852:ILE:HD12	3:F:861:MET:HE2	1.80	0.63
1:E:517:CYS:SG	1:E:577:SER:OG	2.40	0.62
1:E:1531:THR:O	1:E:1531:THR:HG23	1.98	0.62
3:F:288:PHE:CD1	3:F:309:GLN:HA	2.34	0.62
3:F:1058:VAL:HG23	3:F:1059:CYS:H	1.65	0.62
3:F:304:PHE:CG	3:F:308:VAL:HG11	2.34	0.62
3:F:363:ASP:OD1	3:F:364:GLY:N	2.33	0.61
3:F:875:PHE:CD2	3:F:883:MET:HE2	2.36	0.61
3:F:215:ALA:HB2	3:F:238:VAL:HG21	1.81	0.61
1:E:201:ILE:HD13	1:E:243:ARG:NH2	2.15	0.61
3:F:866:ASP:OD1	3:F:867:TYR:N	2.34	0.60
2:H:248:LYS:HE3	2:H:248:LYS:HA	1.83	0.60
3:F:272:ILE:HG13	3:F:389:VAL:HG21	1.84	0.60
3:F:798:VAL:HG13	3:F:798:VAL:O	2.00	0.60
1:E:716:ILE:HD11	1:E:730:CYS:SG	2.42	0.60
1:E:422:GLN:N	1:E:422:GLN:OE1	2.35	0.59
3:F:669:ASP:OD1	3:F:670:LEU:N	2.35	0.59
3:F:108:GLN:HG2	3:F:485:LEU:HD21	1.85	0.59
2:H:353:LEU:O	2:H:356:SER:OG	2.20	0.59
3:F:100:LEU:HB3	3:F:488:MET:HE1	1.84	0.58
1:E:1549:TRP:O	1:E:1553:ASP:N	2.37	0.58
1:E:1060:GLN:NE2	1:E:1169:TYR:OH	2.38	0.57
2:H:340:VAL:HG12	2:H:385:VAL:HG21	1.87	0.57
3:F:243:TRP:O	3:F:463:THR:HG21	2.04	0.57
2:H:401:ASP:OD1	2:H:402:TYR:N	2.38	0.56
3:F:613:ASN:ND2	8:F:1107:NAG:O7	2.33	0.56
1:E:1213:ALA:O	1:E:1607:ASN:ND2	2.39	0.56
1:E:255:GLN:NE2	1:E:259:ASN:OD1	2.36	0.55
3:F:857:GLY:O	3:F:874:PHE:CD1	2.59	0.55
3:F:255:LEU:HD22	3:F:344:LEU:CD1	2.37	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:857:GLY:O	3:F:875:PHE:N	2.40	0.55
3:F:1070:ASP:O	3:F:1071:CYS:SG	2.65	0.55
3:F:327:ALA:C	3:F:328:LYS:HG3	2.30	0.55
2:H:222:ASP:OD2	2:H:276:ARG:NE	2.40	0.55
1:E:1527:PHE:O	1:E:1531:THR:HG22	2.06	0.55
3:F:272:ILE:CG1	3:F:389:VAL:HG21	2.36	0.55
1:E:1000:SER:O	1:E:1003:SER:OG	2.25	0.55
3:F:260:VAL:HG23	3:F:260:VAL:O	2.07	0.55
3:F:821:TRP:CE3	3:F:861:MET:HE1	2.42	0.54
1:E:320:THR:O	1:E:320:THR:HG22	2.08	0.54
3:F:1059:CYS:O	3:F:1059:CYS:SG	2.66	0.54
1:E:122:GLU:N	1:E:122:GLU:OE1	2.40	0.54
1:E:776:LYS:O	1:E:776:LYS:HG2	2.08	0.54
3:F:755:ASN:OD1	3:F:757:GLU:N	2.38	0.54
3:F:876:GLY:N	3:F:883:MET:HE1	2.23	0.54
1:E:1565:VAL:O	1:E:1565:VAL:HG22	2.08	0.54
1:E:1447:PHE:CZ	1:E:1456:LEU:HD22	2.43	0.53
2:H:261:ARG:NH1	2:H:407:TRP:HB3	2.24	0.53
3:F:255:LEU:HD23	3:F:340:ALA:HB1	1.89	0.53
1:E:544:GLU:OE1	1:E:548:GLN:NE2	2.41	0.53
1:E:1286:MET:O	1:E:1290:LEU:HD23	2.09	0.53
3:F:985:ASN:O	3:F:1007:LYS:NZ	2.42	0.53
1:E:742:TYR:CZ	1:E:746:ASN:ND2	2.77	0.52
3:F:712:THR:HG23	3:F:734:VAL:HG11	1.91	0.52
3:F:980:GLN:N	3:F:980:GLN:OE1	2.43	0.52
1:E:999:VAL:HG21	1:E:1020:LEU:HD22	1.90	0.52
1:E:1382:MET:HE2	1:E:1382:MET:HA	1.92	0.52
3:F:732:ARG:HG2	3:F:814:ILE:HG22	1.92	0.52
1:E:1407:ALA:C	1:E:1408:LEU:HD22	2.35	0.52
1:E:1552:TYR:OH	1:E:1564:ASP:OD1	2.28	0.51
2:H:235:PRO:HD2	2:H:243:THR:HG23	1.93	0.51
3:F:436:LEU:HD13	3:F:1065:LEU:O	2.11	0.51
3:F:648:LEU:HD23	3:F:648:LEU:H	1.76	0.51
3:F:865:ASP:OD1	3:F:866:ASP:N	2.43	0.51
3:F:144:ARG:NE	3:F:174:GLU:OE2	2.42	0.51
1:E:1049:ILE:HG22	1:E:1053:VAL:HG23	1.93	0.51
1:E:1147:SER:OG	1:E:1159:ARG:NH2	2.44	0.51
1:E:1446:ASN:OD1	1:E:1452:GLN:NE2	2.43	0.51
1:E:520:ALA:O	1:E:523:SER:OG	2.23	0.51
3:F:642:ALA:O	3:F:646:GLU:OE1	2.28	0.51
1:E:608:THR:HG22	1:E:608:THR:O	2.11	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:712:THR:HG21	3:F:742:ARG:HG3	1.92	0.50
1:E:271:ILE:HD11	1:E:1397:LEU:HD21	1.93	0.50
3:F:79:VAL:HG23	3:F:619:LEU:HD23	1.94	0.50
3:F:821:TRP:CH2	3:F:861:MET:HE1	2.46	0.50
3:F:884:ARG:NH2	3:F:1029:ARG:O	2.39	0.50
1:E:1275:ASN:OD1	1:E:1380:ARG:NH1	2.44	0.50
1:E:1318:VAL:O	1:E:1321:SER:OG	2.21	0.50
3:F:182:GLU:CD	3:F:185:TRP:HE1	2.19	0.49
1:E:193:ASN:OD1	1:E:194:GLY:N	2.45	0.49
1:E:1133:THR:HG22	1:E:1133:THR:O	2.12	0.49
1:E:1516:ILE:HD11	6:E:2304:A1AC9:C35	2.42	0.49
3:F:389:VAL:HG12	3:F:413:ILE:HD12	1.95	0.49
1:E:996:VAL:HG11	1:E:1027:ARG:HH11	1.77	0.49
2:H:265:THR:N	2:H:318:VAL:O	2.40	0.49
3:F:70:VAL:HG23	3:F:70:VAL:O	2.12	0.49
1:E:896:ILE:O	1:E:896:ILE:HG22	2.13	0.49
1:E:1652:VAL:C	1:E:1655:PRO:HD2	2.37	0.49
2:H:326:HIS:N	2:H:329:GLN:OE1	2.46	0.48
3:F:182:GLU:OE1	3:F:185:TRP:NE1	2.42	0.48
1:E:992:LEU:C	1:E:992:LEU:HD23	2.38	0.48
3:F:40:MET:O	3:F:44:LEU:HD23	2.12	0.48
3:F:880:PRO:O	3:F:884:ARG:HG3	2.13	0.48
1:E:890:ARG:NH1	1:E:892:GLN:O	2.46	0.48
3:F:290:ASN:OD1	3:F:291:VAL:N	2.46	0.48
3:F:750:GLU:OE1	3:F:750:GLU:N	2.45	0.48
3:F:185:TRP:CZ2	3:F:485:LEU:HD23	2.49	0.47
3:F:384:VAL:HG21	3:F:406:ASN:HD22	1.79	0.47
3:F:209:GLY:HA3	3:F:238:VAL:HG11	1.96	0.47
1:E:775:ARG:C	1:E:777:LYS:H	2.22	0.47
1:E:774:GLU:O	1:E:777:LYS:CG	2.57	0.47
2:H:232:LEU:HD11	2:H:342:VAL:HG23	1.96	0.47
1:E:1149:THR:HG22	1:E:1150:GLU:N	2.29	0.47
1:E:1286:MET:HE1	1:E:1308:PHE:CD1	2.50	0.47
2:H:261:ARG:O	2:H:316:LEU:N	2.48	0.47
3:F:817:ASP:OD1	3:F:820:SER:OG	2.29	0.47
3:F:1067:ASP:CG	3:F:1069:THR:HG1	2.23	0.47
1:E:130:ILE:HD12	1:E:173:GLU:HG3	1.97	0.47
3:F:743:VAL:HG12	3:F:745:PRO:HD2	1.97	0.47
3:F:261:SER:O	3:F:264:VAL:HG22	2.15	0.47
1:E:1651:GLN:OE1	1:E:1651:GLN:N	2.48	0.47
3:F:185:TRP:CH2	3:F:485:LEU:HD23	2.50	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:271:ILE:HG22	2:H:271:ILE:O	2.15	0.46
1:E:731:ILE:HG22	1:E:735:ILE:HD12	1.97	0.46
2:H:348:LYS:O	2:H:348:LYS:NZ	2.45	0.46
3:F:286:ASP:OD1	3:F:1053:ARG:NH1	2.48	0.46
3:F:567:GLU:O	8:F:1111:NAG:H83	2.15	0.46
3:F:642:ALA:O	3:F:645:SER:N	2.47	0.46
3:F:704:ARG:NH1	3:F:707:LEU:HD22	2.30	0.46
1:E:774:GLU:HG2	1:E:777:LYS:HE3	1.94	0.46
2:H:303:GLU:OE1	2:H:303:GLU:HA	2.14	0.46
3:F:707:LEU:HD21	3:F:711:PHE:CE2	2.50	0.46
3:F:726:ILE:HG22	3:F:727:LYS:N	2.30	0.46
1:E:348:ASN:OD1	1:E:349:PHE:N	2.44	0.46
3:F:167:HIS:O	3:F:167:HIS:ND1	2.48	0.46
3:F:288:PHE:HB3	3:F:307:LEU:HB3	1.97	0.46
8:F:1103:NAG:O7	8:F:1103:NAG:O3	2.25	0.46
1:E:232:ASP:OD1	1:E:232:ASP:N	2.42	0.46
3:F:259:ASP:O	3:F:264:VAL:HG21	2.16	0.45
3:F:384:VAL:CG2	3:F:406:ASN:HD22	2.29	0.45
3:F:209:GLY:CA	3:F:238:VAL:HG11	2.46	0.45
1:E:630:ILE:HG22	1:E:631:THR:N	2.31	0.45
1:E:775:ARG:C	1:E:777:LYS:N	2.74	0.45
1:E:1022:VAL:HG23	1:E:1424:VAL:HG11	1.99	0.45
2:H:263:SER:O	2:H:318:VAL:N	2.40	0.45
3:F:658:TYR:N	3:F:743:VAL:O	2.49	0.45
1:E:988:TYR:CD1	1:E:991:ILE:HD12	2.52	0.45
2:H:259:GLU:OE2	2:H:259:GLU:HA	2.16	0.45
3:F:283:LEU:O	3:F:315:LYS:NZ	2.35	0.45
1:E:774:GLU:C	1:E:777:LYS:HG3	2.41	0.45
2:H:366:ASN:O	2:H:370:VAL:HG13	2.17	0.45
2:H:384:ASP:OD1	2:H:384:ASP:N	2.48	0.45
3:F:83:ALA:HB1	3:F:612:VAL:HG12	1.99	0.45
3:F:238:VAL:HG13	3:F:243:TRP:CZ2	2.51	0.45
1:E:349:PHE:CE2	1:E:353:MET:HE3	2.52	0.45
1:E:441:ILE:H	1:E:441:ILE:HD12	1.82	0.45
1:E:1418:LEU:HD11	1:E:1510:LEU:HB3	1.98	0.45
1:E:702:ILE:HG23	1:E:708:TRP:CD1	2.52	0.45
1:E:1564:ASP:OD1	1:E:1564:ASP:N	2.50	0.45
1:E:150:ASP:OD1	1:E:234:LYS:NZ	2.50	0.44
2:H:232:LEU:HD23	2:H:247:GLN:OE1	2.17	0.44
3:F:182:GLU:HA	3:F:185:TRP:CD1	2.52	0.44
1:E:1209:CYS:HB3	1:E:1614:VAL:HG21	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:575:MET:HE1	1:E:584:PHE:HE1	1.83	0.44
3:F:254:MET:HG3	3:F:283:LEU:HD21	1.99	0.44
3:F:289:VAL:HG12	3:F:310:ALA:HB2	1.99	0.44
3:F:215:ALA:HB2	3:F:238:VAL:CG2	2.48	0.44
1:E:240:ARG:HB2	1:E:243:ARG:HE	1.83	0.44
1:E:999:VAL:HG21	1:E:1020:LEU:CD2	2.47	0.44
3:F:276:VAL:HG11	3:F:322:VAL:HG21	1.99	0.44
3:F:309:GLN:O	3:F:309:GLN:HG2	2.18	0.44
1:E:175:PHE:HA	1:E:178:VAL:HG12	1.99	0.44
1:E:402:GLY:CA	1:E:1523:ILE:HD12	2.48	0.44
1:E:724:PHE:N	1:E:725:PRO:HD2	2.33	0.43
1:E:897:VAL:HG22	1:E:898:ASN:N	2.33	0.43
3:F:357:ILE:HD11	3:F:430:LEU:CD2	2.47	0.43
3:F:514:ALA:O	3:F:522:LEU:N	2.51	0.43
1:E:1654:PRO:HB2	1:E:1655:PRO:HD3	1.99	0.43
2:H:231:VAL:HG12	2:H:319:LEU:O	2.18	0.43
3:F:54:VAL:HG22	3:F:812:VAL:CG2	2.48	0.43
3:F:1058:VAL:HG23	3:F:1059:CYS:N	2.32	0.43
1:E:1185:VAL:HG12	1:E:1520:VAL:HG11	2.00	0.43
1:E:380:TRP:N	1:E:381:PRO:CD	2.82	0.43
1:E:1568:LEU:HD23	1:E:1568:LEU:H	1.82	0.43
2:H:316:LEU:HD22	2:H:407:TRP:HE3	1.82	0.43
2:H:261:ARG:HD2	2:H:407:TRP:HB3	2.01	0.43
1:E:402:GLY:HA3	1:E:1523:ILE:HD12	2.00	0.43
1:E:575:MET:HE1	1:E:584:PHE:CE1	2.53	0.43
1:E:1439:THR:HG22	1:E:1440:GLU:N	2.33	0.43
3:F:66:ASP:OD1	3:F:66:ASP:N	2.51	0.43
3:F:179:VAL:HG13	3:F:214:LEU:HD11	2.00	0.43
1:E:237:ARG:NH1	1:E:671:GLN:OE1	2.52	0.43
2:H:232:LEU:HD23	2:H:247:GLN:HB2	2.00	0.43
3:F:1067:ASP:OD1	3:F:1069:THR:OG1	2.36	0.43
1:E:247:LEU:O	1:E:247:LEU:HD23	2.18	0.43
3:F:384:VAL:HG21	3:F:406:ASN:ND2	2.34	0.43
3:F:734:VAL:CG2	3:F:812:VAL:HG12	2.47	0.43
1:E:640:LEU:HD21	1:E:756:LEU:HD12	2.00	0.42
2:H:351:GLN:H	2:H:351:GLN:CD	2.27	0.42
3:F:100:LEU:HD13	3:F:488:MET:HE1	2.00	0.42
3:F:522:LEU:C	3:F:522:LEU:HD23	2.44	0.42
3:F:638:THR:O	3:F:638:THR:HG22	2.18	0.42
1:E:126:PHE:O	1:E:129:ILE:HG12	2.20	0.42
1:E:197:LEU:O	1:E:201:ILE:HG13	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:159:ILE:HG22	3:F:160:SER:N	2.32	0.42
2:H:338:ILE:HD12	2:H:384:ASP:OD2	2.20	0.42
1:E:1077:THR:HG23	1:E:1077:THR:O	2.20	0.42
3:F:124:TYR:OH	3:F:174:GLU:OE2	2.36	0.42
3:F:534:VAL:O	3:F:534:VAL:HG23	2.18	0.42
1:E:689:PHE:CE2	1:E:698:THR:HG21	2.55	0.42
2:H:324:ILE:O	2:H:324:ILE:HG13	2.20	0.42
3:F:862:ALA:HB3	3:F:867:TYR:CB	2.50	0.42
1:E:159:LEU:O	1:E:163:GLU:N	2.50	0.42
1:E:1279:THR:OG1	1:E:1314:SER:OG	2.37	0.42
2:H:263:SER:N	2:H:316:LEU:O	2.50	0.42
2:H:390:ASN:OD1	2:H:390:ASN:N	2.52	0.42
3:F:79:VAL:HG22	3:F:610:THR:HG22	2.00	0.42
3:F:857:GLY:O	3:F:874:PHE:HD1	2.03	0.42
1:E:1133:THR:HG23	1:E:1508:TYR:CZ	2.55	0.42
1:E:1590:ARG:HG2	1:E:1616:THR:HG21	2.01	0.42
3:F:735:VAL:HG22	3:F:741:THR:HG23	2.01	0.42
1:E:595:VAL:HG13	1:E:596:VAL:N	2.36	0.41
3:F:643:ARG:O	3:F:647:THR:HB	2.20	0.41
1:E:254:LEU:HD21	1:E:656:LEU:HD22	2.02	0.41
1:E:702:ILE:HG23	1:E:708:TRP:HD1	1.85	0.41
3:F:74:ASN:O	3:F:75:ALA:HB3	2.20	0.41
3:F:401:TRP:CH2	3:F:405:GLU:OE1	2.73	0.41
1:E:992:LEU:HD23	1:E:992:LEU:O	2.21	0.41
1:E:1133:THR:HG21	1:E:1466:TRP:HE1	1.85	0.41
1:E:1652:VAL:O	1:E:1652:VAL:HG12	2.20	0.41
2:H:336:ALA:N	2:H:337:PRO:CD	2.84	0.41
3:F:100:LEU:CD2	3:F:192:VAL:HG13	2.50	0.41
1:E:380:TRP:O	1:E:383:ILE:HG22	2.19	0.41
1:E:434:LEU:HD21	2:H:352:ARG:HD3	2.01	0.41
1:E:1418:LEU:HD12	1:E:1514:LEU:CD1	2.49	0.41
3:F:73:ASN:N	3:F:628:PHE:O	2.50	0.41
3:F:218:TYR:HB3	3:F:219:PRO:HD3	2.01	0.41
2:H:237:LEU:N	2:H:368:GLN:OE1	2.54	0.41
3:F:1007:LYS:HG2	3:F:1014:ILE:HD13	2.02	0.41
1:E:1020:LEU:O	1:E:1020:LEU:HD23	2.20	0.41
3:F:115:GLU:OE1	9:F:1105:BMA:O4	2.29	0.41
3:F:875:PHE:C	3:F:883:MET:HE1	2.46	0.41
1:E:167:LEU:HD13	1:E:201:ILE:HG21	2.02	0.41
1:E:1182:VAL:HG22	1:E:1516:ILE:HD12	2.02	0.41
2:H:226:SER:O	2:H:226:SER:OG	2.39	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:917:LEU:CD1	1:E:1424:VAL:HG21	2.51	0.41
1:E:1295:PRO:O	1:E:1298:TYR:N	2.53	0.41
3:F:562:LEU:HD12	3:F:1051:ARG:HD3	2.03	0.41
2:H:341:TYR:OH	2:H:382:LEU:O	2.27	0.41
1:E:1418:LEU:HD23	1:E:1418:LEU:O	2.21	0.40
1:E:346:PHE:CE1	1:E:355:THR:HG21	2.56	0.40
1:E:1049:ILE:CG2	1:E:1053:VAL:HG23	2.51	0.40
2:H:366:ASN:OD1	2:H:367:VAL:N	2.53	0.40
3:F:148:VAL:O	3:F:148:VAL:HG13	2.20	0.40
3:F:155:PHE:N	3:F:155:PHE:CD1	2.88	0.40
3:F:288:PHE:CE2	3:F:351:ARG:HA	2.56	0.40
3:F:715:LEU:C	3:F:715:LEU:HD23	2.45	0.40
1:E:127:GLU:HA	1:E:130:ILE:HG22	2.03	0.40
2:H:250:LEU:O	2:H:254:LEU:HD23	2.22	0.40
2:H:344:ILE:HG13	2:H:350:LEU:HD21	2.04	0.40
3:F:780:PHE:CD1	3:F:780:PHE:C	2.99	0.40
3:F:116:ASP:N	3:F:116:ASP:OD1	2.54	0.40
3:F:255:LEU:HD21	3:F:340:ALA:HA	2.04	0.40
3:F:357:ILE:HG22	3:F:359:MET:HG3	2.03	0.40
2:H:242:VAL:HG13	2:H:243:THR:N	2.37	0.40
2:H:389:GLU:OE2	2:H:391:GLN:NE2	2.54	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	E	1235/2173 (57%)	1173 (95%)	62 (5%)	0	100	100
2	H	159/632 (25%)	153 (96%)	6 (4%)	0	100	100
3	F	899/1071 (84%)	839 (93%)	60 (7%)	0	100	100
All	All	2293/3876 (59%)	2165 (94%)	128 (6%)	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	E	1114/1874 (59%)	1114 (100%)	0	100	100
2	H	146/560 (26%)	146 (100%)	0	100	100
3	F	811/944 (86%)	811 (100%)	0	100	100
All	All	2071/3378 (61%)	2071 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	E	158	ASN
1	E	270	HIS
1	E	1562	HIS
1	E	1630	ASN
2	H	256	HIS
2	H	398	HIS
3	F	377	ASN
3	F	509	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)

Of 19 ligands modelled in this entry, 2 are monoatomic - leaving 17 for Mogul analysis.

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	$\#\|Z\| > 2$
8	NAG	F	1109	3	14,14,15	0.19	0	17,19,21	0.41	0
5	3PE	E	2303	-	18,18,50	0.19	0	16,16,55	0.24	0
8	NAG	F	1108	-	14,14,15	0.21	0	17,19,21	0.40	0
9	BMA	F	1105	-	11,11,12	0.61	0	15,15,17	0.69	0
4	R16	E	2301	-	13,13,15	0.11	0	12,12,14	0.25	0
8	NAG	F	1110	3	14,14,15	0.25	0	17,19,21	0.41	0
8	NAG	F	1107	3	14,14,15	0.51	0	17,19,21	1.19	1 (5%)
8	NAG	F	1112	3	14,14,15	0.22	0	17,19,21	0.42	0
5	3PE	E	2305	-	10,10,50	0.19	0	9,9,55	0.27	0
8	NAG	F	1101	3	14,14,15	0.22	0	17,19,21	0.49	0
5	3PE	E	2302	-	34,34,50	0.61	0	37,39,55	0.71	2 (5%)
8	NAG	F	1102	3	14,14,15	0.21	0	17,19,21	0.47	0
8	NAG	F	1106	3	14,14,15	0.18	0	17,19,21	0.40	0
8	NAG	F	1104	-	14,14,15	0.21	0	17,19,21	0.41	0
8	NAG	F	1103	3	14,14,15	0.28	0	17,19,21	0.43	0
8	NAG	F	1111	3	14,14,15	0.22	0	17,19,21	0.37	0
6	A1AC9	E	2304	-	52,52,52	5.49	17 (32%)	73,76,76	3.30	23 (31%)

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
8	NAG	F	1109	3	-	1/6/23/26	0/1/1/1
5	3PE	E	2303	-	-	2/14/14/54	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	NAG	F	1108	-	-	4/6/23/26	0/1/1/1
9	BMA	F	1105	-	-	0/2/19/22	0/1/1/1
4	R16	E	2301	-	-	2/11/11/13	-
8	NAG	F	1110	3	-	1/6/23/26	0/1/1/1
8	NAG	F	1107	3	-	4/6/23/26	0/1/1/1
8	NAG	F	1112	3	-	0/6/23/26	0/1/1/1
5	3PE	E	2305	-	-	0/8/8/54	-
8	NAG	F	1101	3	-	0/6/23/26	0/1/1/1
5	3PE	E	2302	-	-	17/38/38/54	-
8	NAG	F	1102	3	-	0/6/23/26	0/1/1/1
8	NAG	F	1106	3	-	2/6/23/26	0/1/1/1
8	NAG	F	1104	-	-	4/6/23/26	0/1/1/1
8	NAG	F	1103	3	-	2/6/23/26	0/1/1/1
8	NAG	F	1111	3	-	2/6/23/26	0/1/1/1
6	A1AC9	E	2304	-	-	6/24/50/50	-

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	E	2304	A1AC9	C23-N07	-22.04	1.18	1.46
6	E	2304	A1AC9	C13-C11	-15.54	1.24	1.40
6	E	2304	A1AC9	C29-N08	-13.86	1.17	1.46
6	E	2304	A1AC9	C19-C18	-13.54	1.28	1.51
6	E	2304	A1AC9	C18-C15	-11.34	1.21	1.40
6	E	2304	A1AC9	C13-C14	-10.45	1.22	1.44
6	E	2304	A1AC9	C32-C25	-5.47	1.29	1.40
6	E	2304	A1AC9	C31-C28	-5.38	1.29	1.41
6	E	2304	A1AC9	C12-C14	5.27	1.44	1.33
6	E	2304	A1AC9	C09-N07	5.15	1.50	1.47
6	E	2304	A1AC9	C22-C25	-4.44	1.31	1.38
6	E	2304	A1AC9	C27-C18	4.03	1.45	1.39
6	E	2304	A1AC9	C28-C21	-3.57	1.32	1.39
6	E	2304	A1AC9	C17-C19	3.33	1.58	1.51
6	E	2304	A1AC9	C16-C09	-3.26	1.49	1.54
6	E	2304	A1AC9	C24-C13	2.79	1.45	1.40
6	E	2304	A1AC9	C15-C10	-2.01	1.49	1.52

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	E	2304	A1AC9	C09-N07-C12	-12.51	112.47	120.94
6	E	2304	A1AC9	C13-C14-C12	-10.17	108.32	120.98
6	E	2304	A1AC9	C23-N07-C09	-9.83	109.45	116.88
6	E	2304	A1AC9	C11-C13-C14	9.44	135.10	118.54
6	E	2304	A1AC9	C24-C13-C14	-7.67	108.73	122.88
6	E	2304	A1AC9	C23-N07-C12	-7.29	109.53	121.35
6	E	2304	A1AC9	C19-C18-C15	6.79	131.19	121.11
6	E	2304	A1AC9	O04-C32-C25	4.96	122.13	115.40
8	F	1107	NAG	C1-O5-C5	4.63	118.39	112.19
6	E	2304	A1AC9	C19-C18-C27	-3.49	113.03	119.91
6	E	2304	A1AC9	O06-C42-C37	3.46	120.09	115.40
6	E	2304	A1AC9	O04-C32-C27	-3.37	118.27	124.08
6	E	2304	A1AC9	C17-C19-C18	-3.28	105.67	111.34
6	E	2304	A1AC9	C27-C18-C15	-2.96	115.75	119.49
6	E	2304	A1AC9	C18-C15-C10	-2.94	117.79	121.58
6	E	2304	A1AC9	O06-C42-C38	-2.92	119.38	124.30
6	E	2304	A1AC9	C22-C15-C18	2.82	122.47	119.39
6	E	2304	A1AC9	C45-O03-C31	-2.73	113.50	117.51
6	E	2304	A1AC9	O03-C31-C28	2.67	119.72	115.14
6	E	2304	A1AC9	C44-O04-C32	-2.66	113.61	117.51
6	E	2304	A1AC9	C46-O06-C42	-2.65	113.63	117.51
5	E	2302	3PE	C2-O21-C21	2.55	123.89	117.80
5	E	2302	3PE	O12-P-O14	2.45	123.84	112.44
6	E	2304	A1AC9	O01-C25-C32	2.45	124.60	117.04
6	E	2304	A1AC9	C26-C16-C09	-2.38	109.84	113.82
6	E	2304	A1AC9	O03-C31-C24	-2.38	119.98	124.08

There are no chirality outliers.

All (47) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	E	2302	3PE	C1-O11-P-O13
5	E	2302	3PE	C1-O11-P-O14
5	E	2302	3PE	C11-O13-P-O11
8	F	1106	NAG	C1-C2-N2-C7
5	E	2302	3PE	O32-C31-O31-C3
5	E	2302	3PE	O22-C21-O21-C2
5	E	2302	3PE	C32-C31-O31-C3
5	E	2302	3PE	C22-C21-O21-C2
8	F	1107	NAG	O5-C5-C6-O6
6	E	2304	A1AC9	C25-C32-O04-C44
8	F	1108	NAG	O5-C5-C6-O6
8	F	1108	NAG	C4-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
8	F	1104	NAG	O5-C5-C6-O6
8	F	1107	NAG	C4-C5-C6-O6
6	E	2304	A1AC9	C27-C32-O04-C44
8	F	1104	NAG	C4-C5-C6-O6
6	E	2304	A1AC9	C24-C31-O03-C45
5	E	2302	3PE	C31-C32-C33-C34
8	F	1109	NAG	O5-C5-C6-O6
6	E	2304	A1AC9	C28-C31-O03-C45
8	F	1110	NAG	O5-C5-C6-O6
6	E	2304	A1AC9	C32-C25-O01-C21
8	F	1103	NAG	O5-C5-C6-O6
8	F	1104	NAG	C3-C2-N2-C7
8	F	1107	NAG	C3-C2-N2-C7
6	E	2304	A1AC9	C22-C25-O01-C21
5	E	2302	3PE	C1-C2-C3-O31
5	E	2302	3PE	O21-C2-C3-O31
8	F	1104	NAG	C1-C2-N2-C7
8	F	1107	NAG	C1-C2-N2-C7
8	F	1108	NAG	C1-C2-N2-C7
8	F	1111	NAG	C4-C5-C6-O6
5	E	2302	3PE	C3-C2-O21-C21
8	F	1111	NAG	O5-C5-C6-O6
5	E	2302	3PE	C1-O11-P-O12
5	E	2302	3PE	C11-O13-P-O14
8	F	1108	NAG	C3-C2-N2-C7
5	E	2303	3PE	C35-C36-C37-C38
5	E	2303	3PE	C36-C37-C38-C39
8	F	1103	NAG	C3-C2-N2-C7
8	F	1106	NAG	C3-C2-N2-C7
4	E	2301	R16	C28-C29-C30-C31
5	E	2302	3PE	O11-C1-C2-C3
5	E	2302	3PE	O21-C21-C22-C23
5	E	2302	3PE	O11-C1-C2-O21
5	E	2302	3PE	O22-C21-C22-C23
4	E	2301	R16	C30-C31-C32-C33

There are no ring outliers.

5 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	F	1105	BMA	1	0
8	F	1107	NAG	1	0

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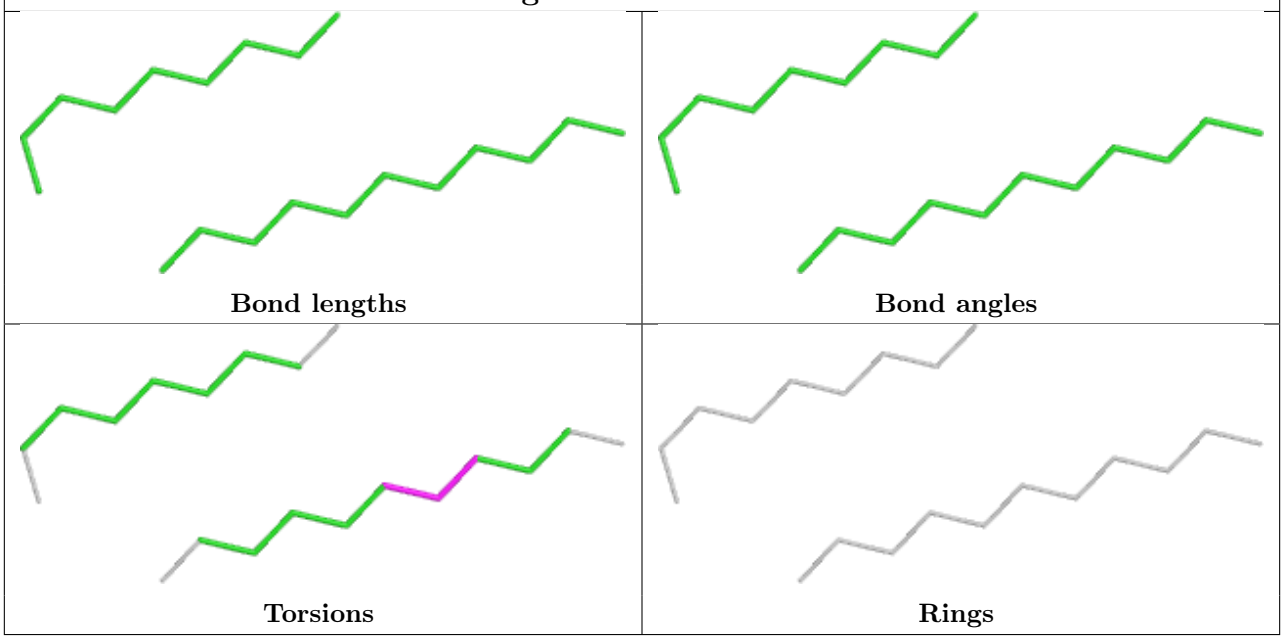
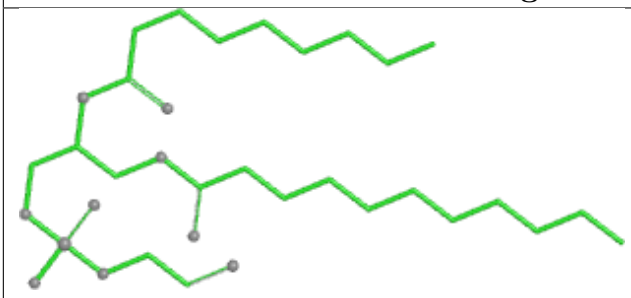
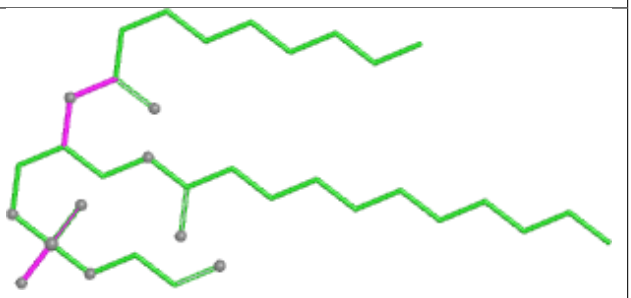
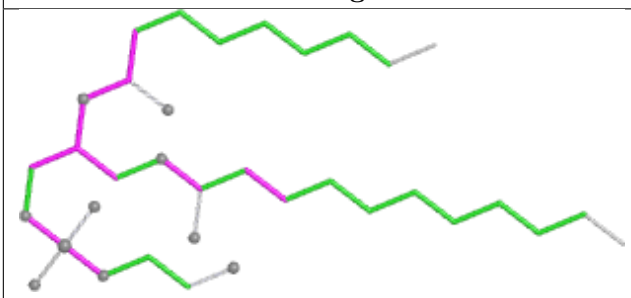
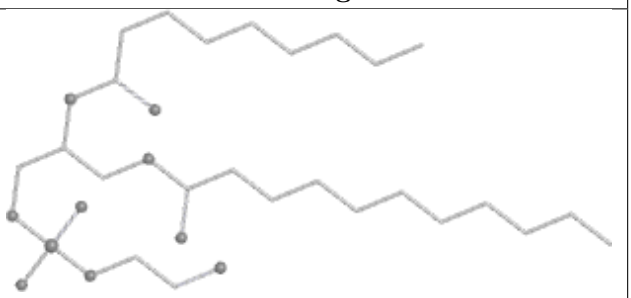
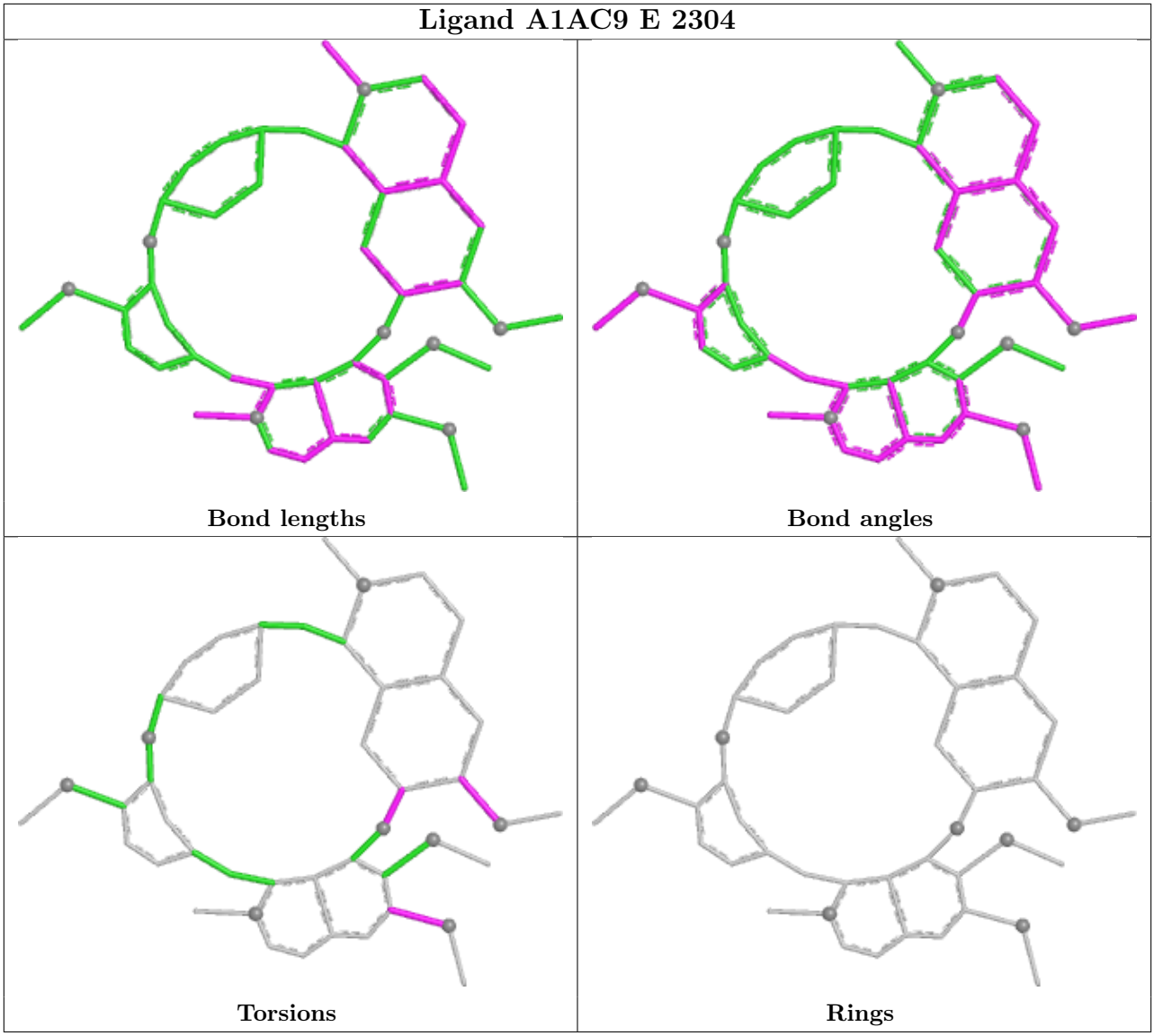
Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	F	1103	NAG	2	0
8	F	1111	NAG	1	0
6	E	2304	A1AC9	1	0

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 3PE E 2303



Ligand 3PE E 2302	
 Bond lengths	 Bond angles
 Torsions	 Rings



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

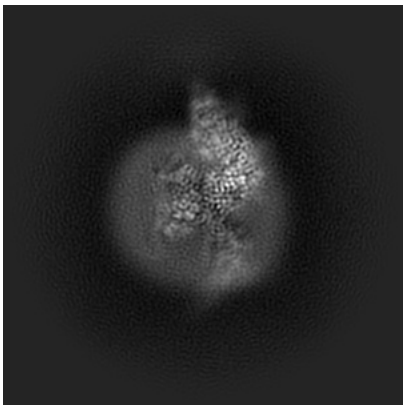
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-34891. These allow visual inspection of the internal detail of the map and identification of artifacts.

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

6.1 Orthogonal projections (i)

6.1.1 Primary map



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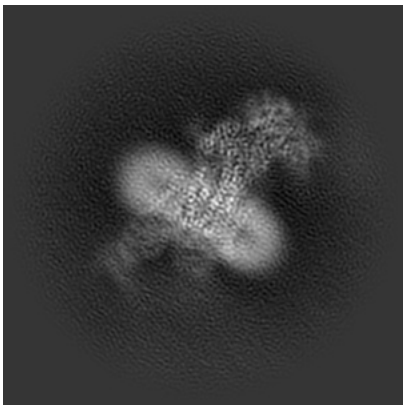
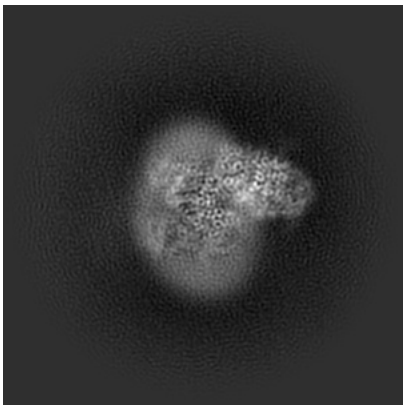
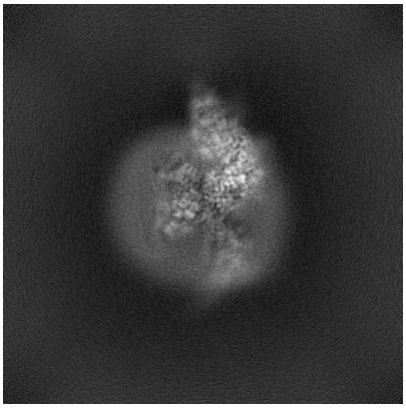


Y

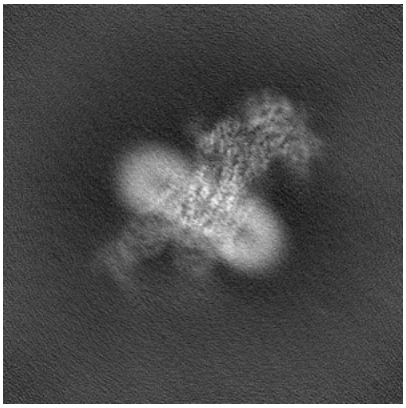


Z

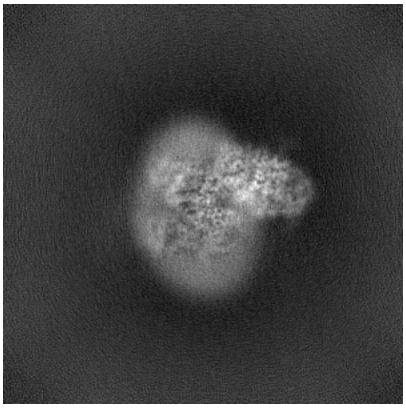
6.1.2 Raw map



X



Y

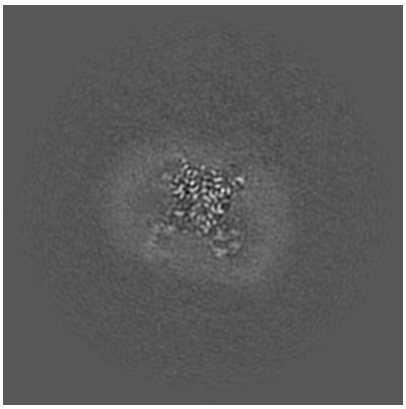


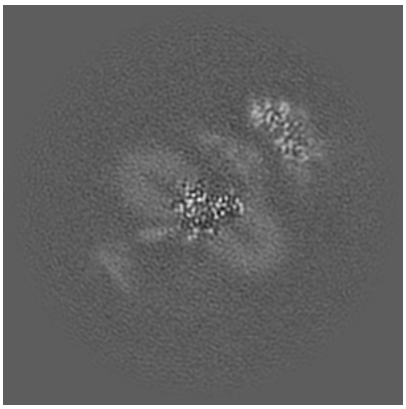
Z

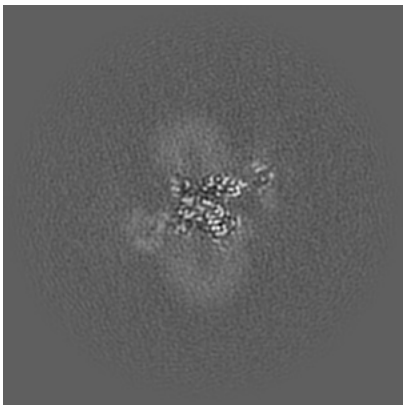
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

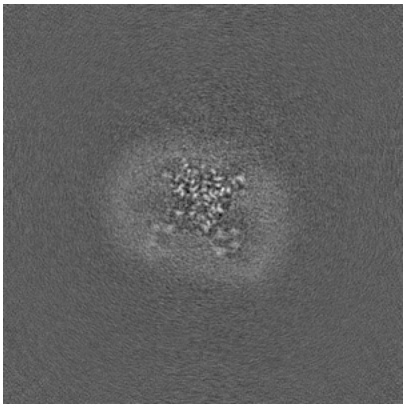
6.2.1 Primary map

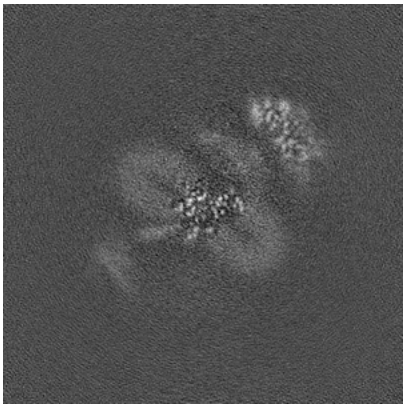

X Index: 160

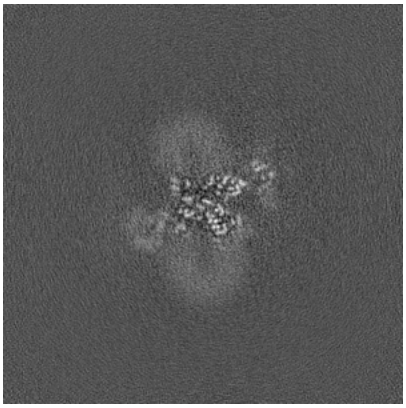

Y Index: 160


Z Index: 160

6.2.2 Raw map


X Index: 160

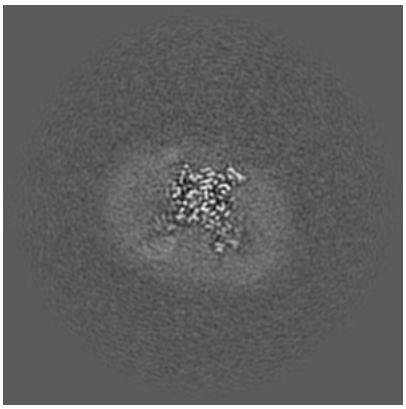

Y Index: 160

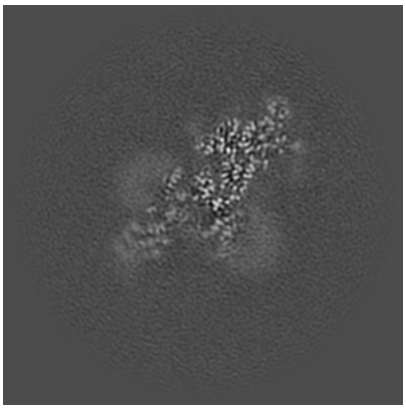

Z Index: 160

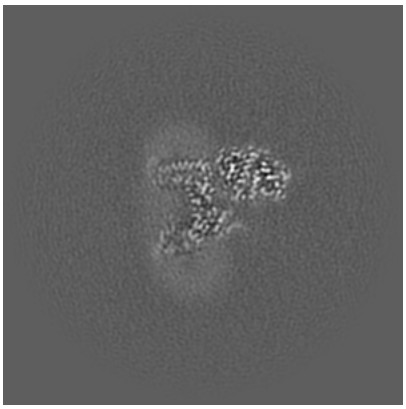
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

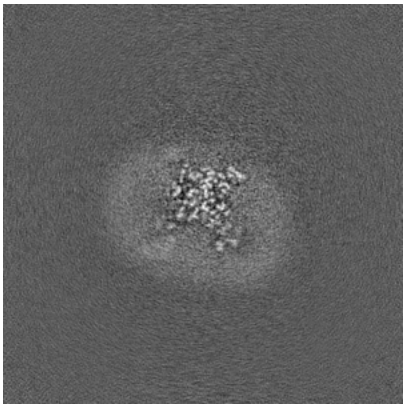
6.3.1 Primary map

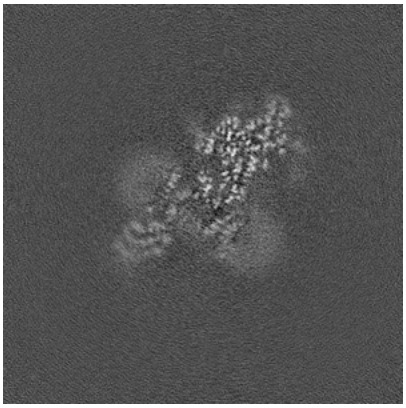

X Index: 164

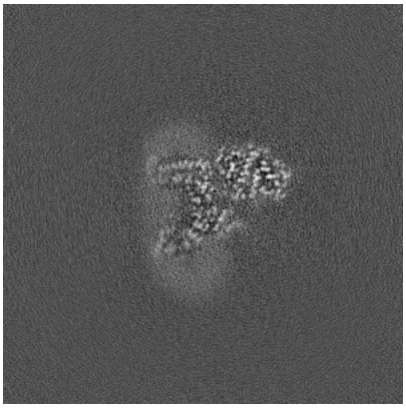

Y Index: 180


Z Index: 180

6.3.2 Raw map


X Index: 164

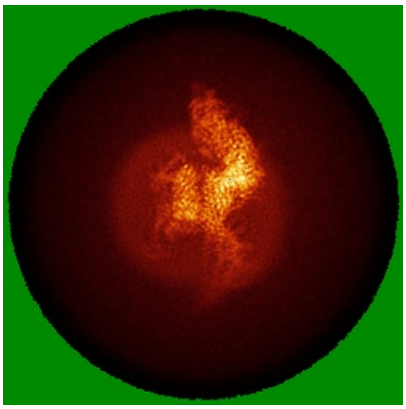

Y Index: 181

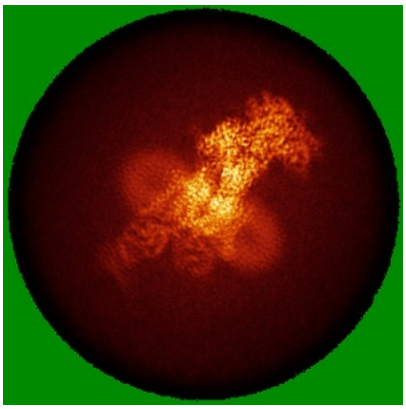

Z Index: 180

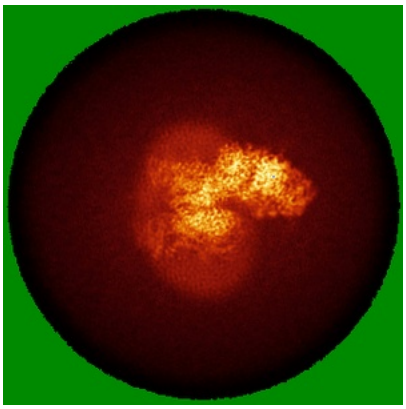
The images above show the largest variance slices of the map in three orthogonal directions.

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

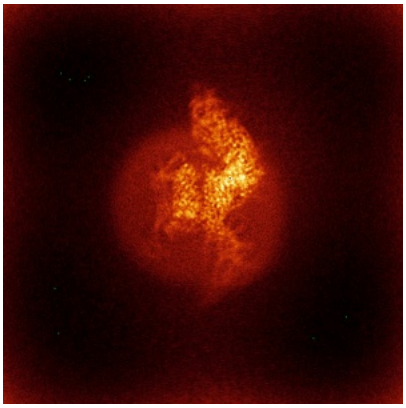
6.4.1 Primary map

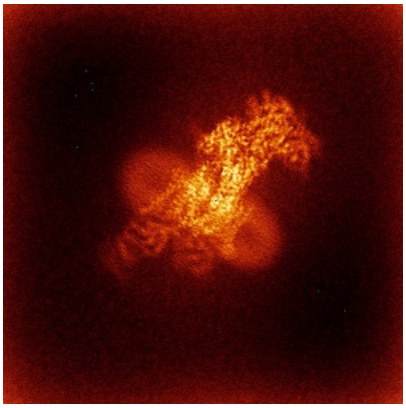

X

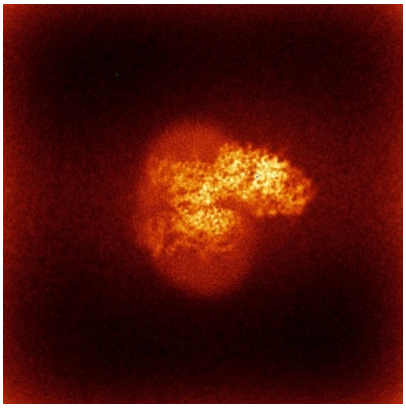

Y


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 0.5. 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.

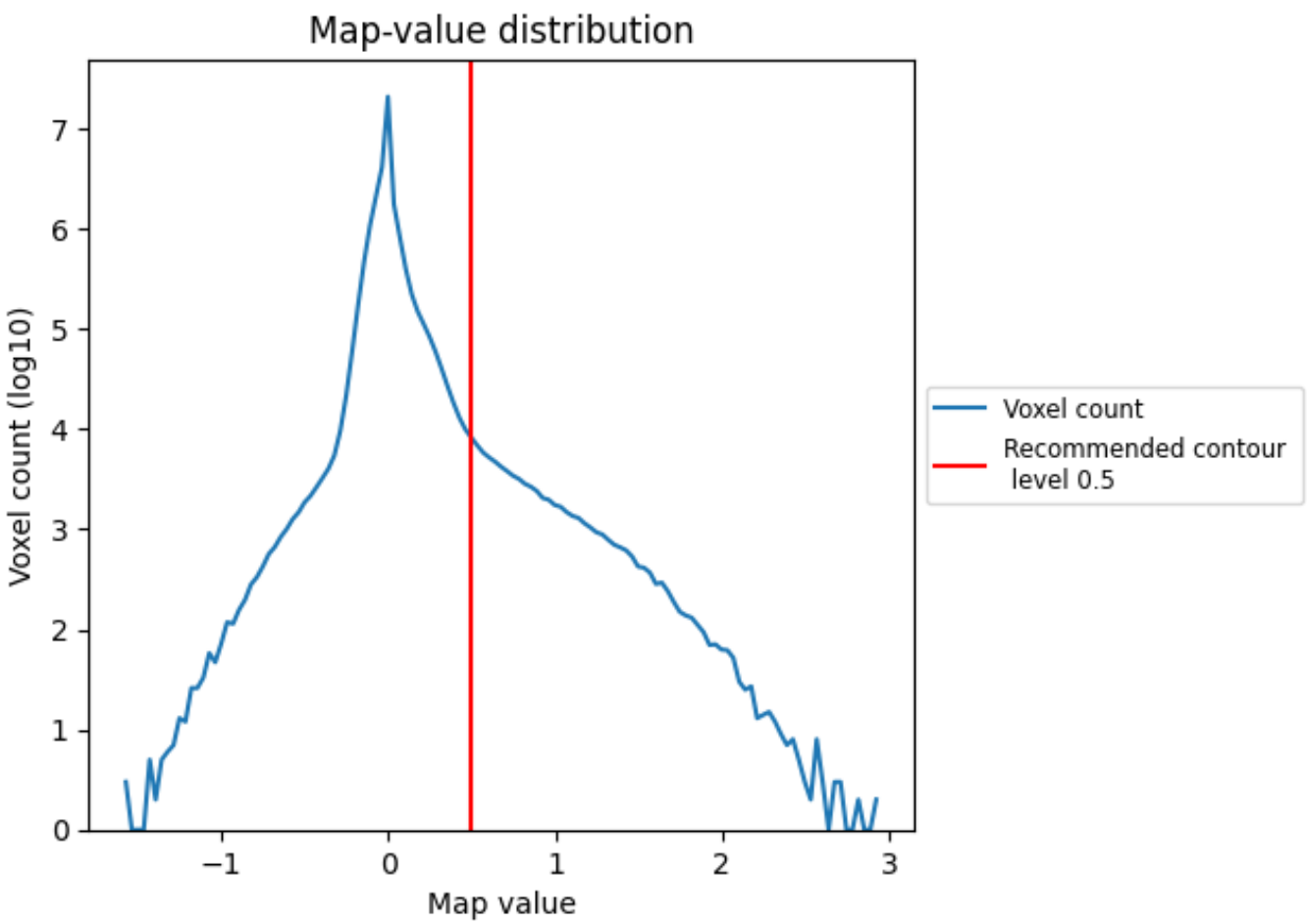
6.6 Mask visualisation (i)

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

7 Map analysis (i)

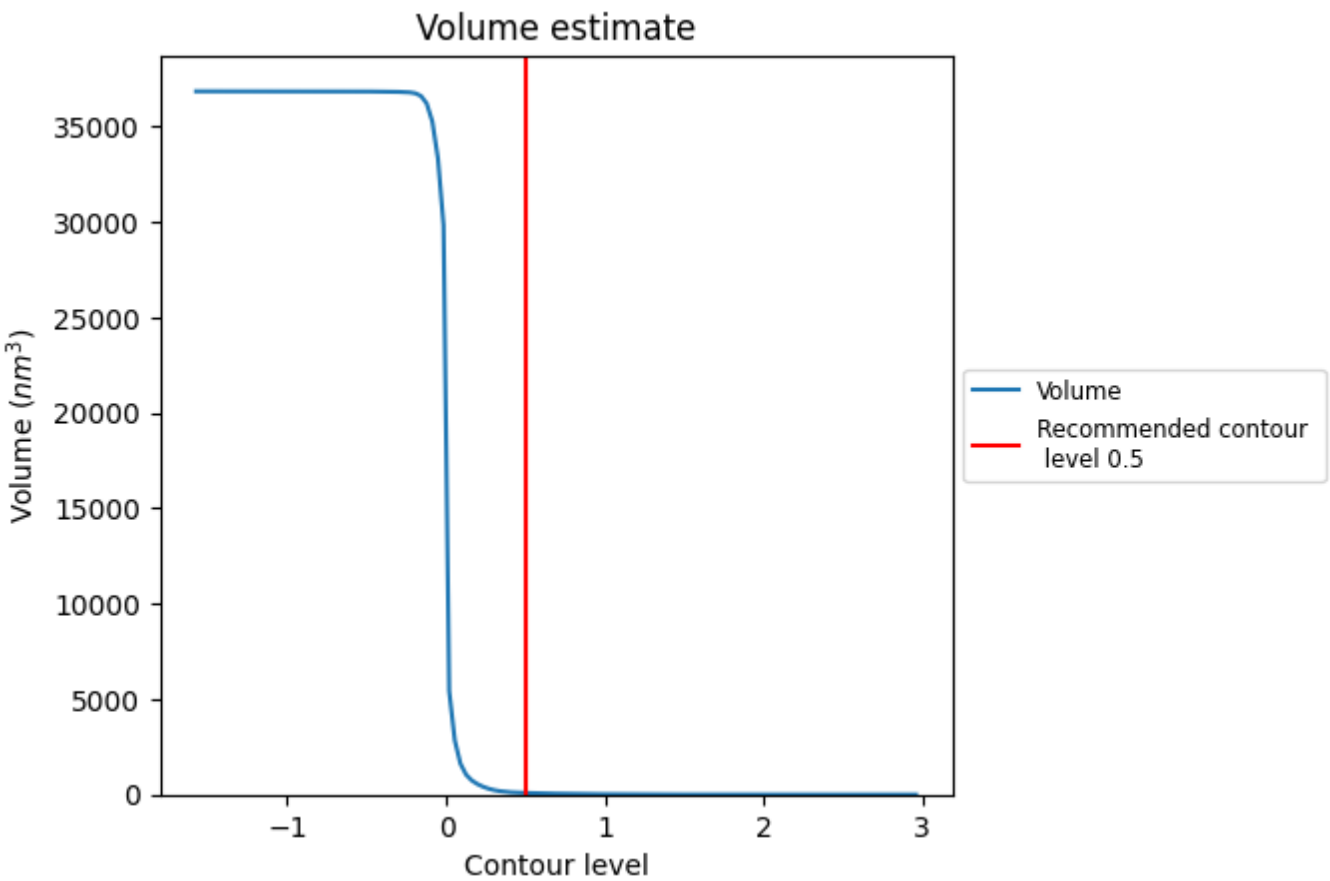
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution (i)



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

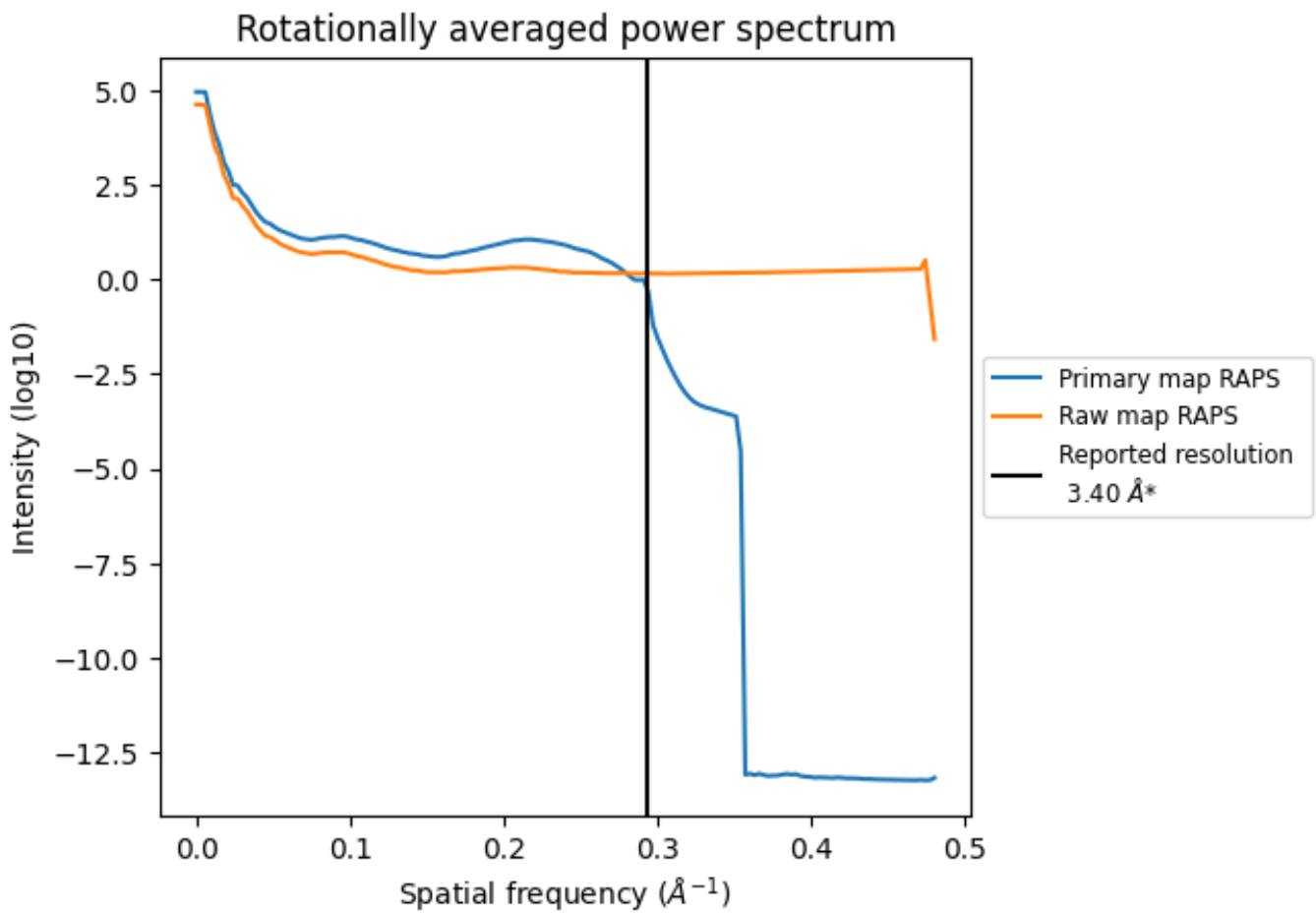
7.2 Volume estimate (i)



The volume at the recommended contour level is 85 nm^3; this corresponds to an approximate mass of 76 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)

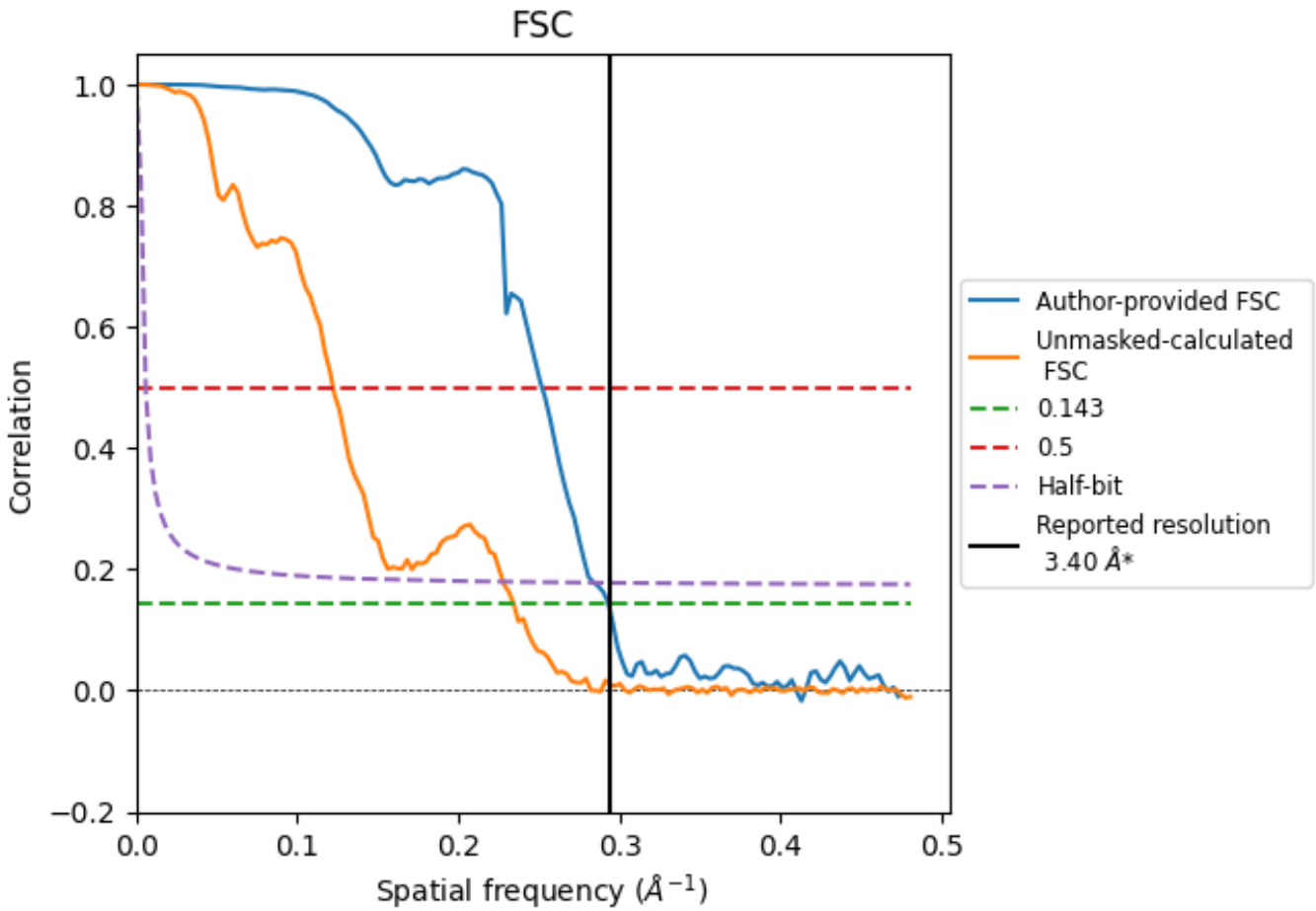


*Reported resolution corresponds to spatial frequency of 0.294 Å^{-1}

8 Fourier-Shell correlation (i)

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

8.1 FSC (i)



*Reported resolution corresponds to spatial frequency of 0.294 Å^{-1}

8.2 Resolution estimates (i)

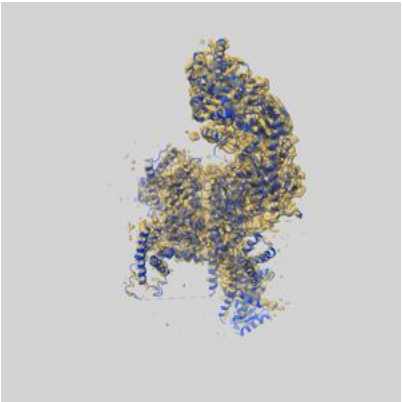
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	3.41	3.97	3.52
Unmasked-calculated*	4.27	8.18	4.39

*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 4.27 differs from the reported value 3.4 by more than 10 %

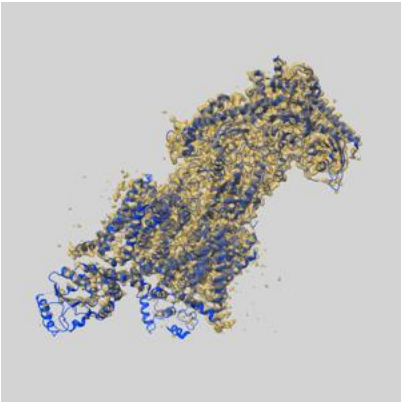
9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-34891 and PDB model 8HMA. Per-residue inclusion information can be found in section 3 on page 8.

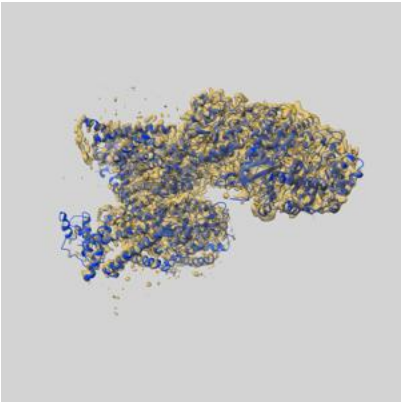
9.1 Map-model overlay (i)



X



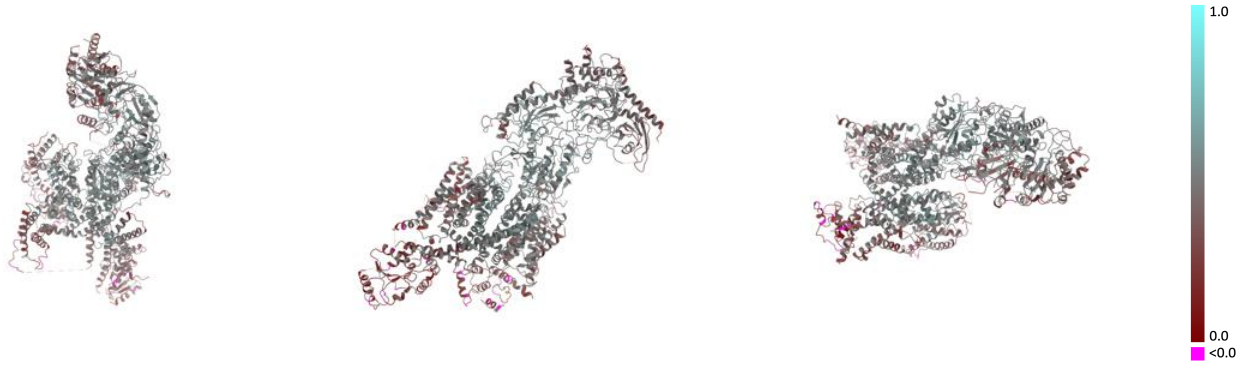
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.5 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.

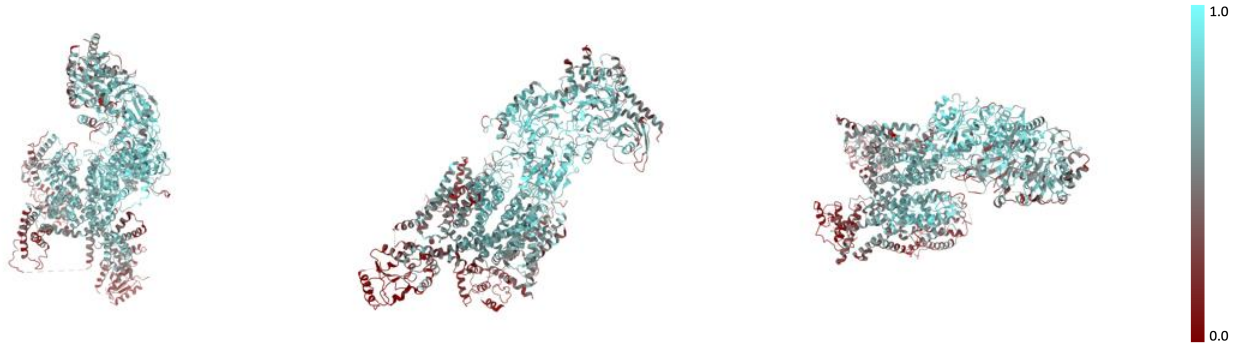
9.2 Q-score mapped to coordinate model (i)



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.

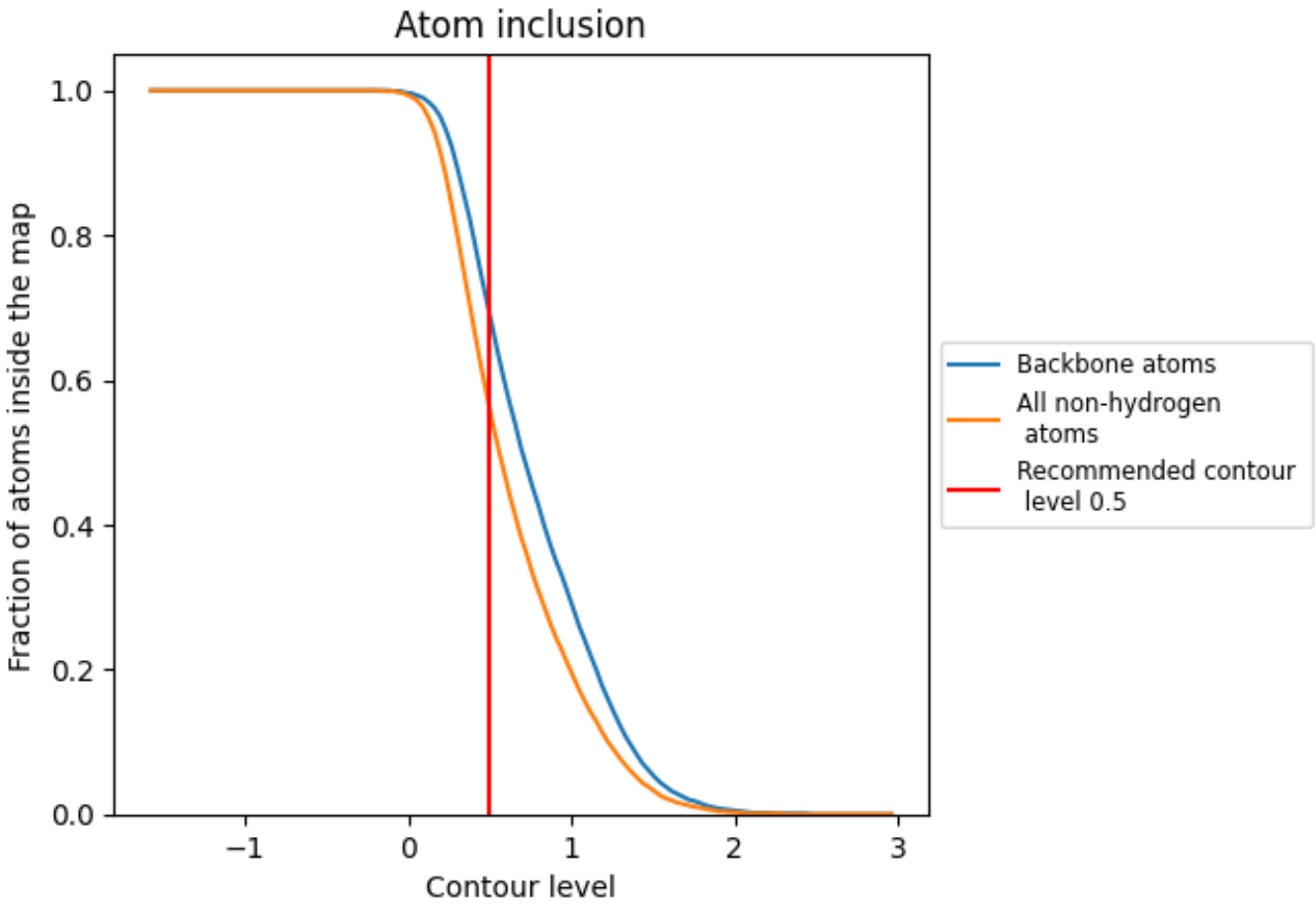
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.5).

9.4 Atom inclusion (i)



At the recommended contour level, 69% of all backbone atoms, 56% 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 (0.5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5600	0.4240
E	0.5230	0.4160
F	0.6790	0.4640
H	0.1540	0.2590