Full wwPDB EM Validation Report ⓘ

Oct 15, 2025 – 01:44 am BST

PDB ID	:	9QWX / pdb_00009qwx
EMDB ID	:	EMD-53430
Title	:	Cryo-EM structure of the human UBR4/KCMF1/CALM1 complex (N-term focused refinement)
Authors	:	Grabarczyk, D.B.; Clausen, T.
Deposited on	:	2025-04-15
Resolution	:	3.60 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:

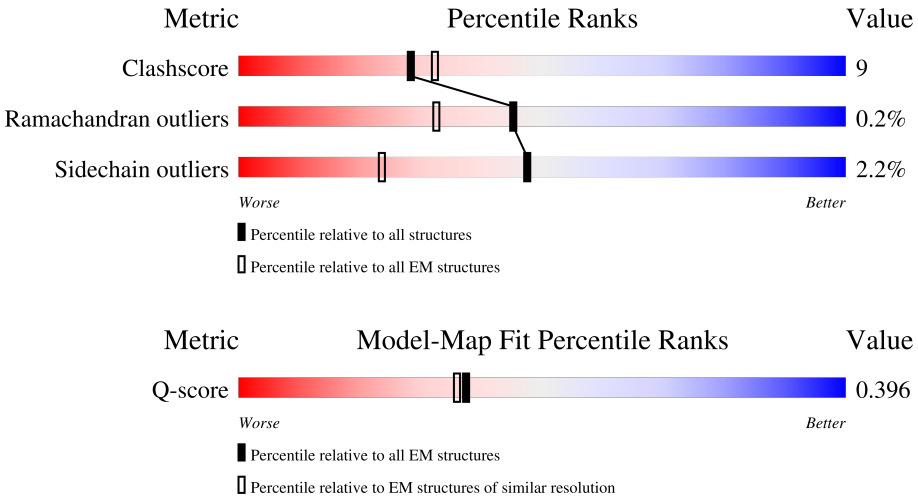
EMDB validation analysis	:	0.0.1.dev129
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh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

1 Overall quality at a glance

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

The reported resolution of this entry is 3.60 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	12797 (3.10 - 4.10)

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	5193	20% 6% 74%
1	B	5193	20% 5% 74%

2 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 20114 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 E3 ubiquitin-protein ligase UBR4.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1351	Total	C	N	O	S	0	0
			10057	6388	1719	1904	46		
1	B	1351	Total	C	N	O	S	0	0
			10057	6388	1719	1904	46		

There are 20 discrepancies between the modelled and reference sequences:

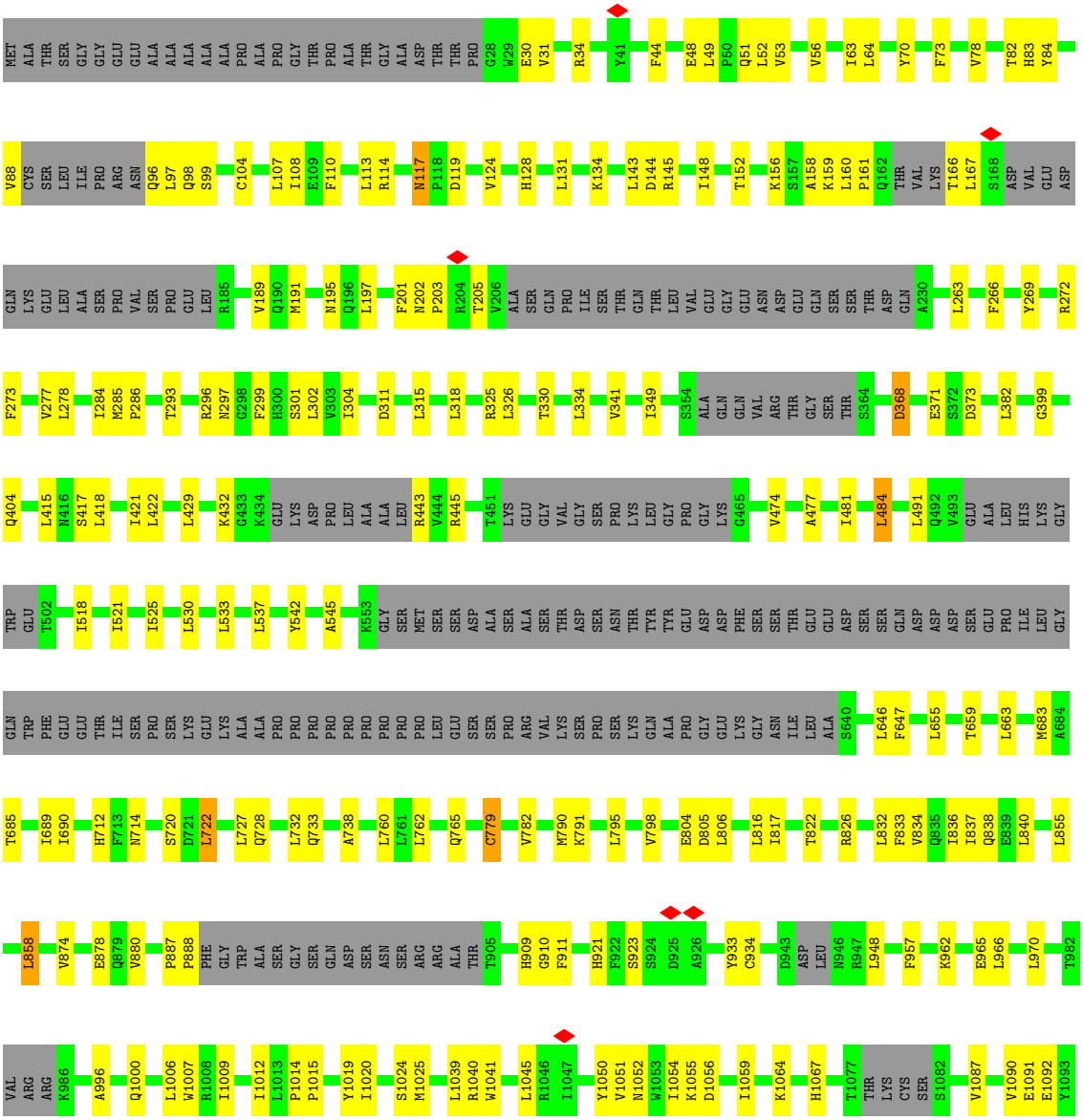
Chain	Residue	Modelled	Actual	Comment	Reference
A	5184	HIS	-	expression tag	UNP Q5T4S7
A	5185	HIS	-	expression tag	UNP Q5T4S7
A	5186	HIS	-	expression tag	UNP Q5T4S7
A	5187	HIS	-	expression tag	UNP Q5T4S7
A	5188	HIS	-	expression tag	UNP Q5T4S7
A	5189	HIS	-	expression tag	UNP Q5T4S7
A	5190	HIS	-	expression tag	UNP Q5T4S7
A	5191	HIS	-	expression tag	UNP Q5T4S7
A	5192	HIS	-	expression tag	UNP Q5T4S7
A	5193	HIS	-	expression tag	UNP Q5T4S7
B	5184	HIS	-	expression tag	UNP Q5T4S7
B	5185	HIS	-	expression tag	UNP Q5T4S7
B	5186	HIS	-	expression tag	UNP Q5T4S7
B	5187	HIS	-	expression tag	UNP Q5T4S7
B	5188	HIS	-	expression tag	UNP Q5T4S7
B	5189	HIS	-	expression tag	UNP Q5T4S7
B	5190	HIS	-	expression tag	UNP Q5T4S7
B	5191	HIS	-	expression tag	UNP Q5T4S7
B	5192	HIS	-	expression tag	UNP Q5T4S7
B	5193	HIS	-	expression tag	UNP Q5T4S7

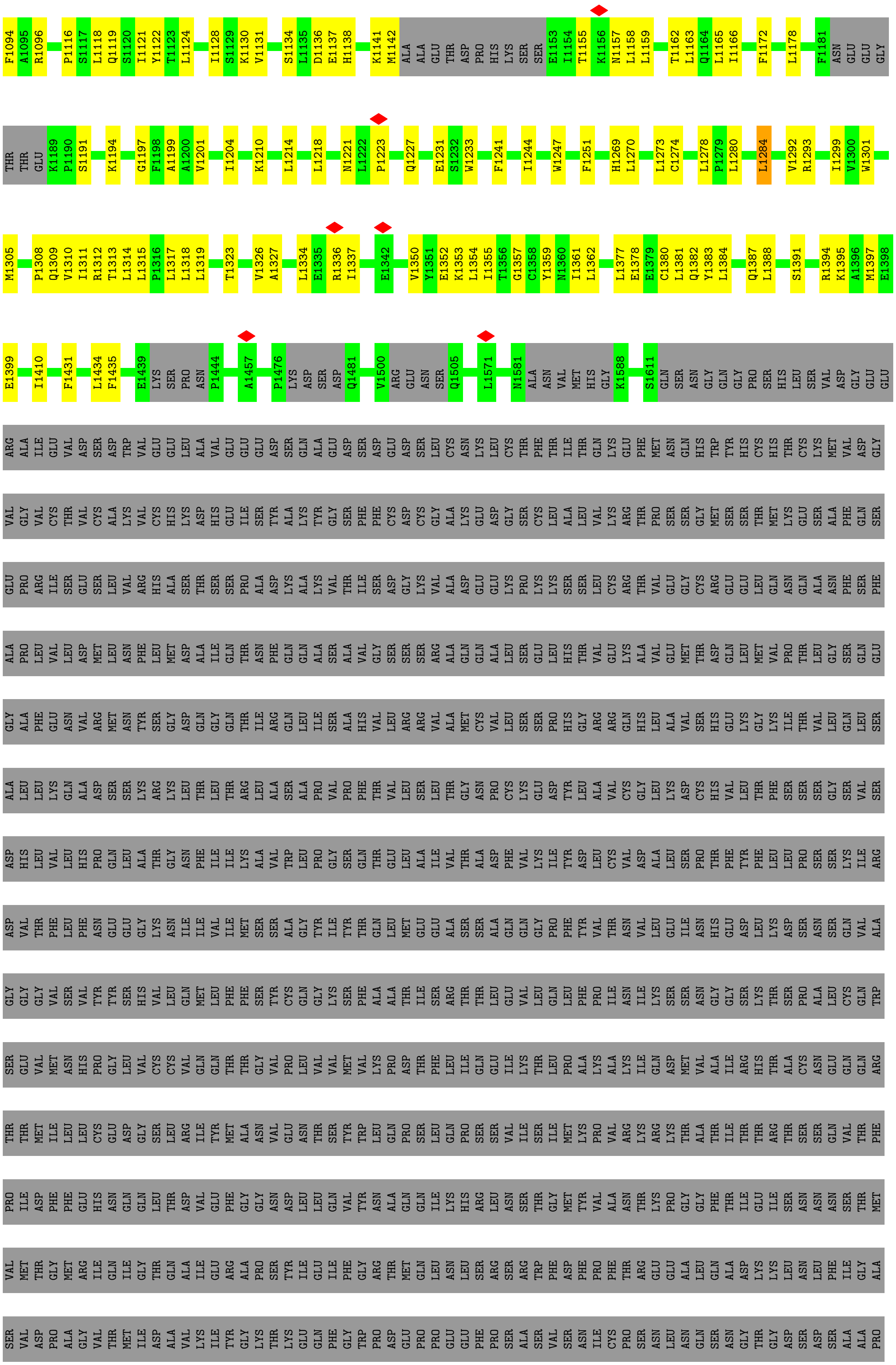
3 Residue-property plots (i)

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: E3 ubiquitin-protein ligase UBR4

Chain A: 20% 6% 74%




F1094 A1095 R1096 P1116 S1117 L1118 Q1119 S1120 I1121 Y1122 T1123 L1124 I1128 S1129 K1130 V1131 S1134 L1135 D1136 E1137 H1138 K1141 M1142 ALA ALA GLU THR ASP PRO HIS LYS SER SER E1153 I1154 T1155 K1156 N1157 L1158 L1159 T1162 L1163 Q1164 L1165 I1166 F1172 L1178 F1181 ASN GLU GLU GLY
THR THR GLU K1189 P1190 S1191 K1194 G1197 F1198 A1199 A1200 V1201 I1204 K1210 L1214 L1218 N1221 L1222 P1223 Q1227 E1231 S1232 W1233 F1241 I1244 W1247 F1251 H1269 L1270 L1273 C1274 L1278 P1279 L1280 L1284 V1292 R1293 I1299 V1300 W1301
M1305 P1308 Q1309 V1310 I1311 R1312 T1313 L1314 L1315 P1316 L1317 L1318 L1319 T1323 V1326 A1327 L1334 E1335 R1336 I1337 E1342 V1350 Y1351 E1352 K1353 L1354 I1355 T1356 G1357 C1358 Y1359 N1360 I1361 L1362 L1377 E1378 E1379 C1380 L1381 Q1382 Y1383 L1384 Q1387 L1388 S1391 R1394 K1395 A1396 M1397 E1398
E1399 I1410 F1431 L1434 F1435 E1439 LYS SER PRO ASN P1444 A1457 P1476 LYS ASP SER ASP Q1481 V1500 ARG GLU ASN SER Q1505 L1571 N1581 ALA ASN VAL MET HIS GLY K1588 S1611 GLN SER ASN GLY GLN GLY PRO SER HIS LEU SER VAL ASP GLY GLU GLU
ARG ALA ILE GLU VAL ASP SER ASP TRP VAL GLU GLU LEU ALA VAL GLU GLU GLU ASP SER GLN ALA GLU ASP SER ASP GLU ASP SER LEU CYS ASN LYS LEU CYS THR PHE THR ILE THR GLN LYS GLU PHE MET ASN GLN HIS TRP TYR HIS CYS HIS THR CYS LYS MET VAL ASP GLY
VAL GLY VAL CYS THR VAL CYS ALA LYS VAL CYS HIS LYS ASP HIS GLU ILE SER TYR ALA LYS TYR GLY SER PHE PHE CYS ASP CYS GLY ALA LYS GLU ASP GLY SER CYS LEU ALA LEU VAL LYS ARG THR PRO SER SER GLY MET SER SER THR MET LYS GLU SER ALA PHE GLN SER
GLU PRO ARG ILE SER GLU SER LEU VAL ARG HIS ALA SER THR SER SER PRO ALA ASP LYS ALA LYS VAL THR ILE SER ASP GLY LYS VAL ALA ASP GLU GLU LYS PRO LYS LYS SER SER LEU CYS ARG THR VAL GLU GLY CYS ARG GLU GLU LEU GLN ASN GLN ALA ASN PHE SER PHE
ALA PRO LEU VAL LEU ASP MET LEU ASN PHE LEU MET ASP ALA ILE GLN THR ASN PHE GLN GLN ALA SER ALA VAL GLY SER SER SER ARG ALA GLN GLN ALA LEU SER GLU LEU HIS THR VAL GLU LYS ALA VAL GLU MET THR ASP GLN LEU MET VAL PRO THR LEU GLY SER GLN GLU
GLY ALA PHE GLU ASN VAL ARG MET ASN TYR SER GLY ASP GLN GLY GLN THR ILE ARG GLN LEU ILE SER ALA HIS VAL LEU ARG ARG VAL ALA MET CYS VAL LEU SER SER PRO HIS GLY ARG ARG GLN HIS LEU ALA VAL SER HIS GLU LYS GLY LYS ILE THR VAL LEU GLN LEU SER
ALA LEU LEU LYS GLN ALA ASP SER SER LYS ARG LYS LEU THR LEU THR ARG LEU ALA SER ALA PRO VAL PRO PHE THR VAL LEU SER LEU THR GLY ASN PRO CYS LYS GLU ASP TYR LEU ALA VAL CYS GLY LEU LYS ASP CYS HIS VAL LEU THR PHE SER SER SER GLY SER VAL SER
ASP HIS LEU VAL LEU HIS PRO GLN LEU ALA THR GLY ASN PHE ILE ILE LYS ALA VAL TRP LEU PRO GLY SER GLN THR GLU LEU ALA ILE VAL THR ALA ASP PHE VAL LYS ILE TYR ASP LEU CYS VAL ASP ALA LEU SER PRO THR PHE TYR PHE LEU LEU PRO SER SER LYS ILE ARG
ASP VAL THR PHE LEU PHE ASN GLU GLU GLY LYS ASN ILE ILE VAL ILE MET SER SER ALA GLY TYR ILE TYR THR GLN LEU MET GLU GLU ALA SER SER ALA GLN GLN GLY PRO PHE TYR VAL THR ASN VAL LEU GLU ILE ASN HIS GLU ASP LEU LYS ASP SER ASN SER GLN VAL ALA
GLY GLY GLY VAL SER VAL TYR TYR SER HIS VAL LEU GLN MET LEU PHE PHE SER TYR CYS GLN GLY LYS SER PHE ALA ALA THR ILE SER ARG THR THR LEU GLU VAL LEU GLN LEU PHE PRO ILE ASN ILE LYS SER SER ASN GLY GLY SER LYS THR SER PRO ALA LEU CYS GLN TRP
SER GLU VAL MET ASN HIS PRO GLY LEU VAL CYS CYS VAL GLN GLN THR THR GLY VAL PRO LEU VAL VAL MET VAL LYS PRO ASP THR PHE LEU ILE GLN GLU ILE LYS THR LEU PRO ALA LYS ALA LYS ILE GLN ASP MET VAL ALA ILE ARG HIS THR ALA CYS ASN GLU GLN GLN ARG
THR THR MET ILE LEU LEU CYS GLU ASP GLY SER LEU ARG ILE TYR MET ALA ASN VAL GLU ASN THR SER TYR TRP LEU GLN PRO SER LEU GLN PRO SER SER VAL ILE SER ILE MET LYS PRO VAL ARG LYS ARG LYS THR ALA THR ILE THR THR ARG THR SER SER GLN VAL THR PHE
PRO ILE ASP PHE PHE GLU HIS ASN GLN GLN LEU THR ASP VAL GLU PHE GLY GLY ASN ASP LEU LEU GLN VAL TYR ASN ALA GLN GLN ILE LYS HIS ARG LEU ASN SER THR GLY MET TYR VAL ALA ASN THR LYS PRO GLY GLY PHE THR ILE GLU ILE SER ASN ASN ASN SER THR MET
VAL MET THR GLY MET ARG ILE GLN ILE GLY THR GLN ALA ILE GLU ARG ALA PRO SER TYR ILE GLU ILE PHE GLY ARG THR MET GLN LEU ASN LEU SER ARG SER ARG TRP PHE ASP PHE PRO PHE THR ARG GLU GLU ALA LEU GLN ALA ASP LYS LYS LEU ASN LEU PHE ILE GLY ALA
SER VAL ASP PRO ALA GLY VAL THR MET ILE ASP ALA VAL LYS ILE TYR GLY LYS THR LYS GLU GLN PHE GLY TRP PRO ASP GLU PRO PRO GLU GLU PHE PRO SER ALA SER VAL SER ASN ILE CYS PRO SER ASN LEU ASN GLN SER ASN GLY THR GLY ASP SER ASP SER ALA ALA PRO

THR THR THR SER GLY THR VAL LEU GLU ARG LEU VAL VAL SER SER LEU GLU ALA LEU GLU SER CYS PHE ALA VAL GLY PRO ILE ILE GLU LYS GLU ARG ASN LYS ASN ALA ALA GLN GLU LEU ALA THR LEU LEU LEU SER LEU PRO ALA PRO ALA SER VAL GLN GLN GLN SER LYS SER

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

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

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

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

GLU MET VAL SER GLU SER MET VAL LEU GLU THR ALA GLU ASN VAL ASN ASN GLY ASN PRO SER PRO LEU GLU ALA LEU LEU ALA GLY ALA GLU GLY PHE PRO PRO MET LEU ASP ILE PRO PRO ASP ALA ASP ASP GLU THR MET VAL GLU LEU ALA ILE ALA LEU SER LEU GLN GLN ASP

GLN GLN GLY SER SER SER SER ALA LEU GLY LEU GLN SER LEU GLY LEU SER GLY GLN ALA PRO SER SER SER SER LEU ASP ALA GLY THR LEU SER ASP THR THR ALA SER ALA PRO ALA SER ASP ASP GLU GLY SER THR ALA ALA THR ASP GLY SER THR LEU ARG THR SER PRO ALA

ASP HIS GLY GLY SER VAL GLY SER GLU SER GLY GLY SER ALA VAL ASP SER VAL ALA GLY GLU HIS SER VAL SER GLY ARG SER SER ALA TYR GLY ASP ALA THR ALA GLU GLY HIS PRO ALA GLY PRO GLY SER VAL SER SER SER THR GLY ALA ILE SER THR THR THR GLY HIS GLN

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

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

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

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

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

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

SER PHE LEU VAL ASP GLU GLY VAL SER PRO VAL LEU LEU GLN LEU LEU SER CYS ALA LEU CYS GLY SER LYS VAL LEU ALA ALA LEU ALA ALA SER SER GLY SER SER SER ALA SER SER SER ALA PRO VAL ALA ALA SER SER GLY GLN ALA THR THR GLN SER LYS SER SER THR

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

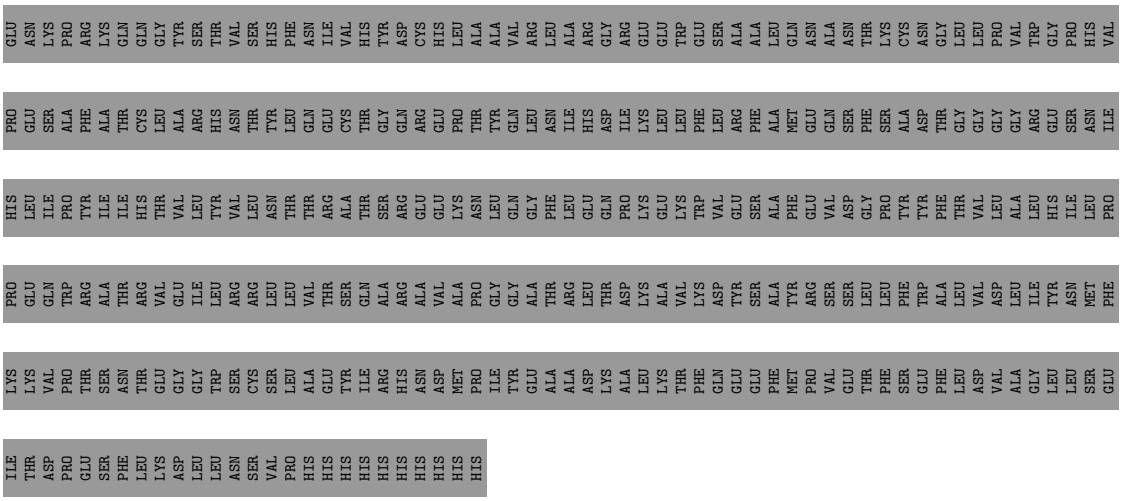
ILE ILE LEU ASP GLU SER ASN ALA GLU PRO LEU SER GLU ASP LYS GLY ASN LEU LEU LEU THR GLY ASP LYS ASP GLN LEU VAL MET LEU LEU ASP GLN ILE ASN SER THR PHE VAL ARG SER ASN PRO SER VAL LEU GLN GLY LEU LEU ARG ILE ILE PRO TYR LEU SER PHE GLY GLU

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

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

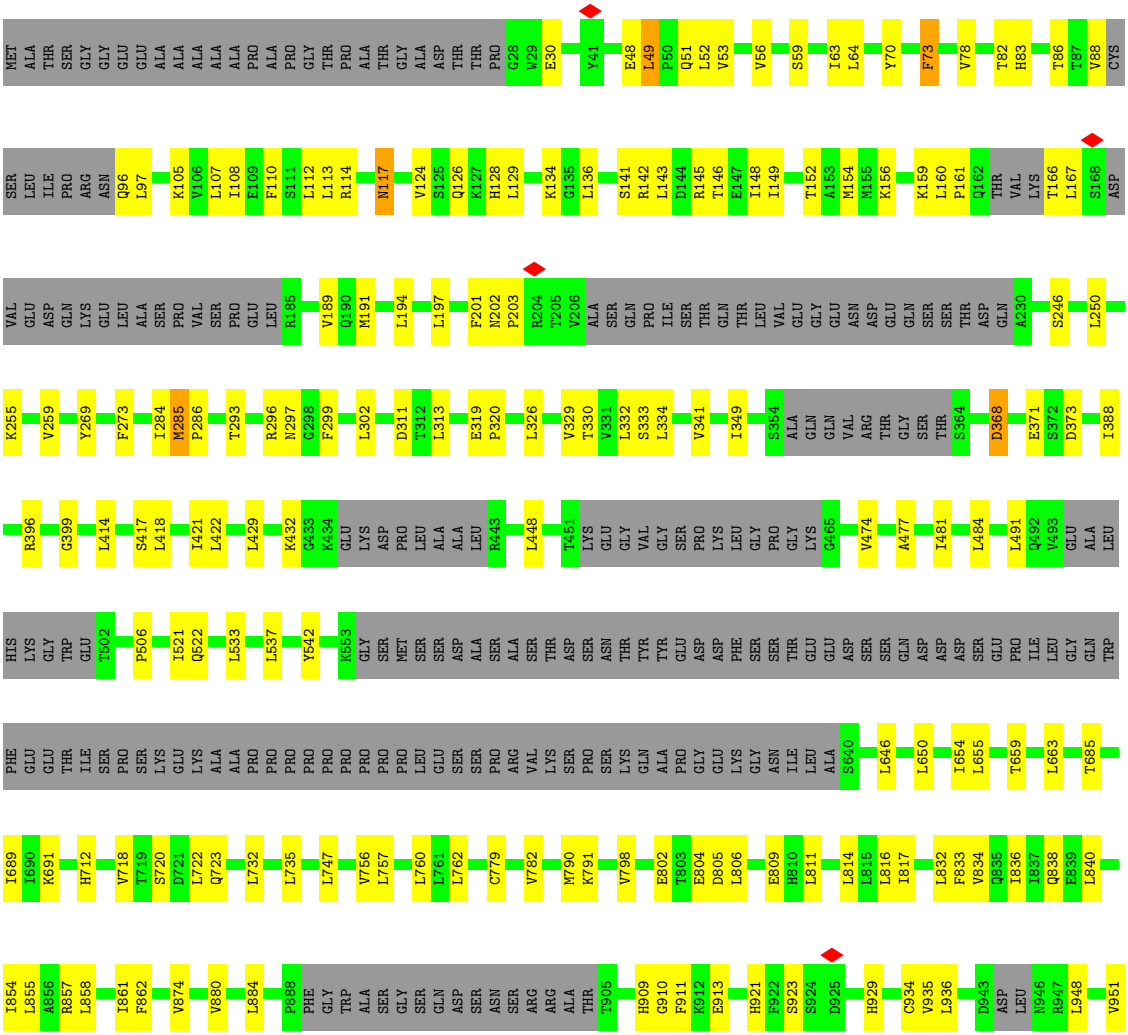
LEU HIS LYS LEU GLU GLN VAL SER SER ASP GLU GLY ILE GLY THR LEU ALA GLU ASN LEU LEU GLU ALA LEU ARG GLU HIS PRO ASP VAL ASN LYS LYS ILE ASP ALA ALA ARG ARG GLU THR ARG ALA GLU LYS LYS ARG MET ALA MET ALA MET ARG GLN LYS ALA LEU GLY THR LEU

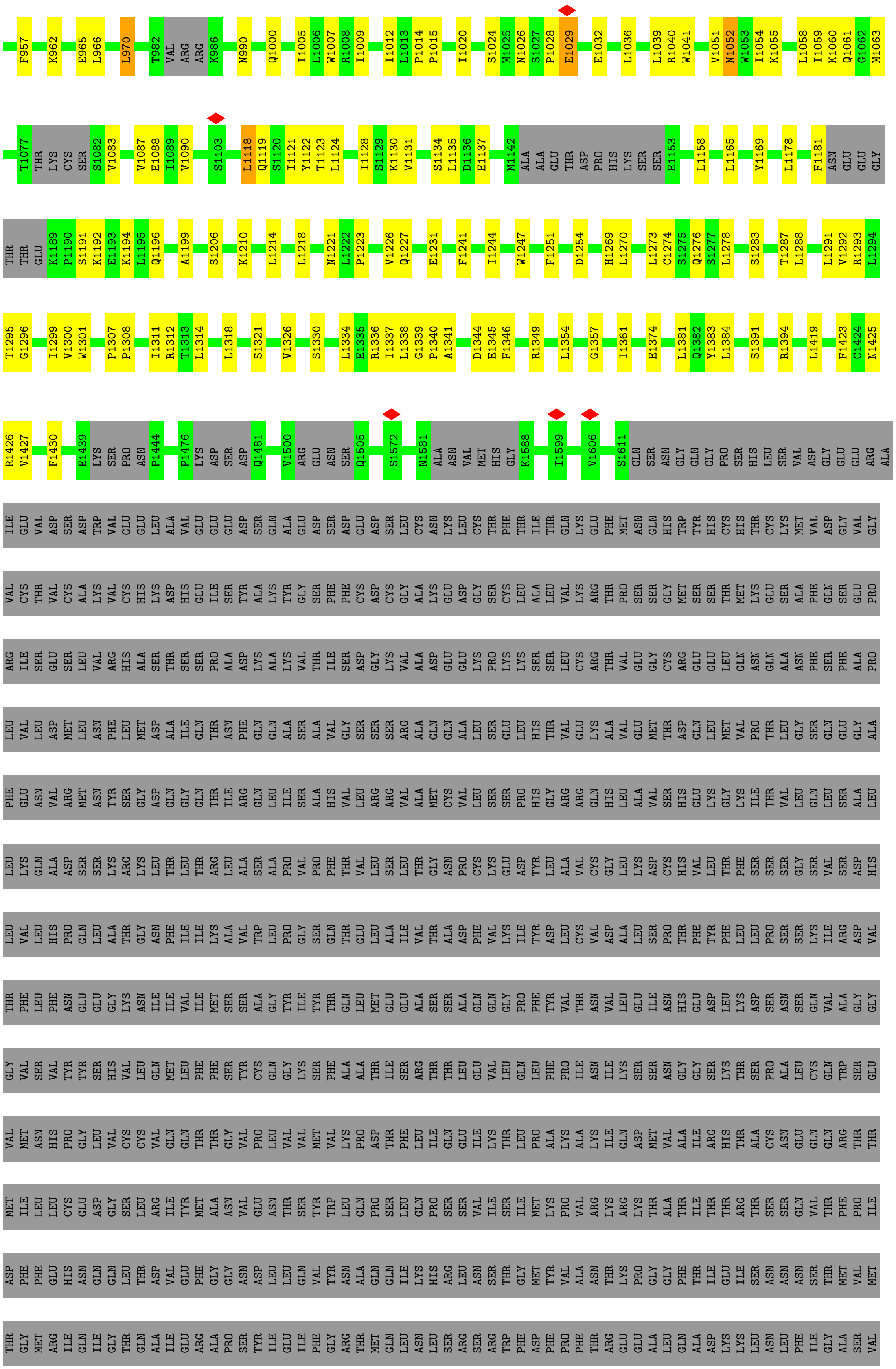
GLY MET THR THR ASN GLU LYS GLY GLN VAL VAL THR LYS THR ALA LEU LEU LYS GLN MET GLU GLU LEU ILE GLU GLU PRO GLY LEU THR CYS CYS ILE CYS ARG GLU GLY TYR LYS PHE GLN PRO THR LYS VAL LEU GLY ILE TYR THR PHE THR LYS ARG VAL ALA LEU GLU GLU MET



• Molecule 1: E3 ubiquitin-protein ligase UBR4

Chain B: 20% 5% 74%




F957 K962 E965 L966 L970 T982 VAL ARG ARG K986 N990 Q1000 I1005 L1006 W1007 R1008 I1009 I1012 L1013 P1014 P1015 I1020 S1024 M1025 N1026 S1027 P1028 E1029 E1032 L1036 L1039 R1040 W1041 V1051 N1052 W1053 I1054 K1055 L1058 I1059 K1060 Q1061 G1062 M1063
T1077 THR LYS CYS SER S1082 V1083 V1087 E1088 I1089 V1090 S1103 L1118 Q1119 S1120 I1121 Y1122 T1123 L1124 I1128 S1129 K1130 V1131 S1134 L1135 D1136 E1137 M1142 ALA ALA GLU THR ASP PRO HIS LYS SER SER E1153 L1158 L1165 Y1169 L1178 F1181 ASN GLU GLU GLY
THR THR GLU K1189 P1190 S1191 K1192 E1193 K1194 L1195 Q1196 A1199 S1206 K1210 L1214 L1218 N1221 L1222 P1223 V1226 Q1227 E1231 F1241 I1244 W1247 F1251 D1254 H1269 L1270 L1273 C1274 S1275 Q1276 S1277 L1278 S1283 T1287 L1288 L1291 V1292 R1293 L1294
T1295 G1296 I1299 V1300 W1301 P1307 P1308 I1311 R1312 T1313 L1314 L1318 S1321 V1326 S1330 L1334 E1335 R1336 I1337 L1338 G1339 P1340 A1341 D1344 E1345 F1346 R1349 L1354 G1357 I1361 E1374 L1381 Q1382 Y1383 L1384 S1391 R1394 L1419 F1423 C1424 N1425
R1426 V1427 F1430 E1439 LYS SER PRO ASN P1444 P1476 LYS ASP SER ASP Q1481 V1500 ARG GLU ASN SER Q1505 S1572 N1581 ALA ASN VAL MET HIS GLY K1588 I1599 V1606 S1611 GLN SER ASN GLY GLN GLY PRO SER HIS LEU SER VAL ASP GLY GLU GLU ARG ALA
ILE GLU VAL ASP SER ASP TRP VAL GLU GLU LEU ALA VAL GLU GLU GLU ASP SER GLN ALA GLU ASP SER ASP GLU ASP SER LEU CYS ASN LYS LEU CYS THR PHE THR ILE THR GLN LYS GLU PHE MET ASN GLN HIS TRP TYR HIS CYS HIS THR CYS LYS MET VAL ASP GLY VAL GLY
VAL CYS THR VAL CYS ALA LYS VAL CYS HIS LYS ASP HIS GLU ILE SER TYR ALA LYS TYR GLY SER PHE PHE CYS ASP CYS GLY ALA LYS GLU ASP GLY SER CYS LEU ALA LEU VAL LYS ARG THR PRO SER SER GLY MET SER SER THR MET LYS GLU SER ALA PHE GLN SER GLU PRO
ARG ILE SER GLU SER LEU VAL ARG HIS ALA SER THR SER SER PRO ALA ASP LYS ALA LYS VAL THR ILE SER ASP GLY LYS VAL ALA ASP GLU GLU LYS PRO LYS LYS SER SER LEU CYS ARG THR VAL GLU GLY CYS ARG GLU GLU LEU GLN ASN GLN ALA ASN PHE SER PHE ALA PRO
LEU VAL LEU ASP MET LEU ASN PHE LEU MET ASP ALA ILE GLN THR ASN PHE GLN GLN ALA SER ALA VAL GLY SER SER SER ARG ALA GLN GLN ALA LEU SER GLU LEU HIS THR VAL GLU LYS ALA VAL GLU MET THR ASP GLN LEU MET VAL PRO THR LEU GLY SER GLN GLU GLY ALA
PHE GLU ASN VAL ARG MET ASN TYR SER GLY ASP GLN GLY GLN THR ILE ARG GLN LEU ILE SER ALA HIS VAL LEU ARG ARG VAL ALA MET CYS VAL LEU SER SER PRO HIS GLY ARG ARG GLN HIS LEU ALA VAL SER HIS GLU LYS GLY LYS ILE THR VAL LEU GLN LEU SER ALA LEU
LEU LYS GLN ALA ASP SER SER LYS ARG LYS LEU THR LEU THR ARG LEU ALA SER ALA PRO VAL PRO PHE THR VAL LEU SER LEU THR GLY ASN PRO CYS LYS GLU ASP TYR LEU ALA VAL CYS GLY LEU LYS ASP CYS HIS VAL LEU THR PHE SER SER SER GLY SER VAL SER ASP HIS
LEU VAL LEU HIS PRO GLN LEU ALA THR GLY ASN PHE ILE ILE LYS ALA VAL TRP LEU PRO GLY SER GLN THR GLU LEU ALA ILE VAL THR ALA ASP PHE VAL LYS ILE TYR ASP LEU CYS VAL ASP ALA LEU SER PRO THR PHE TYR PHE LEU LEU PRO SER SER LYS ILE ARG ASP VAL
THR PHE LEU PHE ASN GLU GLU GLY LYS ASN ILE ILE VAL ILE MET SER SER ALA GLY TYR ILE TYR THR GLN LEU MET GLU GLU ALA SER SER ALA GLN GLN GLY PRO PHE TYR VAL THR ASN VAL LEU GLU ILE ASN HIS GLU ASP LEU LYS ASP SER ASN SER GLN VAL ALA GLY GLY
GLY VAL SER VAL TYR TYR SER HIS VAL LEU GLN MET LEU PHE PHE SER TYR CYS GLN GLY LYS SER PHE ALA ALA THR ILE SER ARG THR THR LEU GLU VAL LEU GLN LEU PHE PRO ILE ASN ILE LYS SER SER ASN GLY GLY SER LYS THR SER PRO ALA LEU CYS GLN TRP SER GLU
VAL MET ASN HIS PRO GLY LEU VAL CYS CYS VAL GLN GLN THR THR GLY VAL PRO LEU VAL VAL MET VAL LYS PRO ASP THR PHE LEU ILE GLN GLU ILE LYS THR LEU PRO ALA LYS ALA LYS ILE GLN ASP MET VAL ALA ILE ARG HIS THR ALA CYS ASN GLU GLN GLN ARG THR THR
MET ILE LEU LEU CYS GLU GLY ASP GLY SER LEU ARG ILE TYR MET ALA ASN VAL GLU ASN THR SER TYR TRP LEU GLN PRO SER LEU GLN PRO SER SER VAL ILE SER ILE MET LYS PRO VAL ARG LYS ARG LYS THR ALA THR ILE THR THR ARG THR SER SER GLN VAL THR PHE PRO ILE
ASP PHE PHE GLU HIS ASN GLN GLN LEU THR ASP VAL GLU PHE GLY GLY ASN ASP LEU LEU GLN VAL TYR ASN ALA GLN GLN ILE LYS HIS ARG LEU ASN SER THR GLY MET TYR VAL ALA ASN THR LYS PRO GLY GLY PHE THR ILE GLU ILE SER ASN ASN ASN SER THR MET VAL MET
THR GLY MET ARG ILE GLN ILE GLY THR GLN ALA ILE GLU ARG ALA PRO SER TYR ILE GLU GLU ILE PHE GLY ARG THR MET GLN LEU ASN LEU SER ARG SER ARG TRP PHE ASP PHE PRO PHE THR ARG GLU GLU ALA LEU GLN ALA ASP LYS LYS LEU ASN LEU PHE ILE GLY ALA SER VAL

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

THR SER GLY THR VAL LEU GLU ARG LEU VAL VAL SER SER LEU GLU ALA LEU GLU SER CYS PHE ALA VAL GLY PRO ILE ILE GLU LYS GLU ARG ASN LYS ASN ALA ALA GLN GLU LEU ALA THR LEU LEU LEU SER LEU PRO ALA PRO ALA SER VAL GLN GLN GLN SER LYS SER LEU LEU

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

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

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

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

VAL SER GLU SER MET VAL LEU GLU THR ALA GLU ASN VAL ASN ASN GLY ASN PRO SER PRO LEU GLU ALA LEU LEU ALA GLY ALA GLU GLY PHE PRO PRO MET LEU ASP ILE PRO PRO ASP ALA ASP ASP GLU THR MET VAL GLU LEU ALA ILE ALA LEU SER LEU GLN GLN ASP GLN GLN

GLY SER SER SER SER ALA LEU GLY LEU GLN SER LEU GLY LEU SER GLY GLN ALA PRO SER SER SER SER LEU ASP ALA GLY THR LEU SER ASP THR THR ALA SER ALA PRO ALA SER ASP ASP GLU GLY SER THR ALA ALA THR ASP GLY SER THR LEU ARG THR SER PRO ALA ASP HIS

GLY GLY SER VAL GLY SER GLU SER GLY GLY SER ALA VAL ASP SER VAL ALA GLY GLU HIS SER VAL SER GLY ARG SER SER ALA TYR GLY ASP ALA THR ALA GLU GLY HIS PRO ALA GLY PRO GLY SER VAL SER SER SER THR GLY ALA ILE SER THR THR THR GLY HIS GLN GLU GLY

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

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

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

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

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

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

LEU VAL ASP GLU GLY VAL SER PRO VAL LEU LEU GLN LEU LEU SER CYS ALA LEU CYS GLY SER LYS VAL LEU ALA ALA LEU ALA ALA SER SER GLY SER SER SER ALA SER SER SER SER ALA PRO VAL ALA ALA SER SER GLY GLN ALA THR THR GLN SER LYS SER SER THR LYS LYS

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

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

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

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

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

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

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

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

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

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

ASP PRO GLU SER PHE LEU LYS ASP LEU LEU ASN SER VAL PRO HIS HIS HIS HIS HIS HIS HIS HIS HIS HIS

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	75153	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	0.028	Depositor
Minimum map value	-0.014	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.00397	Depositor
Map size (Å)	486.912, 486.912, 486.912	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.268, 1.268, 1.268	Depositor

5 Model quality

5.1 Standard geometry

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	0.13	0/10223	0.36	0/13903
1	B	0.14	0/10223	0.37	0/13903
All	All	0.13	0/20446	0.36	0/27806

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	2
All	All	0	3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	117	ASN	Peptide
1	B	117	ASN	Peptide
1	B	285	MET	Peptide

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	10057	0	9639	191	0
1	B	10057	0	9639	183	0
All	All	20114	0	19278	365	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 9.

All (365) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:790:MET:HE3	1:B:854:ILE:HG23	1.57	0.87
1:A:272:ARG:HD3	1:A:285:MET:HE2	1.61	0.83
1:B:811:LEU:HD11	1:B:861:ILE:HD11	1.65	0.78
1:A:124:VAL:HG13	1:A:128:HIS:HB2	1.70	0.73
1:B:1119:GLN:O	1:B:1123:THR:HG23	1.90	0.72
1:B:108:ILE:HD11	1:B:136:LEU:HD23	1.72	0.72
1:A:1015:PRO:HG2	1:A:1054:ILE:HG23	1.70	0.72
1:B:533:LEU:O	1:B:537:LEU:HD12	1.91	0.71
1:B:990:ASN:HD21	1:B:1276:GLN:HB2	1.55	0.71
1:A:683:MET:HE3	1:A:727:LEU:HB3	1.71	0.71
1:A:1191:SER:H	1:A:1194:LYS:HE2	1.58	0.69
1:A:286:PRO:HB2	1:A:349:ILE:HD12	1.74	0.69
1:B:124:VAL:HG13	1:B:128:HIS:HB2	1.75	0.69
1:B:286:PRO:HB2	1:B:349:ILE:HD12	1.76	0.68
1:A:284:ILE:HG22	1:A:286:PRO:HD3	1.75	0.67
1:B:910:GLY:HA2	1:B:934:CYS:H	1.57	0.67
1:B:1178:LEU:HD11	1:B:1199:ALA:HB2	1.76	0.67
1:B:418:LEU:HD13	1:B:537:LEU:HD21	1.76	0.66
1:A:64:LEU:HD12	1:A:113:LEU:HD21	1.78	0.66
1:B:201:PHE:CE2	1:B:203:PRO:HB3	2.30	0.66
1:A:1244:ILE:HA	1:A:1293:ARG:HH22	1.59	0.66
1:B:326:LEU:O	1:B:330:THR:HG23	1.95	0.66
1:A:1178:LEU:HD11	1:A:1199:ALA:HB2	1.78	0.65
1:B:284:ILE:HG22	1:B:286:PRO:HD3	1.78	0.65
1:B:429:LEU:HA	1:B:432:LYS:HG2	1.79	0.65
1:A:52:LEU:O	1:A:56:VAL:HG23	1.96	0.65
1:A:491:LEU:HD12	1:A:521:ILE:HG13	1.78	0.64
1:A:1056:ASP:HA	1:A:1059:ILE:HD12	1.79	0.64
1:B:1020:ILE:O	1:B:1024:SER:HB2	1.99	0.63
1:A:429:LEU:HA	1:A:432:LYS:HG2	1.80	0.63
1:A:326:LEU:O	1:A:330:THR:HG23	1.99	0.62
1:A:1317:LEU:HD12	1:A:1323:THR:HG21	1.81	0.62

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Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1247:TRP:HA	1:A:1251:PHE:HB2	1.81	0.62
1:B:1191:SER:H	1:B:1194:LYS:HE2	1.65	0.62
1:B:1214:LEU:HD12	1:B:1214:LEU:H	1.64	0.62
1:B:319:GLU:HG2	1:B:320:PRO:HD3	1.82	0.61
1:B:159:LYS:HA	1:B:166:THR:HA	1.81	0.61
1:A:948:LEU:HD12	1:A:1012:ILE:HG22	1.81	0.61
1:B:1247:TRP:HA	1:B:1251:PHE:HB2	1.81	0.61
1:A:1015:PRO:HG3	1:A:1041:TRP:HZ2	1.66	0.60
1:B:809:GLU:HB3	1:B:884:LEU:HD11	1.82	0.60
1:A:134:LYS:HZ1	1:A:311:ASP:HA	1.67	0.60
1:B:542:TYR:HD2	1:B:689:ILE:HD12	1.66	0.60
1:B:816:LEU:HD12	1:B:880:VAL:HG21	1.82	0.60
1:A:765:GLN:HE22	1:A:817:ILE:HG23	1.66	0.60
1:B:732:LEU:HD21	1:B:760:LEU:HD13	1.83	0.59
1:B:806:LEU:HD23	1:B:857:ARG:HD2	1.84	0.59
1:A:399:GLY:HA3	1:B:399:GLY:HA3	1.85	0.59
1:A:1025:MET:HE3	1:A:1025:MET:H	1.66	0.59
1:B:814:LEU:HA	1:B:817:ILE:HD12	1.85	0.59
1:B:1244:ILE:HG12	1:B:1293:ARG:HH12	1.68	0.59
1:B:1015:PRO:HG3	1:B:1054:ILE:HG23	1.83	0.59
1:B:1292:VAL:HG21	1:B:1326:VAL:HG13	1.85	0.59
1:B:114:ARG:HH11	1:B:117:ASN:HD21	1.51	0.58
1:B:1423:PHE:O	1:B:1427:VAL:HG13	2.03	0.58
1:A:720:SER:O	1:A:722:LEU:HD22	2.02	0.58
1:B:720:SER:O	1:B:722:LEU:HD22	2.03	0.58
1:A:1310:VAL:O	1:A:1314:LEU:HB2	2.03	0.58
1:A:104:CYS:O	1:A:108:ILE:HG13	2.04	0.58
1:B:1391:SER:HA	1:B:1394:ARG:HE	1.67	0.58
1:A:1019:TYR:CD2	1:A:1041:TRP:HZ3	2.22	0.58
1:A:1162:THR:O	1:A:1166:ILE:HG13	2.04	0.58
1:B:1288:LEU:HD23	1:B:1326:VAL:HG21	1.86	0.57
1:A:1197:GLY:O	1:A:1201:VAL:HG23	2.04	0.57
1:B:1307:PRO:O	1:B:1311:ILE:HG22	2.04	0.57
1:B:64:LEU:HD12	1:B:113:LEU:HD21	1.86	0.57
1:A:525:ILE:HD13	1:A:530:LEU:HD13	1.87	0.57
1:A:542:TYR:HD2	1:A:689:ILE:HD12	1.69	0.57
1:B:285:MET:O	1:B:285:MET:HG2	2.04	0.57
1:A:804:GLU:HG3	1:A:805:ASP:OD2	2.03	0.57
1:B:417:SER:O	1:B:421:ILE:HG22	2.04	0.57
1:A:1020:ILE:O	1:A:1024:SER:HB2	2.04	0.57
1:B:802:GLU:CD	1:B:802:GLU:H	2.13	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:816:LEU:HD22	1:A:880:VAL:HG11	1.87	0.56
1:B:1318:LEU:HD21	1:B:1334:LEU:HD21	1.87	0.56
1:A:1050:TYR:O	1:A:1054:ILE:HG12	2.05	0.56
1:B:935:VAL:HG23	1:B:936:LEU:HD12	1.86	0.56
1:A:203:PRO:HD2	1:B:712:HIS:NE2	2.21	0.55
1:A:874:VAL:HG13	1:B:189:VAL:HG11	1.87	0.55
1:B:1244:ILE:HA	1:B:1293:ARG:HH22	1.71	0.55
1:B:659:THR:HA	1:B:663:LEU:HD12	1.88	0.55
1:B:293:THR:HG23	1:B:296:ARG:HH21	1.72	0.55
1:B:1218:LEU:HA	1:B:1221:ASN:ND2	2.22	0.55
1:B:191:MET:HE2	1:B:191:MET:HA	1.89	0.55
1:A:1155:THR:HA	1:A:1158:LEU:HD23	1.89	0.55
1:A:1292:VAL:HG21	1:A:1326:VAL:HG13	1.88	0.54
1:B:1314:LEU:HD21	1:B:1330:SER:HB2	1.89	0.54
1:B:1118:LEU:HA	1:B:1121:ILE:HD12	1.89	0.54
1:A:1090:VAL:HG11	1:A:1131:VAL:HG21	1.89	0.54
1:B:134:LYS:HZ1	1:B:311:ASP:HA	1.71	0.54
1:A:1119:GLN:HA	1:A:1122:TYR:CZ	2.43	0.53
1:A:790:MET:HE3	1:A:858:LEU:HD23	1.90	0.53
1:B:1119:GLN:HA	1:B:1122:TYR:CZ	2.44	0.53
1:A:1118:LEU:HA	1:A:1121:ILE:HD12	1.91	0.53
1:A:114:ARG:HH11	1:A:117:ASN:HD21	1.55	0.53
1:A:1352:GLU:HA	1:A:1355:ILE:HD12	1.91	0.53
1:B:1340:PRO:HD2	1:B:1344:ASP:HB2	1.91	0.53
1:A:1299:ILE:HD11	1:A:1305:MET:HG2	1.90	0.53
1:B:1134:SER:O	1:B:1137:GLU:HG3	2.09	0.53
1:B:1052:ASN:HA	1:B:1055:LYS:HG2	1.91	0.52
1:B:1090:VAL:HG11	1:B:1131:VAL:HG21	1.91	0.52
1:B:655:LEU:O	1:B:659:THR:HG23	2.10	0.52
1:A:78:VAL:HG11	1:A:110:PHE:CD2	2.45	0.52
1:B:957:PHE:HZ	1:B:1014:PRO:HG2	1.74	0.52
1:A:1395:LYS:O	1:A:1399:GLU:HG2	2.10	0.52
1:A:110:PHE:HE1	1:A:114:ARG:HH21	1.57	0.52
1:A:1384:LEU:O	1:A:1388:LEU:HG	2.10	0.52
1:B:160:LEU:HD21	1:B:167:LEU:HG	1.92	0.52
1:B:1381:LEU:HD13	1:B:1426:ARG:HG3	1.90	0.52
1:A:1280:LEU:O	1:A:1284:LEU:HD22	2.10	0.52
1:A:712:HIS:NE2	1:B:203:PRO:HD2	2.24	0.52
1:A:957:PHE:HZ	1:A:1014:PRO:HG2	1.74	0.51
1:A:49:LEU:O	1:A:53:VAL:HG23	2.10	0.51
1:A:293:THR:HG23	1:A:296:ARG:HH21	1.76	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1214:LEU:H	1:A:1214:LEU:HD12	1.74	0.51
1:A:1244:ILE:HA	1:A:1293:ARG:NH2	2.24	0.51
1:A:197:LEU:HD21	1:B:762:LEU:HB3	1.93	0.51
1:A:966:LEU:HD23	1:A:970:LEU:HD13	1.92	0.51
1:A:655:LEU:O	1:A:659:THR:HG23	2.09	0.51
1:A:160:LEU:HD21	1:A:167:LEU:HG	1.92	0.51
1:A:1308:PRO:HG2	1:A:1309:GLN:HE21	1.75	0.51
1:A:1064:LYS:HE3	1:A:1067:HIS:CE1	2.46	0.51
1:A:659:THR:HA	1:A:663:LEU:HD12	1.92	0.50
1:B:948:LEU:HD12	1:B:1012:ILE:HG22	1.92	0.50
1:A:191:MET:HE2	1:A:191:MET:HA	1.92	0.50
1:A:73:PHE:HB2	1:A:158:ALA:HB1	1.93	0.50
1:A:921:HIS:CE1	1:A:1274:CYS:HB2	2.46	0.50
1:B:1218:LEU:HA	1:B:1221:ASN:HD21	1.77	0.50
1:A:1000:GLN:HA	1:A:1270:LEU:HD13	1.92	0.50
1:B:804:GLU:HG3	1:B:805:ASP:OD2	2.12	0.50
1:A:1314:LEU:HB3	1:A:1334:LEU:HD11	1.93	0.50
1:B:791:LYS:HD3	1:B:836:ILE:HD12	1.94	0.50
1:A:957:PHE:CZ	1:A:1014:PRO:HG2	2.46	0.50
1:B:747:LEU:HB2	1:B:805:ASP:HB3	1.93	0.49
1:B:756:VAL:O	1:B:760:LEU:HD12	2.12	0.49
1:B:1300:VAL:HG22	1:B:1336:ARG:CZ	2.42	0.49
1:A:152:THR:O	1:A:156:LYS:HG2	2.12	0.49
1:B:1119:GLN:HA	1:B:1122:TYR:CE2	2.46	0.49
1:B:70:TYR:CE1	1:B:161:PRO:HA	2.46	0.49
1:B:126:GLN:HA	1:B:129:LEU:HD12	1.95	0.49
1:B:506:PRO:HB3	1:B:522:GLN:HE22	1.78	0.49
1:B:1341:ALA:HA	1:B:1346:PHE:CD2	2.48	0.49
1:A:70:TYR:CE1	1:A:161:PRO:HA	2.48	0.49
1:B:491:LEU:HD22	1:B:521:ILE:HG13	1.95	0.49
1:A:685:THR:O	1:A:689:ILE:HG12	2.12	0.49
1:B:1058:LEU:HD12	1:B:1063:MET:SD	2.53	0.49
1:A:1039:LEU:HB3	1:A:1130:LYS:HD3	1.94	0.48
1:A:1318:LEU:HA	1:A:1327:ALA:HB1	1.94	0.48
1:A:1336:ARG:HE	1:A:1337:ILE:HD11	1.77	0.48
1:B:1124:LEU:O	1:B:1128:ILE:HG12	2.12	0.48
1:B:1165:LEU:HG	1:B:1291:LEU:HD11	1.96	0.48
1:A:733:GLN:HA	1:A:738:ALA:HB2	1.96	0.48
1:B:145:ARG:O	1:B:149:ILE:HG12	2.13	0.48
1:A:910:GLY:HA2	1:A:934:CYS:H	1.78	0.48
1:A:1377:LEU:HA	1:A:1380:CYS:SG	2.54	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:685:THR:O	1:B:689:ILE:HG12	2.13	0.48
1:A:1119:GLN:HA	1:A:1122:TYR:CE2	2.48	0.48
1:B:911:PHE:HD1	1:B:934:CYS:HB2	1.78	0.48
1:B:1336:ARG:HE	1:B:1337:ILE:HD11	1.77	0.48
1:A:1218:LEU:HA	1:A:1221:ASN:ND2	2.29	0.48
1:A:1159:LEU:O	1:A:1163:LEU:HG	2.14	0.48
1:A:1384:LEU:O	1:A:1387:GLN:HG3	2.14	0.48
1:B:202:ASN:HB2	1:B:203:PRO:HA	1.95	0.48
1:B:299:PHE:HB3	1:B:373:ASP:OD2	2.13	0.48
1:B:840:LEU:HD21	1:B:855:LEU:HD11	1.95	0.48
1:A:418:LEU:HD11	1:A:477:ALA:HA	1.96	0.48
1:B:152:THR:O	1:B:156:LYS:HG2	2.14	0.48
1:A:98:GLN:NE2	1:A:201:PHE:HB3	2.29	0.47
1:A:1378:GLU:O	1:A:1382:GLN:HG3	2.13	0.47
1:B:78:VAL:HG11	1:B:110:PHE:CD2	2.49	0.47
1:B:1308:PRO:HB2	1:B:1312:ARG:NH1	2.28	0.47
1:B:1345:GLU:O	1:B:1349:ARG:HG2	2.14	0.47
1:A:1142:MET:HA	1:A:1142:MET:HE2	1.96	0.47
1:A:1311:ILE:O	1:A:1315:LEU:HD12	2.14	0.47
1:A:1092:GLU:O	1:A:1096:ARG:HG3	2.14	0.47
1:A:1233:TRP:HD1	1:A:1278:LEU:HD13	1.78	0.47
1:B:52:LEU:O	1:B:56:VAL:HG23	2.15	0.47
1:B:1214:LEU:HD11	1:B:1383:TYR:CE2	2.50	0.47
1:B:1318:LEU:H	1:B:1318:LEU:HD12	1.80	0.47
1:A:1241:PHE:HE2	1:A:1269:HIS:CD2	2.33	0.47
1:A:765:GLN:NE2	1:A:817:ILE:HG23	2.28	0.47
1:A:1045:LEU:HD12	1:A:1045:LEU:O	2.15	0.47
1:B:30:GLU:CD	1:B:30:GLU:H	2.23	0.47
1:B:1334:LEU:HD13	1:B:1338:LEU:HD11	1.97	0.47
1:A:417:SER:O	1:A:421:ILE:HG22	2.14	0.46
1:B:83:HIS:HD2	1:B:148:ILE:HG21	1.79	0.46
1:A:840:LEU:HD21	1:A:855:LEU:HD21	1.96	0.46
1:A:1134:SER:O	1:A:1137:GLU:HG3	2.15	0.46
1:A:1227:GLN:O	1:A:1231:GLU:HG3	2.15	0.46
1:B:112:LEU:HD13	1:B:255:LYS:HD2	1.96	0.46
1:B:474:VAL:HG11	1:B:646:LEU:HG	1.96	0.46
1:A:474:VAL:HG11	1:A:646:LEU:HG	1.98	0.46
1:B:1090:VAL:HG21	1:B:1131:VAL:HG23	1.97	0.46
1:A:832:LEU:O	1:A:836:ILE:HG12	2.16	0.46
1:B:96:GLN:HG2	1:B:97:LEU:HD22	1.97	0.46
1:B:418:LEU:HD11	1:B:477:ALA:HA	1.96	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:145:ARG:NH1	1:A:148:ILE:HD13	2.30	0.46
1:A:202:ASN:HB2	1:A:203:PRO:HA	1.97	0.46
1:B:141:SER:H	1:B:142:ARG:NH2	2.14	0.46
1:A:404:GLN:HG2	1:B:396:ARG:HH21	1.80	0.46
1:A:1319:LEU:HD21	1:A:1353:LYS:HG2	1.98	0.46
1:B:834:VAL:O	1:B:838:GLN:HG3	2.16	0.46
1:B:1283:SER:O	1:B:1287:THR:HG22	2.16	0.46
1:B:1381:LEU:HD21	1:B:1430:PHE:HB2	1.98	0.46
1:B:59:SER:O	1:B:63:ILE:HG13	2.16	0.46
1:B:909:HIS:O	1:B:934:CYS:HB3	2.15	0.46
1:A:189:VAL:HG11	1:B:874:VAL:HG13	1.99	0.45
1:B:1296:GLY:O	1:B:1300:VAL:HG23	2.17	0.45
1:A:1094:PHE:HZ	1:A:1128:ILE:HG22	1.82	0.45
1:B:110:PHE:HE1	1:B:114:ARG:HH21	1.63	0.45
1:B:1273:LEU:HD23	1:B:1273:LEU:HA	1.75	0.45
1:B:1135:LEU:HD21	1:B:1301:TRP:CD1	2.52	0.45
1:A:1218:LEU:HA	1:A:1221:ASN:HD21	1.80	0.45
1:B:1015:PRO:HB3	1:B:1041:TRP:CH2	2.50	0.45
1:B:1015:PRO:HB2	1:B:1020:ILE:HD11	1.97	0.45
1:B:1374:GLU:HG3	1:B:1419:LEU:HD11	1.97	0.45
1:A:82:THR:HG22	1:A:107:LEU:HD13	1.97	0.45
1:A:1138:HIS:HA	1:A:1141:LYS:HE3	1.98	0.45
1:A:203:PRO:HD2	1:B:712:HIS:HE2	1.81	0.45
1:A:83:HIS:HD2	1:A:148:ILE:HG12	1.81	0.45
1:A:533:LEU:O	1:A:537:LEU:HG	2.17	0.45
1:A:30:GLU:CD	1:A:30:GLU:H	2.25	0.45
1:A:73:PHE:CE2	1:A:161:PRO:HD3	2.52	0.45
1:A:144:ASP:O	1:A:148:ILE:HD12	2.16	0.45
1:A:1007:TRP:CZ2	1:A:1040:ARG:HD3	2.52	0.45
1:B:911:PHE:CD1	1:B:934:CYS:HB2	2.52	0.44
1:A:128:HIS:HA	1:A:131:LEU:HG	1.99	0.44
1:A:762:LEU:HB3	1:B:197:LEU:HD21	1.99	0.44
1:B:1005:ILE:O	1:B:1009:ILE:HG22	2.16	0.44
1:B:1214:LEU:HD13	1:B:1354:LEU:HD12	1.99	0.44
1:B:1206:SER:H	1:B:1321:SER:HB2	1.82	0.44
1:A:31:VAL:HG12	1:A:34:ARG:HE	1.83	0.44
1:A:443:ARG:HD3	1:A:445:ARG:HH12	1.82	0.44
1:A:1391:SER:O	1:A:1394:ARG:HG2	2.16	0.44
1:B:73:PHE:HA	1:B:154:MET:HE1	1.99	0.44
1:B:273:PHE:CE2	1:B:334:LEU:HB3	2.53	0.44
1:A:78:VAL:HG11	1:A:110:PHE:HD2	1.81	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:296:ARG:HG2	1:A:297:ASN:H	1.82	0.44
1:A:732:LEU:HD21	1:A:760:LEU:HD13	2.00	0.44
1:A:159:LYS:HA	1:A:166:THR:HA	1.98	0.44
1:A:273:PHE:O	1:A:277:VAL:HG22	2.18	0.44
1:A:1350:VAL:O	1:A:1354:LEU:HD23	2.17	0.44
1:B:448:LEU:HD23	1:B:448:LEU:HA	1.87	0.44
1:A:1359:TYR:HA	1:A:1362:LEU:HG	1.99	0.44
1:B:48:GLU:HA	1:B:51:GLN:NE2	2.33	0.44
1:B:691:LYS:NZ	1:B:735:LEU:HA	2.33	0.43
1:B:1039:LEU:HB2	1:B:1130:LYS:CE	2.48	0.43
1:A:143:LEU:HD23	1:A:143:LEU:HA	1.86	0.43
1:A:368:ASP:O	1:A:371:GLU:HG3	2.18	0.43
1:A:1178:LEU:HD23	1:A:1178:LEU:HA	1.84	0.43
1:A:1270:LEU:HD23	1:A:1270:LEU:HA	1.83	0.43
1:B:650:LEU:O	1:B:654:ILE:HG22	2.18	0.43
1:A:1244:ILE:HG12	1:A:1293:ARG:HH12	1.83	0.43
1:B:333:SER:HB2	1:B:388:ILE:HG13	2.00	0.43
1:A:779:CYS:O	1:A:782:VAL:HG12	2.18	0.43
1:A:1124:LEU:HD23	1:A:1124:LEU:HA	1.86	0.43
1:A:1165:LEU:HD12	1:A:1165:LEU:HA	1.87	0.43
1:B:1278:LEU:HD23	1:B:1278:LEU:HA	1.89	0.43
1:A:415:LEU:HD11	1:A:484:LEU:HD21	2.00	0.43
1:A:545:ALA:HB2	1:A:647:PHE:HB2	2.01	0.43
1:A:834:VAL:O	1:A:838:GLN:HG3	2.19	0.43
1:B:114:ARG:HA	1:B:114:ARG:HD3	1.82	0.43
1:B:1083:VAL:O	1:B:1087:VAL:HG22	2.19	0.43
1:A:269:TYR:HE2	1:A:302:LEU:HD11	1.82	0.43
1:A:318:LEU:HA	1:A:325:ARG:NH2	2.33	0.43
1:A:1091:GLU:OE2	1:A:1157:ASN:HB3	2.18	0.43
1:A:1273:LEU:HD23	1:A:1273:LEU:HA	1.86	0.43
1:B:1391:SER:HA	1:B:1394:ARG:HB3	2.00	0.43
1:A:1051:VAL:O	1:A:1055:LYS:HG2	2.19	0.43
1:B:832:LEU:O	1:B:836:ILE:HG12	2.18	0.43
1:B:1181:PHE:CZ	1:B:1226:VAL:HG12	2.53	0.43
1:A:299:PHE:HB3	1:A:373:ASP:CG	2.44	0.43
1:A:1357:GLY:O	1:A:1361:ILE:HG23	2.19	0.43
1:B:910:GLY:HA2	1:B:934:CYS:N	2.31	0.43
1:A:273:PHE:CZ	1:A:334:LEU:HB3	2.54	0.42
1:B:108:ILE:CD1	1:B:136:LEU:HD23	2.45	0.42
1:A:690:ILE:HD11	1:A:714:ASN:HD21	1.82	0.42
1:A:962:LYS:HB3	1:A:965:GLU:OE1	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1116:PRO:HD3	1:A:1172:PHE:CE1	2.54	0.42
1:A:1377:LEU:O	1:A:1381:LEU:HD22	2.18	0.42
1:B:1241:PHE:HE2	1:B:1269:HIS:CD2	2.37	0.42
1:B:779:CYS:O	1:B:782:VAL:HG12	2.19	0.42
1:B:833:PHE:CE1	1:B:862:PHE:HB2	2.54	0.42
1:B:913:GLU:CD	1:B:913:GLU:H	2.27	0.42
1:B:1227:GLN:O	1:B:1231:GLU:HG2	2.19	0.42
1:B:1339:GLY:HA2	1:B:1340:PRO:HD3	1.85	0.42
1:B:1135:LEU:HD21	1:B:1301:TRP:HD1	1.85	0.42
1:A:795:LEU:HD12	1:A:840:LEU:HD13	2.01	0.42
1:B:1032:GLU:O	1:B:1036:LEU:HD23	2.19	0.42
1:B:1036:LEU:HA	1:B:1039:LEU:HD23	2.01	0.42
1:A:53:VAL:HG11	1:A:99:SER:HB2	2.02	0.42
1:B:296:ARG:HG2	1:B:297:ASN:H	1.83	0.42
1:A:887:PRO:HA	1:A:888:PRO:HD3	1.92	0.42
1:A:1394:ARG:HA	1:A:1397:MET:HB3	2.02	0.42
1:B:484:LEU:HD12	1:B:484:LEU:HA	1.83	0.42
1:B:1357:GLY:O	1:B:1361:ILE:HG23	2.20	0.42
1:A:273:PHE:CE2	1:A:334:LEU:HB3	2.55	0.42
1:A:791:LYS:HD3	1:A:836:ILE:HD12	2.02	0.42
1:A:1087:VAL:O	1:A:1091:GLU:HB2	2.19	0.42
1:B:329:VAL:HG13	1:B:388:ILE:HD12	2.02	0.42
1:A:911:PHE:CE1	1:A:934:CYS:HB2	2.54	0.42
1:A:1122:TYR:HB3	1:A:1269:HIS:ND1	2.35	0.42
1:B:368:ASP:O	1:B:371:GLU:HG3	2.20	0.42
1:A:418:LEU:HD23	1:A:418:LEU:HA	1.90	0.42
1:A:874:VAL:HG12	1:A:878:GLU:OE1	2.19	0.42
1:A:1431:PHE:O	1:A:1434:LEU:HD12	2.20	0.42
1:A:806:LEU:HD12	1:A:806:LEU:HA	1.73	0.41
1:A:910:GLY:HA2	1:A:933:TYR:HA	2.02	0.41
1:B:269:TYR:HE2	1:B:302:LEU:HD11	1.85	0.41
1:B:1007:TRP:CZ2	1:B:1040:ARG:HD3	2.55	0.41
1:A:728:GLN:O	1:A:732:LEU:HG	2.21	0.41
1:A:1410:ILE:H	1:A:1410:ILE:HG13	1.69	0.41
1:B:718:VAL:HA	1:B:723:GLN:NE2	2.35	0.41
1:B:1254:ASP:C	1:B:1254:ASP:OD1	2.63	0.41
1:A:96:GLN:HG2	1:A:97:LEU:HD22	2.02	0.41
1:A:1308:PRO:HB2	1:A:1312:ARG:HH21	1.85	0.41
1:A:202:ASN:HB2	1:A:203:PRO:CA	2.50	0.41
1:A:1214:LEU:HD11	1:A:1383:TYR:CE2	2.55	0.41
1:A:263:LEU:HD12	1:A:266:PHE:CD2	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1388:LEU:CD2	1:A:1397:MET:HG2	2.51	0.41
1:B:422:LEU:HD23	1:B:422:LEU:HA	1.88	0.41
1:B:1192:LYS:O	1:B:1196:GLN:HG3	2.20	0.41
1:A:1309:GLN:NE2	1:A:1312:ARG:HH22	2.17	0.41
1:B:73:PHE:CE2	1:B:161:PRO:HD3	2.56	0.41
1:B:105:LYS:HE2	1:B:250:LEU:HD21	2.03	0.41
1:B:921:HIS:CE1	1:B:1274:CYS:HB2	2.55	0.41
1:B:1060:LYS:O	1:B:1061:GLN:HG2	2.21	0.41
1:A:301:SER:O	1:A:304:ILE:HG22	2.21	0.41
1:B:70:TYR:CE1	1:B:159:LYS:HE3	2.55	0.41
1:B:313:LEU:HD21	1:B:332:LEU:HD21	2.02	0.41
1:B:1158:LEU:HD12	1:B:1158:LEU:HA	1.86	0.41
1:A:82:THR:HG23	1:A:107:LEU:HD22	2.03	0.41
1:A:1434:LEU:HD12	1:A:1435:PHE:N	2.36	0.41
1:B:966:LEU:HD23	1:B:970:LEU:HD13	2.03	0.41
1:A:98:GLN:HB2	1:A:195:ASN:OD1	2.20	0.41
1:A:202:ASN:HB3	1:A:205:THR:OG1	2.21	0.41
1:A:822:THR:O	1:A:826:ARG:HG3	2.21	0.41
1:A:833:PHE:O	1:A:837:ILE:HG12	2.20	0.41
1:A:1308:PRO:HG2	1:A:1309:GLN:NE2	2.36	0.41
1:A:1313:THR:HG23	1:A:1314:LEU:HD23	2.03	0.41
1:B:49:LEU:O	1:B:53:VAL:HG23	2.21	0.41
1:B:82:THR:O	1:B:86:THR:HG23	2.21	0.41
1:B:105:LYS:HB2	1:B:246:SER:HB3	2.02	0.41
1:B:145:ARG:HA	1:B:148:ILE:CG1	2.50	0.41
1:B:146:THR:HA	1:B:149:ILE:HD11	2.02	0.41
1:B:858:LEU:HD23	1:B:858:LEU:HA	1.80	0.41
1:B:962:LYS:HB3	1:B:965:GLU:OE1	2.21	0.41
1:B:1210:LYS:HE2	1:B:1210:LYS:HB3	1.79	0.41
1:A:104:CYS:HA	1:A:107:LEU:HD12	2.02	0.41
1:A:996:ALA:HB1	1:A:1273:LEU:HB3	2.03	0.41
1:A:1136:ASP:HA	1:A:1301:TRP:CH2	2.56	0.41
1:A:48:GLU:HA	1:A:51:GLN:NE2	2.36	0.40
1:B:1295:THR:O	1:B:1299:ILE:HG22	2.20	0.40
1:B:1381:LEU:HA	1:B:1384:LEU:HG	2.03	0.40
1:B:82:THR:HG23	1:B:107:LEU:HD22	2.03	0.40
1:B:414:LEU:HD23	1:B:414:LEU:HA	1.80	0.40
1:B:1314:LEU:HD23	1:B:1314:LEU:O	2.20	0.40
1:A:909:HIS:O	1:A:934:CYS:HB3	2.22	0.40
1:A:1278:LEU:HD23	1:A:1278:LEU:HA	1.93	0.40
1:B:1039:LEU:HB2	1:B:1130:LYS:HE3	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:44:PHE:HB2	1:A:84:TYR:CD1	2.56	0.40
1:A:326:LEU:HD12	1:A:326:LEU:HA	1.87	0.40
1:B:1028:PRO:C	1:B:1029:GLU:HG2	2.46	0.40
1:B:1214:LEU:HB3	1:B:1218:LEU:HD13	2.03	0.40
1:A:1204:ILE:HG13	1:A:1357:GLY:HA3	2.02	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	1311/5193 (25%)	1265 (96%)	44 (3%)	2 (0%)	44	73
1	B	1311/5193 (25%)	1260 (96%)	49 (4%)	2 (0%)	44	73
All	All	2622/10386 (25%)	2525 (96%)	93 (4%)	4 (0%)	45	73

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	923	SER
1	B	923	SER
1	B	1223	PRO
1	A	1223	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	1036/4531 (23%)	1015 (98%)	21 (2%)	50 72
1	B	1036/4531 (23%)	1011 (98%)	25 (2%)	44 67
All	All	2072/9062 (23%)	2026 (98%)	46 (2%)	47 69

All (46) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	63	ILE
1	A	88	VAL
1	A	119	ASP
1	A	278	LEU
1	A	315	LEU
1	A	341	VAL
1	A	368	ASP
1	A	382	LEU
1	A	422	LEU
1	A	481	ILE
1	A	484	LEU
1	A	518	ILE
1	A	722	LEU
1	A	779	CYS
1	A	798	VAL
1	A	858	LEU
1	A	1006	LEU
1	A	1009	ILE
1	A	1052	ASN
1	A	1210	LYS
1	A	1284	LEU
1	B	49	LEU
1	B	73	PHE
1	B	88	VAL
1	B	143	LEU
1	B	194	LEU
1	B	259	VAL
1	B	341	VAL
1	B	368	ASP
1	B	481	ILE
1	B	757	LEU
1	B	798	VAL
1	B	929	HIS
1	B	951	VAL
1	B	970	LEU

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Mol	Chain	Res	Type
1	B	1000	GLN
1	B	1026	ASN
1	B	1029	GLU
1	B	1051	VAL
1	B	1052	ASN
1	B	1059	ILE
1	B	1088	GLU
1	B	1118	LEU
1	B	1169	TYR
1	B	1270	LEU
1	B	1425	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	98	GLN
1	A	237	ASN
1	A	765	GLN
1	A	820	ASN
1	A	917	ASN
1	A	1227	GLN
1	A	1365	HIS
1	B	83	HIS
1	B	237	ASN
1	B	728	GLN
1	B	881	GLN
1	B	882	HIS
1	B	990	ASN
1	B	1164	GLN
1	B	1227	GLN
1	B	1266	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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

There are no ligands in this entry.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

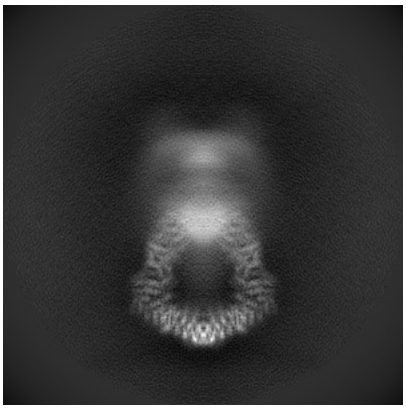
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-53430. These allow visual inspection of the internal detail of the map and identification of artifacts.

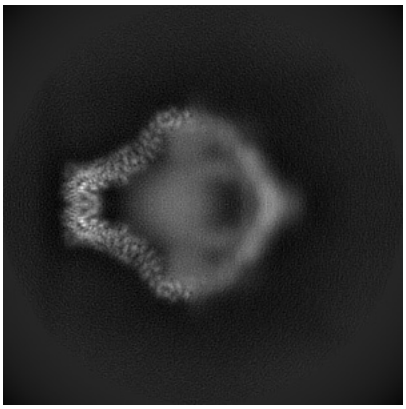
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

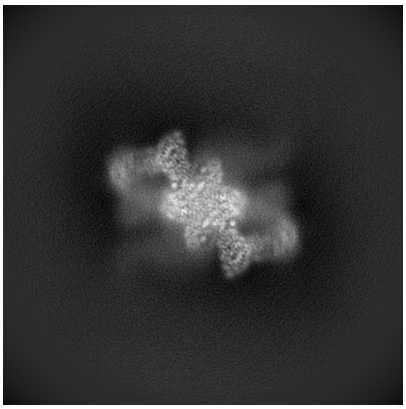
6.1.1 Primary map



X

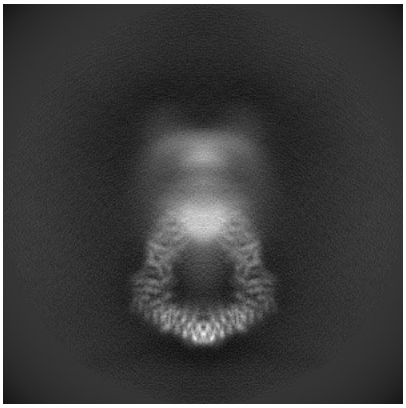


Y

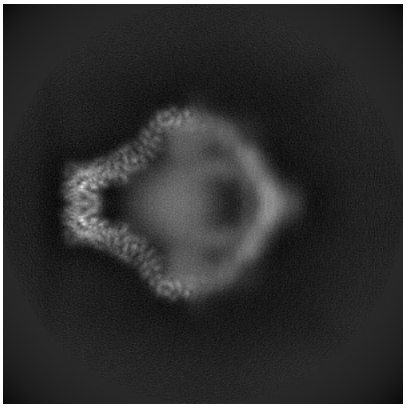


Z

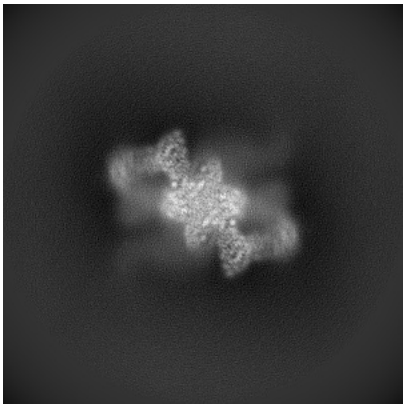
6.1.2 Raw map



X



Y

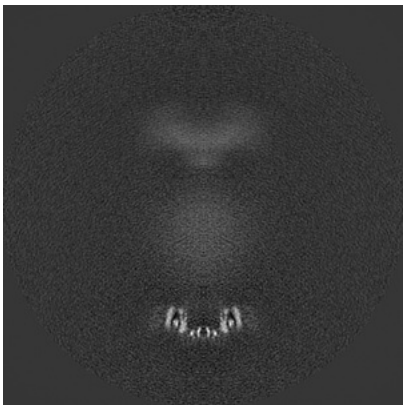


Z

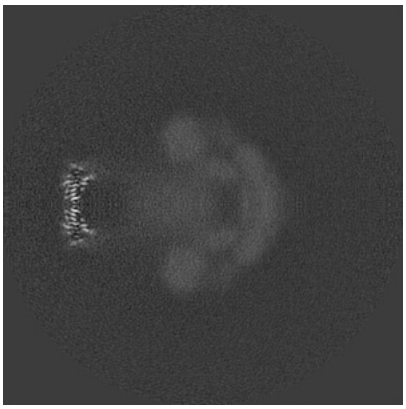
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

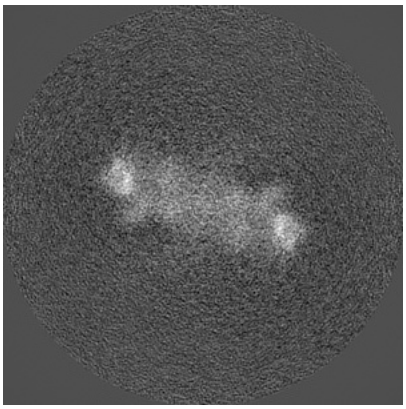
6.2.1 Primary map



X Index: 192

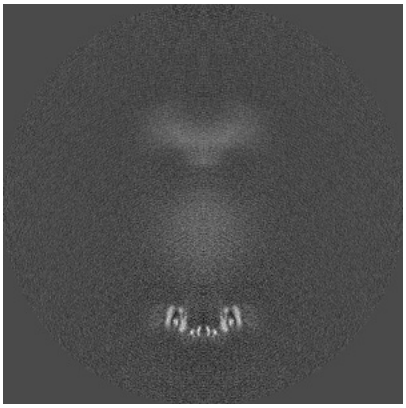


Y Index: 192

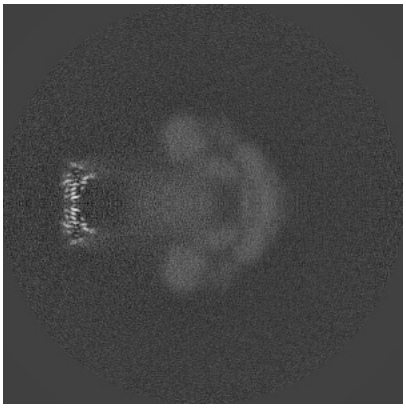


Z Index: 192

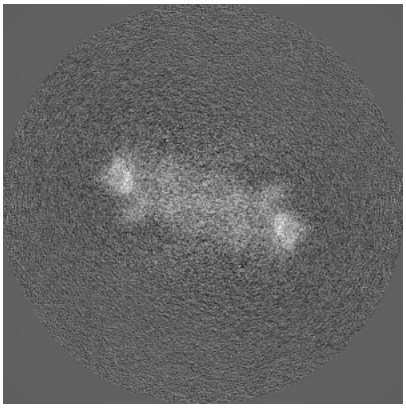
6.2.2 Raw map



X Index: 192



Y Index: 192

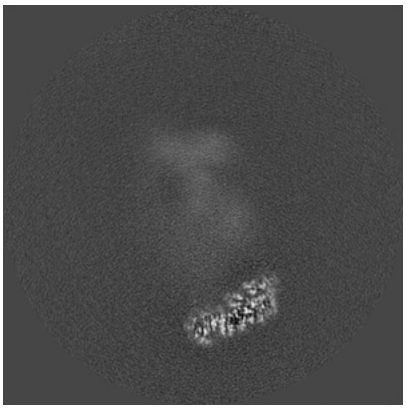


Z Index: 192

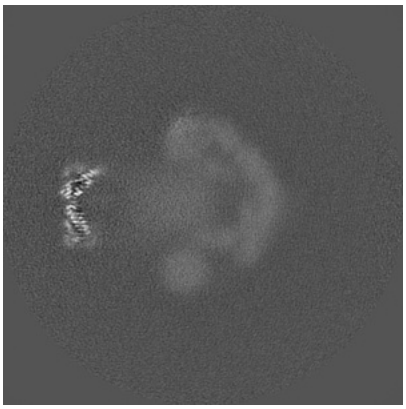
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

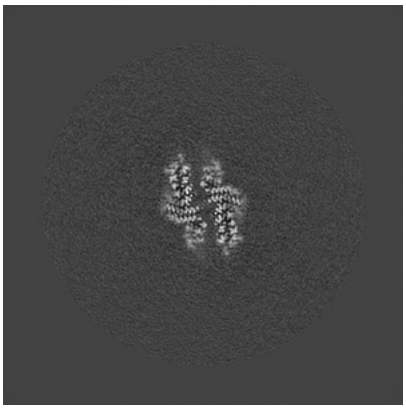
6.3.1 Primary map



X Index: 165

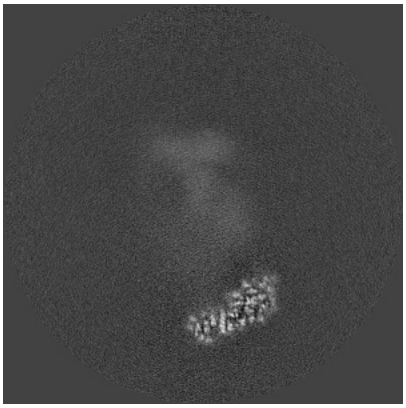


Y Index: 184

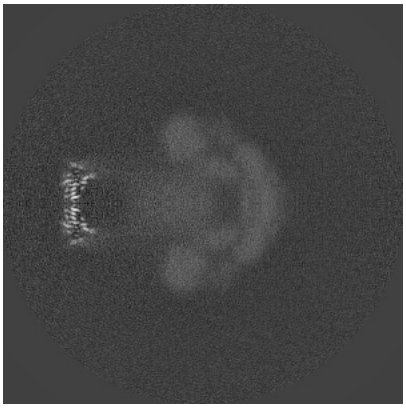


Z Index: 75

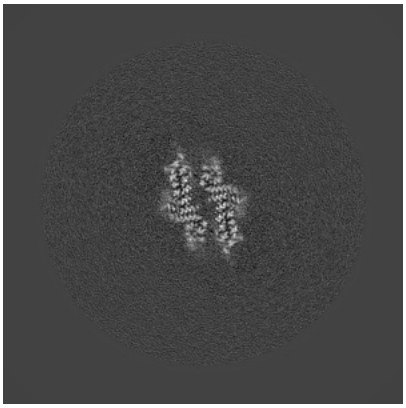
6.3.2 Raw map



X Index: 164



Y Index: 192

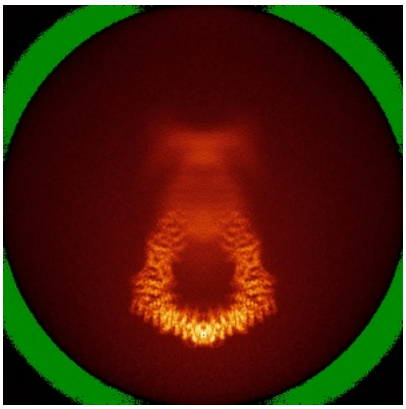


Z Index: 76

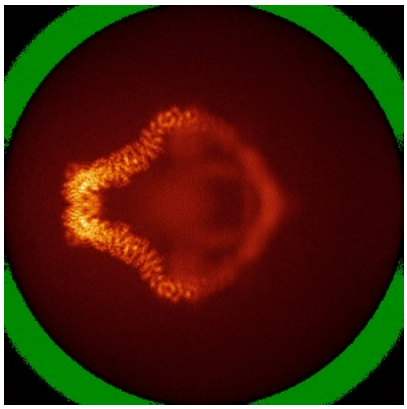
The images above show the largest variance slices of the map in three orthogonal directions.

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

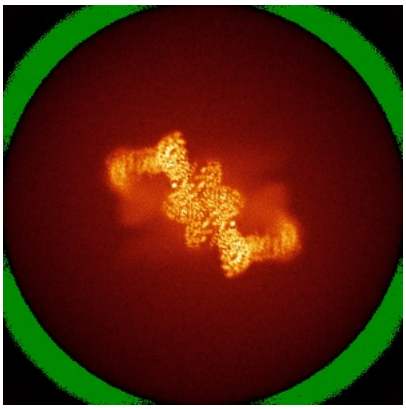
6.4.1 Primary map



X

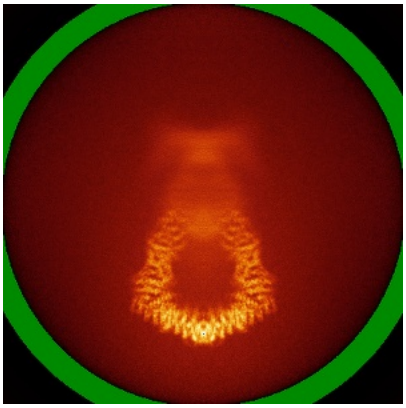


Y

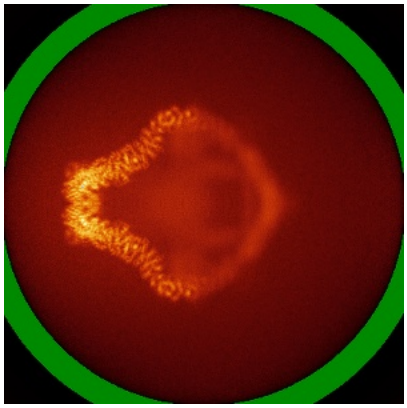


Z

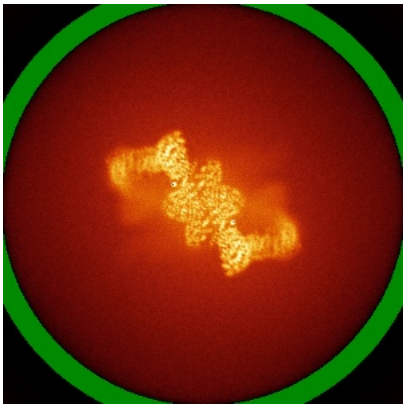
6.4.2 Raw map



X



Y

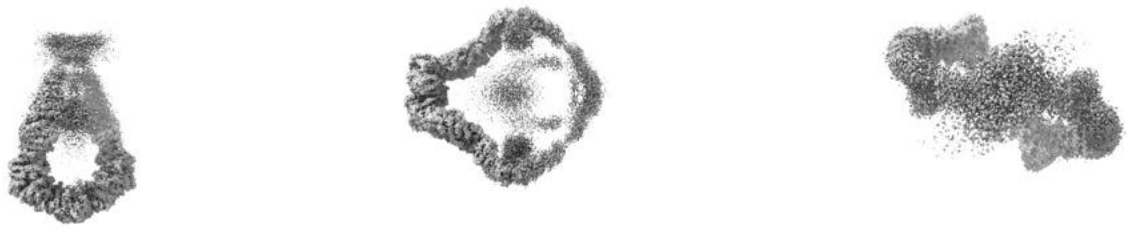


Z

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)

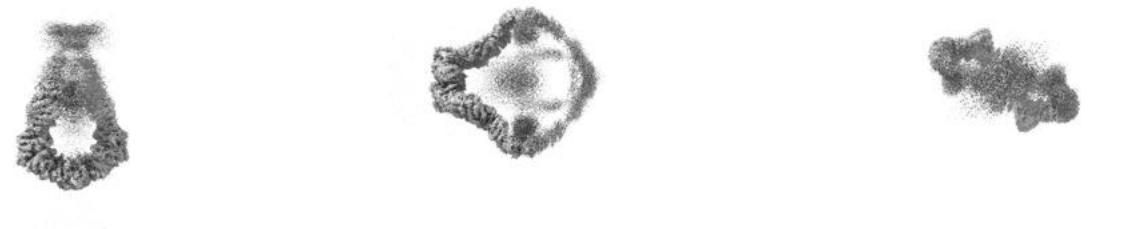
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.00397. 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)

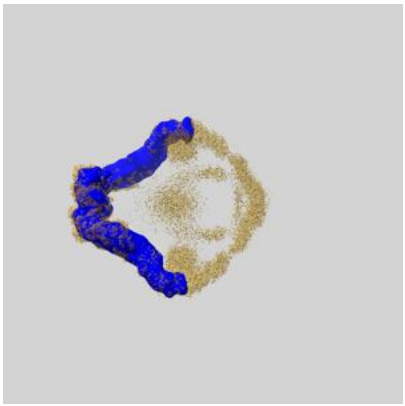
This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

A mask typically either:

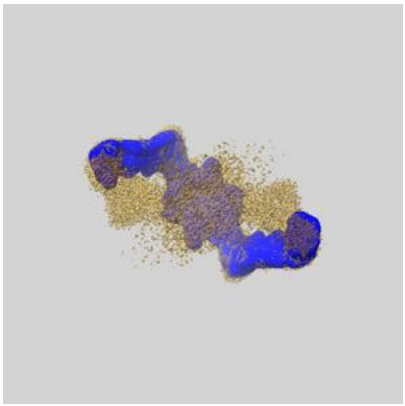
- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

6.6.1 emd_53430_msk_1.map (i)

X



Y

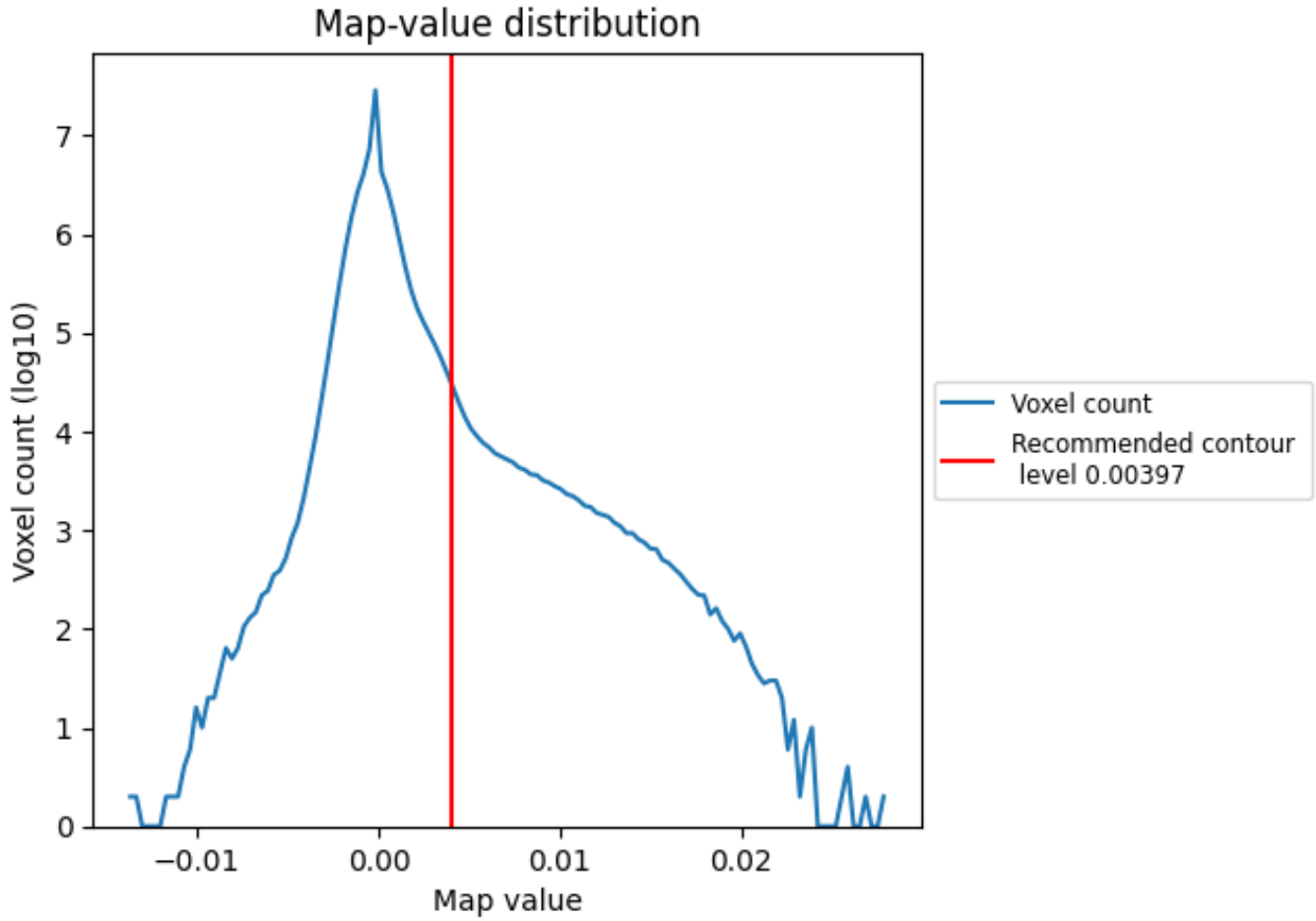


Z

7 Map analysis

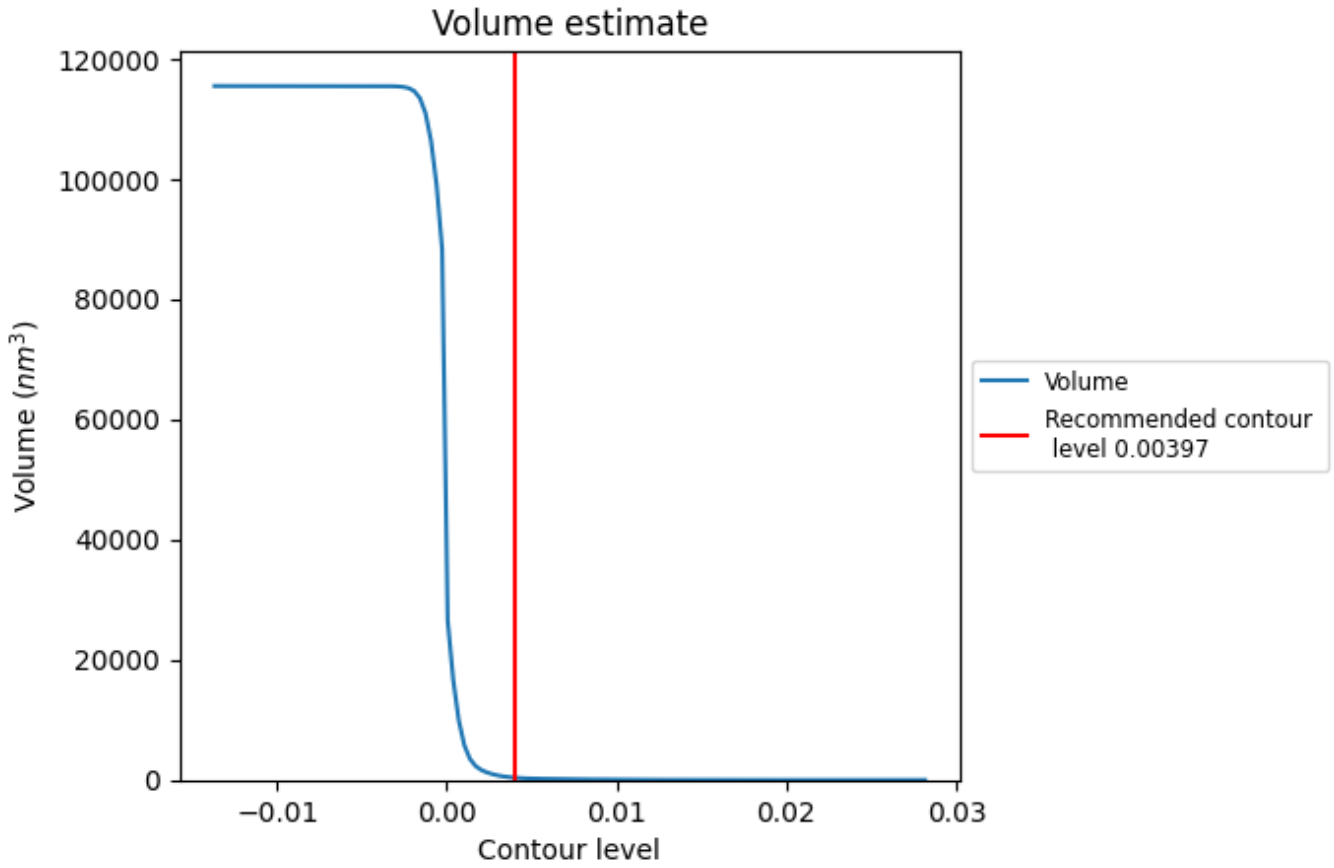
This section contains the results of statistical analysis of the map.

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.

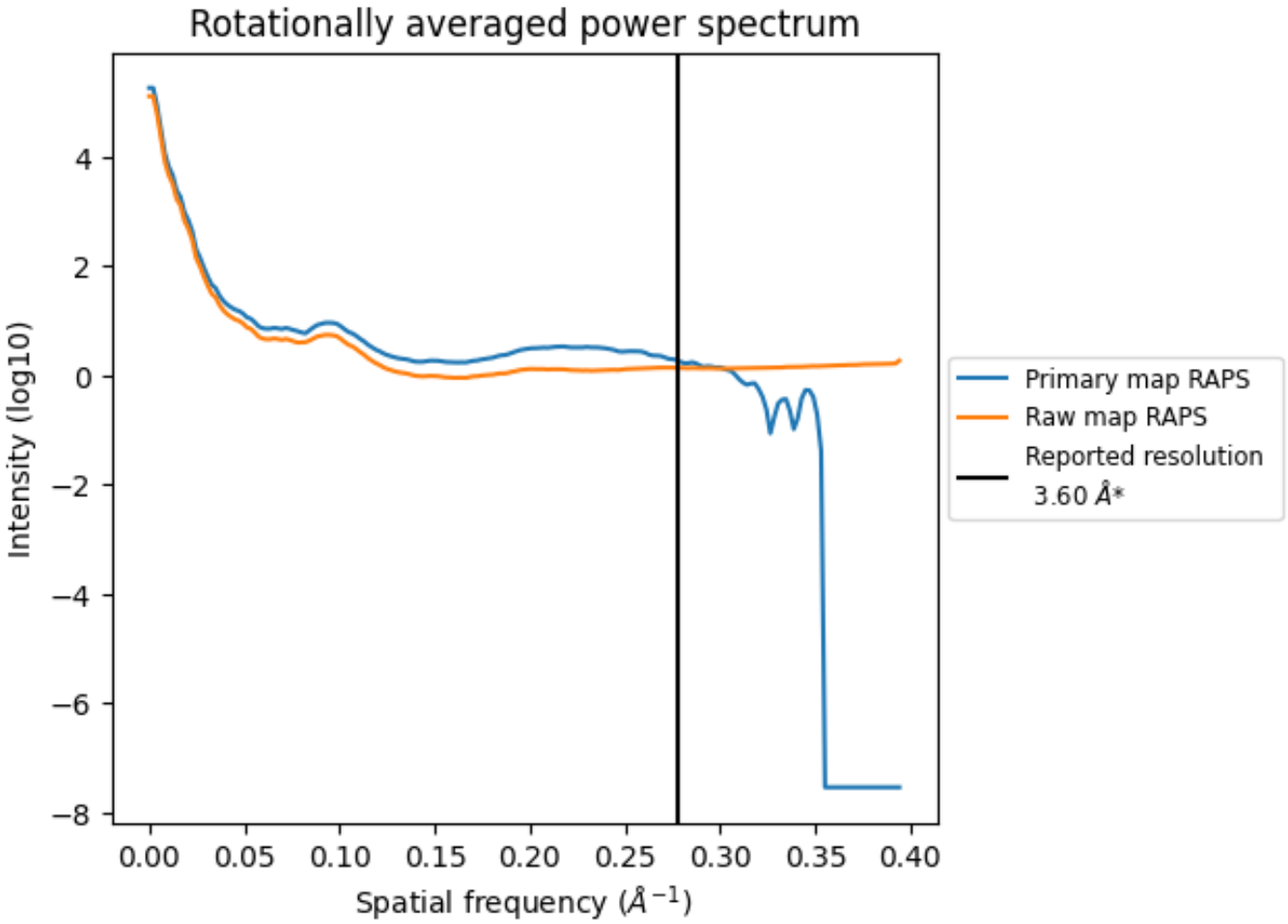
7.2 Volume estimate (i)



The volume at the recommended contour level is 376 nm^3; this corresponds to an approximate mass of 340 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)

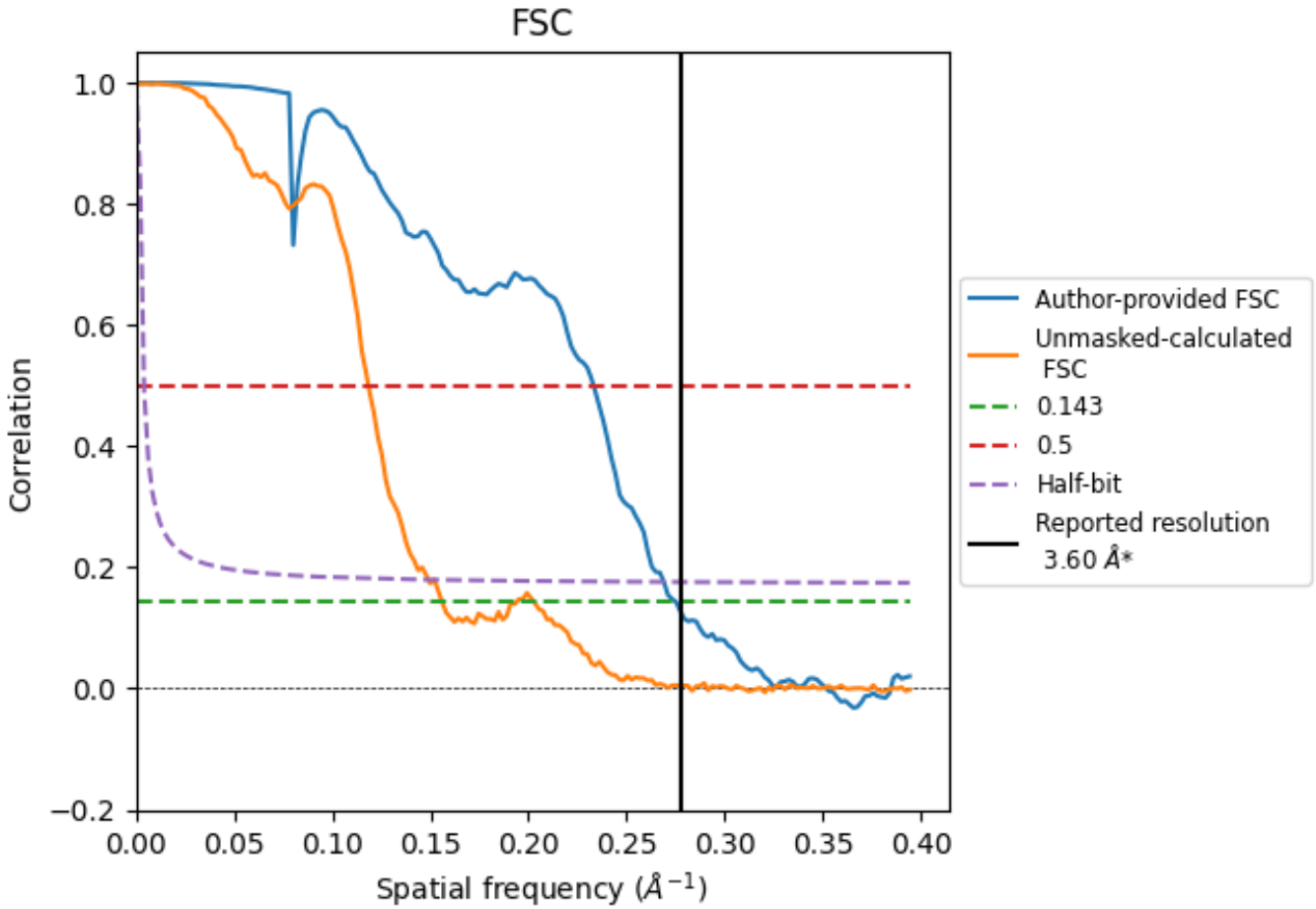


*Reported resolution corresponds to spatial frequency of 0.278 Å^{-1}

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 0.278 Å^{-1}

8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.60	-	-
Author-provided FSC curve	3.63	4.29	3.72
Unmasked-calculated*	6.41	8.45	6.71

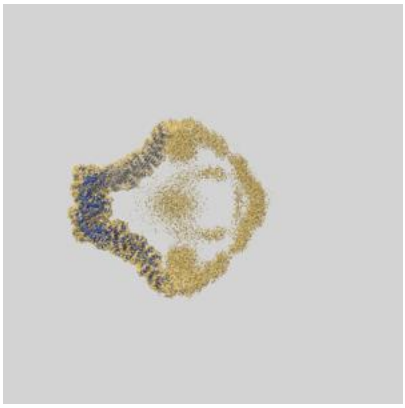
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.41 differs from the reported value 3.6 by more than 10 %

9 Map-model fit

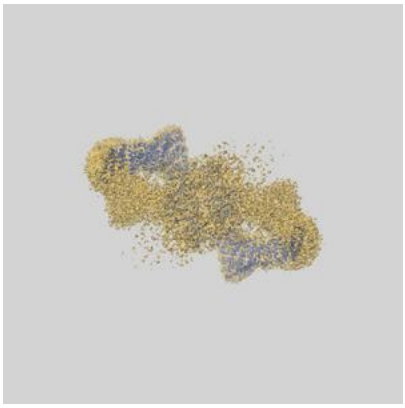
This section contains information regarding the fit between EMDB map EMD-53430 and PDB model 9QWX. Per-residue inclusion information can be found in section 3 on page 4.

9.1 Map-model overlay

X



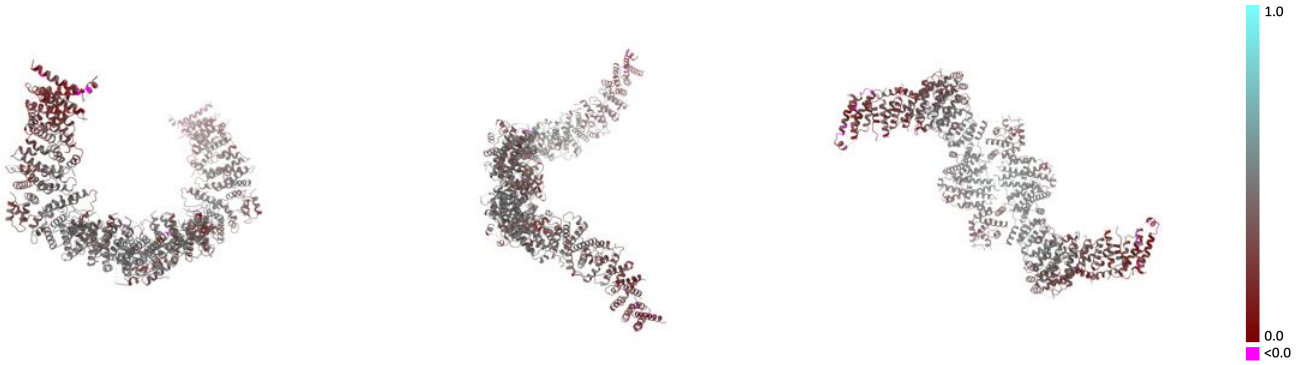
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.00397 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.

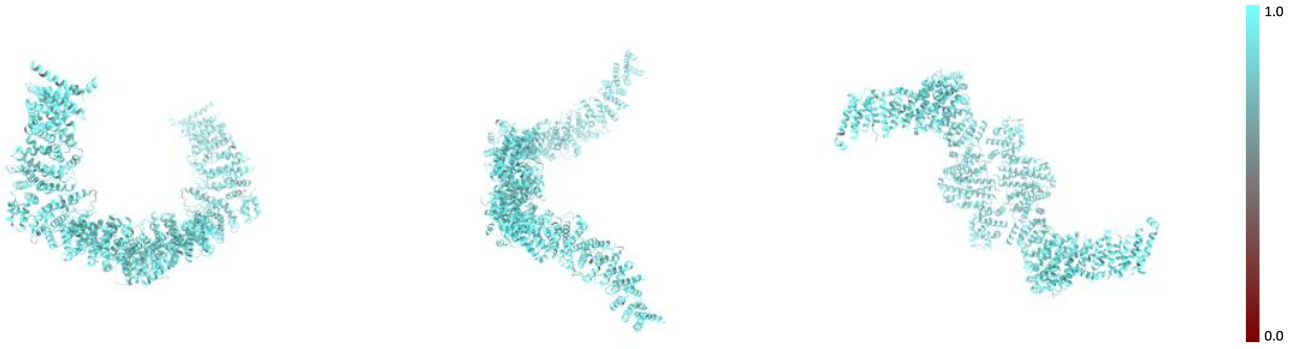
9.2 Q-score mapped to coordinate model (i)



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.

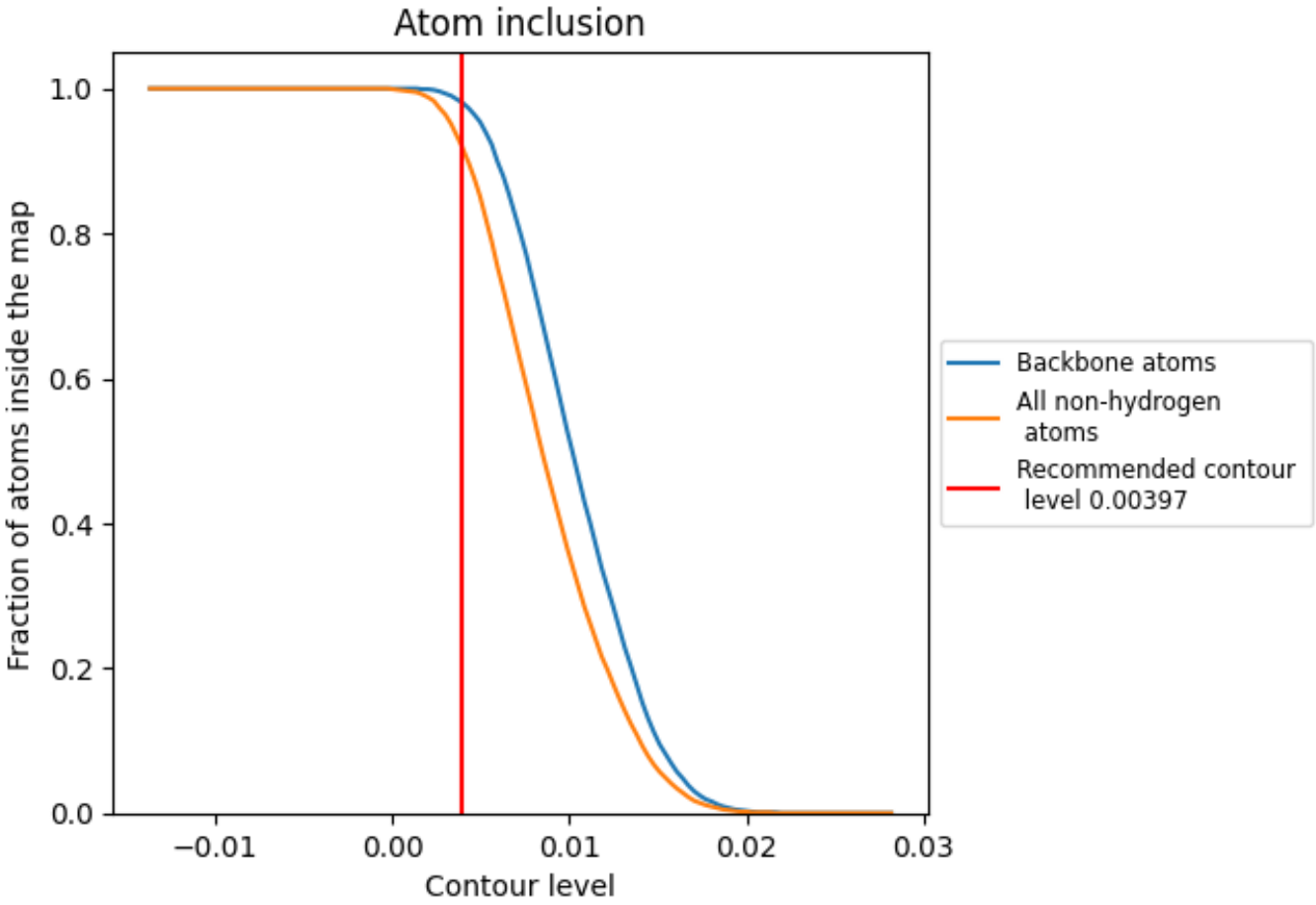
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.00397).

9.4 Atom inclusion (i)



At the recommended contour level, 98% of all backbone atoms, 92% 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 (0.00397) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9180	0.3960
A	0.9200	0.3980
B	0.9160	0.3950