wwPDB EM Validation Summary Report (i)

Jul 12, 2023 – 12:46 PM JST

PDB ID	:	8I9P
EMDB ID	:	EMD-35279
Title	:	Cryo-EM structure of a Chaetomium thermophilum pre-60S ribosomal subunit - State Mak16
Authors	:	Lau, B.; Huang, Z.; Beckmann, R.; Hurt, E.; Cheng, J.
Deposited on	:	2023-02-07
Resolution	:	3.00 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references (i)) were used in the production of this report:

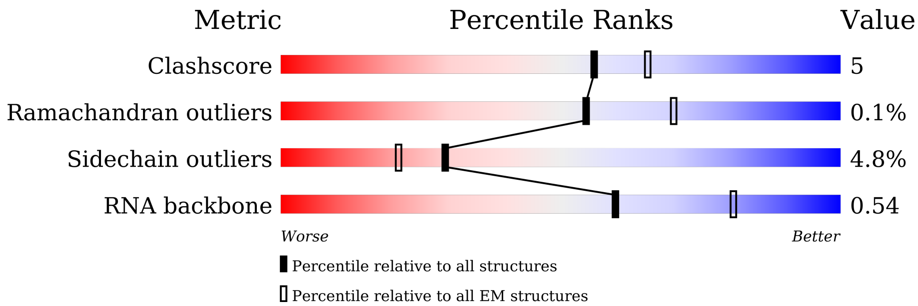
EMDB validation analysis	:	0.0.1.dev50
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.34

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 3.00 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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	C1	3341	• 25% 12% • 61%
2	C2	306	• 52% 27% • 16%
3	CA	316	• 60% 20% • 18%
4	CB	391	56% 13% 31%
5	CC	801	8% 24% 7% • 68%
6	CE	598	• 66% 11% • 23%
7	CI	414	26% 8% • 65%

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Mol	Chain	Length	Quality of chain
8	CJ	679	23% 40% 15% • 44%
9	CM	249	13% 54% 19% • 25%
9	LF	249	81% 14% • •
10	CR	237	62% 8% 30%
11	CU	451	• 18% 7% • 74%
12	LC	365	• 86% 13% •
13	LE	200	73% 10% • 15%
14	LG	262	• 58% 13% 29%
15	LL	213	48% 7% 45%
16	LM	142	71% 18% • 10%
17	LN	203	• 77% 10% • 10%
18	LO	204	6% 72% 24% • •
19	LP	187	12% 72% 10% • 18%
20	LQ	213	54% 7% 39%
21	LS	174	• 83% 17%
22	LT	160	28% 60% 14% • • 21%
23	LX	156	5% 13% • 86%
24	LY	138	• 83% 14% • •
25	Le	131	• 98% •
26	Lf	109	• 98% ••
27	Lh	935	13% 87%
28	Li	110	• 76% • 20%
29	Lj	95	77% • 22%
30	Cc	282	• 83% • 16%
31	Cd	436	77% • 21%

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Mol	Chain	Length	Quality of chain
32	Ce	336	55% • 42%

2 Entry composition (i)

There are 33 unique types of molecules in this entry. The entry contains 80799 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 RNA chain called RNA (3341-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	C1	1307	27990	12490	5103	9090	1307	0	0

- Molecule 2 is a RNA chain called RNA (306-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	C2	256	5456	2435	974	1791	256	0	0

- Molecule 3 is a protein called Brix domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	CA	260	2144	1371	393	373	7	0	0

- Molecule 4 is a protein called Ribosome biogenesis protein C8F11.04.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	CB	269	2140	1370	377	390	3	0	0

- Molecule 5 is a protein called Ribosome biogenesis protein ERB1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	CC	258	2159	1378	362	412	7	0	0

- Molecule 6 is a protein called RNA helicase.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	CE	463	3673	2352	643	667	11	0	0

There are 42 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
CE	543	LYS	-	insertion	UNP G0RYU9
CE	544	SER	-	insertion	UNP G0RYU9
CE	545	PHE	-	insertion	UNP G0RYU9
CE	546	GLY	-	insertion	UNP G0RYU9
CE	547	PHE	-	insertion	UNP G0RYU9
CE	548	SER	-	insertion	UNP G0RYU9
CE	549	THR	-	insertion	UNP G0RYU9
CE	550	PRO	-	insertion	UNP G0RYU9
CE	551	PRO	-	insertion	UNP G0RYU9
CE	552	ARG	-	insertion	UNP G0RYU9
CE	553	VAL	-	insertion	UNP G0RYU9
CE	554	ASP	-	insertion	UNP G0RYU9
CE	555	ILE	-	insertion	UNP G0RYU9
CE	556	THR	-	insertion	UNP G0RYU9
CE	557	LEU	-	insertion	UNP G0RYU9
CE	558	SER	-	insertion	UNP G0RYU9
CE	559	ALA	-	insertion	UNP G0RYU9
CE	560	SER	-	insertion	UNP G0RYU9
CE	561	LEU	-	insertion	UNP G0RYU9
CE	562	SER	-	insertion	UNP G0RYU9
CE	563	ARG	-	insertion	UNP G0RYU9
CE	564	ASP	-	insertion	UNP G0RYU9
CE	565	LYS	-	insertion	UNP G0RYU9
CE	566	LYS	-	insertion	UNP G0RYU9
CE	567	PRO	-	insertion	UNP G0RYU9
CE	568	GLN	-	insertion	UNP G0RYU9
CE	569	GLY	-	insertion	UNP G0RYU9
CE	570	ARG	-	insertion	UNP G0RYU9
CE	571	ARG	-	insertion	UNP G0RYU9
CE	572	ALA	-	insertion	UNP G0RYU9
CE	573	TYR	-	insertion	UNP G0RYU9
CE	574	GLY	-	insertion	UNP G0RYU9
CE	575	SER	-	insertion	UNP G0RYU9
CE	576	GLN	-	insertion	UNP G0RYU9
CE	577	PRO	-	insertion	UNP G0RYU9
CE	578	ARG	-	insertion	UNP G0RYU9
CE	579	GLN	-	insertion	UNP G0RYU9
CE	580	GLY	-	insertion	UNP G0RYU9
CE	581	GLY	-	insertion	UNP G0RYU9
CE	582	ARG	-	insertion	UNP G0RYU9
CE	583	TYR	-	insertion	UNP G0RYU9
CE	584	LYS	-	insertion	UNP G0RYU9

- Molecule 7 is a protein called Putative RNA-binding protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	CI	146	Total 1196	C 763	N 224	O 204	S 5	0	0

- Molecule 8 is a protein called Pescadillo homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	CJ	380	Total 3109	C 2003	N 547	O 549	S 10	0	0

- Molecule 9 is a protein called 60S ribosomal protein l7-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	CM	187	Total 1525	C 987	N 278	O 257	S 3	0	0
9	LF	240	Total 1967	C 1264	N 368	O 332	S 3	0	0

- Molecule 10 is a protein called Nucleolar protein 16.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	CR	167	Total 1354	C 827	N 278	O 247	S 2	0	0

- Molecule 11 is a protein called rRNA-processing protein EBP2.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	CU	116	Total 924	C 576	N 169	O 176	S 3	0	0

- Molecule 12 is a protein called 60S ribosomal protein L4-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	LC	362	Total 2752	C 1738	N 526	O 479	S 9	0	0

- Molecule 13 is a protein called 60S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	LE	170	Total 1338	C 861	N 241	O 233	S 3	0	0

- Molecule 14 is a protein called 60S ribosomal protein L8.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	LG	185	Total 1482	C 958	N 265	O 254	S 5	0	0

- Molecule 15 is a protein called 60S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	LL	117	Total 964	C 608	N 206	O 148	S 2	0	0

- Molecule 16 is a protein called 60S ribosomal protein L14-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	LM	128	Total 1037	C 661	N 201	O 174	S 1	0	0

- Molecule 17 is a protein called Ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	LN	183	Total 1563	C 974	N 332	O 253	S 4	0	0

- Molecule 18 is a protein called 60S ribosomal protein L16-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	LO	204	Total 1618	C 1039	N 306	O 267	S 6	0	0

- Molecule 19 is a protein called 60S ribosomal protein l17-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	LP	154	Total 1212	C 758	N 233	O 218	S 3	0	0

- Molecule 20 is a protein called Ribosomal protein L18-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	LQ	129	Total 1021	C 646	N 200	O 173	S 2	0	0

- Molecule 21 is a protein called 60S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	LS	174	Total 1433	C 922	N 267	O 239	S 5	0	0

- Molecule 22 is a protein called 60S ribosomal protein l21-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	LT	126	Total 1014	C 643	N 196	O 173	S 2	0	0

- Molecule 23 is a protein called 60S ribosomal protein L25-like protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
23	LX	22	Total 148	C 91	N 31	O 26	0	0

- Molecule 24 is a protein called 60S ribosomal protein L26-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	LY	134	Total 1065	C 664	N 215	O 184	S 2	0	0

- Molecule 25 is a protein called 60S ribosomal protein L32-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	Le	131	Total 1055	C 663	N 213	O 172	S 7	0	0

- Molecule 26 is a protein called 60S ribosomal protein l33-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	Lf	108	Total 862	C 546	N 171	O 144	S 1	0	0

- Molecule 27 is a protein called dolichyl-diphosphooligosaccharide--protein glycotransferase.

Mol	Chain	Residues	Atoms				AltConf	Trace
27	Lh	121	Total 995	C 633	N 196	O 166	0	0

- Molecule 28 is a protein called 60S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	Li	88	Total 731	C 449	N 162	O 119	S 1	0	0

- Molecule 29 is a protein called Ribosomal protein L37.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	Lj	74	Total 595	C 365	N 132	O 93	S 5	0	0

- Molecule 30 is a protein called Ribosomal RNA-processing protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	Cc	236	Total 1898	C 1208	N 337	O 343	S 10	0	0

- Molecule 31 is a protein called Brix domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	Cd	343	Total 2768	C 1746	N 534	O 484	S 4	0	0

- Molecule 32 is a protein called Protein MAK16.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	Ce	194	Total 1609	C 1020	N 304	O 276	S 9	0	0

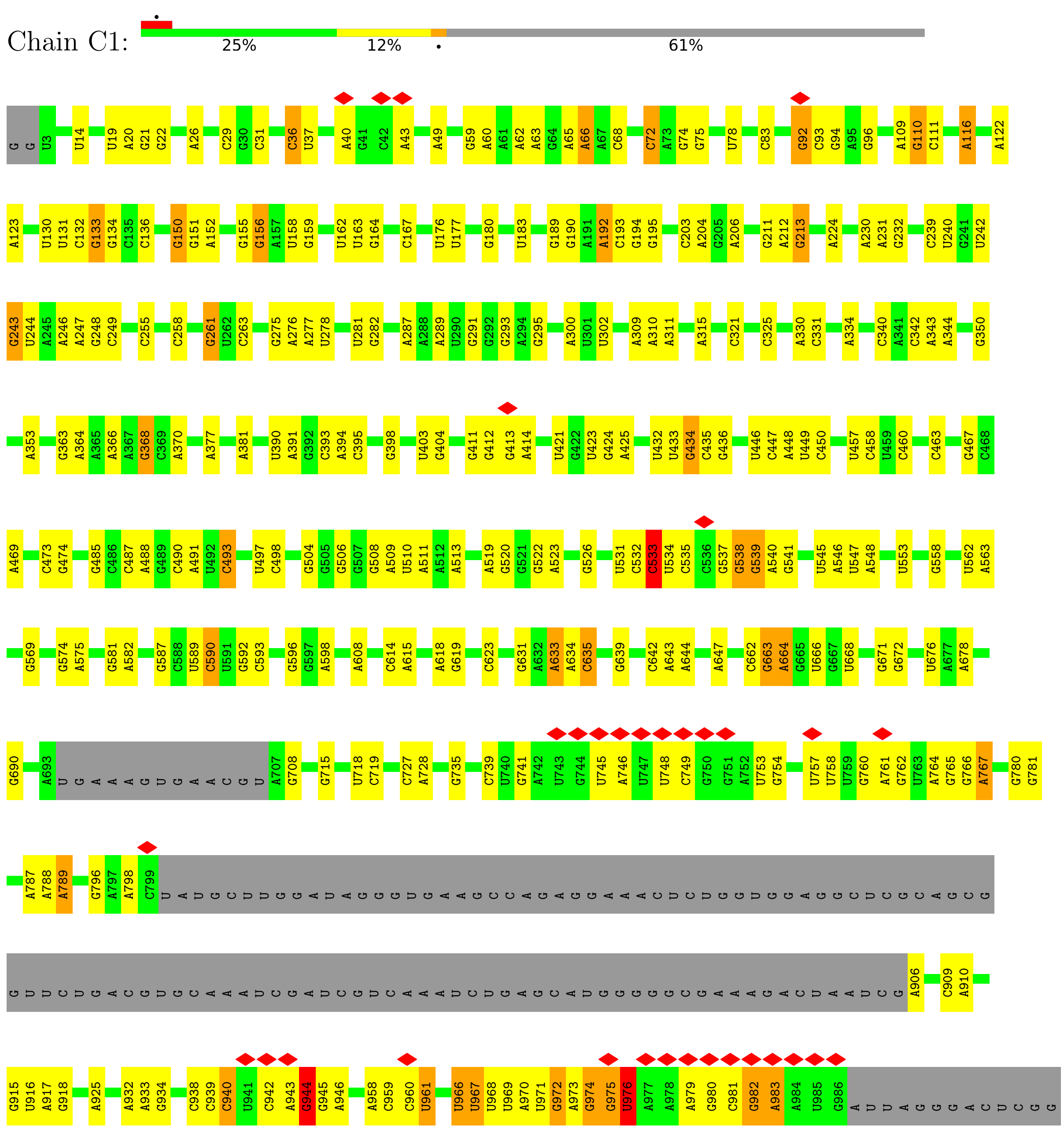
- Molecule 33 is ZINC ION (three-letter code: ZN) (formula: Zn).

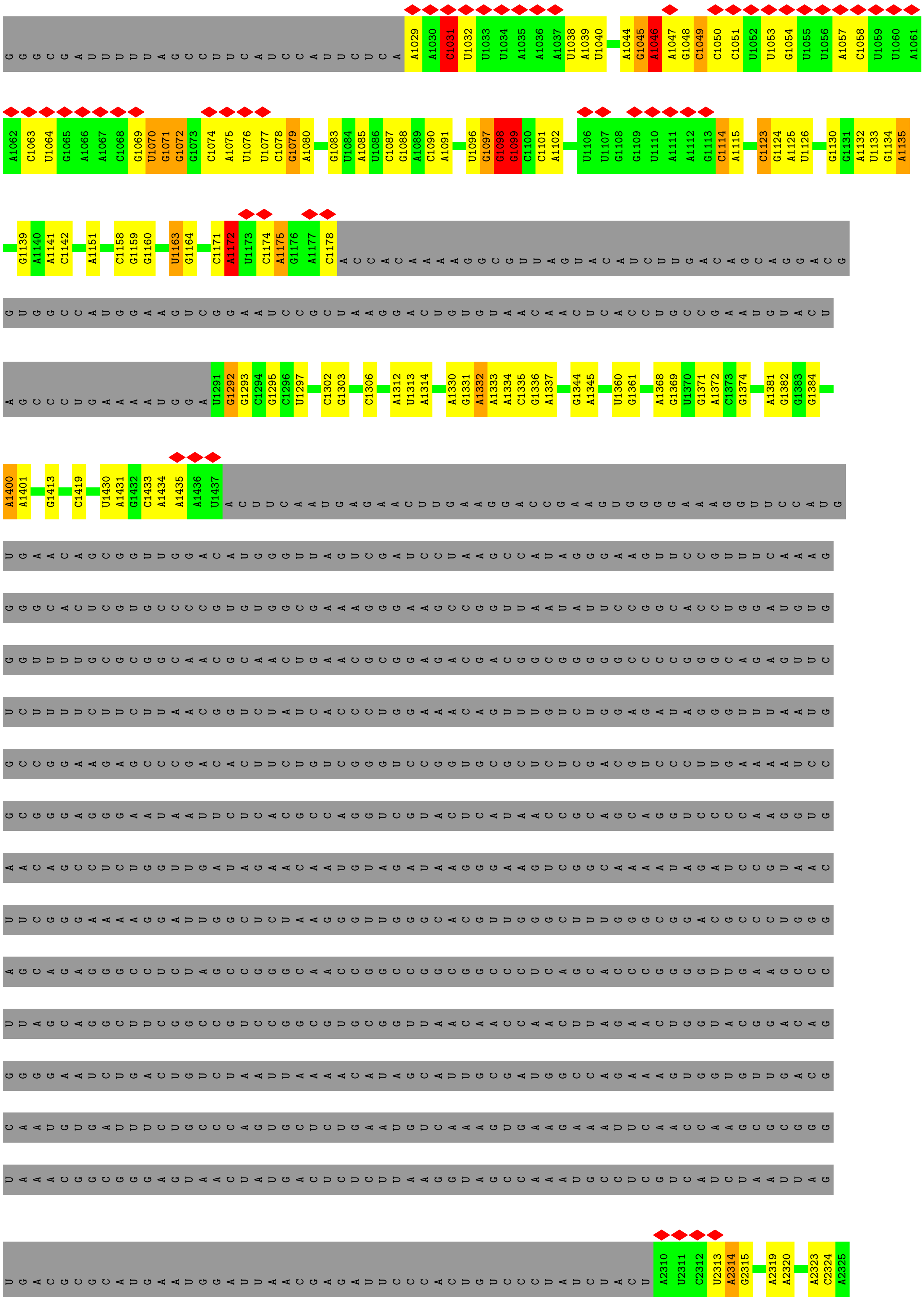
Mol	Chain	Residues	Atoms		AltConf
33	Lj	1	Total 1	Zn 1	0
33	Ce	1	Total 1	Zn 1	0

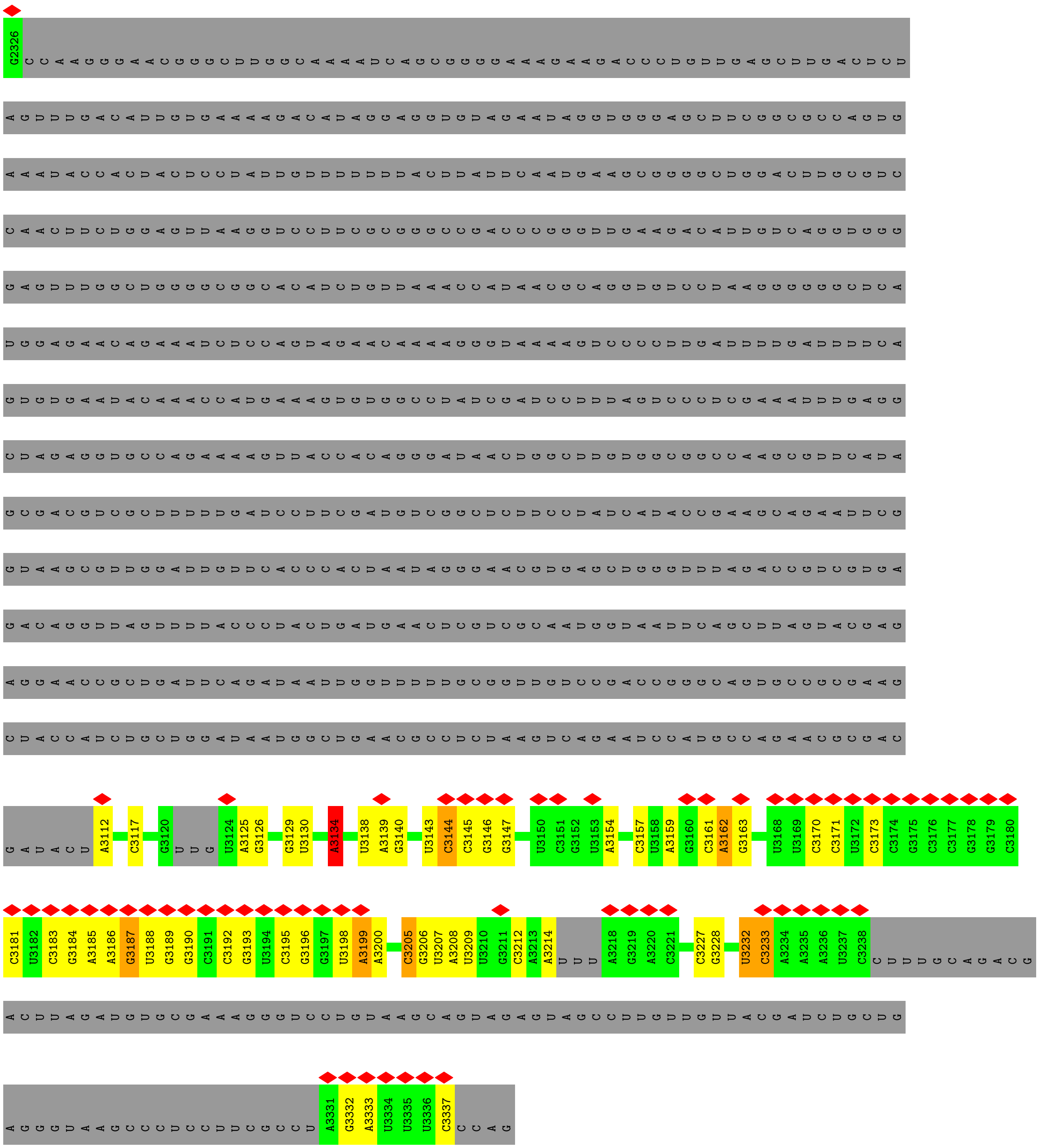
3 Residue-property plots

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: RNA (3341-MER)

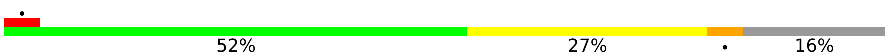


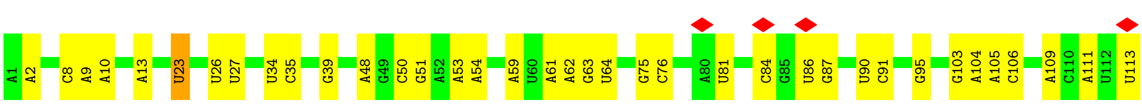


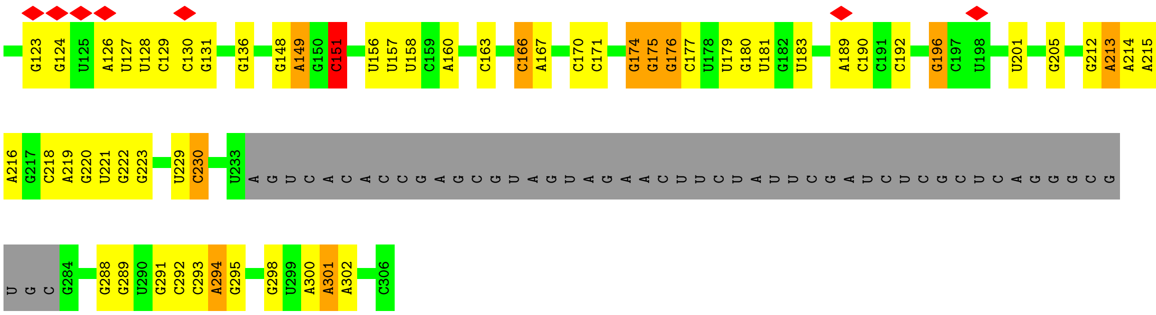


• Molecule 2: RNA (306-MER)

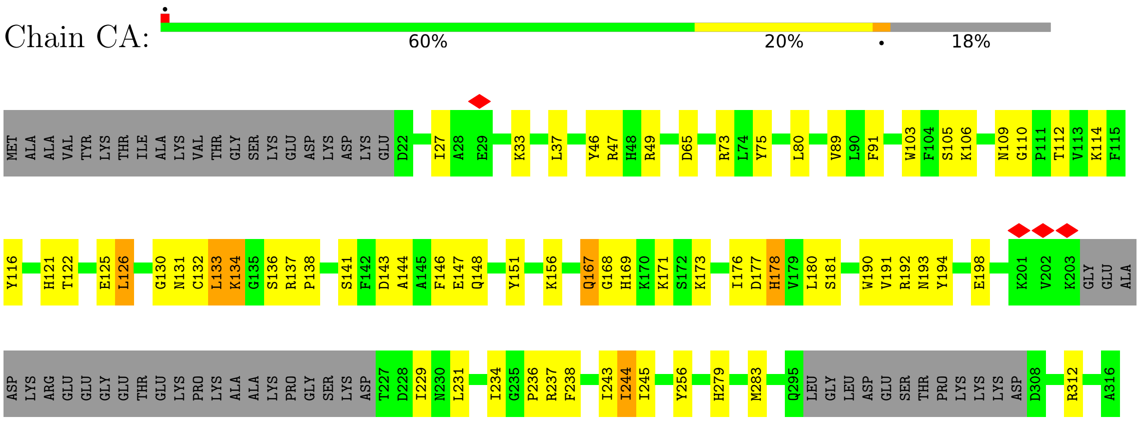
Chain C2:



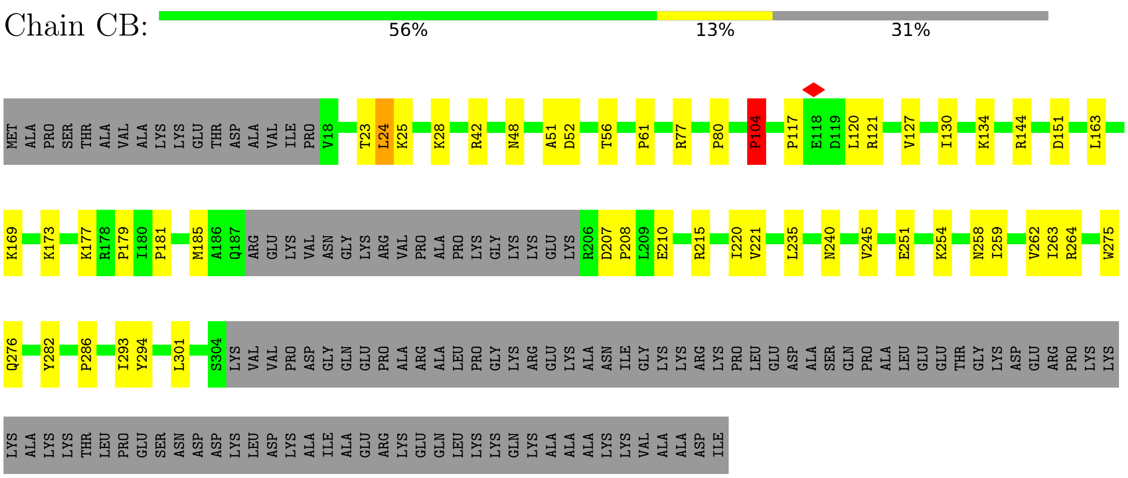




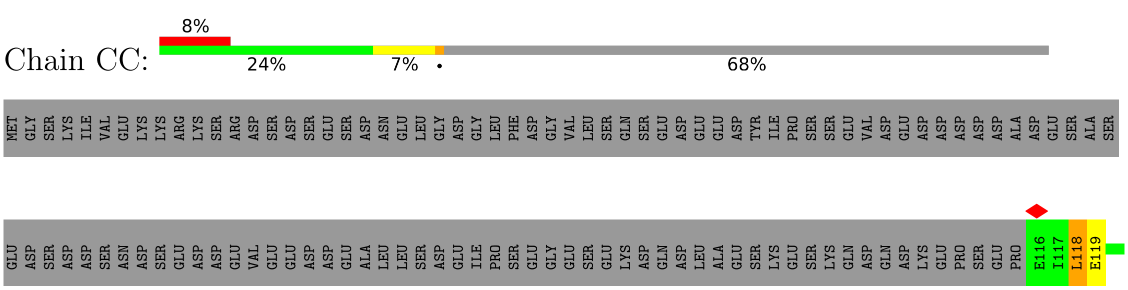
• Molecule 3: Brix domain-containing protein

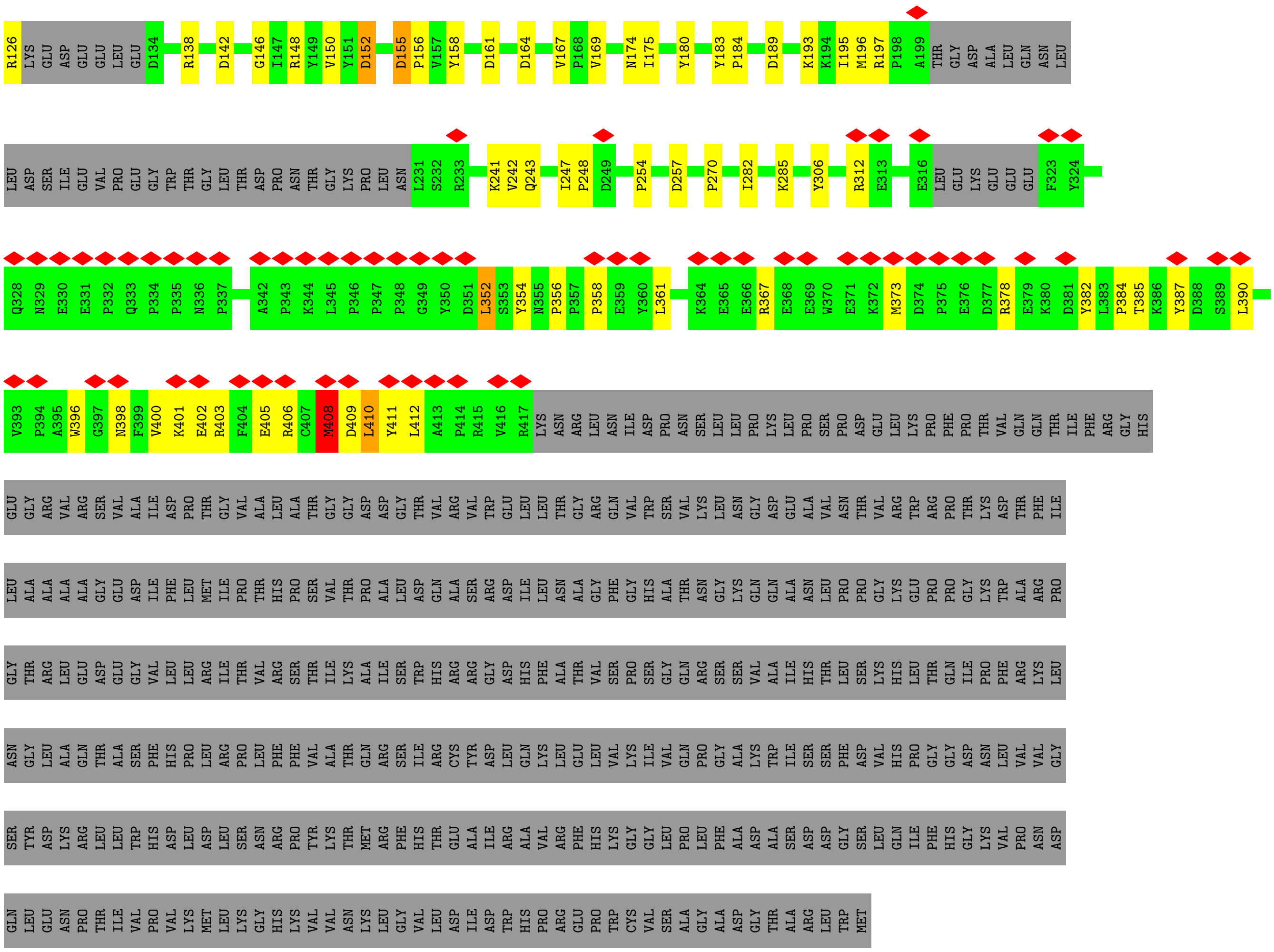


• Molecule 4: Ribosome biogenesis protein C8F11.04



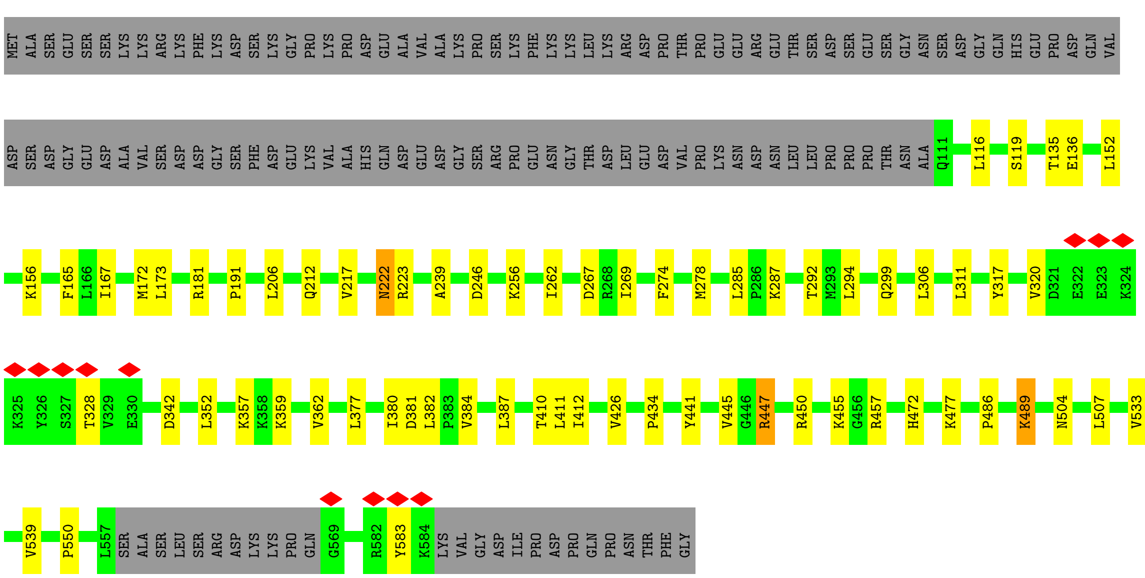
• Molecule 5: Ribosome biogenesis protein ERB1



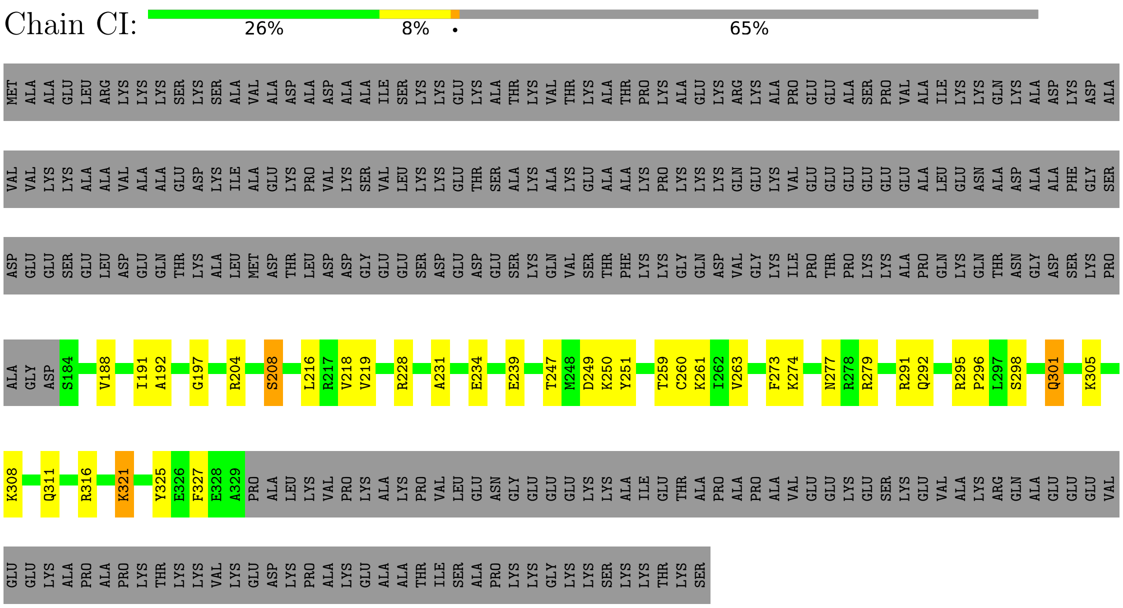


• Molecule 6: RNA helicase

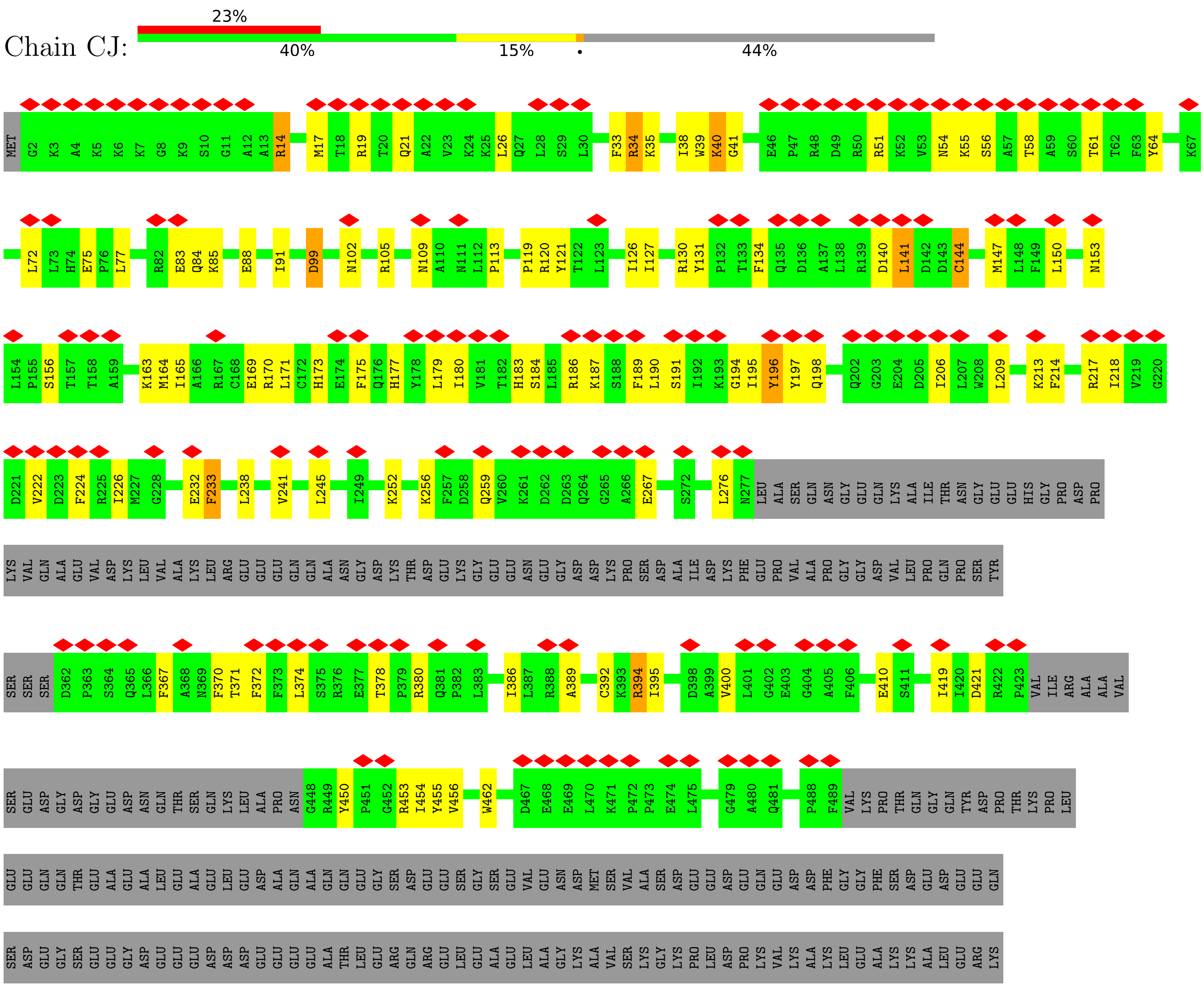
Chain CE:



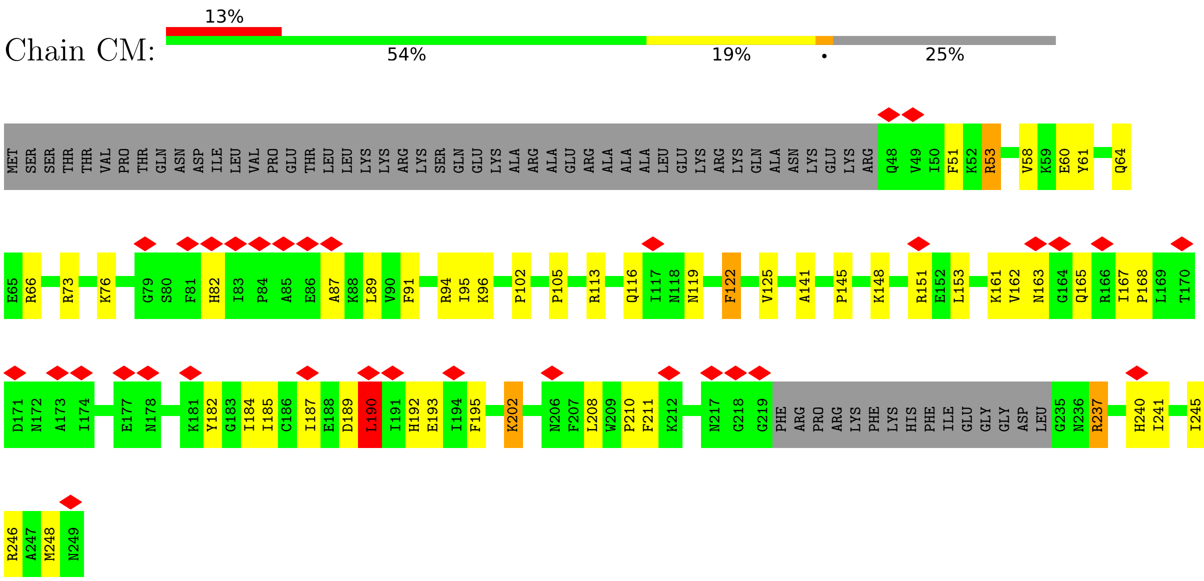
• Molecule 7: Putative RNA-binding protein



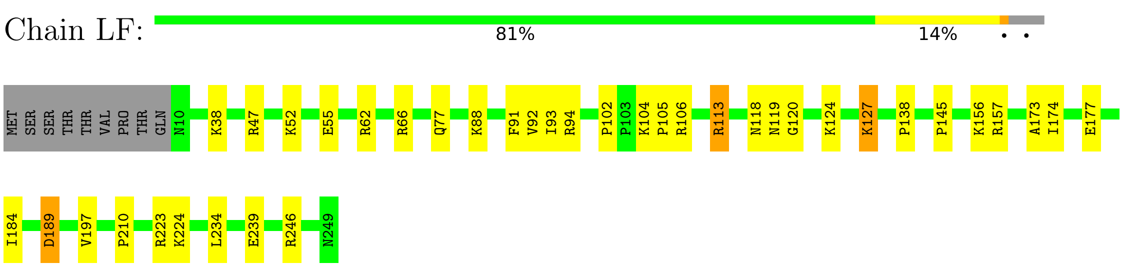
- Molecule 8: Pescadillo homolog



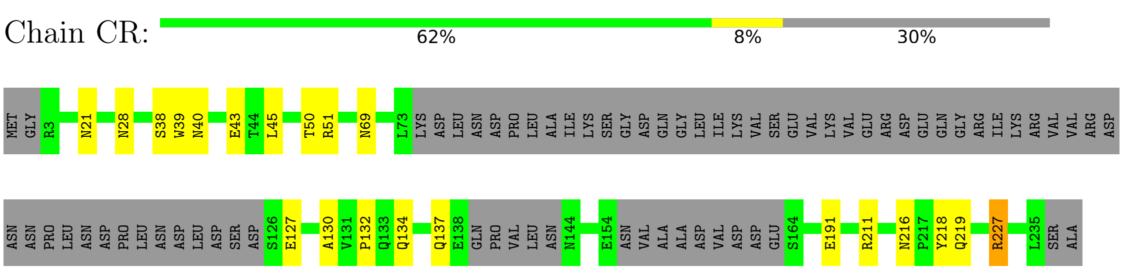
• Molecule 9: 60S ribosomal protein l7-like protein



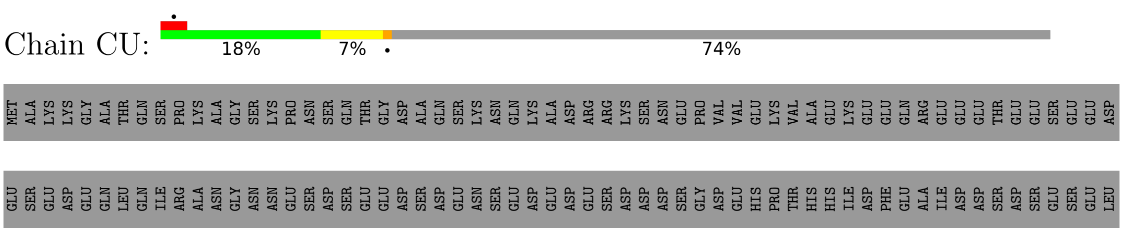
• Molecule 9: 60S ribosomal protein l7-like protein

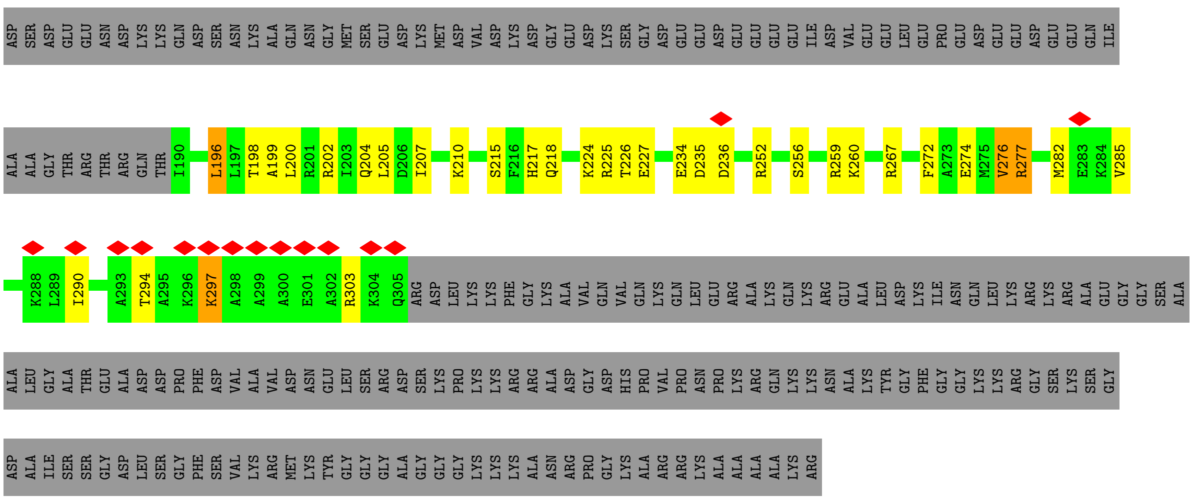


• Molecule 10: Nucleolar protein 16



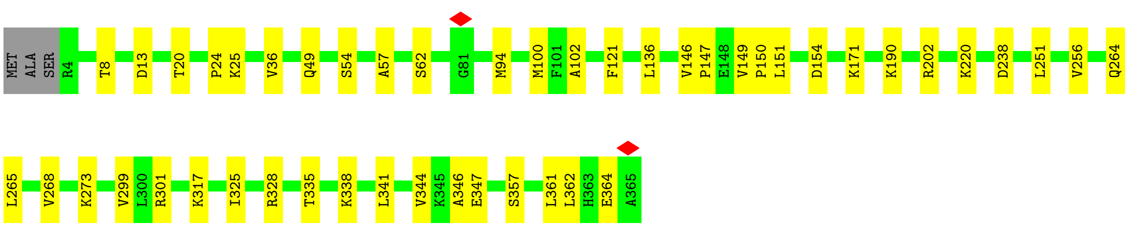
• Molecule 11: rRNA-processing protein EBP2





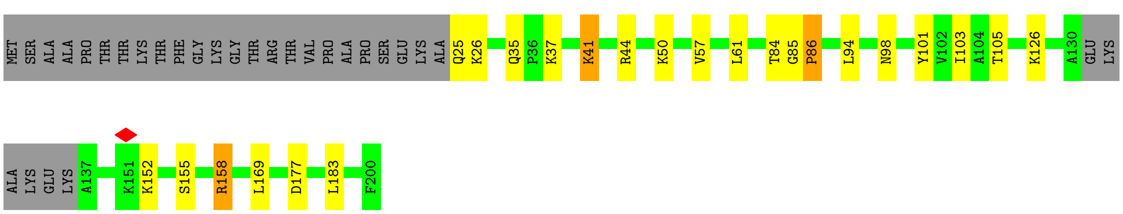
- Molecule 12: 60S ribosomal protein L4-like protein

Chain LC:



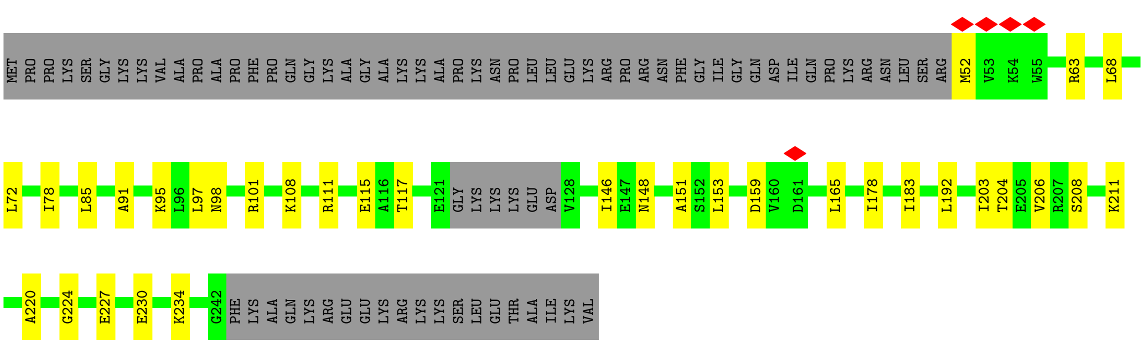
- Molecule 13: 60S ribosomal protein L6

Chain LE:

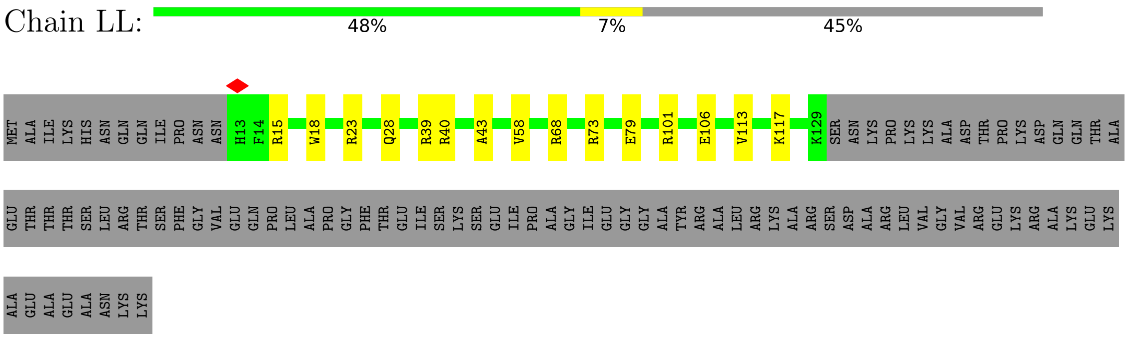


- Molecule 14: 60S ribosomal protein L8

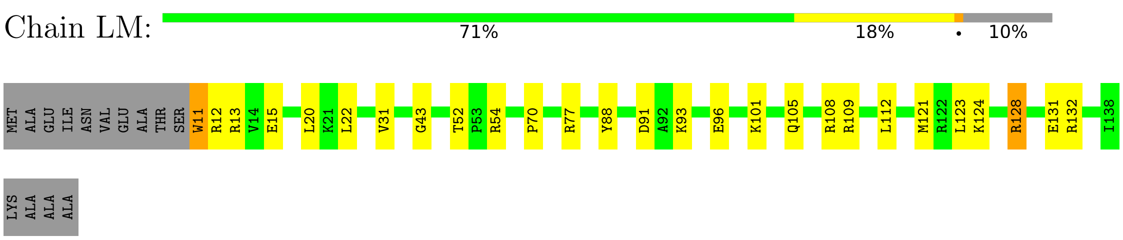
Chain LG:



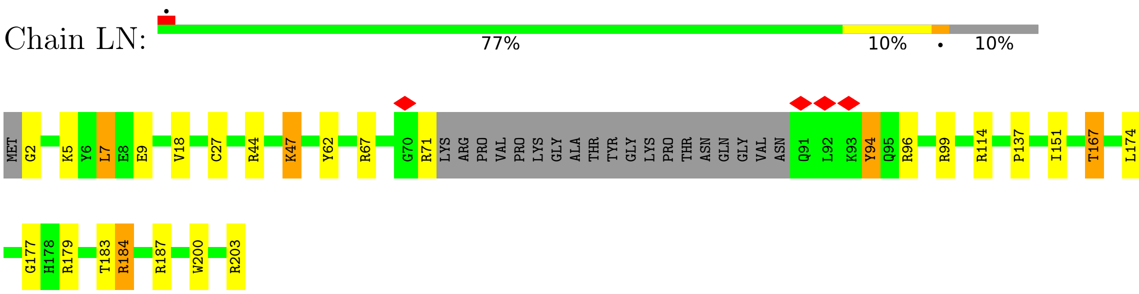
• Molecule 15: 60S ribosomal protein L13



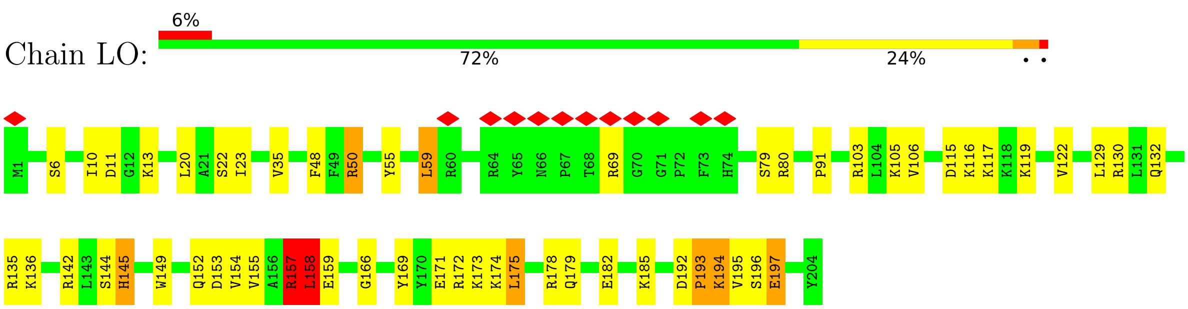
• Molecule 16: 60S ribosomal protein L14-like protein



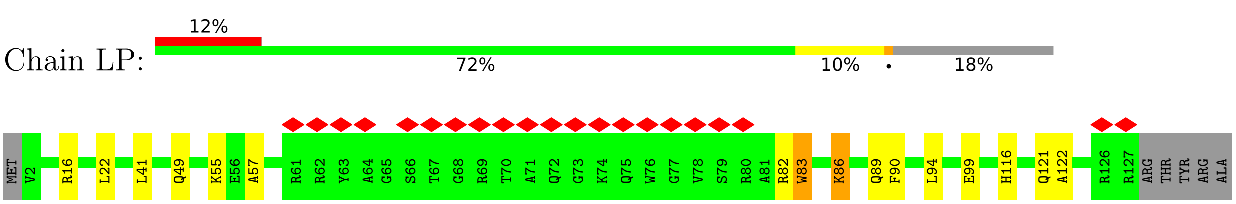
• Molecule 17: Ribosomal protein L15



• Molecule 18: 60S ribosomal protein L16-like protein



• Molecule 19: 60S ribosomal protein l17-like protein



HIS GLY ARG ILE ASN P138 P143 L148 K159 S160 E161 R165 ASP VAL GLU SER HIS LEU SER SER ARG GLN ARG GLY VAL ARG ILE ARG ARG ALA LEU THR ALA ALA

• Molecule 20: Ribosomal protein L18-like protein

Chain LQ: 54% 7% 39%

MET ASP LEU VAL CYS ALA PHE ILE GLY PRO LEU PHE ALA PRO GLY ALA ARG ARG LEU ASN LEU GLU GLU ILE ALA ALA GLU SER SER SER GLY ILE ASP LEU ARG TRP LYS HIS VAL ARG SER SER HIS R44 D50 P71 M82 N86 V90 S91 L92 R97 N98 L99

K100 E104 T113 V114 R119 P159 N172 ALA ARG GLU ALA VAL LYS HIS PHE GLY PHE GLY PRO HIS LYS HIS LYS LYS PRO TYR VAL ARG SER LYS GLY ARG LYS PHE GLU ARG ALA ARG GLY ARG ARG SER ARG GLY PHE LYS VAL

• Molecule 21: 60S ribosomal protein L20

Chain LS: 83% 17%

M1 G2 Q8 R12 P15 N21 Y25 R26 M27 R28 L45 I64 K67 N74 I77 W78 L79 R84 D109 L124 K125 V126 L129 E133 D134 V135 V144 A145 K146 P151 H154 K168 R169 P170 S171 T172 F173 S174

• Molecule 22: 60S ribosomal protein l21-like protein

Chain LT: 28% 60% 14% 21%

MET GLY HIS ALA ALA GLY LEU ARG SER GLY THR ARG TYR ALA PHE SER ARG GLY PHE ARG LYS HIS GLY GLN ILE PRO LEU SER THR TYR LEU R32 T33 Y34 R35 V36 G37 I42 K43 V44 N45 G46 A47 V48 Q49 K50 G51 M52 P53 H54 K55 F56 Y57 H58 G59 G62 V63 V64

Y65 N66 V67 T68 K69 S70 A71 V74 I75 R79 V80 K81 H82 I89 N90 V91 R92 I93 E94 H95 V96 K97 R100 D104 R107 R108 V109 E114 L115 K118 A119 K120 A121 E122 G123 V124 P125 V126 Q131 P132 N146 K147 P148 V154 A155 Y156 E157 THR THR

ILE

• Molecule 23: 60S ribosomal protein L25-like protein

Chain LX: 5% 13% 86%

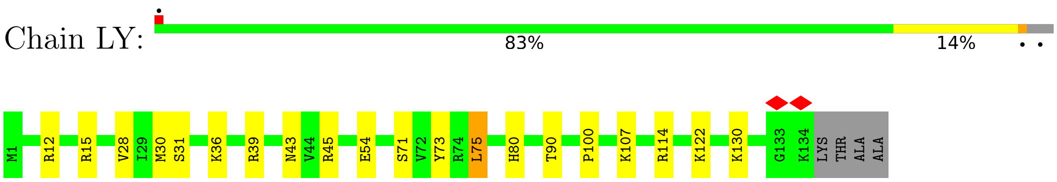
MET ALA PRO LYS ASP VAL LYS LYS GLY GLY ALA S12 K13 A14 A15 K16 G17 K21 A24 V31 H32 S33 HIS LYS LYS THR LYS VAL ARG LYS SER THR THR PHE HIS ARG PRO LYS THR LEU VAL LEU SER ARG ALA PRO LYS TYR PRO ARG LYS SER ILE PRO HIS GLU PRO

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

PRO ASP GLY THR LYS LYS ALA PHE ALA ARG LEU THR PRO ASP VAL ASP ALA LEU ASP ILE ALA ALA THR LYS LEU GLY LEU VAL

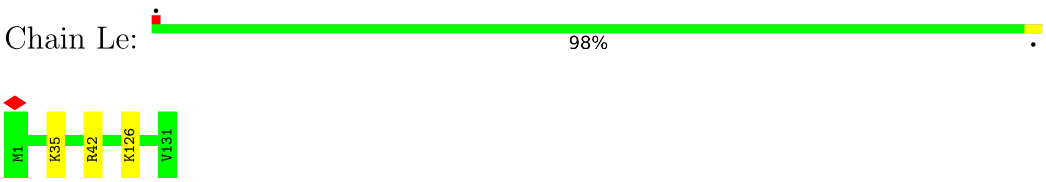
• Molecule 24: 60S ribosomal protein L26-like protein

Chain LY:



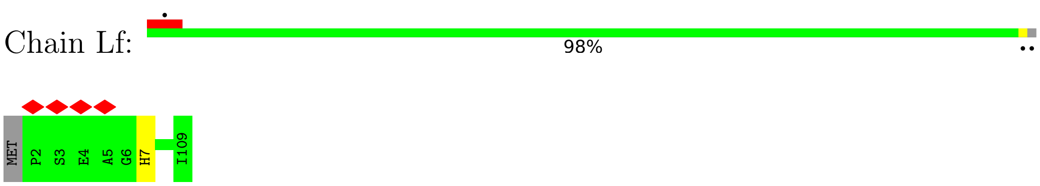
• Molecule 25: 60S ribosomal protein L32-like protein

Chain Le:



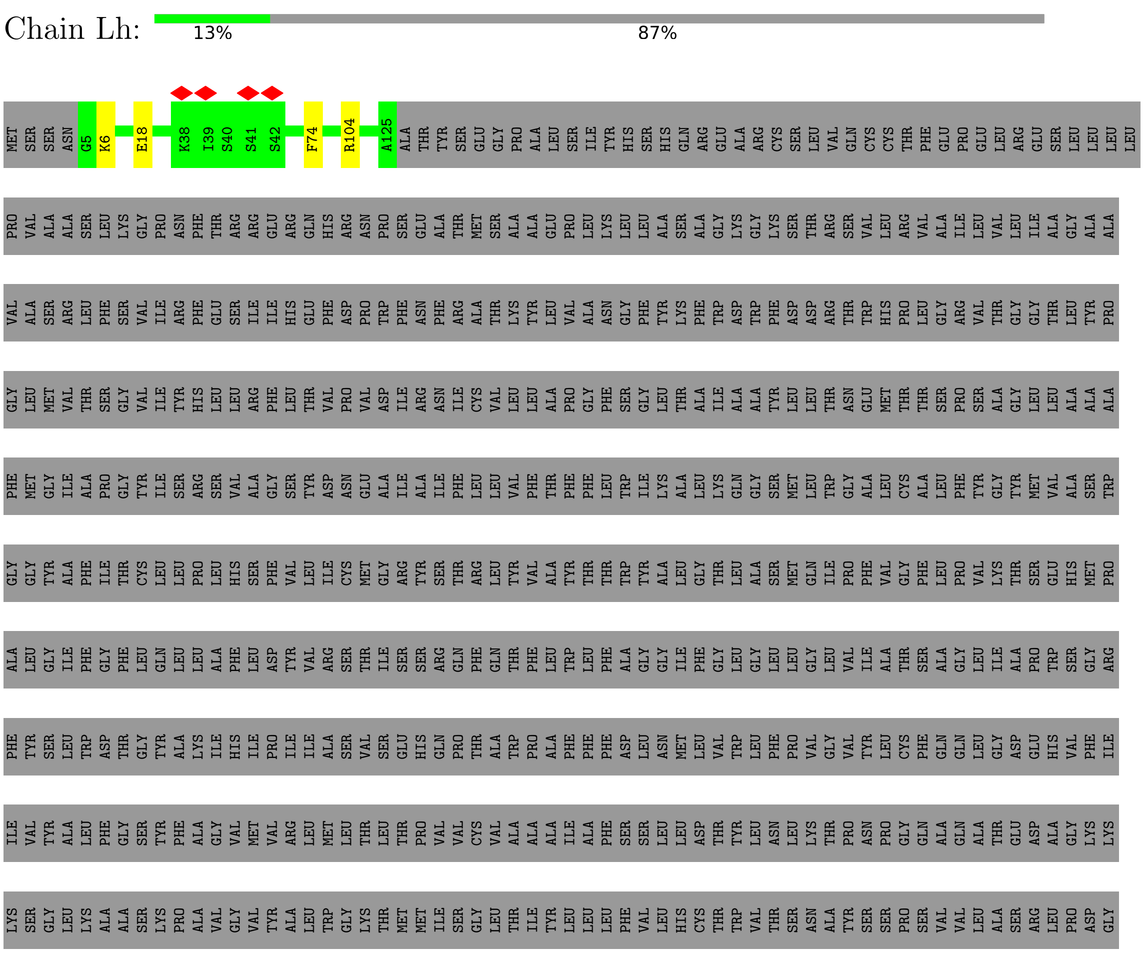
• Molecule 26: 60S ribosomal protein l33-like protein

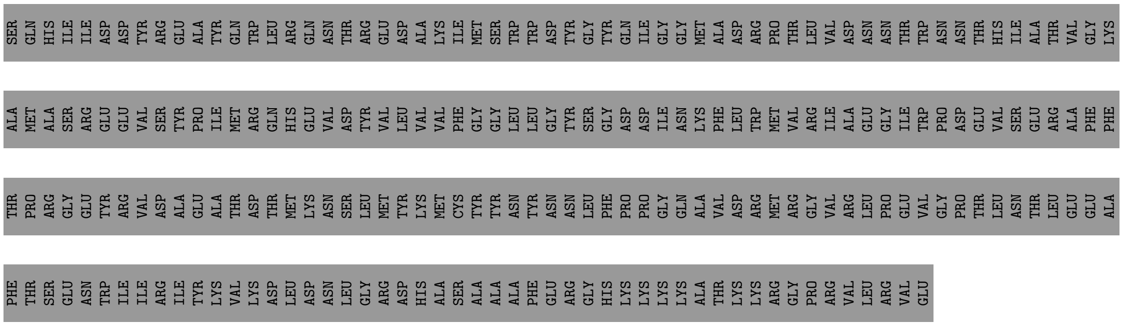
Chain Lf:



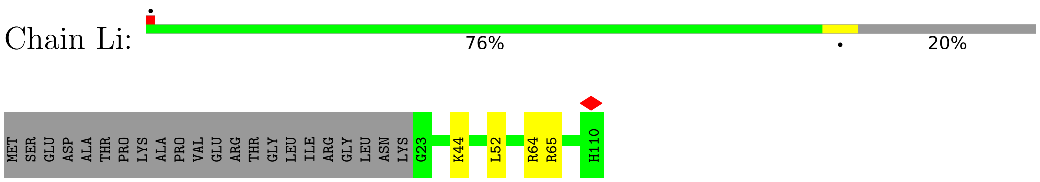
• Molecule 27: dolichyl-diphosphooligosaccharide--protein glycotransferase

Chain Lh:

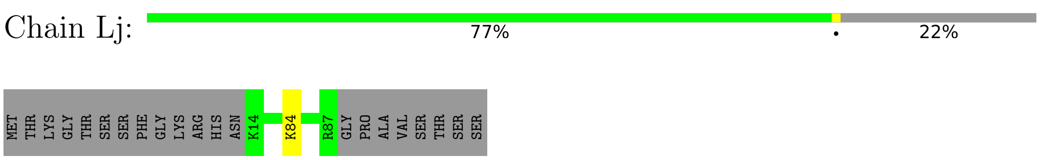




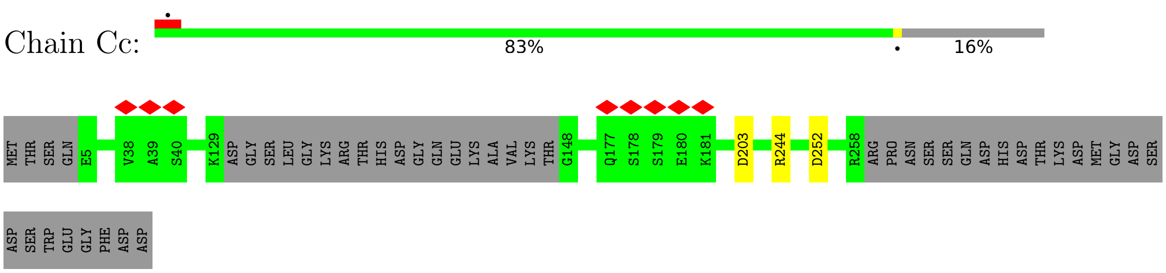
- Molecule 28: 60S ribosomal protein L36



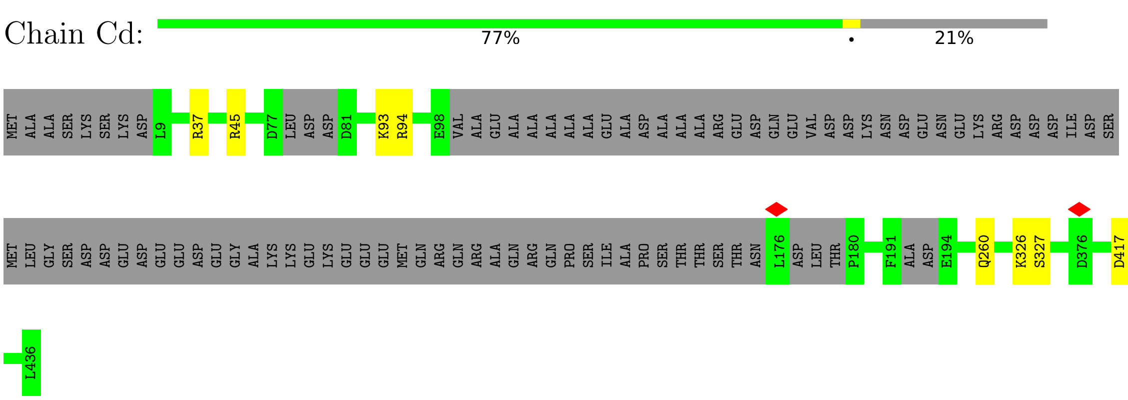
- Molecule 29: Ribosomal protein L37



- Molecule 30: Ribosomal RNA-processing protein 1

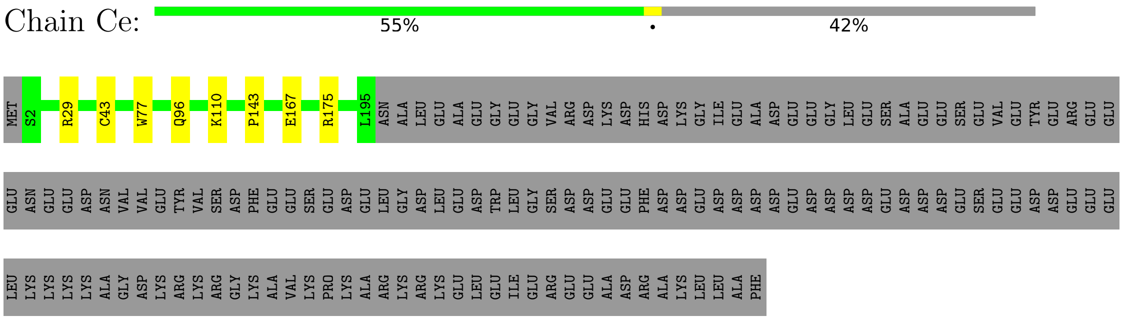


- Molecule 31: Brix domain-containing protein



- Molecule 32: Protein MAK16

Chain Ce:


55%
42%
MET S2 R29 C43 W77 Q96 K110 P143 E167 R175 L195 ASN ALA LEU GLU ALA GLU GLY GLU GLY VAL ARG ASP LYS ASP HIS ASP LYS GLY ILE GLU ALA ASP GLU GLU GLY LEU GLU SER ALA GLU GLU SER GLU VAL GLU TYR GLU ARG GLU GLU
GLU ASN GLU GLU ASP ASN VAL VAL GLU TYR VAL SER ASP PHE GLU GLU SER GLU ASP GLU LEU GLY ASP LEU GLU ASP TRP LEU GLY SER ASP ASP GLU GLU PHE ASP ASP GLU ASP ASP ASP GLU ASP ASP ASP GLU ASP ASP ASP GLU SER GLU GLU ASP ASP GLU GLU GLU
LEU LYS LYS LYS LYS ALA GLY ASP LYS ARG LYS ARG GLY LYS ALA VAL LYS PRO LYS ALA ARG LYS ARG LYS GLU LEU GLU ILE GLU ARG GLU GLU ALA ASP ARG ALA LYS LEU LEU ALA PHE

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	83243	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	44	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.449	Depositor
Minimum map value	-0.224	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.008	Depositor
Recommended contour level	0.02	Depositor
Map size (Å)	438.9, 438.9, 438.9	wwPDB
Map dimensions	420, 420, 420	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.045, 1.045, 1.045	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: ZN

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 RMSZ	Bond lengths #|Z| >5	Bond angles RMSZ	Bond angles #|Z| >5
1	C1	0.34	1/31321 (0.0%)	0.96	75/48825 (0.2%)
2	C2	0.31	0/6097	0.93	8/9499 (0.1%)
3	CA	0.38	0/2190	0.65	1/2940 (0.0%)
4	CB	0.38	0/2188	0.65	3/2975 (0.1%)
5	CC	0.32	0/2224	0.67	6/3024 (0.2%)
6	CE	0.32	0/3743	0.56	1/5045 (0.0%)
7	CI	0.38	0/1225	0.75	2/1645 (0.1%)
8	CJ	0.30	0/3189	0.70	4/4309 (0.1%)
9	CM	0.32	0/1555	0.74	2/2091 (0.1%)
9	LF	0.35	0/2004	0.60	0/2686
10	CR	0.37	0/1369	0.57	0/1828
11	CU	0.39	0/935	0.79	0/1256
12	LC	0.35	0/2809	0.58	0/3787
13	LE	0.47	0/1363	0.64	1/1833 (0.1%)
14	LG	0.34	0/1504	0.57	0/2018
15	LL	0.31	0/983	0.61	0/1318
16	LM	0.40	0/1056	0.70	1/1419 (0.1%)
17	LN	0.41	0/1595	0.60	0/2132
18	LO	0.32	0/1652	0.81	8/2215 (0.4%)
19	LP	0.32	0/1231	0.60	0/1658
20	LQ	0.38	0/1033	0.64	0/1391
21	LS	0.50	0/1468	0.63	1/1975 (0.1%)
22	LT	0.32	0/1033	0.75	2/1389 (0.1%)
23	LX	0.25	0/148	0.36	0/194
24	LY	0.32	0/1079	0.60	0/1443
25	Le	0.39	0/1073	0.58	0/1431
26	Lf	0.51	0/883	0.63	0/1187
27	Lh	0.30	0/1006	0.61	0/1338
28	Li	0.37	0/738	0.65	0/971
29	Lj	0.29	0/606	0.64	0/803
30	Cc	0.27	0/1934	0.59	1/2614 (0.0%)
31	Cd	0.31	0/2822	0.62	1/3790 (0.0%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
32	Ce	0.28	0/1638	0.55	0/2196
All	All	0.34	1/85694 (0.0%)	0.81	117/123225 (0.1%)

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
18	LO	0	1
22	LT	0	1
All	All	0	2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C1	1098	G	C6-N1	-8.16	1.33	1.39

The worst 5 of 117 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C1	1098	G	N1-C6-O6	-27.47	103.42	119.90
1	C1	1123	C	N3-C4-N4	-25.91	99.86	118.00
1	C1	1098	G	C5-C6-O6	23.89	142.94	128.60
1	C1	1123	C	C5-C4-N4	20.27	134.38	120.20
1	C1	1050	C	N3-C2-O2	-11.16	114.08	121.90

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
18	LO	192	ASP	Peptide
22	LT	92	ARG	Peptide

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	C1	27990	0	14115	200	0
2	C2	5456	0	2762	36	0
3	CA	2144	0	2178	43	0
4	CB	2140	0	2195	27	0
5	CC	2159	0	2081	48	0
6	CE	3673	0	3778	33	0
7	CI	1196	0	1202	23	0
8	CJ	3109	0	3122	71	0
9	CM	1525	0	1604	34	0
9	LF	1967	0	2080	22	0
10	CR	1354	0	1400	13	0
11	CU	924	0	951	27	0
12	LC	2752	0	2878	26	0
13	LE	1338	0	1423	12	0
14	LG	1482	0	1610	22	0
15	LL	964	0	1041	14	0
16	LM	1037	0	1110	12	0
17	LN	1563	0	1618	17	0
18	LO	1618	0	1714	35	0
19	LP	1212	0	1250	10	0
20	LQ	1021	0	1118	6	0
21	LS	1433	0	1496	18	0
22	LT	1014	0	1073	20	0
23	LX	148	0	163	2	0
24	LY	1065	0	1156	10	0
25	Le	1055	0	1133	0	0
26	Lf	862	0	891	0	0
27	Lh	995	0	1110	0	0
28	Li	731	0	797	0	0
29	Lj	595	0	625	0	0
30	Cc	1898	0	1931	0	0
31	Cd	2768	0	2860	0	0
32	Ce	1609	0	1682	0	0
33	Ce	1	0	0	0	0
33	Lj	1	0	0	0	0
All	All	80799	0	66147	654	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 5.

The worst 5 of 654 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:C1:788:A:N6	1:C1:915:G:H1	1.49	1.10
2:C2:223:G:H21	2:C2:301:A:H61	1.11	0.93
2:C2:196:G:H1	2:C2:201:U:H3	0.94	0.91
1:C1:788:A:H62	1:C1:915:G:H1	0.87	0.86
2:C2:223:G:N2	2:C2:301:A:H61	1.73	0.86

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	
3	CA	254/316 (80%)	238 (94%)	16 (6%)	0	100	100
4	CB	265/391 (68%)	252 (95%)	12 (4%)	1 (0%)	34	72
5	CC	250/801 (31%)	241 (96%)	9 (4%)	0	100	100
6	CE	459/598 (77%)	440 (96%)	19 (4%)	0	100	100
7	CI	144/414 (35%)	131 (91%)	13 (9%)	0	100	100
8	CJ	374/679 (55%)	359 (96%)	15 (4%)	0	100	100
9	CM	183/249 (74%)	175 (96%)	8 (4%)	0	100	100
9	LF	238/249 (96%)	229 (96%)	9 (4%)	0	100	100
10	CR	159/237 (67%)	152 (96%)	6 (4%)	1 (1%)	25	64
11	CU	114/451 (25%)	113 (99%)	1 (1%)	0	100	100
12	LC	360/365 (99%)	351 (98%)	9 (2%)	0	100	100
13	LE	166/200 (83%)	152 (92%)	13 (8%)	1 (1%)	25	64
14	LG	181/262 (69%)	178 (98%)	3 (2%)	0	100	100
15	LL	115/213 (54%)	113 (98%)	2 (2%)	0	100	100
16	LM	126/142 (89%)	120 (95%)	5 (4%)	1 (1%)	19	57
17	LN	179/203 (88%)	175 (98%)	4 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
18	LO	202/204 (99%)	191 (95%)	11 (5%)	0	100	100
19	LP	150/187 (80%)	148 (99%)	2 (1%)	0	100	100
20	LQ	127/213 (60%)	122 (96%)	5 (4%)	0	100	100
21	LS	172/174 (99%)	164 (95%)	8 (5%)	0	100	100
22	LT	124/160 (78%)	115 (93%)	7 (6%)	2 (2%)	9	40
23	LX	20/156 (13%)	20 (100%)	0	0	100	100
24	LY	132/138 (96%)	129 (98%)	3 (2%)	0	100	100
25	Le	129/131 (98%)	124 (96%)	5 (4%)	0	100	100
26	Lf	106/109 (97%)	101 (95%)	5 (5%)	0	100	100
27	Lh	119/935 (13%)	116 (98%)	3 (2%)	0	100	100
28	Li	86/110 (78%)	84 (98%)	2 (2%)	0	100	100
29	Lj	72/95 (76%)	70 (97%)	2 (3%)	0	100	100
30	Cc	232/282 (82%)	226 (97%)	6 (3%)	0	100	100
31	Cd	334/436 (77%)	317 (95%)	17 (5%)	0	100	100
32	Ce	192/336 (57%)	188 (98%)	4 (2%)	0	100	100
All	All	5764/9436 (61%)	5534 (96%)	224 (4%)	6 (0%)	54	85

5 of 6 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	CB	104	PRO
10	CR	130	ALA
16	LM	22	LEU
13	LE	86	PRO
22	LT	44	VAL

5.3.2 Protein sidechains ⓘ

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	
3	CA	231/276 (84%)	218 (94%)	13 (6%)	21	56

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	CB	231/329 (70%)	223 (96%)	8 (4%)	36	71
5	CC	240/710 (34%)	231 (96%)	9 (4%)	33	69
6	CE	398/517 (77%)	382 (96%)	16 (4%)	31	68
7	CI	121/336 (36%)	112 (93%)	9 (7%)	13	44
8	CJ	332/579 (57%)	309 (93%)	23 (7%)	15	48
9	CM	161/215 (75%)	144 (89%)	17 (11%)	6	26
9	LF	206/215 (96%)	197 (96%)	9 (4%)	28	65
10	CR	144/206 (70%)	139 (96%)	5 (4%)	36	71
11	CU	99/376 (26%)	86 (87%)	13 (13%)	4	18
12	LC	283/285 (99%)	272 (96%)	11 (4%)	32	69
13	LE	143/166 (86%)	136 (95%)	7 (5%)	25	61
14	LG	158/222 (71%)	157 (99%)	1 (1%)	86	95
15	LL	99/176 (56%)	97 (98%)	2 (2%)	55	83
16	LM	108/117 (92%)	99 (92%)	9 (8%)	11	39
17	LN	164/180 (91%)	154 (94%)	10 (6%)	18	53
18	LO	163/163 (100%)	148 (91%)	15 (9%)	9	34
19	LP	125/152 (82%)	119 (95%)	6 (5%)	25	62
20	LQ	110/178 (62%)	105 (96%)	5 (4%)	27	64
21	LS	154/154 (100%)	148 (96%)	6 (4%)	32	69
22	LT	109/135 (81%)	99 (91%)	10 (9%)	9	34
23	LX	12/129 (9%)	12 (100%)	0	100	100
24	LY	117/119 (98%)	112 (96%)	5 (4%)	29	66
25	Le	114/114 (100%)	111 (97%)	3 (3%)	46	78
26	Lf	89/90 (99%)	88 (99%)	1 (1%)	73	90
27	Lh	108/781 (14%)	104 (96%)	4 (4%)	34	70
28	Li	75/93 (81%)	71 (95%)	4 (5%)	22	58
29	Lj	61/78 (78%)	60 (98%)	1 (2%)	62	86
30	Cc	204/244 (84%)	202 (99%)	2 (1%)	76	91
31	Cd	291/367 (79%)	284 (98%)	7 (2%)	49	79
32	Ce	173/297 (58%)	165 (95%)	8 (5%)	27	64
All	All	5023/7999 (63%)	4784 (95%)	239 (5%)	29	62

5 of 239 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
12	LC	94	MET
29	Lj	84	LYS
16	LM	11	TRP
28	Li	64	ARG
32	Ce	143	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 10 such sidechains are listed below:

Mol	Chain	Res	Type
21	LS	122	HIS
27	Lh	37	GLN
32	Ce	93	GLN
11	CU	218	GLN
11	CU	246	GLN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	C1	1297/3341 (38%)	255 (19%)	10 (0%)
2	C2	254/306 (83%)	59 (23%)	3 (1%)
All	All	1551/3647 (42%)	314 (20%)	13 (0%)

5 of 314 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	C1	22	G
1	C1	26	A
1	C1	40	A
1	C1	43	A
1	C1	49	A

5 of 13 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	C1	1159	G
1	C1	3162	A
2	C2	175	G
2	C2	123	G
2	C2	174	G

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

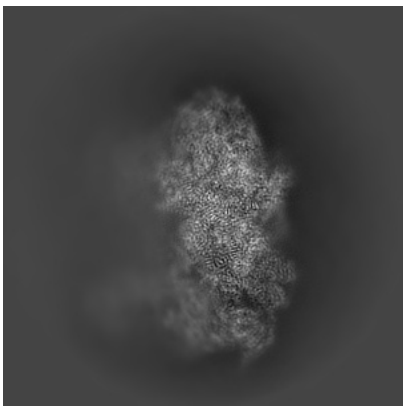
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-35279. These allow visual inspection of the internal detail of the map and identification of artifacts.

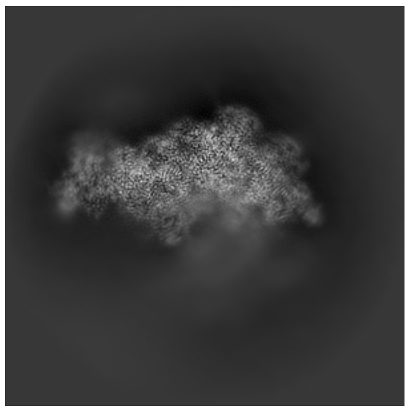
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections (i)

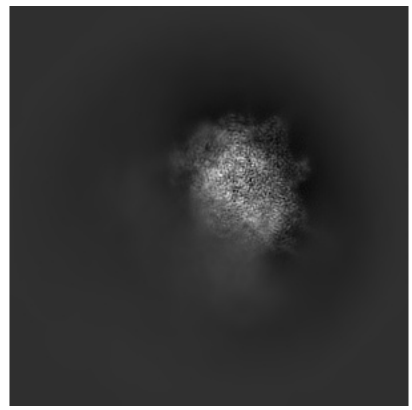
6.1.1 Primary map



X

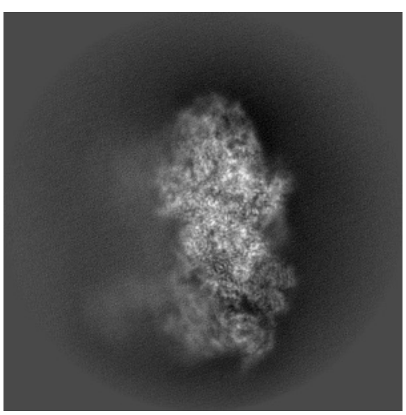


Y

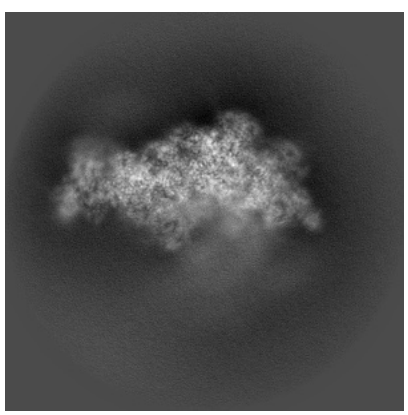


Z

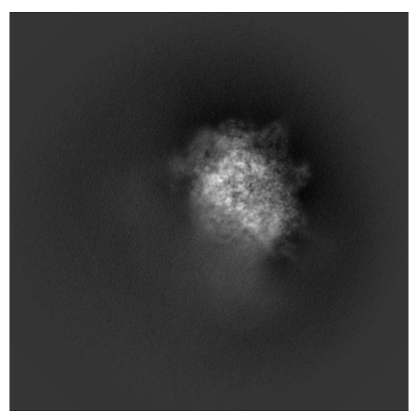
6.1.2 Raw map



X



Y

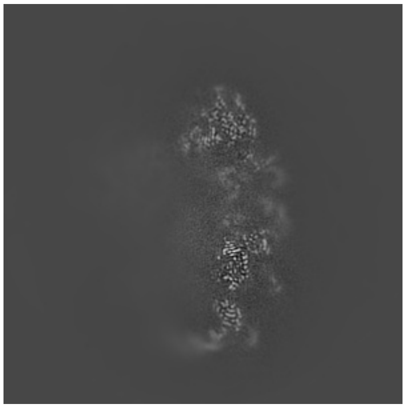


Z

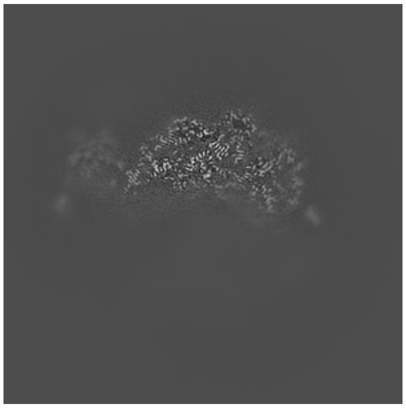
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

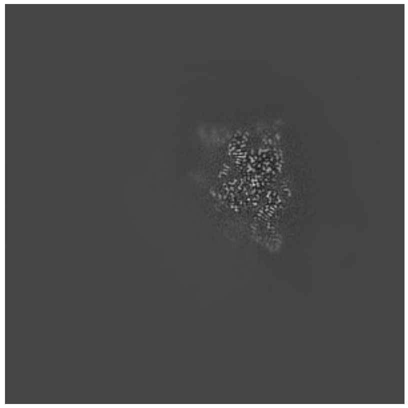
6.2.1 Primary map



X Index: 210

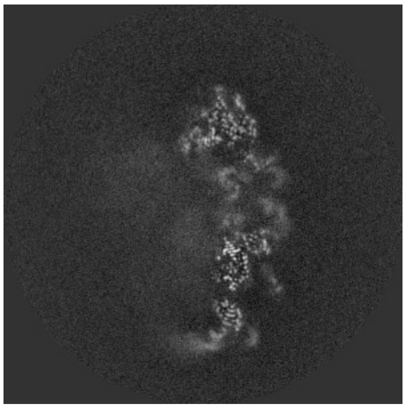


Y Index: 210

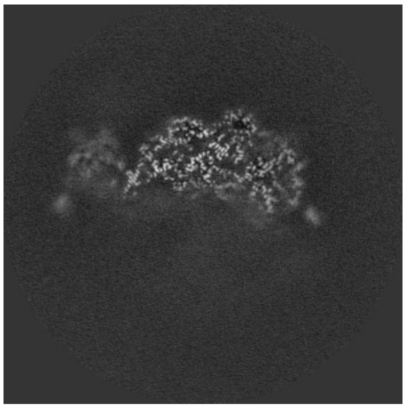


Z Index: 210

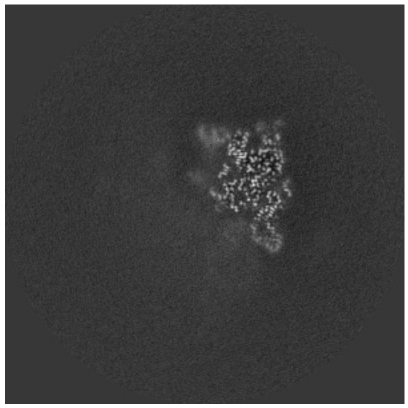
6.2.2 Raw map



X Index: 210



Y Index: 210

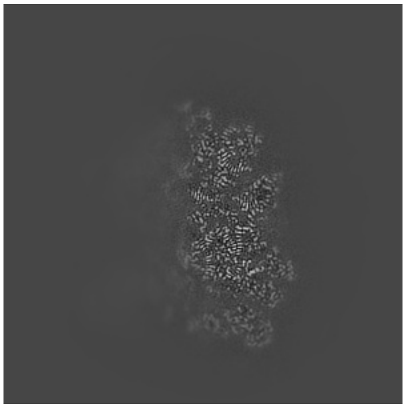


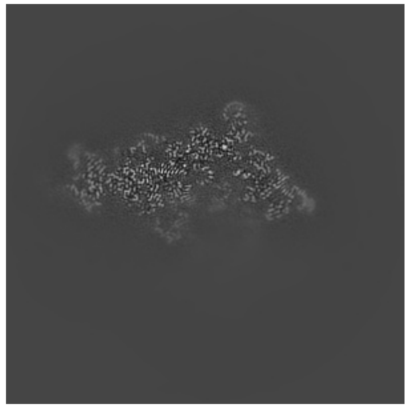
Z Index: 210

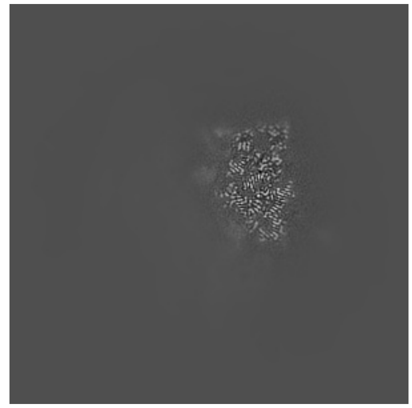
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

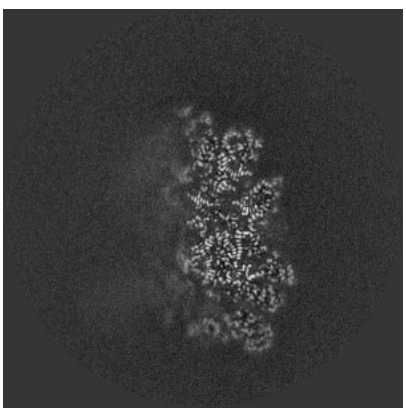
6.3.1 Primary map

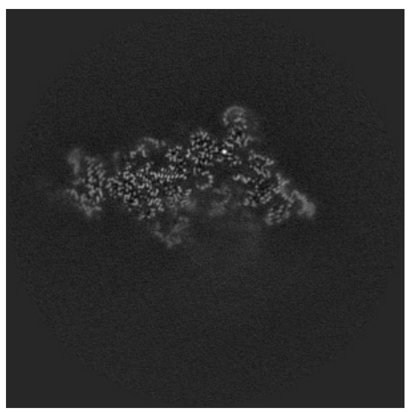

X Index: 244

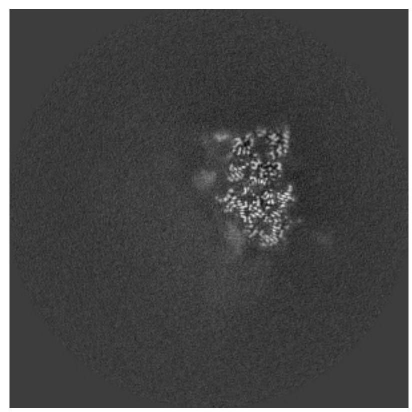

Y Index: 247


Z Index: 216

6.3.2 Raw map


X Index: 244

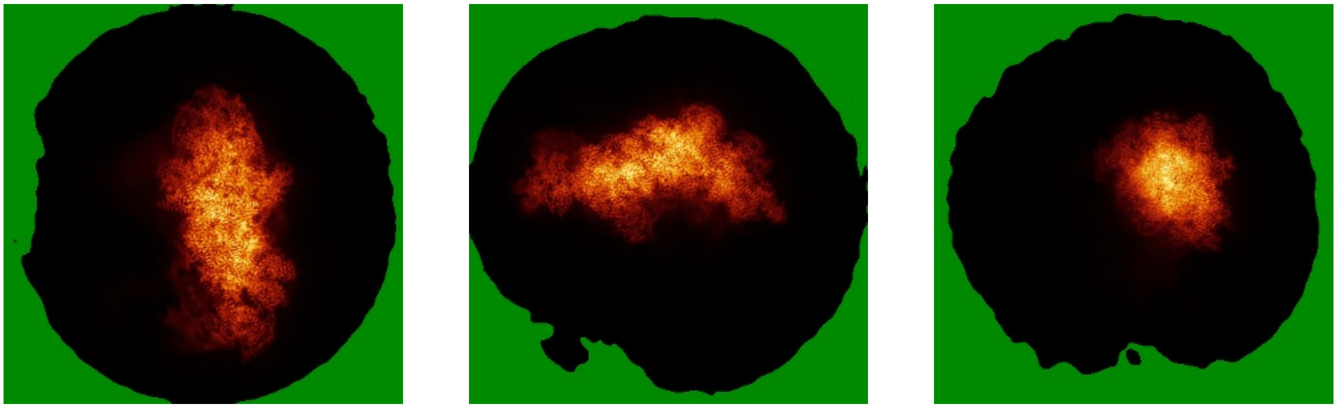

Y Index: 247


Z Index: 217

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

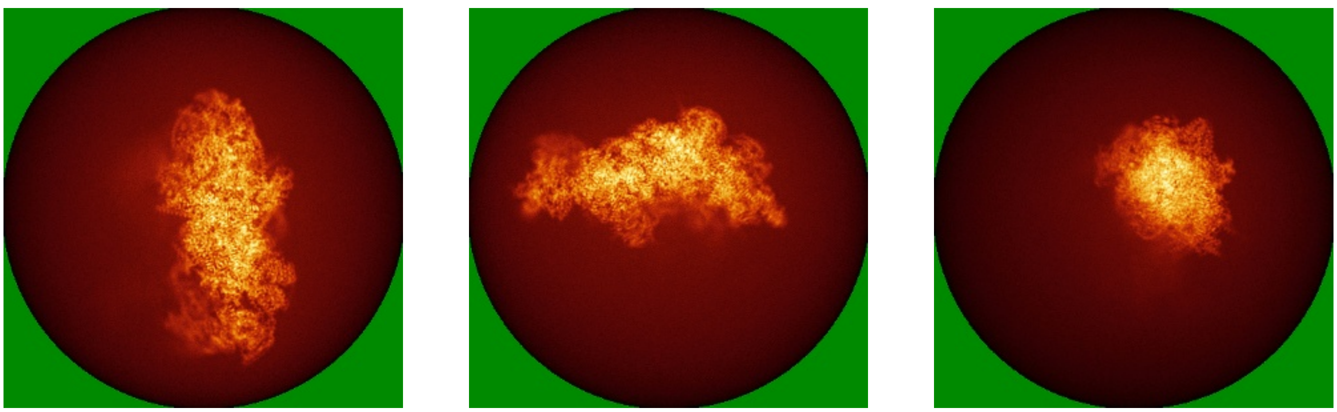
6.4 Orthogonal standard-deviation projections (False-color) ⓘ

6.4.1 Primary map



X Y Z

6.4.2 Raw map

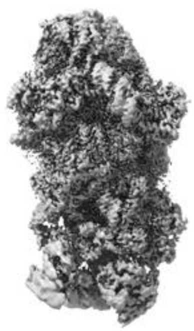


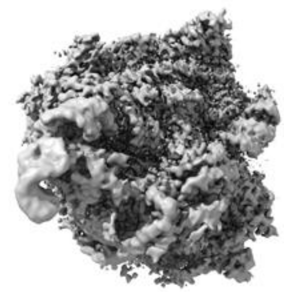
X Y Z

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

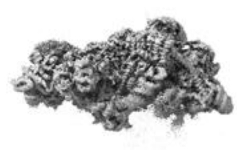




X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.02. 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.

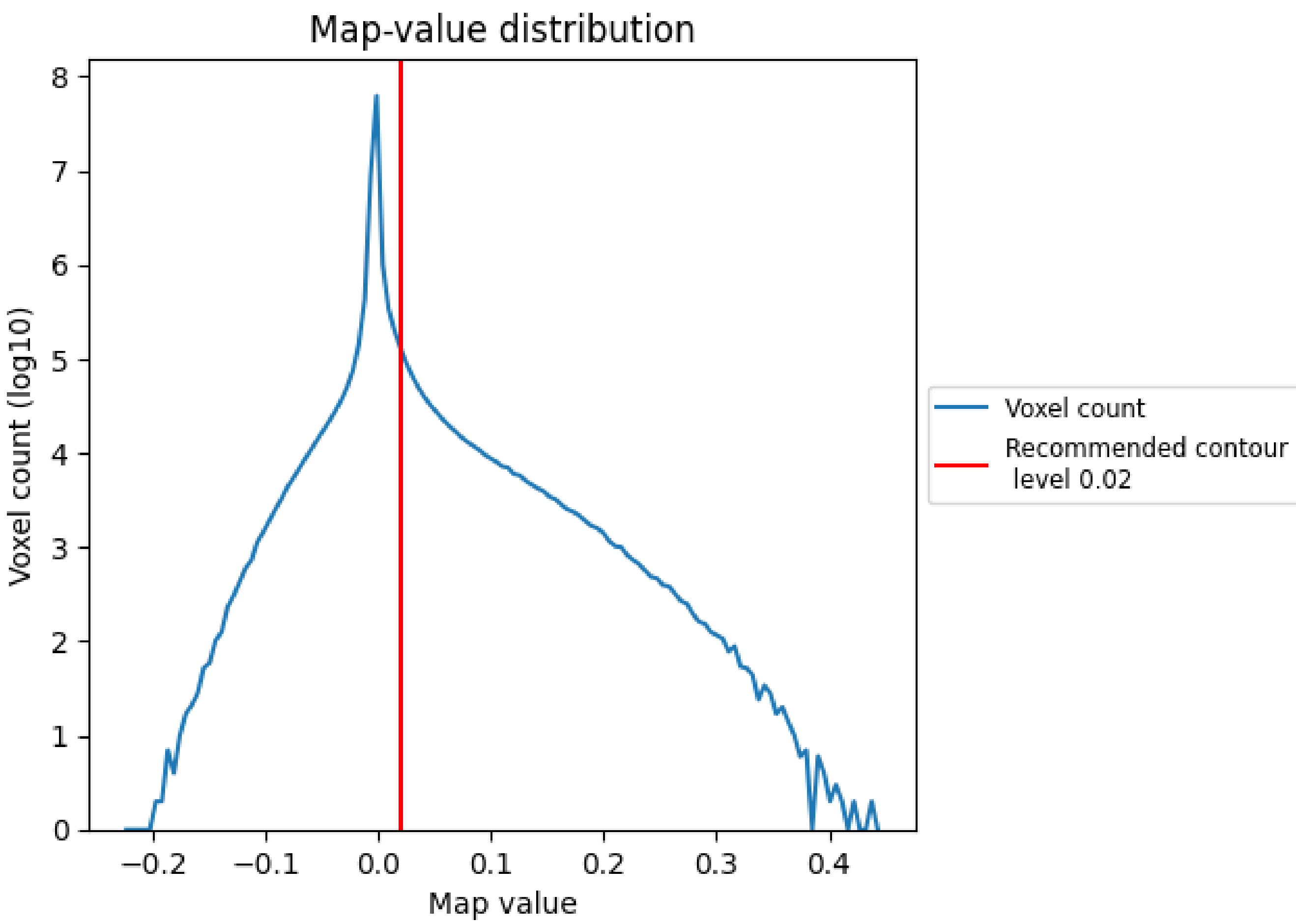
6.6 Mask visualisation (i)

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

7 Map analysis (i)

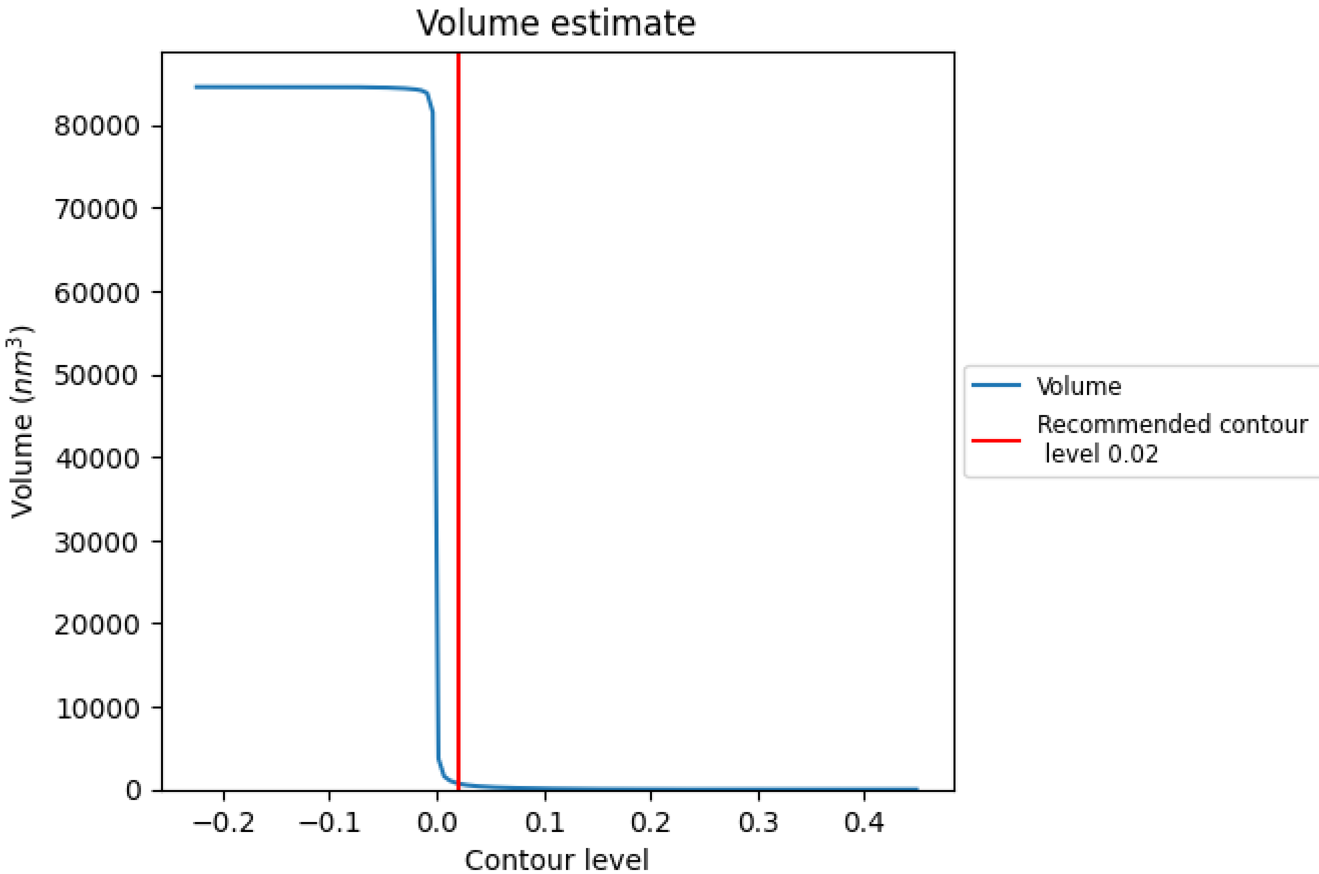
This section contains the results of statistical analysis of the map.

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.

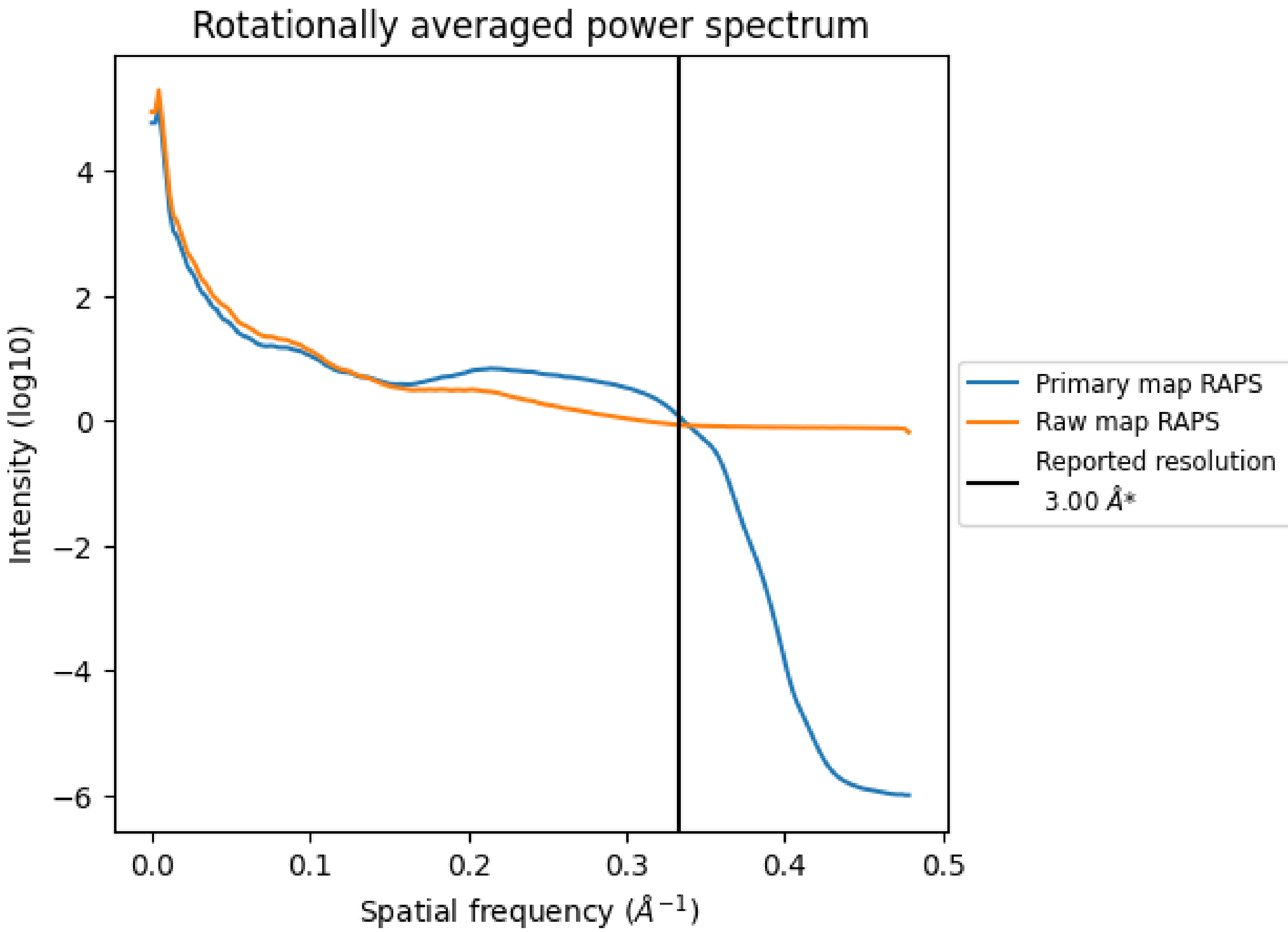
7.2 Volume estimate (i)



The volume at the recommended contour level is 730 nm^3; this corresponds to an approximate mass of 660 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)

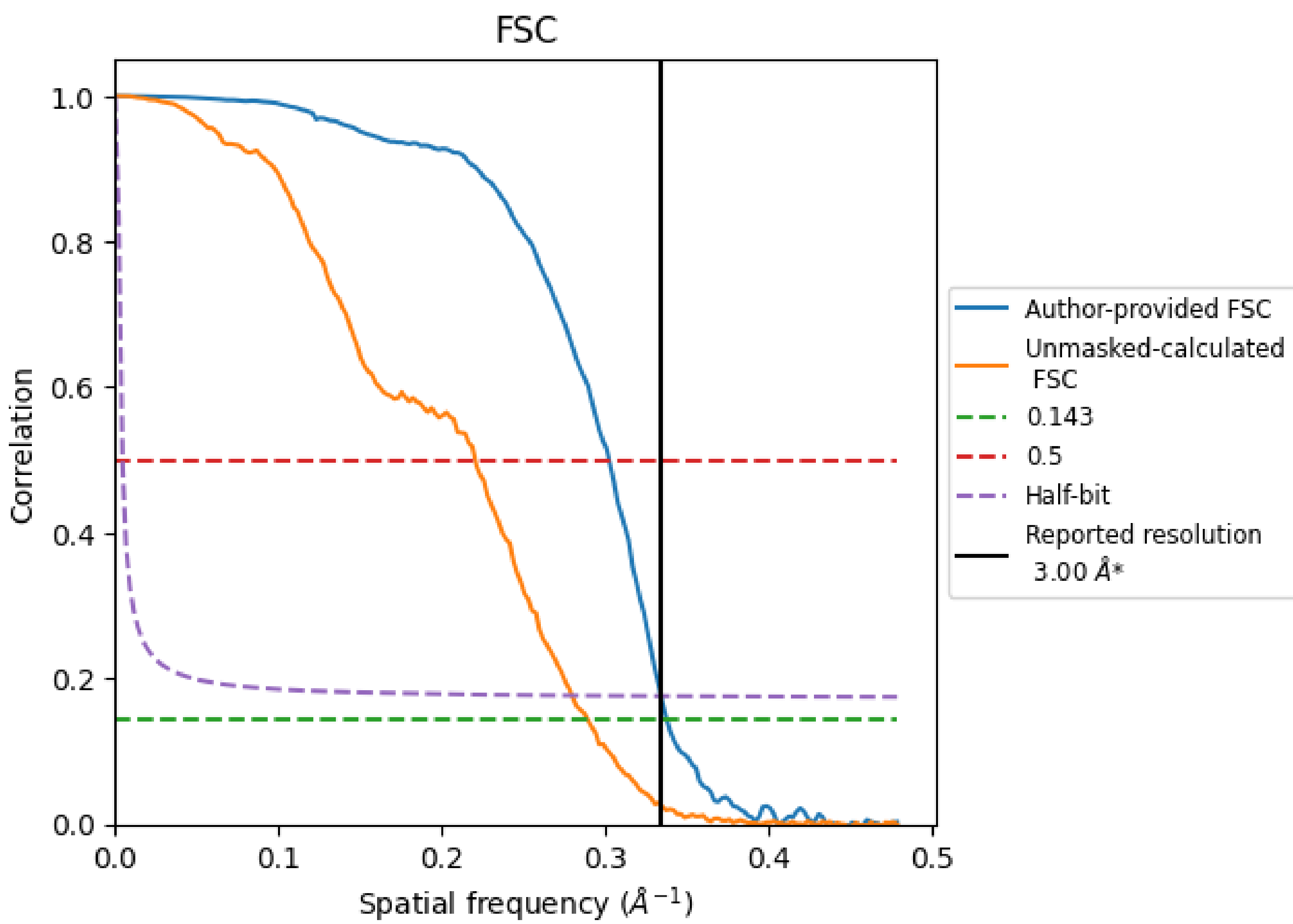


*Reported resolution corresponds to spatial frequency of 0.333 Å^{-1}

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 0.333 Å^{-1}

8.2 Resolution estimates (i)

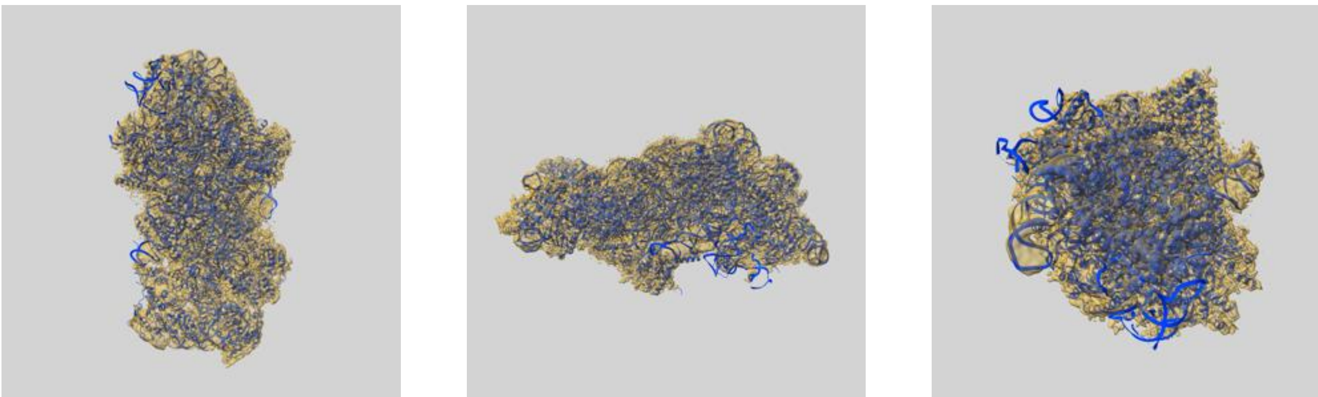
Resolution estimate (Å)	**Estimation criterion (FSC cut-off)**		
	0.143	0.5	Half-bit
Reported by author	3.00	-	-
Author-provided FSC curve	2.96	3.31	2.99
Unmasked-calculated*	3.46	4.54	3.58

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.46 differs from the reported value 3.0 by more than 10 %

9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-35279 and PDB model 8I9P. Per-residue inclusion information can be found in section 3 on page 11.

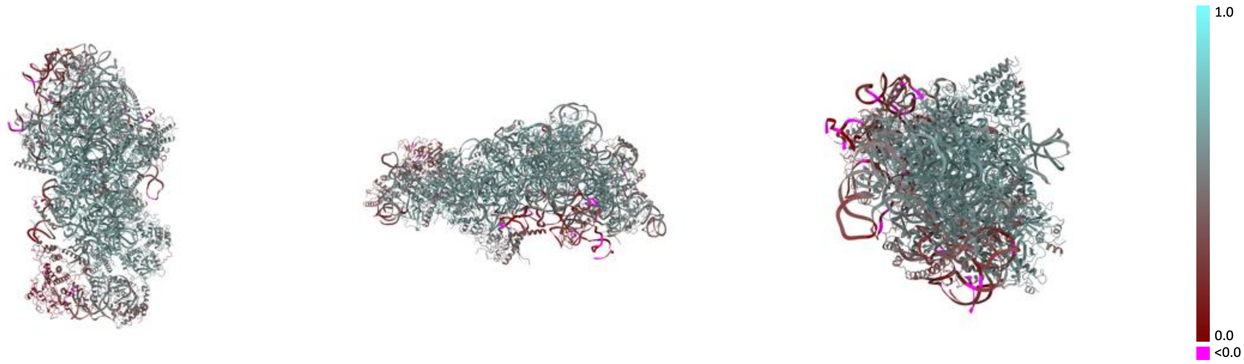
9.1 Map-model overlay (i)



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.02 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.

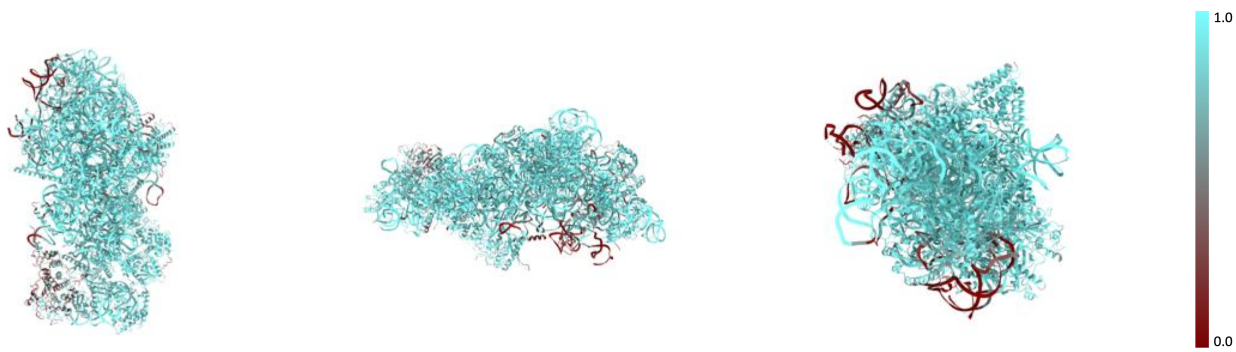
9.2 Q-score mapped to coordinate model (i)



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.

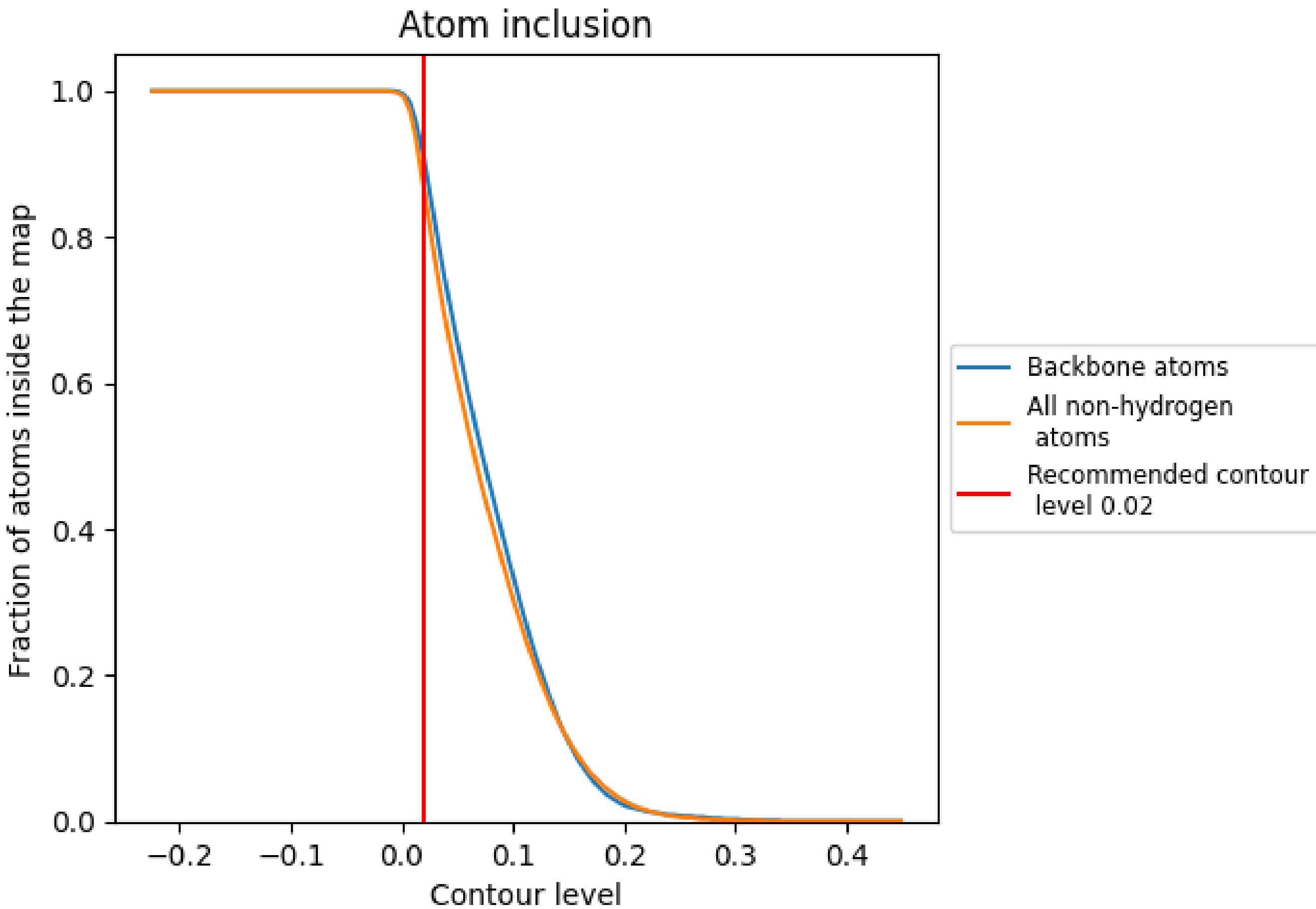
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.02).

9.4 Atom inclusion (i)



At the recommended contour level, 91% of all backbone atoms, 87% 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 (0.02) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8660	0.5060
C1	0.8530	0.4980
C2	0.9190	0.4810
CA	0.9000	0.5070
CB	0.8900	0.4860
CC	0.6640	0.3660
CE	0.9270	0.5530
CI	0.9090	0.4980
CJ	0.5190	0.2470
CM	0.6790	0.3310
CR	0.9540	0.5940
CU	0.7270	0.3630
Cc	0.9220	0.5550
Cd	0.9390	0.5730
Ce	0.9780	0.6160
LC	0.9710	0.6190
LE	0.9110	0.5320
LF	0.9580	0.5880
LG	0.9460	0.5920
LL	0.9650	0.6190
LM	0.8960	0.4910
LN	0.9640	0.6240
LO	0.8560	0.4570
LP	0.7840	0.4880
LQ	0.9800	0.6070
LS	0.8940	0.5010
LT	0.5030	0.3290
LX	0.5270	0.4450
LY	0.9520	0.6040
Le	0.9700	0.6290
Lf	0.9510	0.5980
Lh	0.9130	0.5490
Li	0.9540	0.5890
Lj	0.9750	0.6310