



Full wwPDB EM Validation Report ⓘ

Mar 23, 2026 – 09:13 PM JST

PDB ID : 9JPG / pdb_00009jpg
EMDB ID : EMD-61699
Title : crRNA-guided surveillance (Csy) complex
Authors : Wang, W.H.; Guan, L.L.; Du, X.Y.; Feng, Y.
Deposited on : 2024-09-26
Resolution : 3.32 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:

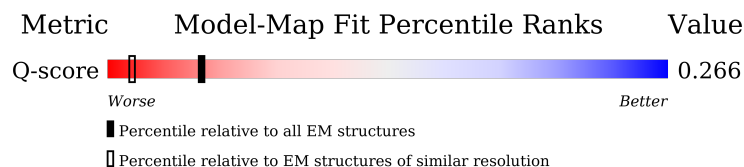
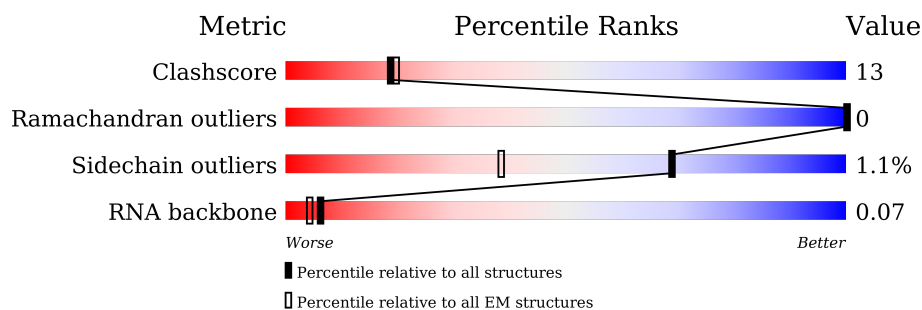
EMDB validation analysis : 0.0.1.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.48.1

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 3.32 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	-
RNA backbone	6643	2191	-
Q-score	-	25397	14518 (2.82 - 3.82)

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 $\leq 5\%$. 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	473	
2	B	327	
3	C	342	

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Mol	Chain	Length	Quality of chain
3	D	342	32% 71% 27% ..
3	E	342	56% 82% 18% .
3	F	342	27% 69% 30% .
3	G	342	26% 70% 30% .
4	I	54	19% 11% 33% 24% 31%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 19060 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 Type I-F CRISPR-associated protein Csy1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	319	Total	C	N	O	S	0	0
			2557	1609	486	456	6		

There are 39 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	initiating methionine	UNP A0A643IV20
A	2	GLY	-	expression tag	UNP A0A643IV20
A	3	SER	-	expression tag	UNP A0A643IV20
A	4	SER	-	expression tag	UNP A0A643IV20
A	5	HIS	-	expression tag	UNP A0A643IV20
A	6	HIS	-	expression tag	UNP A0A643IV20
A	7	HIS	-	expression tag	UNP A0A643IV20
A	8	HIS	-	expression tag	UNP A0A643IV20
A	9	HIS	-	expression tag	UNP A0A643IV20
A	10	HIS	-	expression tag	UNP A0A643IV20
A	11	SER	-	expression tag	UNP A0A643IV20
A	12	SER	-	expression tag	UNP A0A643IV20
A	13	GLY	-	expression tag	UNP A0A643IV20
A	14	LEU	-	expression tag	UNP A0A643IV20
A	15	VAL	-	expression tag	UNP A0A643IV20
A	16	ASP	-	expression tag	UNP A0A643IV20
A	17	TYR	-	expression tag	UNP A0A643IV20
A	18	LYS	-	expression tag	UNP A0A643IV20
A	19	ASP	-	expression tag	UNP A0A643IV20
A	20	ASP	-	expression tag	UNP A0A643IV20
A	21	ASP	-	expression tag	UNP A0A643IV20
A	22	ASP	-	expression tag	UNP A0A643IV20
A	23	LYS	-	expression tag	UNP A0A643IV20
A	24	ASP	-	expression tag	UNP A0A643IV20
A	25	TYR	-	expression tag	UNP A0A643IV20
A	26	LYS	-	expression tag	UNP A0A643IV20
A	27	ASP	-	expression tag	UNP A0A643IV20
A	28	ASP	-	expression tag	UNP A0A643IV20

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Chain	Residue	Modelled	Actual	Comment	Reference
A	29	ASP	-	expression tag	UNP A0A643IV20
A	30	ASP	-	expression tag	UNP A0A643IV20
A	31	LYS	-	expression tag	UNP A0A643IV20
A	32	HIS	-	expression tag	UNP A0A643IV20
A	33	GLY	-	expression tag	UNP A0A643IV20
A	34	SER	-	expression tag	UNP A0A643IV20
A	35	HIS	-	expression tag	UNP A0A643IV20
A	36	MET	-	expression tag	UNP A0A643IV20
A	37	ALA	-	expression tag	UNP A0A643IV20
A	38	SER	-	expression tag	UNP A0A643IV20
A	39	VAL	-	expression tag	UNP A0A643IV20

- Molecule 2 is a protein called Type I-F CRISPR-associated protein Csy2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	327	Total	C	N	O	S	0	0
			2543	1596	469	471	7		

- Molecule 3 is a protein called Type I-F CRISPR-associated protein Csy3.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	340	Total	C	N	O	S	0	0
			2634	1651	478	504	1		
3	D	340	Total	C	N	O	S	0	0
			2634	1651	478	504	1		
3	E	340	Total	C	N	O	S	0	0
			2634	1651	478	504	1		
3	F	340	Total	C	N	O	S	0	0
			2634	1651	478	504	1		
3	G	340	Total	C	N	O	S	0	0
			2634	1651	478	504	1		

There are 15 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	59	THR	SER	conflict	UNP A0A643IYA9
C	124	THR	ALA	conflict	UNP A0A643IYA9
C	128	ASP	GLU	conflict	UNP A0A643IYA9
D	59	THR	SER	conflict	UNP A0A643IYA9
D	124	THR	ALA	conflict	UNP A0A643IYA9
D	128	ASP	GLU	conflict	UNP A0A643IYA9
E	59	THR	SER	conflict	UNP A0A643IYA9

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Chain	Residue	Modelled	Actual	Comment	Reference
E	124	THR	ALA	conflict	UNP A0A643IYA9
E	128	ASP	GLU	conflict	UNP A0A643IYA9
F	59	THR	SER	conflict	UNP A0A643IYA9
F	124	THR	ALA	conflict	UNP A0A643IYA9
F	128	ASP	GLU	conflict	UNP A0A643IYA9
G	59	THR	SER	conflict	UNP A0A643IYA9
G	124	THR	ALA	conflict	UNP A0A643IYA9
G	128	ASP	GLU	conflict	UNP A0A643IYA9

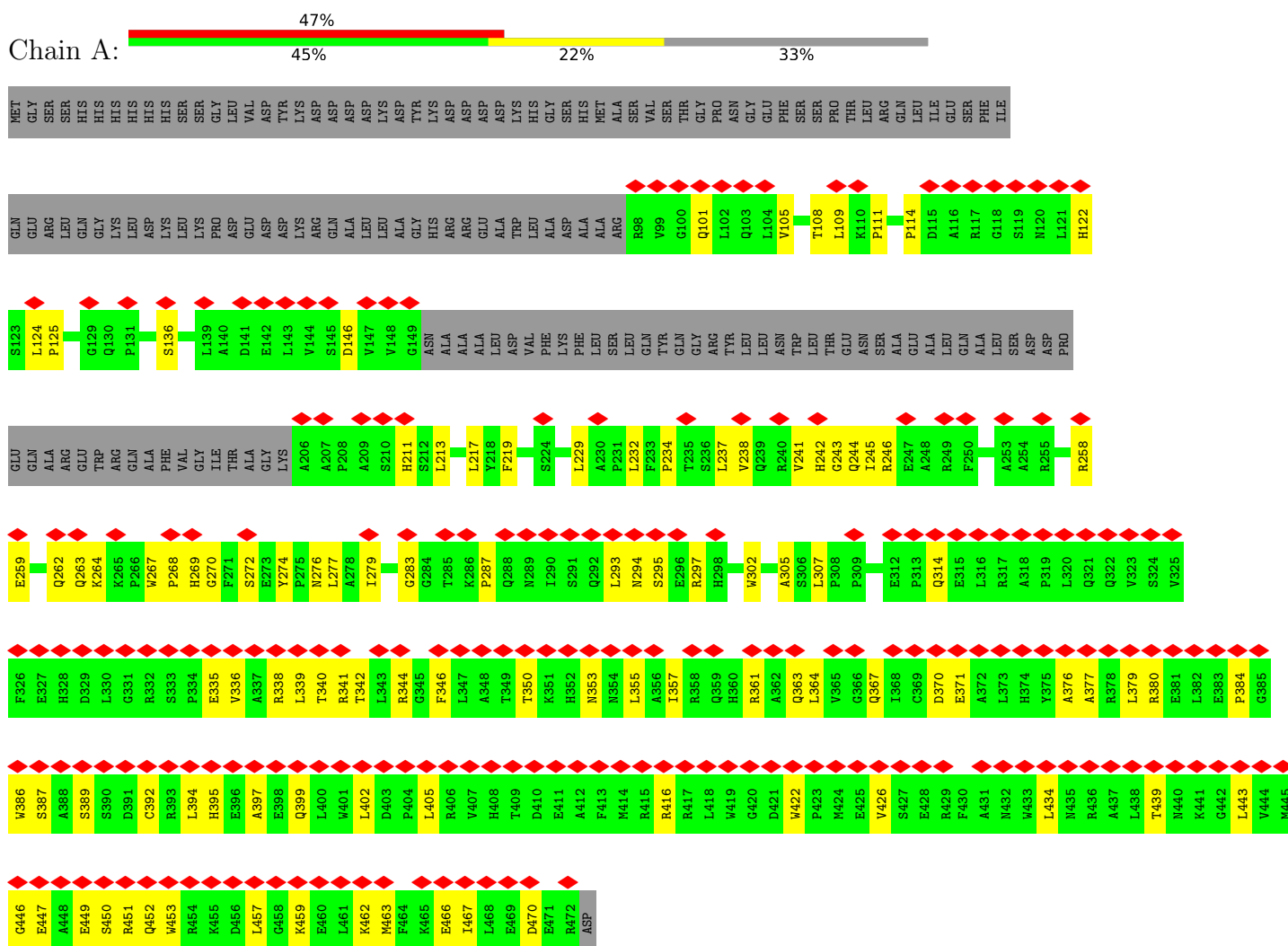
- Molecule 4 is a RNA chain called RNA (54-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
4	I	37	Total	C	N	O	P	0	0
			790	354	142	257	37		

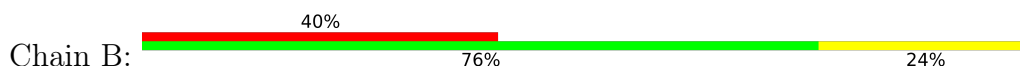
3 Residue-property plots

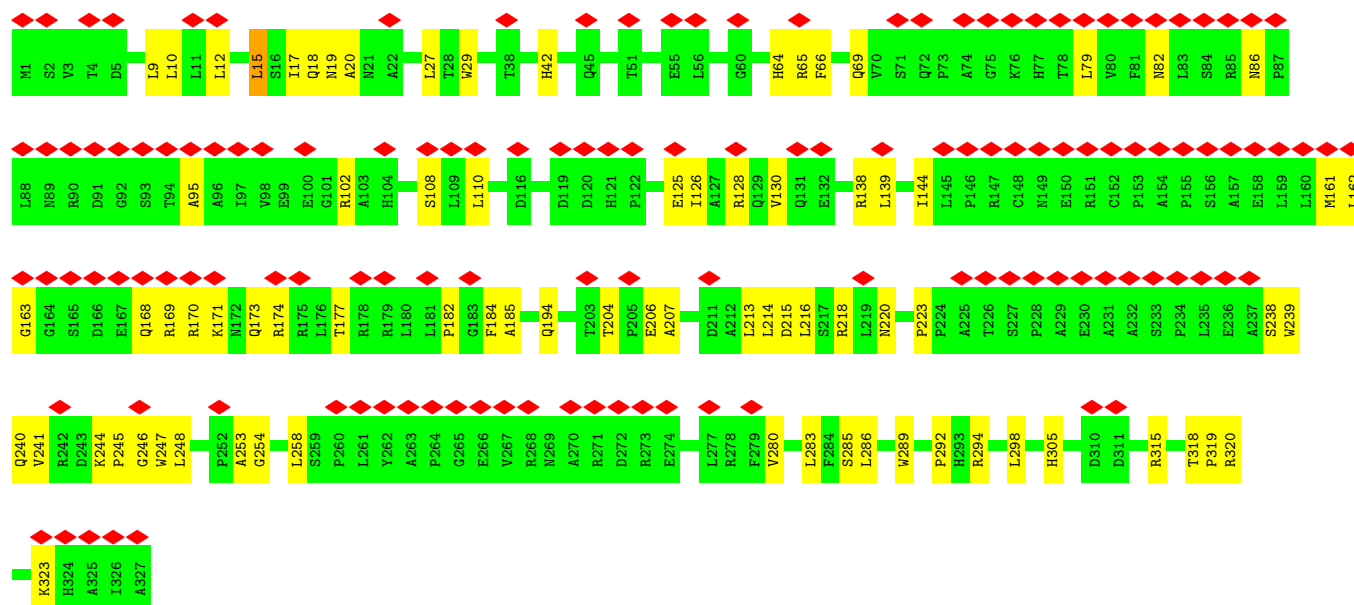
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: Type I-F CRISPR-associated protein Csy1

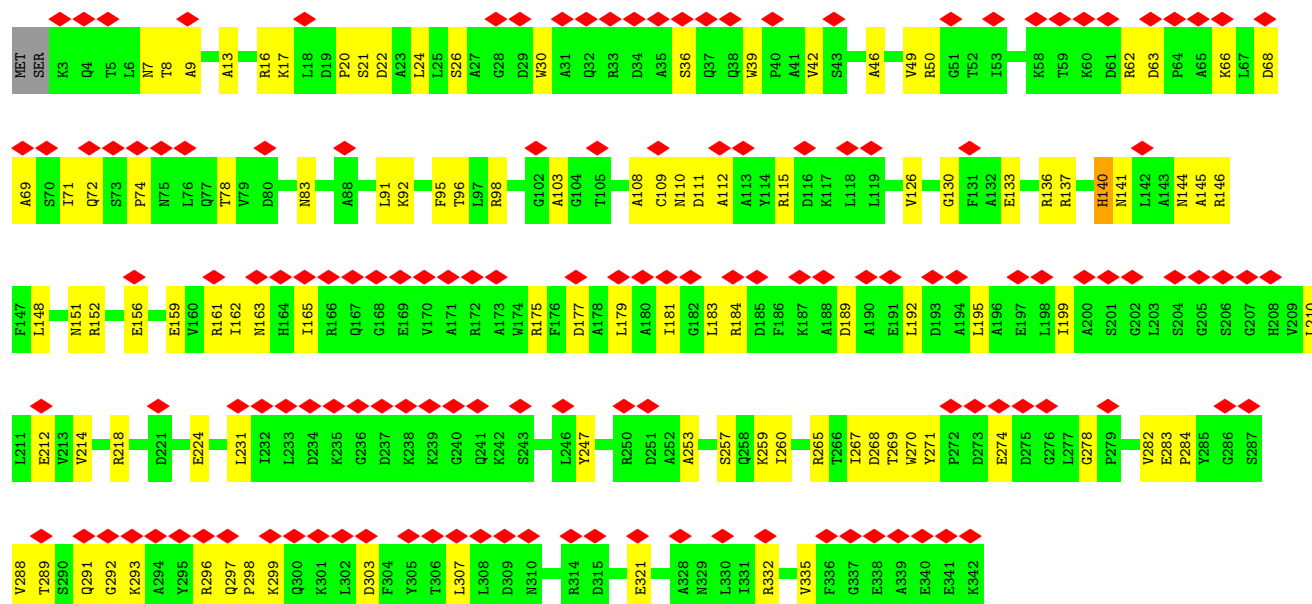
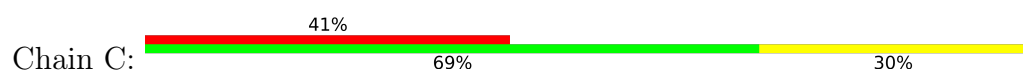


• Molecule 2: Type I-F CRISPR-associated protein Csy2

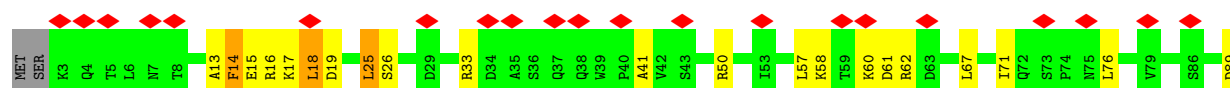


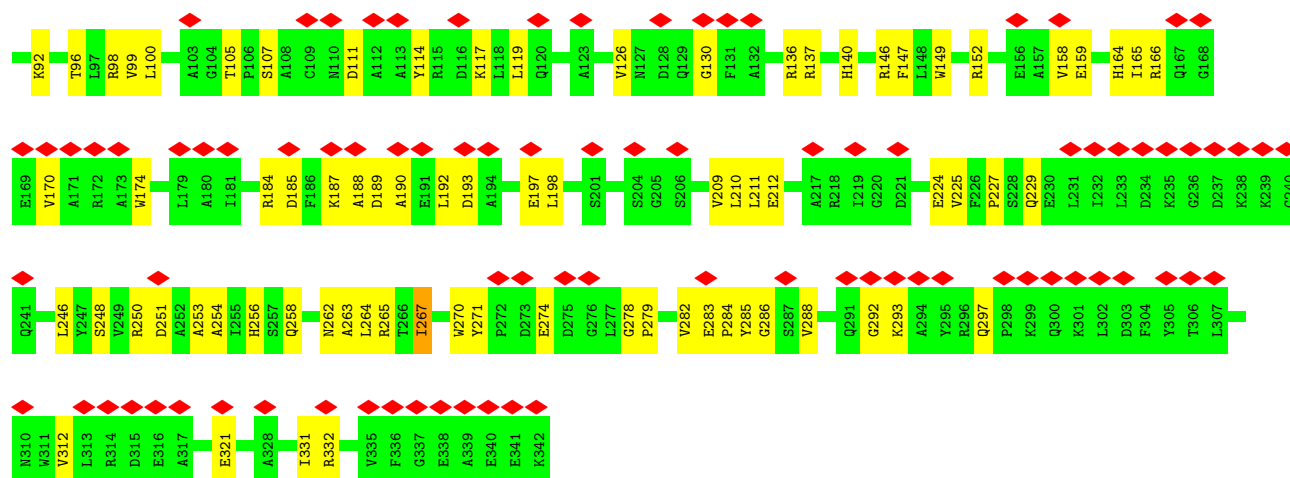


• Molecule 3: Type I-F CRISPR-associated protein Csy3

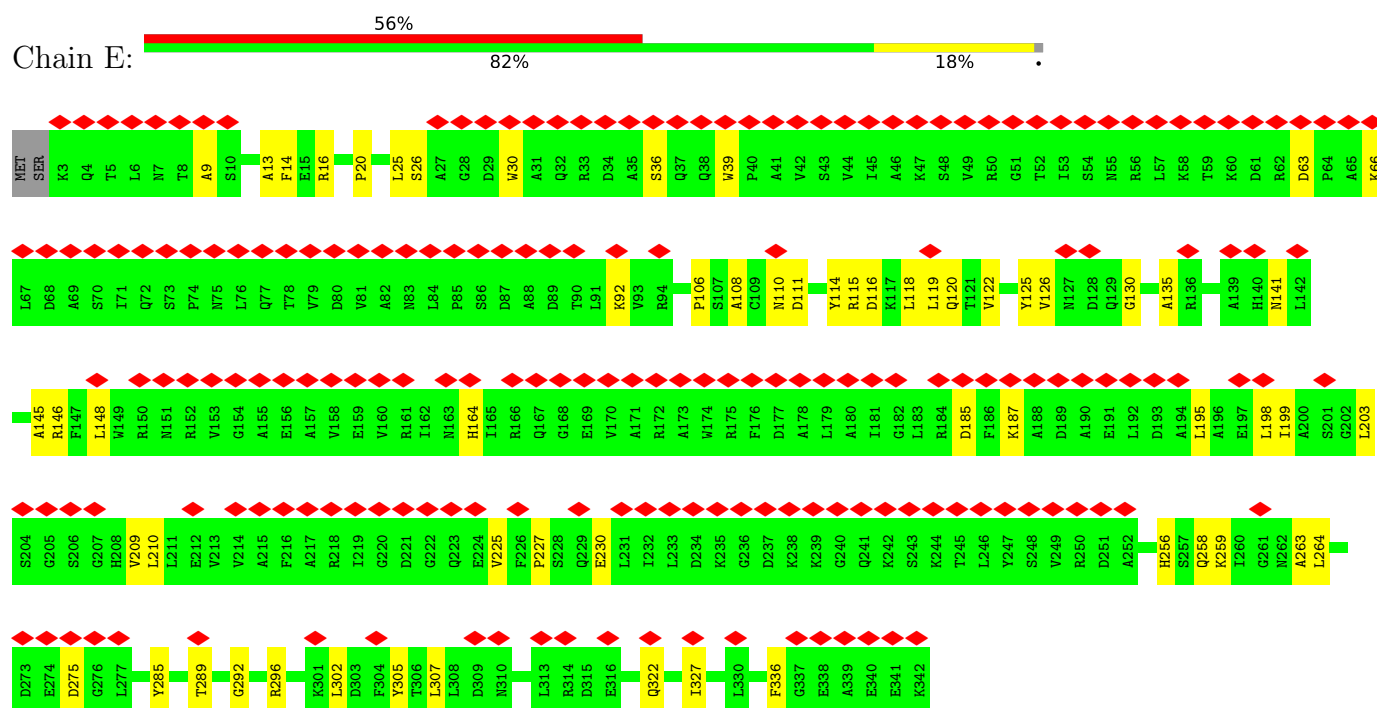


• Molecule 3: Type I-F CRISPR-associated protein Csy3

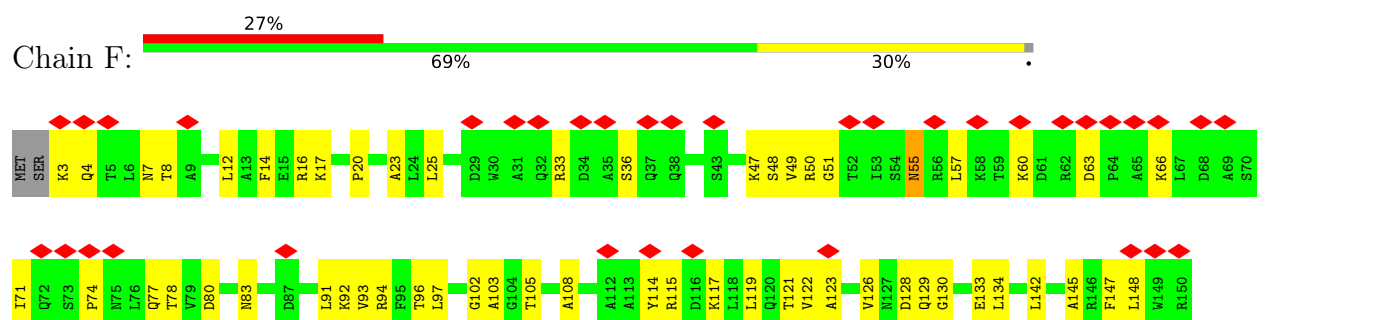


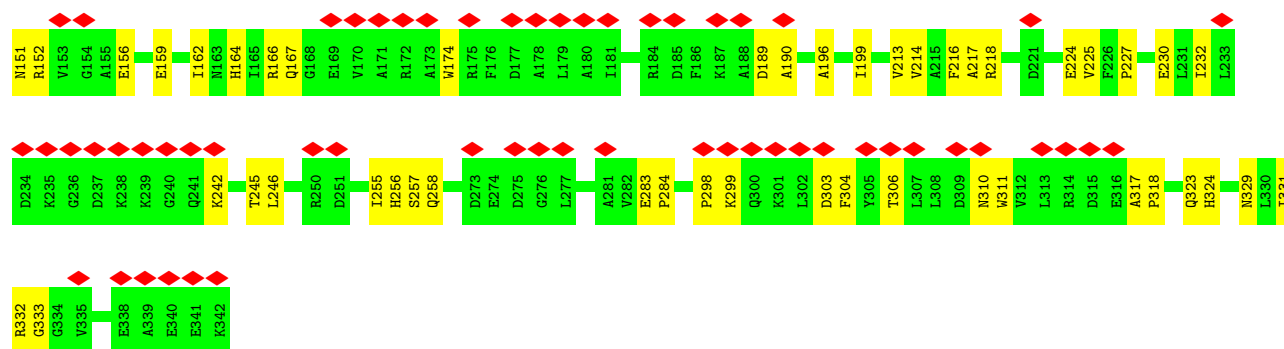


• Molecule 3: Type I-F CRISPR-associated protein Csy3

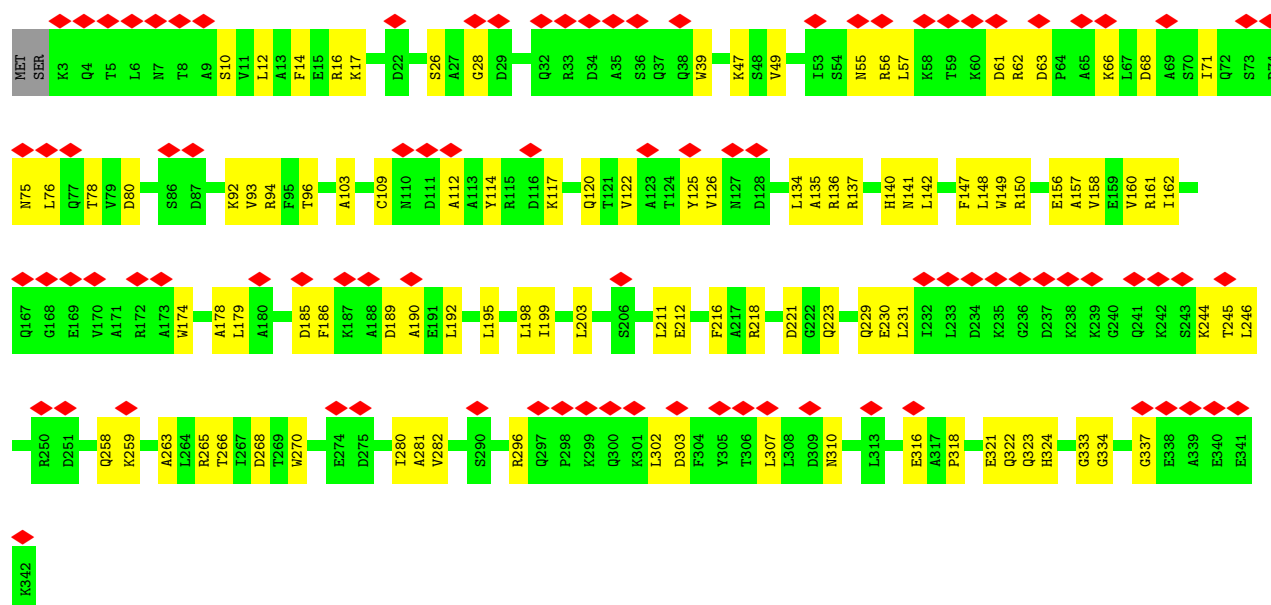


• Molecule 3: Type I-F CRISPR-associated protein Csy3





• Molecule 3: Type I-F CRISPR-associated protein Csy3



• Molecule 4: RNA (54-MER)



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	122663	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	5000	Depositor
Magnification	Not provided	
Image detector	OTHER	Depositor
Maximum map value	1.158	Depositor
Minimum map value	-0.615	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.035	Depositor
Recommended contour level	0.22	Depositor
Map size (Å)	301.46402, 301.46402, 301.46402	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8374001, 0.8374001, 0.8374001	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.16	0/2625	0.41	0/3558
2	B	0.18	0/2603	0.46	0/3545
3	C	0.19	0/2681	0.43	0/3634
3	D	0.16	0/2681	0.42	1/3634 (0.0%)
3	E	0.15	0/2681	0.39	0/3634
3	F	0.17	0/2681	0.40	0/3634
3	G	0.16	0/2681	0.39	0/3634
4	I	0.12	0/884	0.25	0/1373
All	All	0.17	0/19517	0.41	1/26646 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	267	ILE	N-CA-C	-5.33	107.93	113.10

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2557	0	2517	80	0
2	B	2543	0	2529	65	0
3	C	2634	0	2622	77	0
3	D	2634	0	2622	84	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	E	2634	0	2622	41	0
3	F	2634	0	2622	72	0
3	G	2634	0	2622	87	0
4	I	790	0	397	34	0
All	All	19060	0	18553	478	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 13.

All (478) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:227:PRO:HG2	3:F:246:LEU:HD22	1.61	0.83
3:F:306:THR:O	3:F:310:ASN:ND2	2.11	0.82
3:F:299:LYS:NZ	3:G:62:ARG:O	2.12	0.82
3:G:140:HIS:HE1	3:G:192:LEU:HD21	1.45	0.81
3:D:33:ARG:HH22	3:D:159:GLU:HB3	1.45	0.79
3:F:23:ALA:HB1	3:F:93:VAL:HG13	1.64	0.77
3:F:16:ARG:NH2	4:I:24:U:OP2	2.16	0.75
3:F:134:LEU:HG	3:F:324:HIS:HD2	1.52	0.74
3:D:224:GLU:OE1	3:G:16:ARG:NH2	2.20	0.74
2:B:162:LEU:HB3	2:B:169:ARG:HE	1.51	0.74
3:D:152:ARG:HH12	3:D:158:VAL:HG21	1.53	0.73
4:I:30:G:OP1	4:I:31:A:N6	2.22	0.73
3:G:80:ASP:O	3:G:244:LYS:NZ	2.22	0.72
3:F:80:ASP:OD1	3:F:242:LYS:NZ	2.23	0.71
3:E:146:ARG:HG3	3:E:263:ALA:HB1	1.73	0.70
3:D:225:VAL:HG23	3:D:227:PRO:HD3	1.74	0.69
3:G:47:LYS:O	3:G:78:THR:OG1	2.10	0.69
3:C:265:ARG:HH21	3:C:332:ARG:HB2	1.56	0.69
3:G:94:ARG:HH21	3:G:96:THR:HG1	1.40	0.69
3:D:26:SER:HA	3:D:41:ALA:HA	1.76	0.68
3:D:185:ASP:HB2	3:D:187:LYS:HE2	1.75	0.68
3:C:137:ARG:NH1	3:C:269:THR:OG1	2.27	0.68
3:C:265:ARG:HH22	3:C:282:VAL:HB	1.59	0.68
3:F:148:LEU:HD11	3:F:217:ALA:HB1	1.76	0.68
3:C:109:CYS:SG	3:C:115:ARG:NH1	2.67	0.67
1:A:446:GLY:O	1:A:450:SER:OG	2.13	0.67
1:A:335:GLU:O	1:A:339:LEU:HG	1.95	0.67
3:D:76:LEU:HB3	3:G:231:LEU:HD11	1.77	0.67
3:D:98:ARG:NH2	3:D:209:VAL:O	2.28	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:270:TRP:CD1	3:G:321:GLU:HB3	2.31	0.66
3:C:265:ARG:HH12	3:C:282:VAL:H	1.43	0.65
3:C:298:PRO:HA	3:C:303:ASP:HB3	1.79	0.65
3:G:162:ILE:HD11	3:G:211:LEU:HD22	1.79	0.65
1:A:125:PRO:HG2	1:A:136:SER:HB3	1.79	0.65
3:E:115:ARG:O	3:E:119:LEU:HD12	1.97	0.64
3:D:136:ARG:HH22	3:D:188:ALA:HA	1.62	0.64
3:C:16:ARG:HD3	4:I:6:A:H5'	1.78	0.64
3:C:98:ARG:HH22	3:C:210:LEU:HA	1.61	0.64
3:G:94:ARG:NH2	3:G:96:THR:OG1	2.25	0.64
3:G:334:GLY:HA2	4:I:18:U:H1'	1.79	0.64
1:A:234:PRO:HB2	1:A:237:LEU:HB3	1.79	0.64
2:B:173:GLN:O	2:B:177:THR:HG23	1.97	0.64
3:D:57:LEU:HB3	3:D:61:ASP:HB2	1.78	0.64
3:E:305:TYR:OH	3:E:336:PHE:O	2.16	0.64
3:C:62:ARG:O	3:C:62:ARG:NE	2.27	0.64
3:C:140:HIS:CE1	3:C:192:LEU:HD13	2.33	0.63
2:B:185:ALA:HB2	2:B:292:PRO:HG3	1.79	0.63
3:C:183:LEU:O	3:C:184:ARG:NH1	2.31	0.63
2:B:253:ALA:N	2:B:283:LEU:O	2.32	0.63
3:G:55:ASN:OD1	3:G:56:ARG:N	2.32	0.63
3:F:91:LEU:HD13	3:F:225:VAL:HG21	1.80	0.63
1:A:294:ASN:OD1	1:A:295:SER:N	2.32	0.62
3:C:144:ASN:HD21	3:C:146:ARG:NH2	1.97	0.62
3:D:13:ALA:HB3	3:D:107:SER:HB3	1.82	0.62
2:B:170:ARG:O	2:B:174:ARG:HG2	1.99	0.62
3:D:256:HIS:ND1	4:I:15:A:OP1	2.32	0.62
3:E:126:VAL:HA	3:E:130:GLY:HA2	1.82	0.62
1:A:341:ARG:NH2	2:B:239:TRP:O	2.31	0.61
1:A:470:ASP:OD2	2:B:171:LYS:NZ	2.31	0.61
3:C:36:SER:O	3:C:92:LYS:NZ	2.33	0.61
3:C:259:LYS:NZ	4:I:8:A:N3	2.48	0.61
3:C:224:GLU:OE1	3:D:16:ARG:NH2	2.33	0.61
3:D:262:ASN:OD1	3:D:265:ARG:NH1	2.33	0.61
3:D:14:PHE:O	4:I:11:G:O2'	2.18	0.61
3:G:266:THR:HA	3:G:281:ALA:HA	1.82	0.61
3:E:292:GLY:HA2	3:F:71:ILE:HG12	1.82	0.61
3:G:26:SER:HB2	3:G:92:LYS:HB3	1.83	0.61
3:G:158:VAL:H	3:G:179:LEU:HD11	1.65	0.61
3:G:268:ASP:HB2	3:G:282:VAL:HG22	1.83	0.61
3:G:140:HIS:CE1	3:G:192:LEU:HD21	2.33	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:126:VAL:HA	3:C:130:GLY:HA2	1.83	0.60
3:E:135:ALA:HB1	3:E:199:ILE:HG23	1.82	0.60
3:D:111:ASP:HB3	3:D:114:TYR:HB2	1.83	0.60
1:A:439:THR:HG22	1:A:443:LEU:HD12	1.82	0.60
3:D:126:VAL:HA	3:D:130:GLY:HA2	1.84	0.60
2:B:17:ILE:HD11	2:B:139:LEU:HD13	1.84	0.60
2:B:161:MET:HG2	2:B:163:GLY:H	1.66	0.60
3:F:298:PRO:HA	3:F:303:ASP:HB3	1.84	0.60
1:A:367:GLN:O	1:A:371:GLU:HG2	2.02	0.60
1:A:386:TRP:H	1:A:386:TRP:CD1	2.19	0.59
2:B:204:THR:HG23	2:B:207:ALA:HB2	1.83	0.59
3:E:258:GLN:HG2	4:I:31:A:N3	2.18	0.59
1:A:376:ALA:O	1:A:380:ARG:NH1	2.36	0.59
3:F:128:ASP:OD1	3:F:129:GLN:N	2.36	0.59
3:C:271:TYR:OH	3:C:278:GLY:O	2.20	0.59
3:G:270:TRP:NE1	3:G:321:GLU:OE2	2.36	0.59
3:F:164:HIS:H	3:F:174:TRP:HZ3	1.50	0.58
2:B:79:LEU:HD12	2:B:79:LEU:H	1.69	0.58
3:G:158:VAL:HG13	3:G:178:ALA:HB3	1.84	0.58
3:C:156:GLU:HG2	3:C:218:ARG:HH21	1.68	0.58
1:A:124:LEU:HD23	1:A:124:LEU:H	1.68	0.58
3:C:13:ALA:HB1	4:I:5:G:H1'	1.84	0.58
1:A:279:ILE:N	2:B:79:LEU:O	2.34	0.57
3:D:105:THR:HG22	3:D:119:LEU:HD21	1.86	0.57
2:B:216:LEU:O	2:B:244:LYS:HE3	2.05	0.57
2:B:254:GLY:HA3	2:B:315:ARG:HA	1.86	0.57
3:D:271:TYR:OH	3:D:274:GLU:OE2	2.23	0.57
3:E:14:PHE:CZ	3:E:106:PRO:HB3	2.40	0.57
3:C:36:SER:HA	3:C:39:TRP:CD1	2.40	0.57
3:E:230:GLU:OE1	3:E:230:GLU:N	2.36	0.57
2:B:215:ASP:OD1	2:B:218:ARG:NH2	2.32	0.57
2:B:318:THR:HA	2:B:320:ARG:HH12	1.70	0.57
1:A:114:PRO:HG2	2:B:95:ALA:HB1	1.87	0.57
3:G:149:TRP:HE1	3:G:263:ALA:HB2	1.70	0.57
3:D:16:ARG:HH11	4:I:12:U:H5''	1.70	0.56
3:D:187:LYS:HD3	3:D:187:LYS:N	2.20	0.56
3:E:225:VAL:HG23	3:E:227:PRO:HD3	1.87	0.56
3:F:55:ASN:OD1	3:F:55:ASN:N	2.38	0.56
3:C:22:ASP:OD1	3:C:257:SER:N	2.38	0.56
3:F:17:LYS:HE3	3:F:103:ALA:HA	1.87	0.56
3:F:50:ARG:HE	3:F:74:PRO:HG2	1.70	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:189:ASP:OD1	3:F:190:ALA:N	2.37	0.56
3:G:185:ASP:OD1	3:G:185:ASP:N	2.36	0.56
1:A:367:GLN:NE2	2:B:246:GLY:HA2	2.21	0.56
3:E:122:VAL:O	3:E:126:VAL:HG22	2.05	0.56
3:G:134:LEU:HD21	3:G:324:HIS:HB3	1.87	0.56
1:A:279:ILE:HD12	1:A:302:TRP:HD1	1.70	0.56
2:B:42:HIS:ND1	4:I:1:C:OP3	2.39	0.56
3:E:141:ASN:ND2	3:E:264:LEU:O	2.39	0.56
3:G:140:HIS:HD2	3:G:186:PHE:CD1	2.23	0.56
1:A:258:ARG:O	1:A:262:GLN:HG2	2.07	0.55
3:G:14:PHE:HB2	3:G:333:GLY:HA2	1.87	0.55
3:G:76:LEU:HD23	4:I:27:A:H61	1.71	0.55
3:C:46:ALA:HB1	3:C:78:THR:HG22	1.87	0.55
3:C:179:LEU:HD23	3:C:179:LEU:H	1.71	0.55
3:G:150:ARG:NH1	4:I:23:A:OP1	2.40	0.55
3:D:283:GLU:CD	3:D:285:TYR:H	2.14	0.55
3:D:189:ASP:HB3	3:D:192:LEU:HB2	1.89	0.55
1:A:453:TRP:HZ3	1:A:457:LEU:HD22	1.72	0.55
1:A:234:PRO:O	1:A:238:VAL:HG12	2.07	0.55
2:B:204:THR:OG1	2:B:206:GLU:OE2	2.25	0.55
3:D:189:ASP:OD2	3:D:190:ALA:N	2.40	0.55
1:A:217:LEU:HD11	4:I:3:A:H5"	1.88	0.55
1:A:229:LEU:HD22	2:B:280:VAL:HG11	1.88	0.55
3:F:25:LEU:HD21	3:F:255:ILE:HG13	1.87	0.54
3:F:77:GLN:OE1	3:F:77:GLN:N	2.40	0.54
3:E:185:ASP:O	3:E:187:LYS:NZ	2.38	0.54
3:E:26:SER:N	3:E:92:LYS:O	2.39	0.54
1:A:459:LYS:O	1:A:463:MET:HG2	2.08	0.54
3:D:137:ARG:HA	3:D:140:HIS:ND1	2.23	0.54
1:A:389:SER:HB3	1:A:392:CYS:HB2	1.90	0.54
3:D:250:ARG:O	3:D:250:ARG:NH1	2.41	0.54
3:C:68:ASP:HA	3:C:71:ILE:HG12	1.89	0.54
3:C:137:ARG:HB2	3:C:267:ILE:HD12	1.90	0.54
3:D:67:LEU:O	3:D:71:ILE:HG12	2.08	0.54
3:F:60:LYS:HD3	3:F:60:LYS:N	2.23	0.53
3:G:174:TRP:HZ3	3:G:195:LEU:HD13	1.72	0.53
1:A:217:LEU:HD22	4:I:2:U:H5"	1.89	0.53
3:D:136:ARG:HH12	3:D:188:ALA:HA	1.73	0.53
3:D:248:SER:HA	3:D:253:ALA:HA	1.90	0.53
3:C:17:LYS:HG3	3:C:103:ALA:HB1	1.89	0.53
1:A:357:ILE:O	1:A:361:ARG:HG2	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:321:GLU:HA	3:G:324:HIS:ND1	2.23	0.53
3:C:265:ARG:NH2	3:C:282:VAL:HB	2.23	0.53
3:F:126:VAL:HA	3:F:130:GLY:HA2	1.91	0.53
3:G:122:VAL:O	3:G:126:VAL:HG23	2.09	0.53
2:B:319:PRO:HB2	2:B:323:LYS:HE3	1.90	0.53
3:E:106:PRO:HG3	3:E:118:LEU:HD13	1.90	0.53
3:G:199:ILE:O	3:G:203:LEU:HD12	2.08	0.53
2:B:126:ILE:O	2:B:130:VAL:HG22	2.09	0.53
3:D:193:ASP:O	3:D:197:GLU:HG2	2.09	0.53
3:G:229:GLN:OE1	4:I:21:U:H5''	2.09	0.53
3:D:166:ARG:HA	3:D:166:ARG:NE	2.24	0.53
3:G:149:TRP:NE1	3:G:263:ALA:HB2	2.24	0.52
1:A:342:THR:HG23	2:B:241:VAL:HB	1.91	0.52
3:E:115:ARG:HA	3:E:118:LEU:HD12	1.90	0.52
3:D:271:TYR:OH	3:D:278:GLY:O	2.27	0.52
3:D:283:GLU:HG2	3:D:284:PRO:HD2	1.91	0.52
3:F:304:PHE:HE1	3:F:329:ASN:HD22	1.56	0.52
3:G:141:ASN:HD21	3:G:266:THR:C	2.17	0.52
2:B:144:ILE:HD12	2:B:144:ILE:H	1.74	0.52
3:C:20:PRO:HB3	3:C:95:PHE:CE1	2.45	0.52
3:E:307:LEU:HD21	3:E:322:GLN:HB3	1.90	0.52
3:G:157:ALA:HA	3:G:179:LEU:HD21	1.90	0.52
1:A:350:THR:HG21	1:A:357:ILE:HG21	1.91	0.52
2:B:64:HIS:NE2	2:B:108:SER:OG	2.40	0.52
3:D:15:GLU:HA	4:I:12:U:H5'	1.92	0.52
3:D:184:ARG:HH22	3:D:279:PRO:HD2	1.74	0.52
3:F:16:ARG:HH21	4:I:24:U:P	2.32	0.52
1:A:355:LEU:H	1:A:355:LEU:HD23	1.75	0.52
3:C:22:ASP:OD2	3:C:247:TYR:OH	2.27	0.52
3:F:63:ASP:HB3	3:F:66:LYS:NZ	2.26	0.52
1:A:241:VAL:O	1:A:245:ILE:HG12	2.10	0.51
1:A:463:MET:O	1:A:467:ILE:HG13	2.09	0.51
3:D:229:GLN:HE21	4:I:15:A:H2'	1.75	0.51
3:F:167:GLN:HA	3:G:218:ARG:HH21	1.76	0.51
3:F:14:PHE:HB2	3:F:333:GLY:HA2	1.91	0.51
3:F:134:LEU:HG	3:F:324:HIS:CD2	2.40	0.51
4:I:21:U:O2'	4:I:23:A:OP2	2.27	0.51
3:D:146:ARG:HH12	3:D:184:ARG:NH2	2.08	0.51
1:A:370:ASP:OD2	2:B:294:ARG:NH2	2.43	0.51
3:C:91:LEU:HD23	3:C:151:ASN:HD21	1.76	0.51
3:G:142:LEU:O	3:G:160:VAL:HG11	2.10	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:173:GLN:CB	2:B:174:ARG:HH21	2.24	0.51
1:A:243:GLY:HA2	1:A:246:ARG:HD2	1.92	0.51
3:D:165:ILE:HA	3:D:170:VAL:HA	1.93	0.51
3:C:189:ASP:HB2	3:C:192:LEU:HB2	1.92	0.51
3:E:118:LEU:O	3:E:122:VAL:HG13	2.11	0.51
3:F:142:LEU:HD21	3:F:162:ILE:HD11	1.93	0.50
3:E:145:ALA:O	3:E:148:LEU:HB3	2.11	0.50
1:A:377:ALA:HB1	2:B:182:PRO:HB3	1.94	0.50
3:E:111:ASP:HB3	3:E:114:TYR:HB3	1.94	0.50
3:F:94:ARG:HG2	3:F:214:VAL:HG22	1.94	0.50
3:D:33:ARG:NH2	3:D:159:GLU:HB3	2.19	0.50
3:D:98:ARG:CZ	3:D:98:ARG:HA	2.40	0.50
3:E:275:ASP:OD1	3:E:275:ASP:N	2.44	0.50
3:F:196:ALA:HA	3:F:199:ILE:HD12	1.93	0.50
3:G:114:TYR:HA	3:G:117:LYS:HE3	1.92	0.50
2:B:206:GLU:CD	2:B:206:GLU:H	2.19	0.50
3:D:16:ARG:NH1	4:I:12:U:OP1	2.43	0.50
1:A:243:GLY:O	1:A:246:ARG:HG2	2.12	0.50
3:C:265:ARG:NH1	3:C:282:VAL:H	2.08	0.50
3:D:250:ARG:HH12	3:D:251:ASP:HB2	1.77	0.50
2:B:138:ARG:HD3	4:I:5:G:OP1	2.12	0.49
3:F:159:GLU:HB3	3:F:216:PHE:HB2	1.94	0.49
3:C:148:LEU:HD13	3:C:151:ASN:OD1	2.12	0.49
3:F:36:SER:O	3:F:92:LYS:NZ	2.44	0.49
3:F:117:LYS:O	3:F:121:THR:HG23	2.11	0.49
3:E:9:ALA:HB1	3:E:110:ASN:HB3	1.93	0.49
3:G:28:GLY:HA3	3:G:39:TRP:CE2	2.48	0.49
1:A:269:HIS:ND1	1:A:270:GLY:O	2.44	0.49
2:B:244:LYS:HZ3	2:B:248:LEU:H	1.61	0.49
3:D:250:ARG:NH1	3:D:251:ASP:HB2	2.27	0.49
3:E:164:HIS:HE1	3:E:209:VAL:HG13	1.78	0.49
3:E:256:HIS:ND1	3:F:47:LYS:HD2	2.27	0.49
1:A:109:LEU:HD21	1:A:232:LEU:HD22	1.94	0.49
3:C:283:GLU:HG2	3:C:284:PRO:HD2	1.95	0.49
3:F:122:VAL:O	3:F:126:VAL:HG13	2.13	0.49
2:B:86:ASN:HD21	2:B:95:ALA:HB3	1.77	0.49
3:C:136:ARG:HH21	3:C:140:HIS:CE1	2.30	0.49
2:B:65:ARG:HD2	2:B:66:PHE:N	2.27	0.49
3:F:133:GLU:HB3	3:F:324:HIS:NE2	2.27	0.49
1:A:447:GLU:O	1:A:451:ARG:HG2	2.13	0.49
3:D:166:ARG:HH12	3:D:210:LEU:H	1.59	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:307:LEU:HD21	2:B:29:TRP:CZ3	2.48	0.49
2:B:173:GLN:HB3	2:B:174:ARG:HH21	1.78	0.49
3:C:7:ASN:OD1	3:C:8:THR:N	2.46	0.49
3:D:26:SER:O	3:D:92:LYS:N	2.43	0.49
3:G:136:ARG:HG2	3:G:140:HIS:CE1	2.47	0.49
3:F:51:GLY:HA2	4:I:31:A:H5'	1.94	0.48
3:F:96:THR:HG21	3:G:221:ASP:HB2	1.94	0.48
3:C:111:ASP:OD1	3:C:112:ALA:N	2.46	0.48
3:F:115:ARG:O	3:F:119:LEU:HD23	2.11	0.48
3:F:230:GLU:N	3:F:245:THR:O	2.46	0.48
3:G:229:GLN:HA	3:G:246:LEU:HA	1.94	0.48
1:A:367:GLN:HA	1:A:370:ASP:OD2	2.12	0.48
3:C:291:GLN:OE1	3:C:293:LYS:HB3	2.13	0.48
3:D:265:ARG:HH21	3:D:332:ARG:HH11	1.60	0.48
3:E:16:ARG:NH1	3:E:20:PRO:HD2	2.28	0.48
3:G:76:LEU:HD23	4:I:27:A:N6	2.28	0.48
3:G:161:ARG:HD2	3:G:216:PHE:HE2	1.76	0.48
2:B:171:LYS:HE3	2:B:171:LYS:HA	1.95	0.48
3:D:265:ARG:HE	3:D:282:VAL:HB	1.79	0.48
1:A:277:LEU:HG	1:A:302:TRP:HB3	1.96	0.48
1:A:353:ASN:O	1:A:357:ILE:HG12	2.13	0.48
1:A:384:PRO:HG3	1:A:405:LEU:HD12	1.95	0.48
2:B:244:LYS:HG3	2:B:245:PRO:HD2	1.95	0.48
2:B:248:LEU:HD12	2:B:286:LEU:HB3	1.96	0.48
3:D:50:ARG:HD2	4:I:21:U:O4'	2.14	0.48
3:D:288:VAL:O	3:D:292:GLY:N	2.45	0.48
3:E:296:ARG:HH11	3:E:302:LEU:HB3	1.79	0.48
3:G:179:LEU:HD12	3:G:179:LEU:H	1.79	0.48
2:B:238:SER:OG	2:B:240:GLN:NE2	2.37	0.48
1:A:244:GLN:OE1	1:A:245:ILE:HD13	2.14	0.48
1:A:258:ARG:NE	1:A:258:ARG:HA	2.29	0.48
1:A:283:GLY:HA3	1:A:287:PRO:HB3	1.94	0.47
3:D:96:THR:HG22	3:D:212:GLU:HA	1.96	0.47
3:D:98:ARG:CZ	3:D:210:LEU:HA	2.44	0.47
3:D:265:ARG:NH2	3:D:282:VAL:O	2.47	0.47
1:A:219:PHE:CE1	2:B:305:HIS:CE1	3.02	0.47
1:A:335:GLU:HG2	1:A:336:VAL:N	2.28	0.47
2:B:285:SER:OG	2:B:286:LEU:N	2.47	0.47
3:D:17:LYS:HG2	3:D:331:ILE:HG12	1.95	0.47
3:G:93:VAL:HG21	3:G:148:LEU:HD21	1.96	0.47
1:A:264:LYS:HD2	1:A:264:LYS:HA	1.75	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:258:GLN:HB3	4:I:14:C:H5''	1.96	0.47
3:E:164:HIS:CE1	3:E:198:LEU:HD21	2.49	0.47
3:F:284:PRO:HA	3:F:329:ASN:HD21	1.80	0.47
3:G:17:LYS:HG3	3:G:103:ALA:HA	1.96	0.47
3:G:268:ASP:HB3	3:G:280:ILE:HG12	1.96	0.47
3:G:318:PRO:O	3:G:323:GLN:NE2	2.45	0.47
3:C:296:ARG:CZ	3:C:307:LEU:HD11	2.44	0.47
3:D:117:LYS:HZ1	3:D:312:VAL:HA	1.79	0.47
3:F:83:ASN:ND2	3:F:224:GLU:HB2	2.30	0.47
3:G:57:LEU:HD12	3:G:61:ASP:HB3	1.96	0.47
1:A:242:HIS:CD2	1:A:297:ARG:HD2	2.49	0.47
3:D:19:ASP:HB2	3:D:98:ARG:HB2	1.97	0.47
3:G:137:ARG:HA	3:G:140:HIS:CD2	2.50	0.47
3:C:271:TYR:OH	3:C:274:GLU:OE2	2.32	0.47
3:E:146:ARG:O	3:E:146:ARG:HD3	2.15	0.47
3:E:285:TYR:OH	3:F:57:LEU:HB2	2.15	0.47
3:F:167:GLN:H	3:G:156:GLU:CD	2.23	0.47
3:G:94:ARG:NH2	3:G:96:THR:HG1	2.08	0.47
2:B:12:LEU:HB2	2:B:15:LEU:HD11	1.96	0.46
3:C:268:ASP:HA	3:C:270:TRP:CZ3	2.50	0.46
3:F:298:PRO:HG2	3:F:299:LYS:HD2	1.97	0.46
3:G:140:HIS:CE1	3:G:192:LEU:HD11	2.50	0.46
1:A:363:GLN:HE22	1:A:367:GLN:HG3	1.81	0.46
3:C:42:VAL:HG13	3:C:253:ALA:HB3	1.97	0.46
3:G:258:GLN:HB2	4:I:19:U:H3'	1.97	0.46
3:E:63:ASP:HB3	3:E:66:LYS:HB2	1.96	0.46
3:G:230:GLU:HB2	3:G:245:THR:HG23	1.97	0.46
3:G:117:LYS:O	3:G:120:GLN:HG2	2.16	0.46
3:G:310:ASN:OD1	3:G:316:GLU:HB2	2.16	0.46
3:D:297:GLN:OE1	3:D:297:GLN:N	2.45	0.46
1:A:462:LYS:O	1:A:466:GLU:HG2	2.16	0.46
3:C:9:ALA:HB1	3:C:110:ASN:HB3	1.98	0.46
3:F:318:PRO:O	3:F:323:GLN:NE2	2.49	0.46
3:G:265:ARG:O	3:G:282:VAL:HG23	2.16	0.46
2:B:253:ALA:HB2	2:B:285:SER:HB2	1.98	0.46
3:C:156:GLU:OE1	3:C:218:ARG:NE	2.43	0.46
3:D:229:GLN:HA	3:D:246:LEU:HA	1.97	0.46
1:A:267:TRP:CG	1:A:268:PRO:HD2	2.52	0.45
3:C:265:ARG:HH12	3:C:282:VAL:N	2.10	0.45
1:A:338:ARG:O	1:A:342:THR:OG1	2.31	0.45
3:D:149:TRP:HE1	3:D:263:ALA:HB2	1.81	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:283:GLU:N	3:F:283:GLU:OE1	2.50	0.45
1:A:344:ARG:HA	1:A:344:ARG:HD3	1.81	0.45
3:D:98:ARG:HH12	3:D:211:LEU:H	1.63	0.45
1:A:105:VAL:HA	1:A:122:HIS:HB2	1.99	0.45
3:C:36:SER:HA	3:C:39:TRP:NE1	2.30	0.45
3:D:50:ARG:HE	3:D:76:LEU:HD21	1.81	0.45
3:E:195:LEU:O	3:E:199:ILE:HG22	2.16	0.45
3:F:148:LEU:HD13	3:F:152:ARG:HA	1.98	0.45
3:G:162:ILE:HA	3:G:212:GLU:O	2.17	0.45
1:A:314:GLN:N	1:A:314:GLN:OE1	2.49	0.45
3:C:140:HIS:CE1	3:C:192:LEU:CD1	2.98	0.45
3:D:274:GLU:CD	3:D:278:GLY:H	2.22	0.45
3:E:13:ALA:H	3:E:108:ALA:HB3	1.81	0.45
3:C:50:ARG:NH2	3:C:74:PRO:HD2	2.31	0.45
3:D:99:VAL:O	3:D:100:LEU:HD23	2.16	0.45
3:G:318:PRO:HB2	3:G:322:GLN:HB2	1.97	0.45
3:G:307:LEU:HD12	3:G:307:LEU:HA	1.80	0.45
1:A:279:ILE:HD12	1:A:302:TRP:CD1	2.50	0.45
2:B:218:ARG:HG3	2:B:218:ARG:HH11	1.82	0.45
3:C:297:GLN:HG3	3:C:299:LYS:H	1.80	0.45
1:A:422:TRP:NE1	1:A:426:VAL:HB	2.32	0.45
3:C:95:PHE:CE1	3:C:260:ILE:HG21	2.52	0.45
3:C:175:ARG:HH22	3:C:177:ASP:CG	2.25	0.45
3:C:195:LEU:O	3:C:199:ILE:HG22	2.17	0.45
1:A:269:HIS:HA	2:B:223:PRO:HG3	1.98	0.45
2:B:69:GLN:HB3	2:B:102:ARG:HB2	1.98	0.45
3:G:135:ALA:HB1	3:G:199:ILE:HB	1.99	0.45
3:D:198:LEU:HD21	3:D:211:LEU:HD21	1.99	0.44
3:E:258:GLN:OE1	3:F:49:VAL:HG11	2.17	0.44
1:A:101:GLN:OE1	1:A:101:GLN:N	2.41	0.44
1:A:340:THR:O	1:A:344:ARG:HG2	2.18	0.44
3:C:30:TRP:NE1	3:C:218:ARG:HH11	2.14	0.44
1:A:449:GLU:O	1:A:452:GLN:HG3	2.17	0.44
3:F:332:ARG:HG2	3:F:333:GLY:O	2.16	0.44
3:G:10:SER:O	3:G:337:GLY:HA2	2.18	0.44
1:A:274:TYR:OH	2:B:214:LEU:HD12	2.17	0.44
2:B:18:GLN:NE2	2:B:19:ASN:HB2	2.32	0.44
3:C:13:ALA:HB3	3:C:108:ALA:HB3	1.99	0.44
3:C:21:SER:HB3	3:C:96:THR:H	1.83	0.44
3:D:293:LYS:HE2	3:G:112:ALA:H	1.83	0.44
2:B:258:LEU:H	2:B:280:VAL:HA	1.83	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:12:LEU:HA	3:F:108:ALA:O	2.18	0.44
3:F:3:LYS:HB3	3:F:4:GLN:H	1.62	0.44
3:G:189:ASP:OD1	3:G:190:ALA:N	2.51	0.44
1:A:272:SER:OG	2:B:220:ASN:OD1	2.24	0.44
3:C:145:ALA:HB3	3:C:152:ARG:HH21	1.83	0.44
3:C:270:TRP:HB3	3:C:321:GLU:HB3	2.00	0.44
3:G:174:TRP:HH2	3:G:198:LEU:HD22	1.83	0.44
3:G:199:ILE:HG22	3:G:203:LEU:HD11	2.00	0.44
3:D:283:GLU:HB3	3:D:286:GLY:H	1.83	0.43
3:E:125:TYR:CE2	3:E:327:ILE:HG13	2.53	0.43
1:A:346:PHE:O	1:A:350:THR:HG23	2.18	0.43
3:C:288:VAL:O	3:C:292:GLY:N	2.47	0.43
3:F:47:LYS:HA	3:F:47:LYS:HD3	1.88	0.43
3:F:162:ILE:HD11	3:F:213:VAL:HG13	2.00	0.43
3:F:299:LYS:HD2	3:F:299:LYS:N	2.33	0.43
3:D:293:LYS:HA	3:D:293:LYS:HD3	1.68	0.43
3:F:148:LEU:HD22	3:F:151:ASN:HB3	2.00	0.43
3:F:311:TRP:CD1	3:F:317:ALA:HA	2.53	0.43
2:B:173:GLN:OE1	2:B:174:ARG:NH2	2.52	0.43
3:C:26:SER:O	3:C:91:LEU:HD12	2.19	0.43
3:C:133:GLU:OE1	3:C:137:ARG:NH2	2.44	0.43
3:C:141:ASN:HD22	3:C:267:ILE:HG22	1.84	0.43
3:C:163:ASN:O	3:C:210:LEU:HD21	2.19	0.43
3:C:165:ILE:HD12	3:C:165:ILE:HA	1.87	0.43
3:G:63:ASP:HB3	3:G:66:LYS:HG2	2.00	0.43
3:G:259:LYS:HE3	4:I:20:C:H1'	1.98	0.43
2:B:168:GLN:OE1	2:B:168:GLN:HA	2.18	0.43
3:C:69:ALA:HA	3:C:72:GLN:HE22	1.82	0.43
3:C:140:HIS:HE1	3:C:192:LEU:HD13	1.80	0.43
3:C:162:ILE:HG12	3:C:212:GLU:O	2.18	0.43
3:D:50:ARG:HH21	3:D:76:LEU:HD11	1.84	0.43
3:C:159:GLU:OE2	3:C:161:ARG:NE	2.35	0.43
3:E:209:VAL:O	3:E:210:LEU:HD23	2.19	0.43
1:A:457:LEU:HD12	1:A:457:LEU:HA	1.94	0.43
3:G:296:ARG:HB3	3:G:303:ASP:HA	2.00	0.43
3:D:147:PHE:O	3:D:149:TRP:HD1	2.01	0.43
1:A:394:LEU:HD12	1:A:395:HIS:H	1.84	0.43
2:B:17:ILE:HG22	2:B:20:ALA:HB2	2.01	0.43
3:D:18:LEU:HD12	3:D:18:LEU:O	2.19	0.43
3:F:156:GLU:HB3	3:F:218:ARG:HE	1.84	0.43
3:G:26:SER:N	3:G:92:LYS:O	2.52	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:184:PHE:HA	2:B:292:PRO:HD3	2.01	0.42
3:C:21:SER:N	3:C:96:THR:O	2.49	0.42
3:C:49:VAL:HB	3:D:258:GLN:OE1	2.18	0.42
3:D:58:LYS:O	3:D:62:ARG:HG2	2.19	0.42
1:A:237:LEU:HD21	2:B:27:LEU:HD11	2.02	0.42
1:A:379:LEU:HD23	1:A:386:TRP:CZ2	2.54	0.42
2:B:184:PHE:HB2	2:B:289:TRP:HE3	1.84	0.42
3:D:270:TRP:HB3	3:D:321:GLU:HG3	2.02	0.42
3:D:282:VAL:O	3:D:332:ARG:NH1	2.52	0.42
3:F:20:PRO:HB3	3:F:97:LEU:HD13	2.01	0.42
1:A:259:GLU:O	1:A:263:GLN:HG2	2.19	0.42
3:D:267:ILE:HG13	3:D:270:TRP:CH2	2.55	0.42
3:D:274:GLU:OE1	3:D:278:GLY:N	2.43	0.42
3:F:159:GLU:O	3:F:216:PHE:N	2.52	0.42
3:F:258:GLN:NE2	3:G:49:VAL:HG12	2.34	0.42
3:G:12:LEU:HD12	3:G:109:CYS:HB2	2.01	0.42
3:G:296:ARG:HD3	3:G:302:LEU:HG	2.01	0.42
3:C:335:VAL:HG12	4:I:6:A:H2	1.83	0.42
3:C:69:ALA:HA	3:C:72:GLN:NE2	2.34	0.42
3:E:26:SER:HB2	3:E:92:LYS:HB3	2.00	0.42
3:E:199:ILE:O	3:E:203:LEU:HG	2.18	0.42
2:B:244:LYS:NZ	2:B:248:LEU:H	2.17	0.42
1:A:379:LEU:HD22	1:A:402:LEU:HD13	2.02	0.42
3:F:96:THR:OG1	3:G:223:GLN:NE2	2.44	0.42
3:F:166:ARG:HA	3:F:166:ARG:HD3	1.82	0.42
3:G:26:SER:HB2	3:G:92:LYS:HG2	2.02	0.42
2:B:9:LEU:C	2:B:10:LEU:HD23	2.45	0.42
2:B:9:LEU:HD12	2:B:110:LEU:HD22	2.01	0.42
3:F:256:HIS:HB3	3:F:258:GLN:CD	2.44	0.42
3:C:63:ASP:HB2	3:C:66:LYS:HG2	2.01	0.42
3:D:262:ASN:HB2	4:I:14:C:H5'	2.01	0.42
3:G:63:ASP:HB3	3:G:66:LYS:HE3	2.01	0.42
3:G:147:PHE:HA	3:G:263:ALA:CB	2.50	0.42
3:C:83:ASN:OD1	3:C:83:ASN:C	2.62	0.41
3:E:36:SER:HA	3:E:39:TRP:CD1	2.55	0.41
1:A:211:HIS:CE1	1:A:213:LEU:HD23	2.55	0.41
3:C:270:TRP:CD1	3:C:321:GLU:HB3	2.54	0.41
3:F:123:ALA:HA	3:F:126:VAL:HG22	2.01	0.41
3:G:195:LEU:HD12	3:G:195:LEU:O	2.20	0.41
1:A:108:THR:HG23	1:A:111:PRO:HD2	2.02	0.41
3:D:164:HIS:HB2	3:D:174:TRP:CZ3	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:68:ASP:O	3:G:71:ILE:HG22	2.21	0.41
3:G:68:ASP:HA	3:G:71:ILE:HG22	2.03	0.41
3:G:192:LEU:HD23	3:G:192:LEU:C	2.46	0.41
3:D:25:LEU:HD23	3:D:254:ALA:HA	2.02	0.41
3:D:60:LYS:HA	3:D:60:LYS:HD3	1.69	0.41
3:E:116:ASP:O	3:E:120:GLN:HG2	2.21	0.41
1:A:416:ARG:HA	1:A:416:ARG:NH1	2.35	0.41
3:D:164:HIS:HB2	3:D:174:TRP:HZ3	1.86	0.41
3:F:7:ASN:OD1	3:F:8:THR:N	2.53	0.41
3:F:33:ARG:NH2	3:F:216:PHE:CZ	2.88	0.41
3:F:102:GLY:O	3:F:105:THR:OG1	2.37	0.41
2:B:177:THR:HG22	2:B:298:LEU:HD21	2.02	0.41
2:B:244:LYS:HG2	2:B:246:GLY:O	2.21	0.41
1:A:276:ASN:HB2	1:A:305:ALA:HB2	2.02	0.41
2:B:125:GLU:O	2:B:128:ARG:HG2	2.21	0.41
3:C:271:TYR:CZ	3:C:274:GLU:HG2	2.55	0.41
3:G:140:HIS:CD2	3:G:186:PHE:CD1	3.07	0.41
3:D:89:ASP:N	3:D:89:ASP:OD1	2.54	0.41
3:E:259:LYS:NZ	4:I:32:A:O4'	2.53	0.41
3:F:8:THR:HG23	3:F:114:TYR:CE2	2.56	0.41
3:F:48:SER:HA	3:F:78:THR:HA	2.02	0.41
1:A:416:ARG:HA	1:A:416:ARG:HH11	1.86	0.41
2:B:213:LEU:HD12	2:B:213:LEU:HA	1.92	0.41
3:D:136:ARG:NH2	3:D:188:ALA:HA	2.31	0.41
3:F:12:LEU:HD21	3:F:14:PHE:HE2	1.85	0.41
1:A:232:LEU:O	4:I:3:A:N6	2.52	0.40
1:A:397:ALA:HB1	1:A:422:TRP:CZ2	2.56	0.40
3:C:21:SER:OG	3:C:22:ASP:N	2.54	0.40
3:E:259:LYS:HD2	3:E:259:LYS:HA	1.93	0.40
3:G:75:ASN:OD1	3:G:76:LEU:N	2.54	0.40
3:G:147:PHE:HA	3:G:263:ALA:HB1	2.02	0.40
2:B:69:GLN:HG2	2:B:82:ASN:HD22	1.85	0.40
1:A:387:SER:HB2	1:A:399:GLN:NE2	2.36	0.40
3:F:145:ALA:HB1	3:F:147:PHE:CE2	2.57	0.40
3:G:259:LYS:NZ	4:I:21:U:H5'	2.36	0.40
3:G:125:TYR:OH	3:G:324:HIS:HD2	2.05	0.40
1:A:146:ASP:HA	1:A:293:LEU:HD11	2.03	0.40
3:C:231:LEU:HD22	4:I:9:U:H5	1.86	0.40
3:D:26:SER:N	3:D:92:LYS:O	2.35	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	315/473 (67%)	308 (98%)	7 (2%)	0	100	100
2	B	325/327 (99%)	315 (97%)	10 (3%)	0	100	100
3	C	338/342 (99%)	324 (96%)	14 (4%)	0	100	100
3	D	338/342 (99%)	326 (96%)	12 (4%)	0	100	100
3	E	338/342 (99%)	327 (97%)	11 (3%)	0	100	100
3	F	338/342 (99%)	325 (96%)	13 (4%)	0	100	100
3	G	338/342 (99%)	328 (97%)	10 (3%)	0	100	100
All	All	2330/2510 (93%)	2253 (97%)	77 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	
1	A	266/394 (68%)	264 (99%)	2 (1%)	79	87
2	B	270/270 (100%)	267 (99%)	3 (1%)	70	82
3	C	271/273 (99%)	266 (98%)	5 (2%)	54	74
3	D	271/273 (99%)	267 (98%)	4 (2%)	60	77
3	E	271/273 (99%)	268 (99%)	3 (1%)	70	82
3	F	271/273 (99%)	267 (98%)	4 (2%)	60	77
3	G	271/273 (99%)	271 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	1891/2029 (93%)	1870 (99%)	21 (1%)	69 82

All (21) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	364	LEU
1	A	434	LEU
2	B	15	LEU
2	B	194	GLN
2	B	247	TRP
3	C	24	LEU
3	C	140	HIS
3	C	181	ILE
3	C	214	VAL
3	C	289	THR
3	D	14	PHE
3	D	18	LEU
3	D	25	LEU
3	D	264	LEU
3	E	25	LEU
3	E	30	TRP
3	E	289	THR
3	F	55	ASN
3	F	232	ILE
3	F	257	SER
3	F	331	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	310	HIS
1	A	363	GLN
1	A	374	HIS
3	C	140	HIS
3	C	144	ASN
3	C	208	HIS
3	C	241	GLN
3	C	256	HIS
3	C	262	ASN
3	D	223	GLN
3	D	229	GLN

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Mol	Chain	Res	Type
3	E	164	HIS
3	F	310	ASN
3	F	324	HIS
3	F	329	ASN
3	G	140	HIS
3	G	256	HIS
3	G	258	GLN
3	G	324	HIS

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
4	I	36/54 (66%)	23 (63%)	0

All (23) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
4	I	2	U
4	I	3	A
4	I	4	A
4	I	5	G
4	I	7	A
4	I	8	A
4	I	9	U
4	I	10	A
4	I	11	G
4	I	14	C
4	I	15	A
4	I	16	G
4	I	22	U
4	I	24	U
4	I	26	U
4	I	27	A
4	I	28	G
4	I	29	A
4	I	30	G
4	I	31	A
4	I	32	A
4	I	36	U
4	I	37	C

There are no RNA pucker outliers to report.

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.

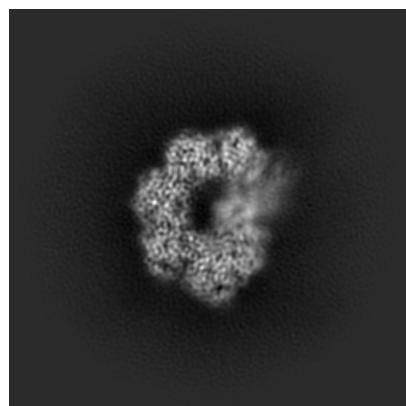
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-61699. These allow visual inspection of the internal detail of the map and identification of artifacts.

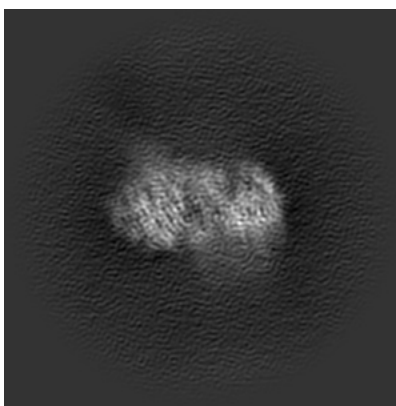
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

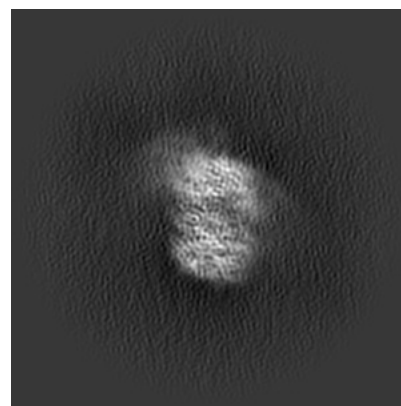
6.1.1 Primary map



X

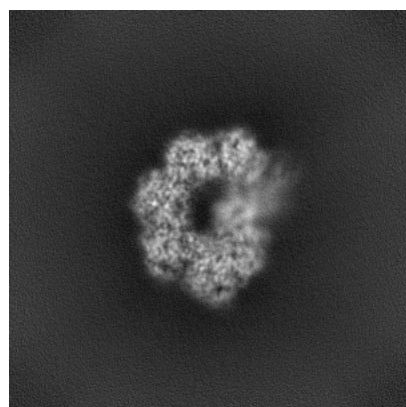


Y

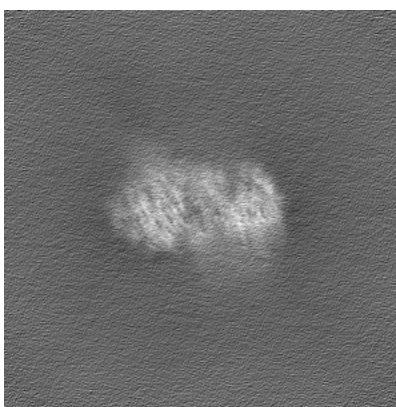


Z

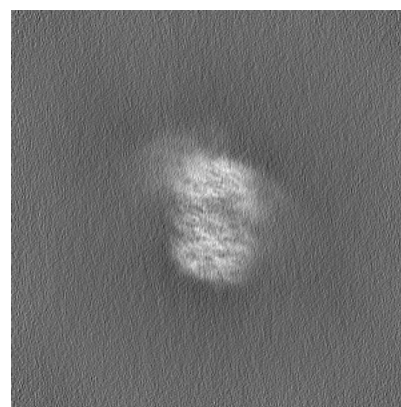
6.1.2 Raw map



X



Y

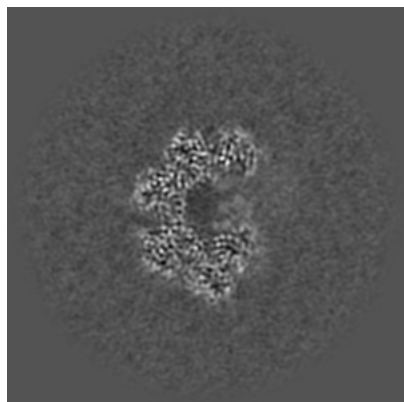


Z

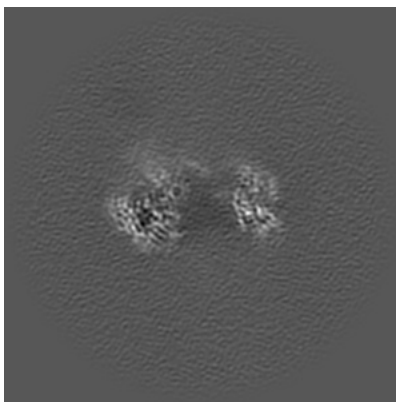
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

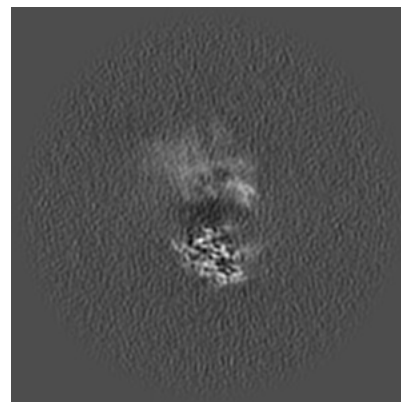
6.2.1 Primary map



X Index: 180

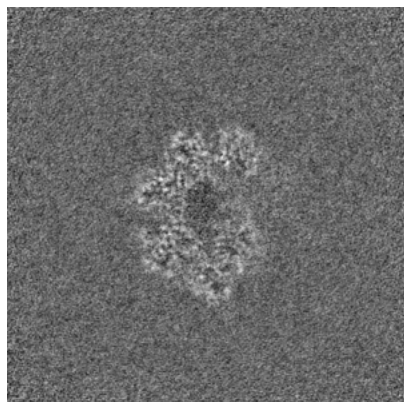


Y Index: 180

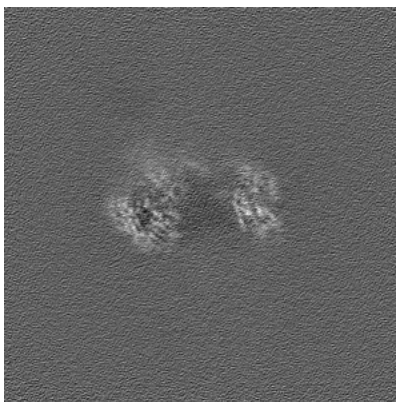


Z Index: 180

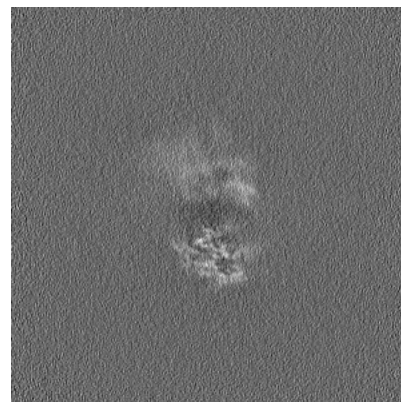
6.2.2 Raw map



X Index: 180



Y Index: 180

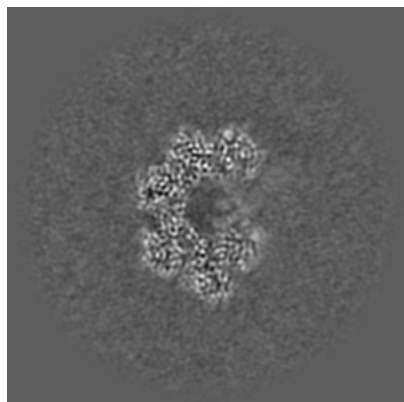


Z Index: 180

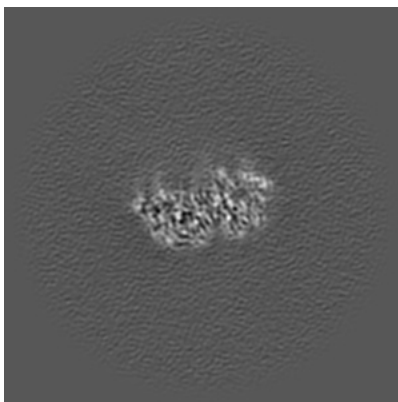
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

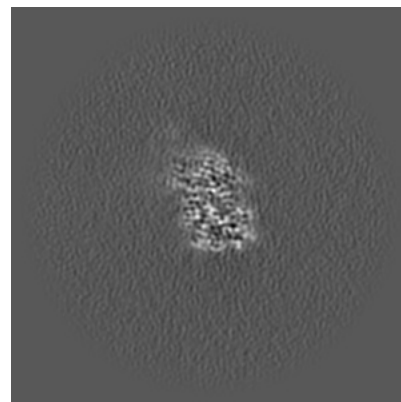
6.3.1 Primary map



X Index: 177

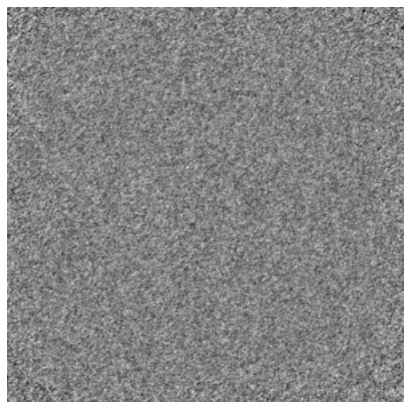


Y Index: 145

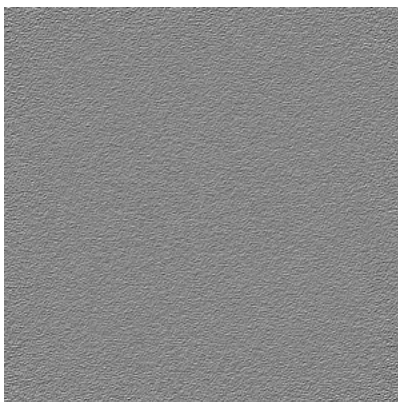


Z Index: 228

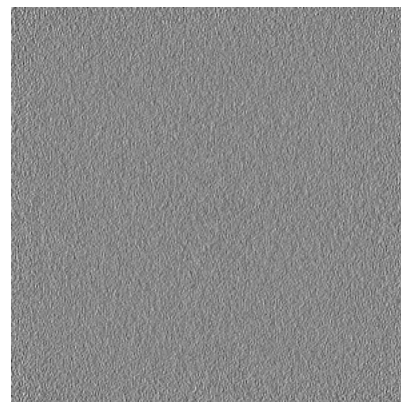
6.3.2 Raw map



X Index: 0



Y Index: 0

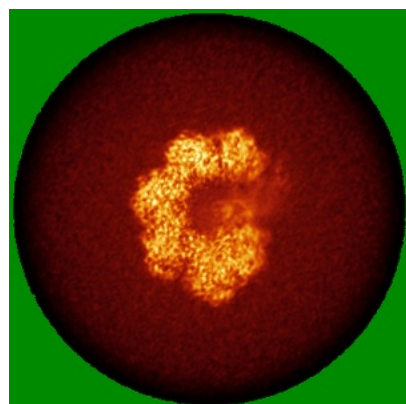


Z Index: 359

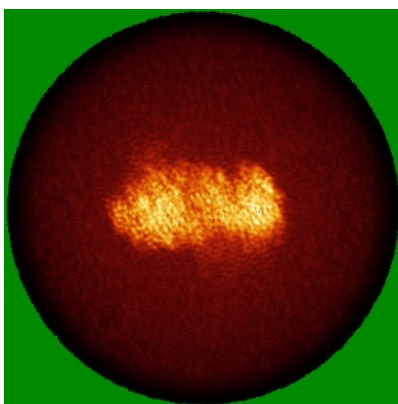
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

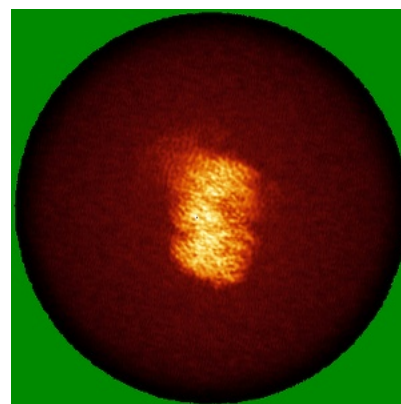
6.4.1 Primary map



X

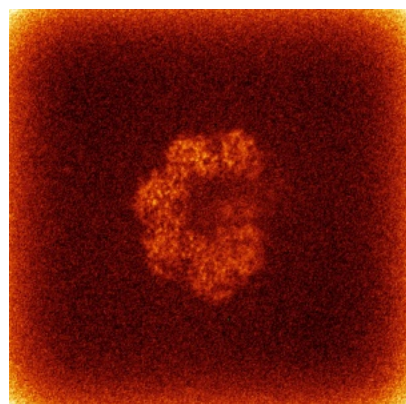


Y

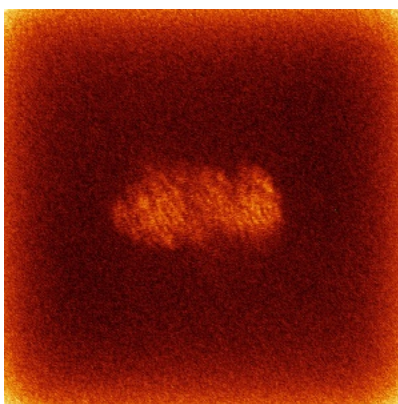


Z

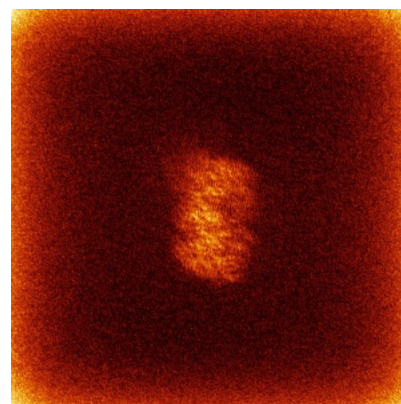
6.4.2 Raw map



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.

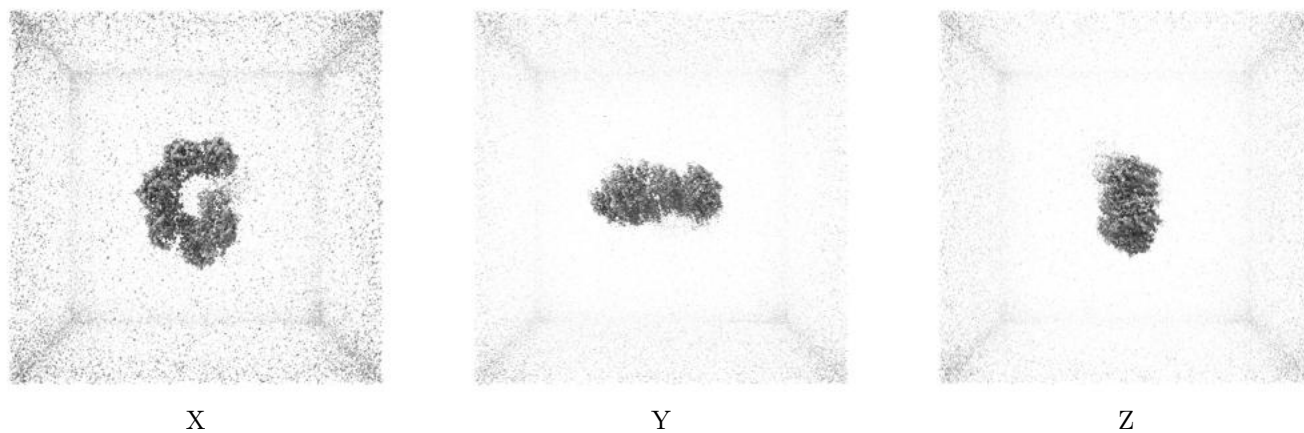
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.22. 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



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.

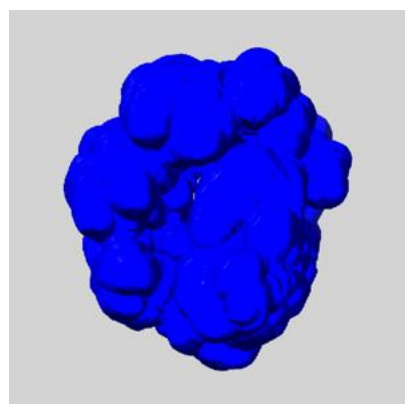
6.6 Mask visualisation [i](#)

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

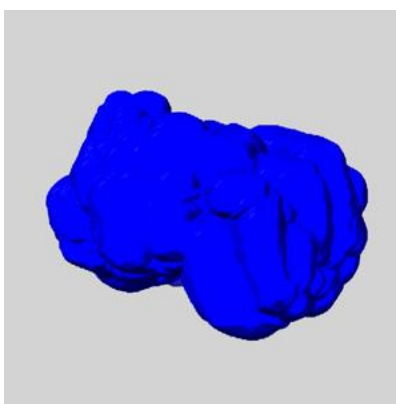
A mask typically either:

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

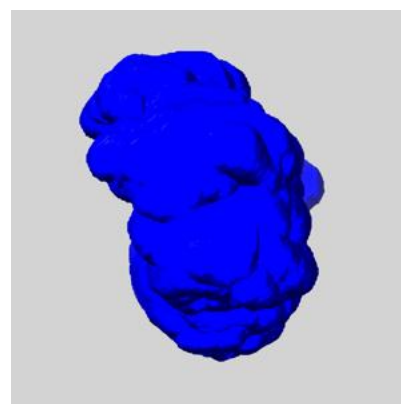
6.6.1 emd_61699_msk_1.map [i](#)



X



Y

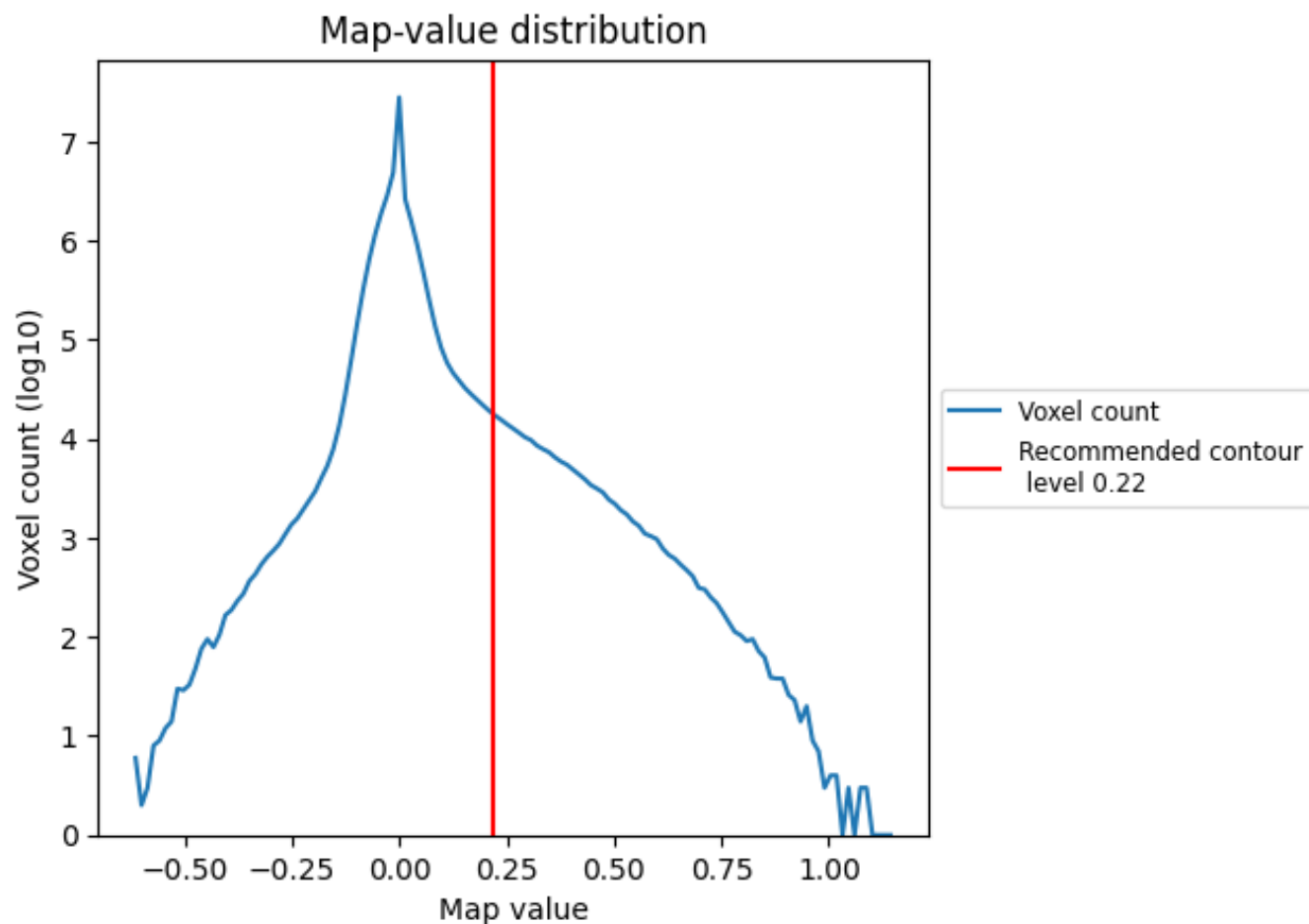


Z

7 Map analysis [i](#)

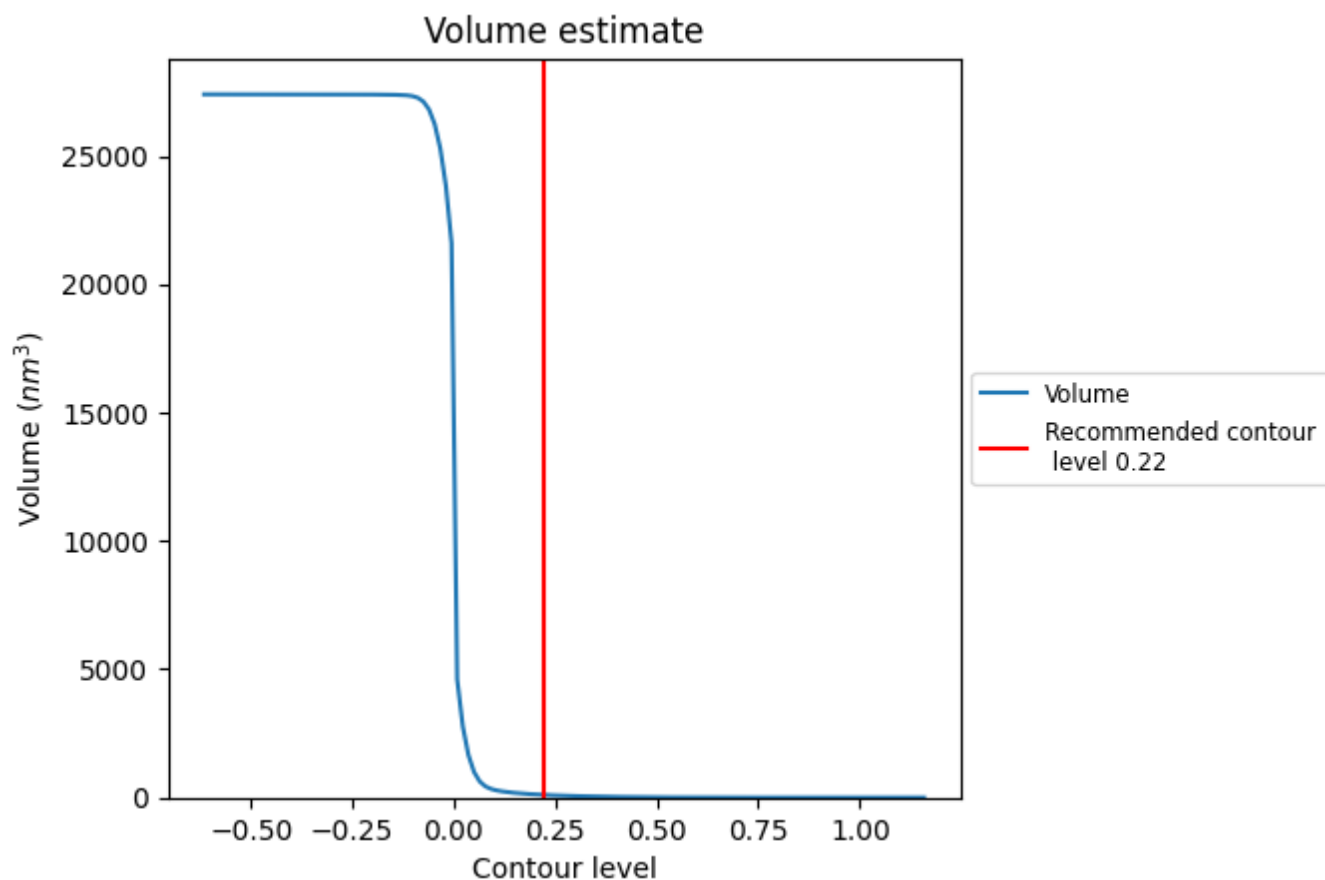
This section contains the results of statistical analysis of the map.

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.

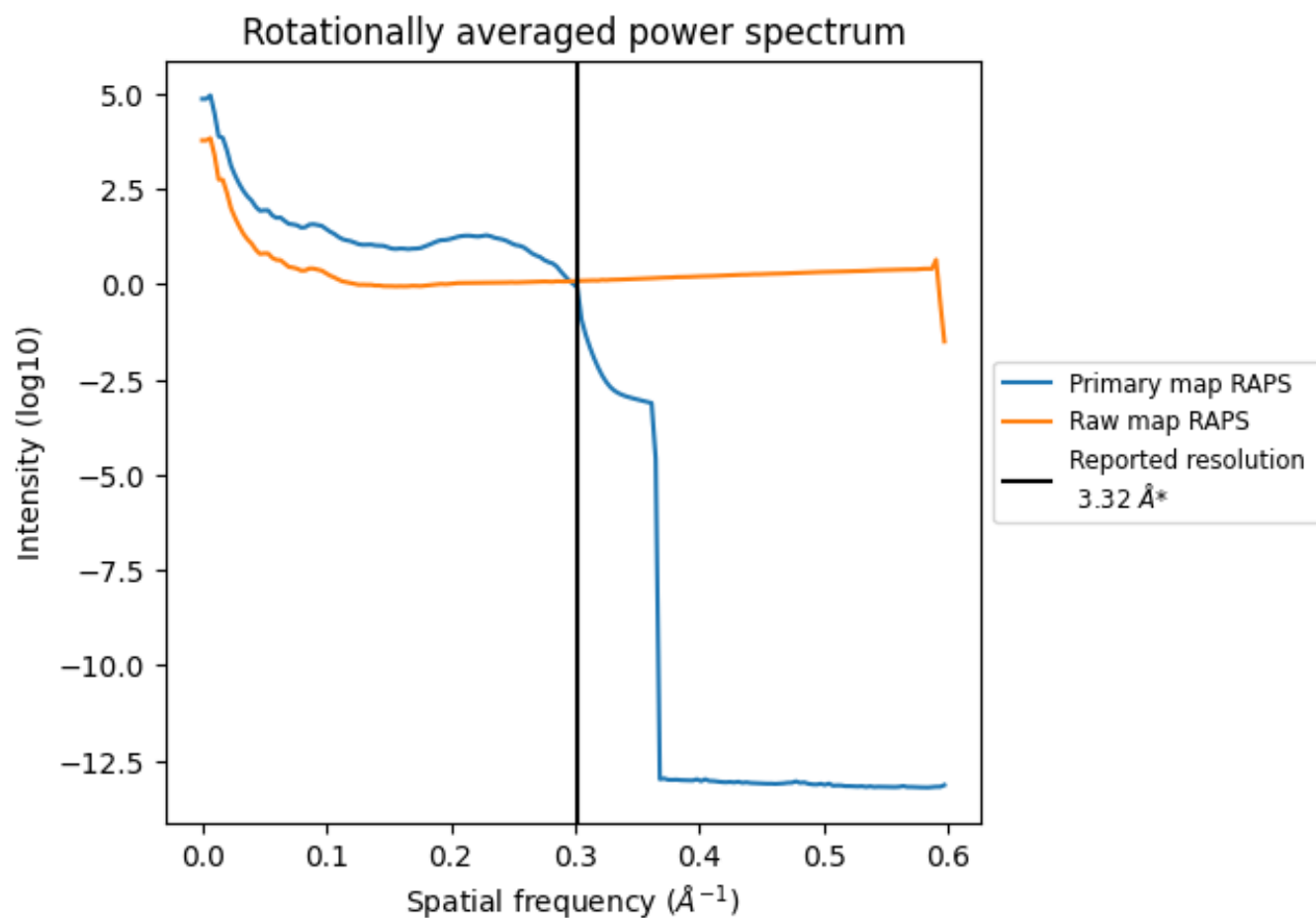
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 105 nm³; this corresponds to an approximate mass of 95 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 ⓘ

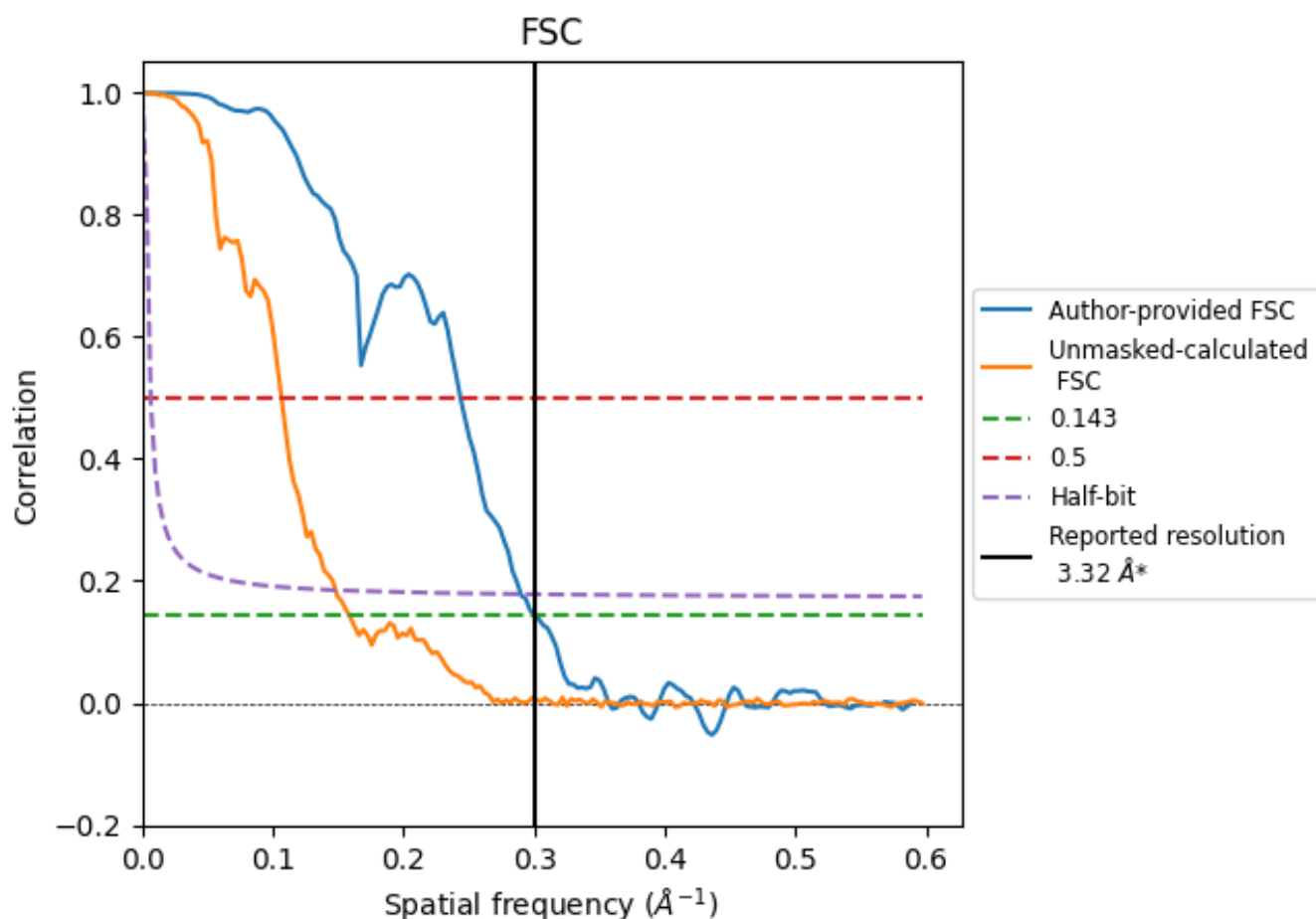


*Reported resolution corresponds to spatial frequency of 0.301 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.301 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

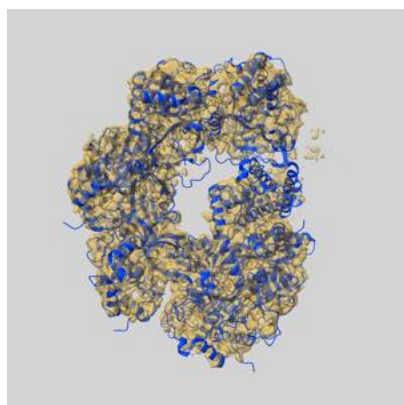
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.32	-	-
Author-provided FSC curve	3.32	4.10	3.45
Unmasked-calculated*	6.31	9.37	6.76

*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 6.31 differs from the reported value 3.32 by more than 10 %

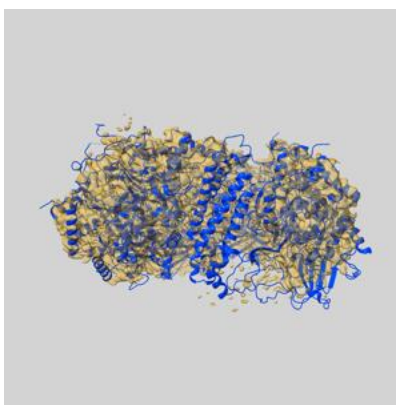
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-61699 and PDB model 9JPG. Per-residue inclusion information can be found in section [3](#) on page [7](#).

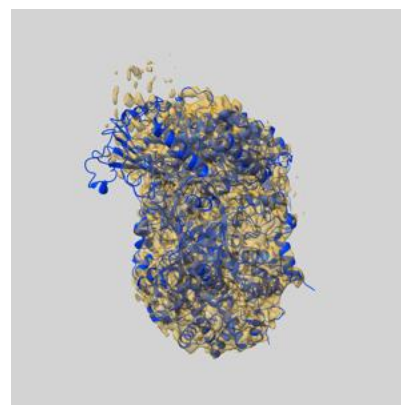
9.1 Map-model overlay [i](#)



X



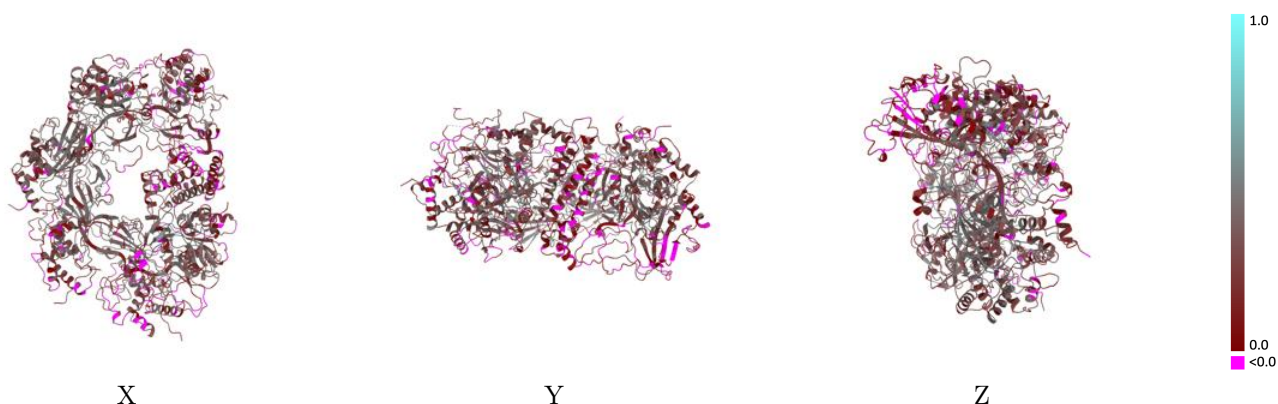
Y



Z

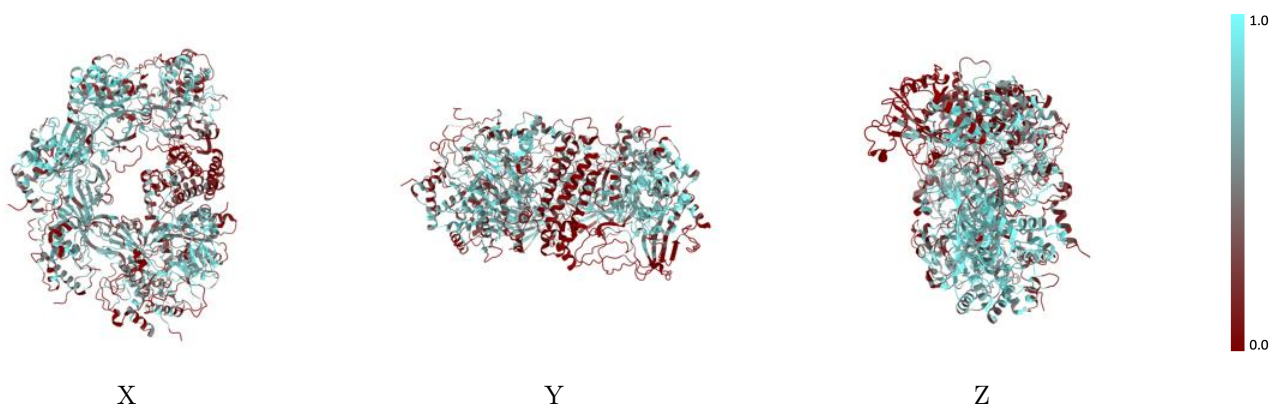
The images above show the 3D surface view of the map at the recommended contour level 0.22 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



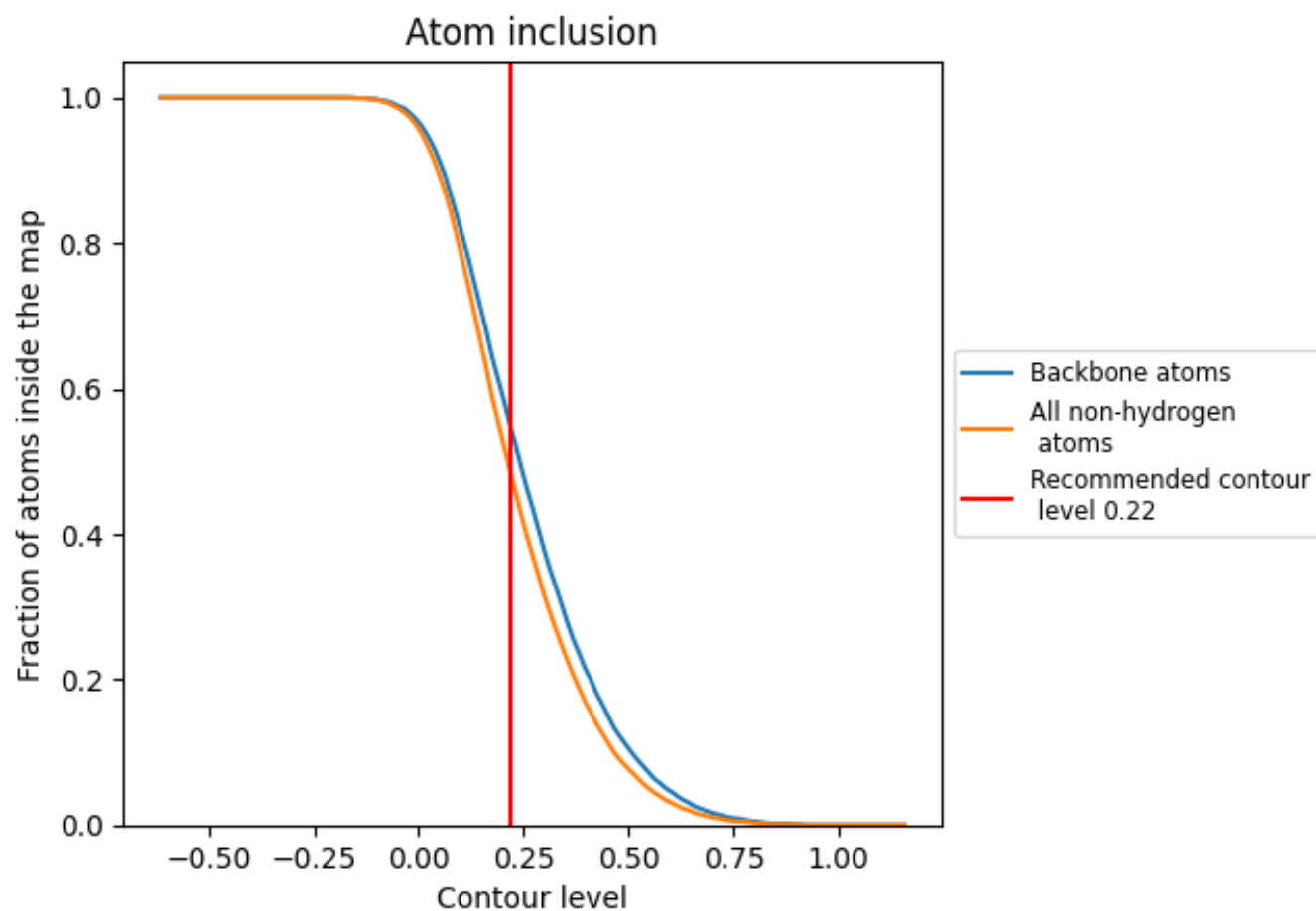
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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](#)



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 (0.22).

9.4 Atom inclusion [i](#)



At the recommended contour level, 55% of all backbone atoms, 48% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.22) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4820	0.2660
A	0.2610	0.1930
B	0.4870	0.2790
C	0.4850	0.2590
D	0.5480	0.2830
E	0.3610	0.2050
F	0.5970	0.3200
G	0.6090	0.3300
I	0.5460	0.2390

1.0

0.0

<0.0