



wwPDB EM Validation Summary Report ⓘ

Nov 14, 2022 – 07:31 PM EST

PDB ID : 7KEK
EMDB ID : EMD-22840
Title : Structure of the free outer-arm dynein in pre-parallel state
Authors : Rao, Q.; Zhang, K.
Deposited on : 2020-10-11
Resolution : 8.00 Å (reported)

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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.dev43
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.2

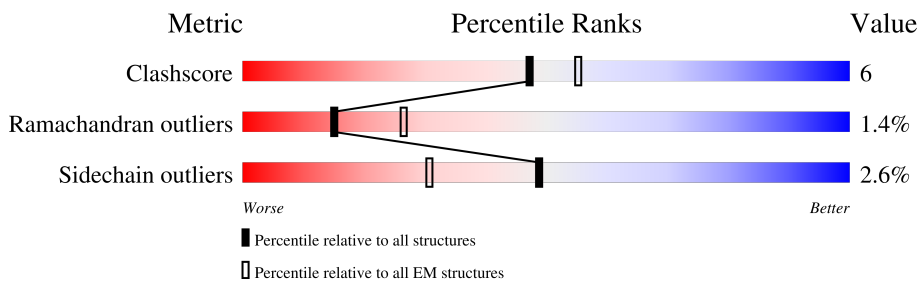
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 8.00 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

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	4620	
2	C	4168	
3	Q	202	
4	B	4595	
5	I	110	
6	H	92	
7	G	159	
8	F	133	

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Mol	Chain	Length	Quality of chain
9	N	117	
10	O	132	
11	E	670	
12	D	667	
13	P	122	
14	L	111	
15	K	93	
16	J	111	
17	M	87	

2 Entry composition i

There are 20 unique types of molecules in this entry. The entry contains 117936 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 Dynein alpha heavy chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	4443	33894	21519	5788	6429	158	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	4488	LYS	GLY	conflict	UNP Q22A67

- Molecule 2 is a protein called Dynein gamma heavy chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	C	3943	30436	19390	5162	5735	149	0	0

- Molecule 3 is a protein called Dynein light chain 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	Q	192	1002	607	202	193	2	0

- Molecule 4 is a protein called Dynein beta heavy chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	B	4516	34604	21978	5928	6547	151	0	0

- Molecule 5 is a protein called Dynein light chain LC8_1a (LC10).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	I	106	827	526	134	161	6	0	0

- Molecule 6 is a protein called Dynein light chain LC8_1b (DLC82).

Mol	Chain	Residues	Atoms					AltConf	Trace
6	H	91	Total	C	N	O	S	0	0
			750	483	124	139	4		

- Molecule 7 is a protein called Dynein light chain roadblock LC7B.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	96	Total	C	N	O	S	0	0
			749	471	129	148	1		

- Molecule 8 is a protein called Dynein light chain roadblock LC7A.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	F	110	Total	C	N	O	S	0	0
			863	544	152	165	2		

- Molecule 9 is a protein called Dynein light chain Tctex_b.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	N	114	Total	C	N	O	S	0	0
			855	543	143	166	3		

- Molecule 10 is a protein called Dynein light chain Tctex_a (LC2A).

Mol	Chain	Residues	Atoms					AltConf	Trace
10	O	120	Total	C	N	O	S	0	0
			986	634	172	177	3		

- Molecule 11 is a protein called Dynein intermediate chain DIC3.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	E	555	Total	C	N	O	S	0	0
			4423	2786	759	856	22		

- Molecule 12 is a protein called Dynein intermediate chain DIC2.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	D	579	Total	C	N	O	S	0	0
			4664	2964	787	883	30		

- Molecule 13 is a protein called Thioredoxin LC3BL.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
13	P	109	541	323	109	109	0	0

- Molecule 14 is a protein called Dynein light chain LC8_3b.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	L	98	783	511	132	137	3	0	0

- Molecule 15 is a protein called Dynein light chain LC8_2a (LC8E).

Mol	Chain	Residues	Atoms				AltConf	Trace	
			Total	C	N	O			S
15	K	90	754	489	124	137	4	0	0

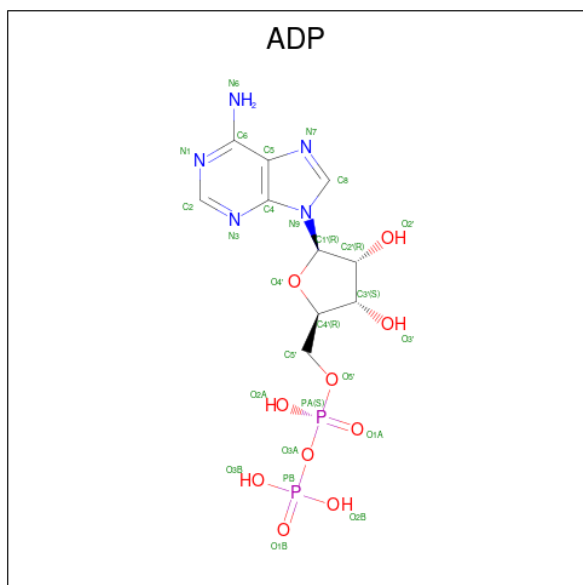
- Molecule 16 is a protein called Dynein light chain LC8_2b.

Mol	Chain	Residues	Atoms				AltConf	Trace	
			Total	C	N	O			S
16	J	95	806	527	135	140	4	0	0

- Molecule 17 is a protein called Dynein light chain LC8_3a.

Mol	Chain	Residues	Atoms				AltConf	Trace	
			Total	C	N	O			S
17	M	87	735	477	123	130	5	0	0

- Molecule 18 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: C₁₀H₁₅N₅O₁₀P₂).



Mol	Chain	Residues	Atoms				AltConf	
			Total	C	N	O		P
18	A	1	Total	C	N	O	P	0
			54	20	10	20	4	
18	A	1	Total	C	N	O	P	0
			54	20	10	20	4	
18	C	1	Total	C	N	O	P	0
			54	20	10	20	4	
18	C	1	Total	C	N	O	P	0
			54	20	10	20	4	
18	B	1	Total	C	N	O	P	0
			54	20	10	20	4	
18	B	1	Total	C	N	O	P	0
			54	20	10	20	4	

- Molecule 19 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



Mol	Chain	Residues	Atoms					AltConf
19	A	1	Total	C	N	O	P	0
			31	10	5	13	3	
19	C	1	Total	C	N	O	P	0
			31	10	5	13	3	
19	B	1	Total	C	N	O	P	0
			31	10	5	13	3	

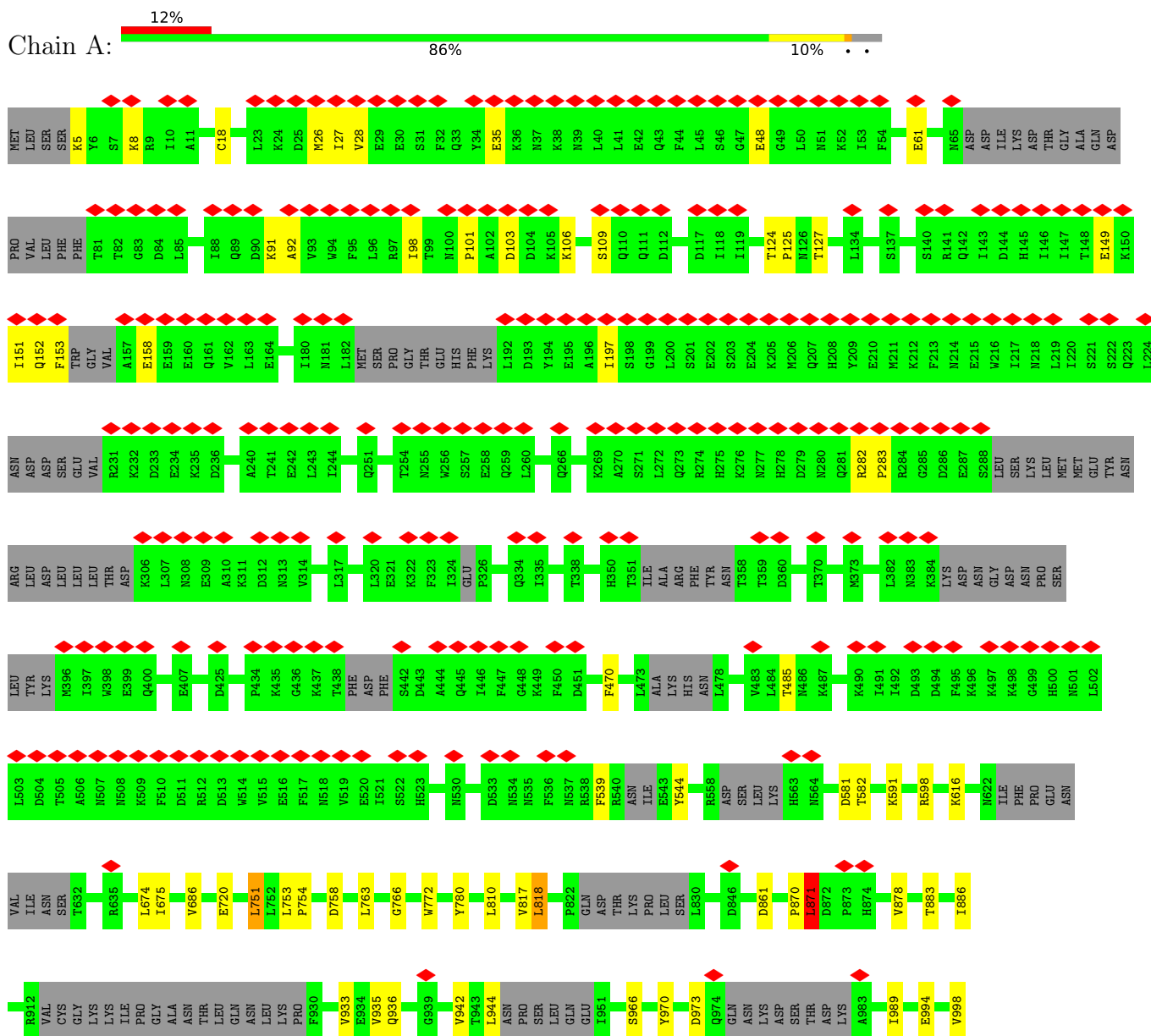
- Molecule 20 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

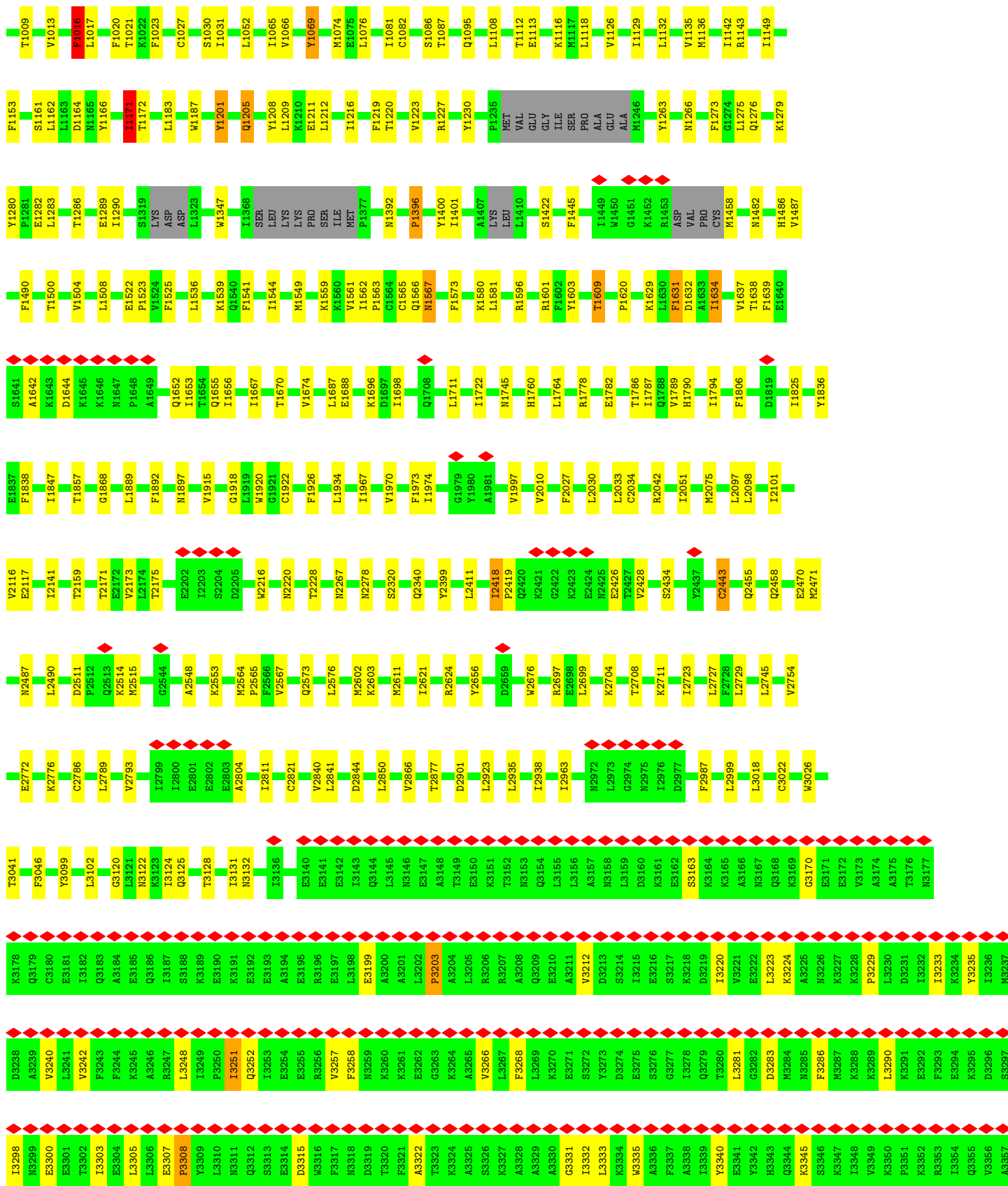
Mol	Chain	Residues	Atoms		AltConf
20	A	3	Total	Mg	0
			3	3	
20	C	3	Total	Mg	0
			3	3	
20	B	3	Total	Mg	0
			3	3	

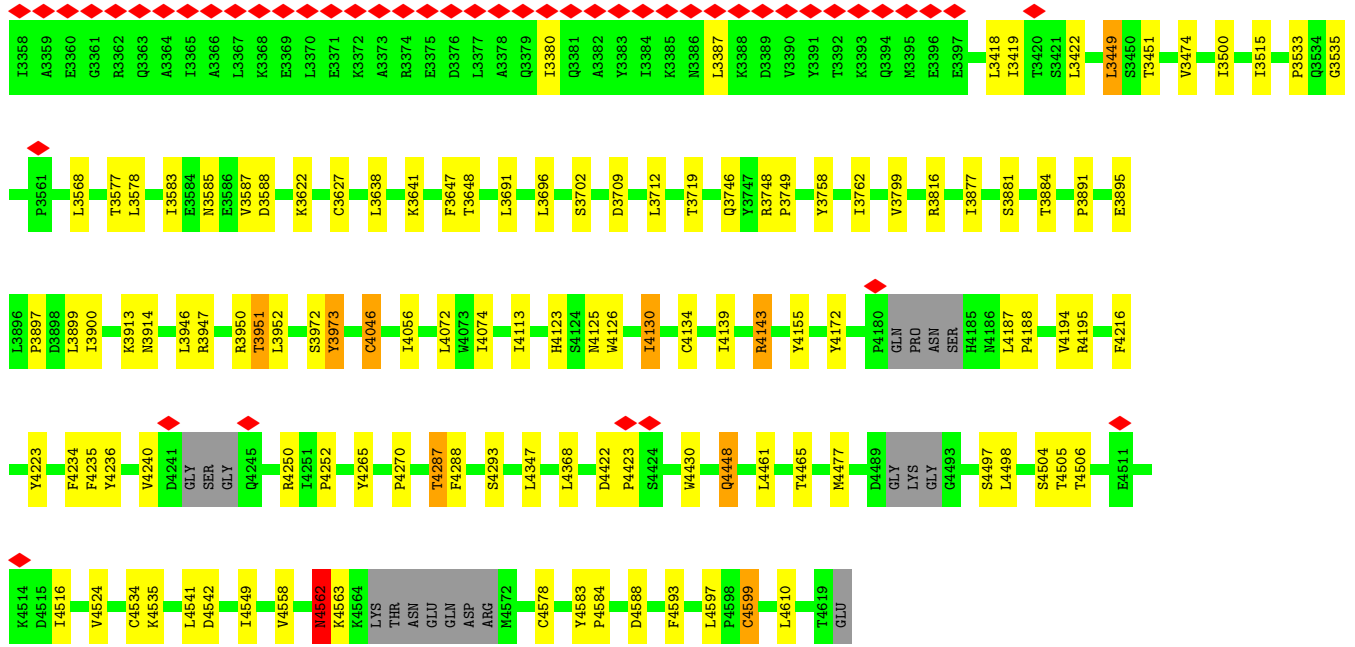
3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

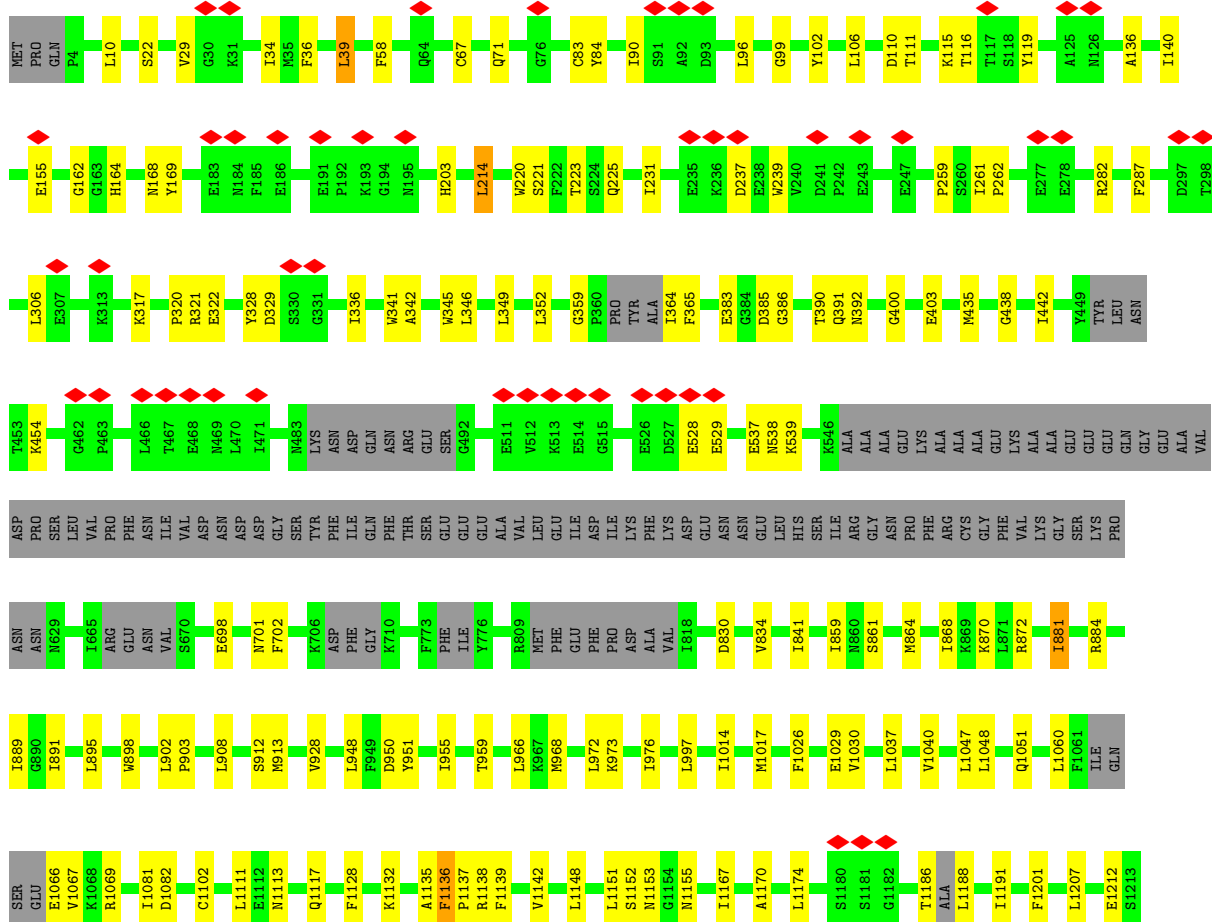
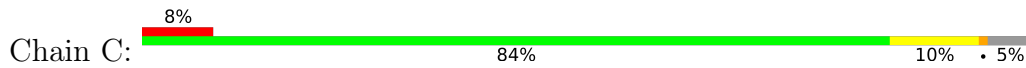
• Molecule 1: Dynein alpha heavy chain

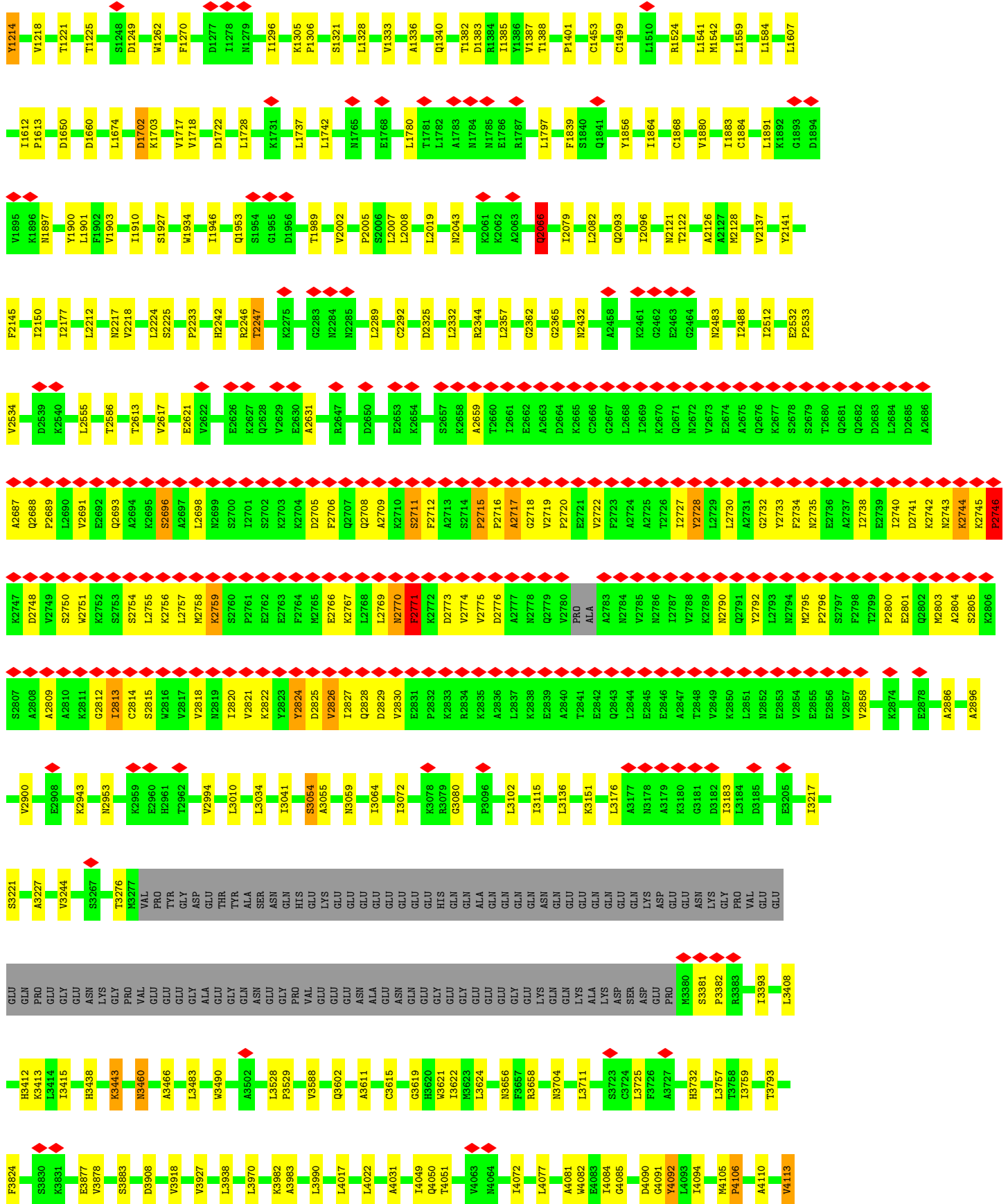






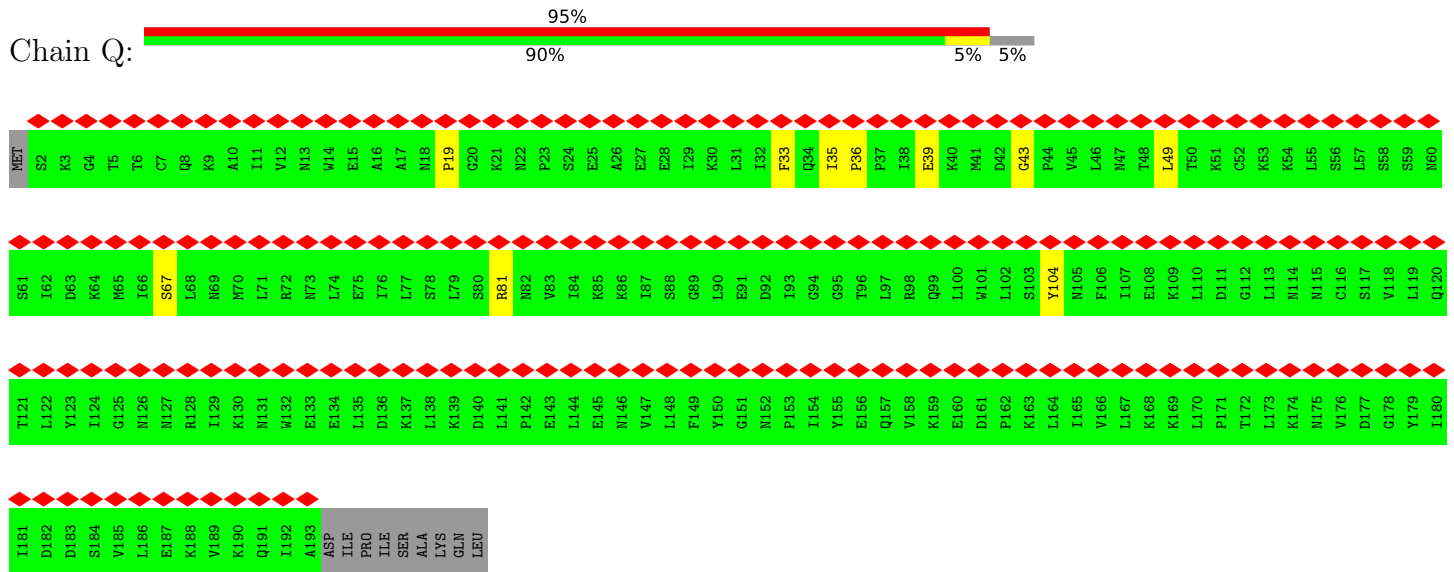
• Molecule 2: Dynein gamma heavy chain



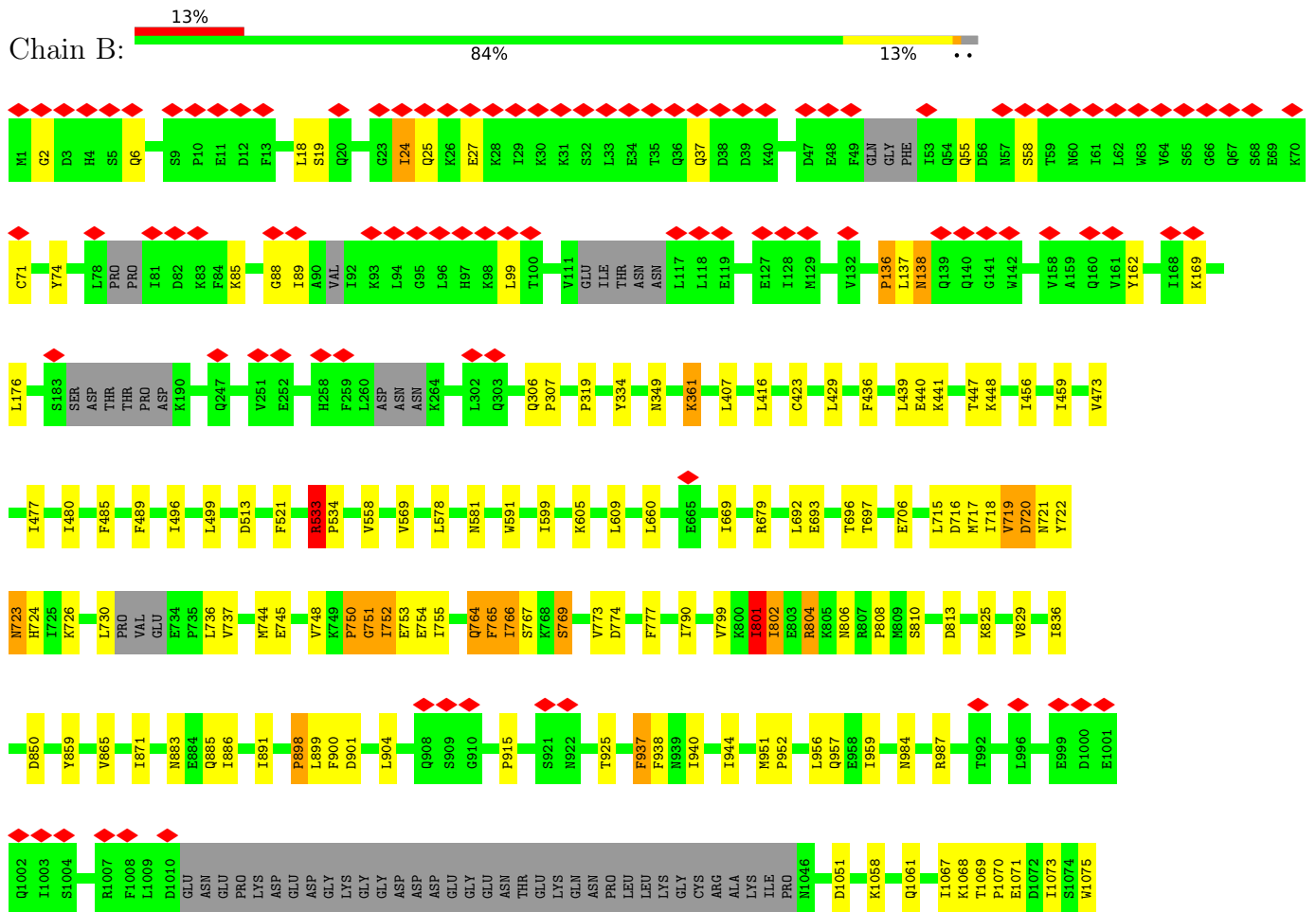


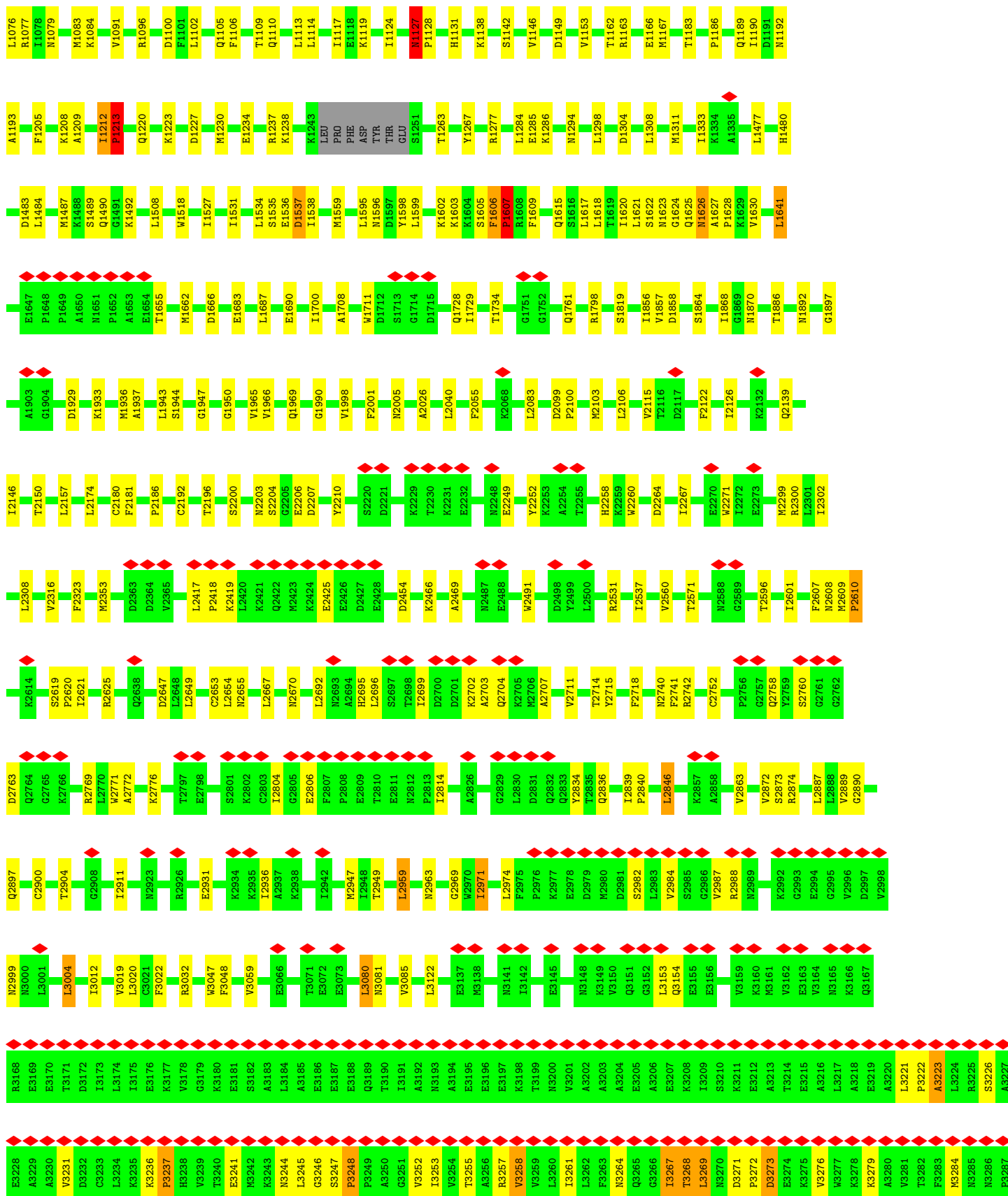


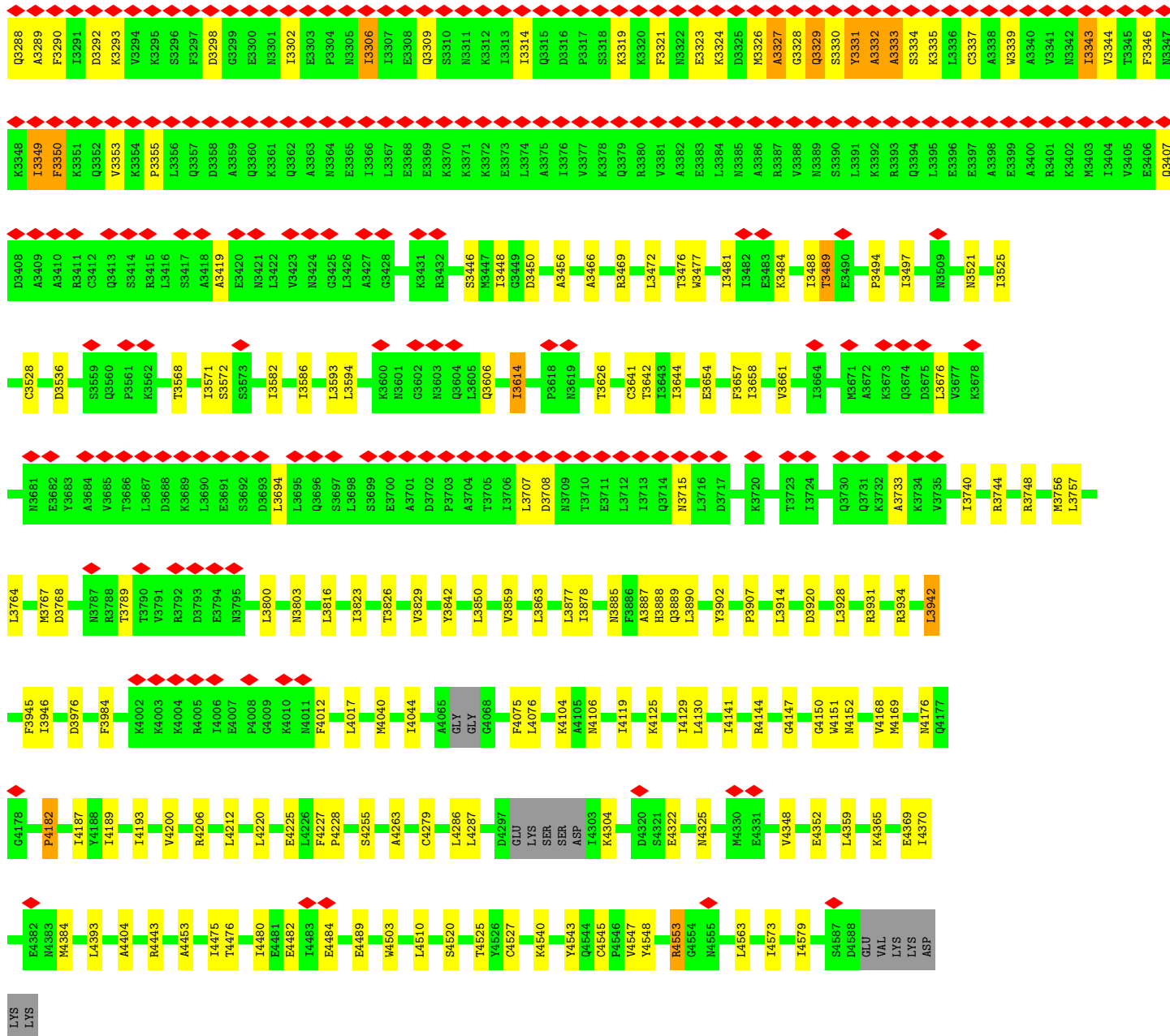
• Molecule 3: Dynein light chain 1



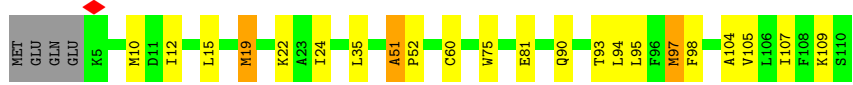
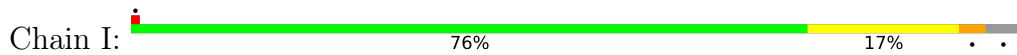
• Molecule 4: Dynein beta heavy chain



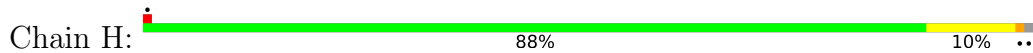


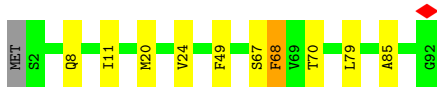


• Molecule 5: Dynein light chain LC8_1a (LC10)

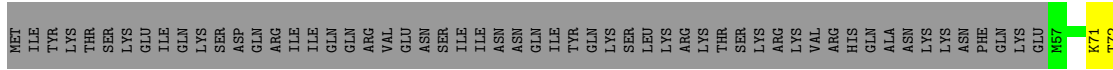


• Molecule 6: Dynein light chain LC8_1b (DLC82)





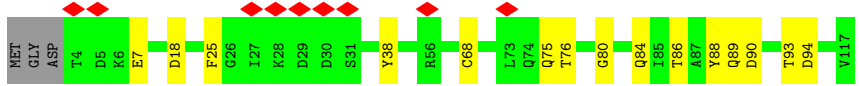
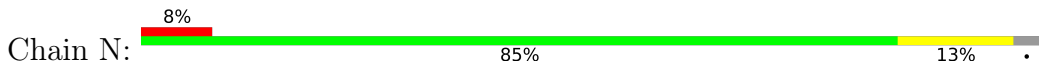
• Molecule 7: Dynein light chain roadblock LC7B



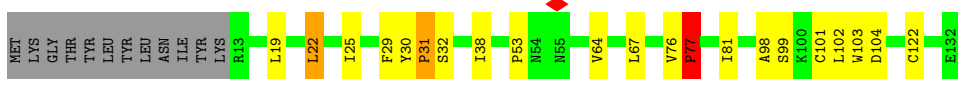
• Molecule 8: Dynein light chain roadblock LC7A



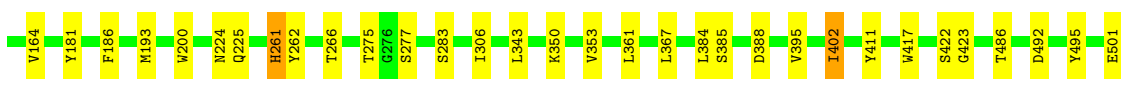
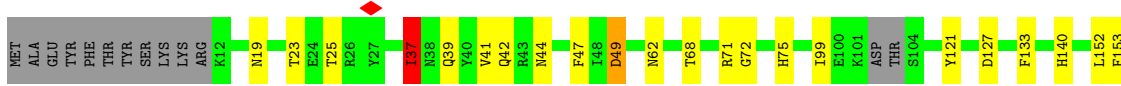
• Molecule 9: Dynein light chain Tctex_b

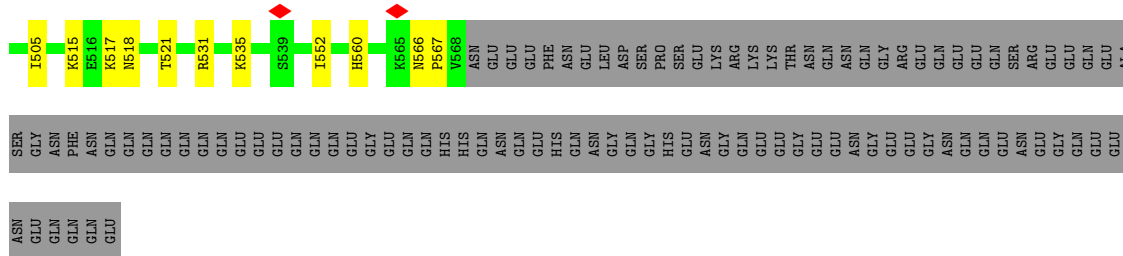


• Molecule 10: Dynein light chain Tctex_a (LC2A)

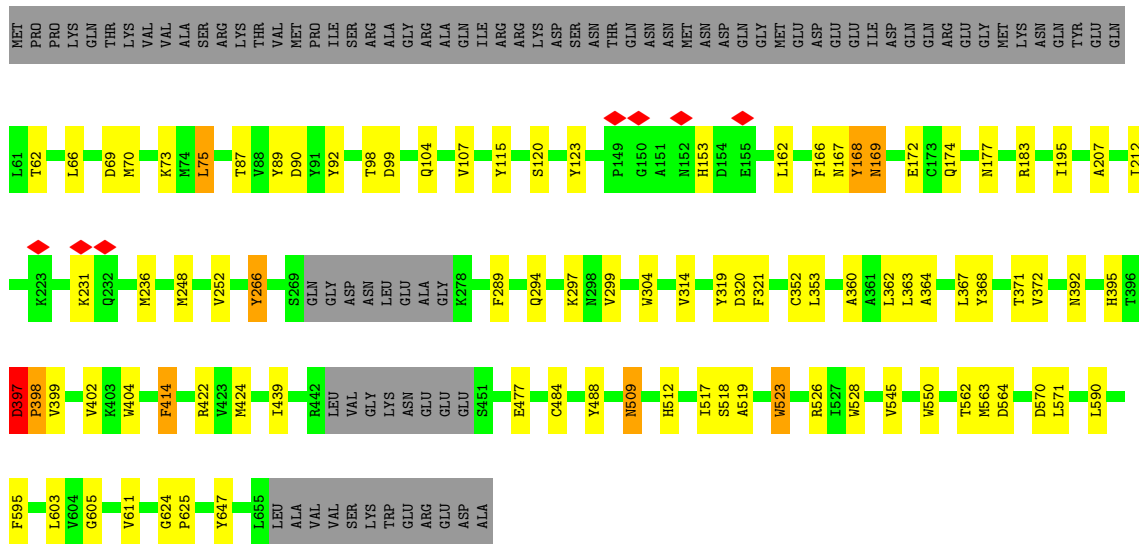
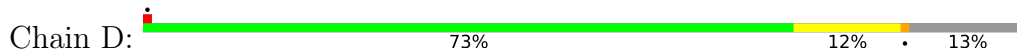


• Molecule 11: Dynein intermediate chain DIC3

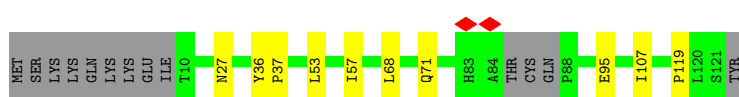
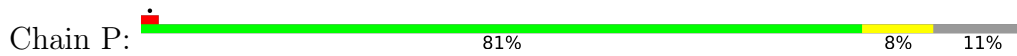




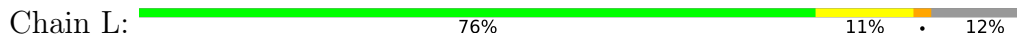
• Molecule 12: Dynein intermediate chain DIC2



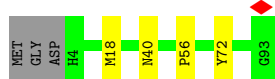
• Molecule 13: Thioredoxin LC3BL




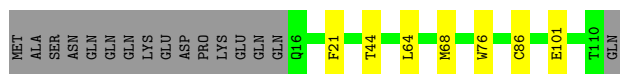
• Molecule 14: Dynein light chain LC8_3b




• Molecule 15: Dynein light chain LC8_2a (LC8E)



● Molecule 16: Dynein light chain LC8_2b

Chain J:  79% 6% 14%

● Molecule 17: Dynein light chain LC8_3a

Chain M:  82% 17%

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	209656	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	53.3	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	9.863	Depositor
Minimum map value	-0.000	Depositor
Average map value	0.006	Depositor
Map value standard deviation	0.098	Depositor
Recommended contour level	0.8	Depositor
Map size (\AA)	1015.746, 1061.068, 970.42395	wwPDB
Map dimensions	381, 398, 364	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	2.666, 2.666, 2.666	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: ADP, MG, ATP

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	0.69	0/34464	0.78	1/46623 (0.0%)
2	C	0.69	1/31037 (0.0%)	0.80	5/42000 (0.0%)
3	Q	0.86	0/1005	0.84	0/1388
4	B	0.70	2/35205 (0.0%)	0.81	7/47647 (0.0%)
5	I	0.68	0/838	0.77	0/1131
6	H	0.67	0/767	0.77	0/1031
7	G	0.69	0/755	0.77	0/1018
8	F	0.68	0/875	0.77	0/1178
9	N	0.69	0/867	0.78	0/1179
10	O	0.67	0/1004	0.80	0/1349
11	E	0.67	0/4522	0.78	0/6114
12	D	0.66	0/4772	0.78	1/6458 (0.0%)
13	P	0.87	0/538	0.86	0/746
14	L	0.66	0/800	0.76	0/1076
15	K	0.66	0/776	0.73	0/1038
16	J	0.63	0/831	0.74	0/1118
17	M	0.65	0/752	0.76	0/1006
All	All	0.69	3/119808 (0.0%)	0.79	14/162100 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
2	C	0	3
4	B	0	4
All	All	0	9

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	1606	PHE	C-N	20.47	1.73	1.34
2	C	1136	PHE	C-N	16.22	1.65	1.34
4	B	730	LEU	C-O	5.28	1.33	1.23

The worst 5 of 14 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	1136	PHE	O-C-N	26.30	171.08	121.10
2	C	1136	PHE	C-N-CD	23.12	176.95	128.40
4	B	1606	PHE	O-C-N	-20.88	81.42	121.10
4	B	1606	PHE	C-N-CD	-20.37	75.80	120.60
2	C	1136	PHE	CA-C-N	-18.02	66.65	117.10

There are no chirality outliers.

5 of 9 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	35	GLU	Peptide
1	A	4250	ARG	Peptide
2	C	2717	ALA	Peptide
2	C	2746	PRO	Peptide
2	C	528	GLU	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	A	33894	0	32284	319	0
2	C	30436	0	29388	319	0
3	Q	1002	0	498	6	0
4	B	34604	0	33084	703	0
5	I	827	0	829	17	0
6	H	750	0	735	7	0
7	G	749	0	772	10	0
8	F	863	0	881	9	0
9	N	855	0	800	13	0
10	O	986	0	1002	11	0
11	E	4423	0	4291	40	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
12	D	4664	0	4484	65	0
13	P	541	0	220	2	0
14	L	783	0	811	9	0
15	K	754	0	716	3	0
16	J	806	0	769	2	0
17	M	735	0	738	9	0
18	A	54	0	24	2	0
18	B	54	0	24	0	0
18	C	54	0	24	3	0
19	A	31	0	12	0	0
19	B	31	0	12	1	0
19	C	31	0	12	0	0
20	A	3	0	0	0	0
20	B	3	0	0	0	0
20	C	3	0	0	0	0
All	All	117936	0	112410	1466	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 6.

The worst 5 of 1466 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)
4:B:1223:LYS:HE2	4:B:1277:ARG:CB	1.23	1.63
4:B:1599:LEU:HB3	4:B:1617:LEU:CG	1.18	1.61
1:A:1219:PHE:HZ	1:A:1263:TYR:CD2	1.17	1.60
1:A:1219:PHE:CE1	1:A:1263:TYR:HA	1.26	1.60
1:A:1219:PHE:CZ	1:A:1263:TYR:CD2	1.89	1.60

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	4381/4620 (95%)	4081 (93%)	258 (6%)	42 (1%)	15	55
2	C	3914/4168 (94%)	3582 (92%)	283 (7%)	49 (1%)	12	48
3	Q	190/202 (94%)	163 (86%)	24 (13%)	3 (2%)	9	44
4	B	4488/4595 (98%)	4017 (90%)	383 (8%)	88 (2%)	7	38
5	I	104/110 (94%)	95 (91%)	8 (8%)	1 (1%)	15	55
6	H	89/92 (97%)	83 (93%)	6 (7%)	0	100	100
7	G	92/159 (58%)	87 (95%)	5 (5%)	0	100	100
8	F	108/133 (81%)	96 (89%)	11 (10%)	1 (1%)	17	57
9	N	112/117 (96%)	92 (82%)	17 (15%)	3 (3%)	5	31
10	O	118/132 (89%)	103 (87%)	10 (8%)	5 (4%)	3	22
11	E	551/670 (82%)	496 (90%)	51 (9%)	4 (1%)	22	63
12	D	569/667 (85%)	510 (90%)	51 (9%)	8 (1%)	11	46
13	P	103/122 (84%)	86 (84%)	11 (11%)	6 (6%)	1	18
14	L	96/111 (86%)	91 (95%)	4 (4%)	1 (1%)	15	55
15	K	88/93 (95%)	79 (90%)	9 (10%)	0	100	100
16	J	93/111 (84%)	84 (90%)	8 (9%)	1 (1%)	14	52
17	M	85/87 (98%)	72 (85%)	11 (13%)	2 (2%)	6	33
All	All	15181/16189 (94%)	13817 (91%)	1150 (8%)	214 (1%)	15	46

5 of 214 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	125	PRO
1	A	197	ILE
1	A	871	LEU
1	A	973	ASP
1	A	3251	ILE

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	3420/4197 (82%)	3338 (98%)	82 (2%)	49	69
2	C	3149/3691 (85%)	3095 (98%)	54 (2%)	60	78
3	Q	10/186 (5%)	10 (100%)	0	100	100
4	B	3497/4145 (84%)	3399 (97%)	98 (3%)	43	65
5	I	91/95 (96%)	87 (96%)	4 (4%)	28	53
6	H	82/83 (99%)	80 (98%)	2 (2%)	49	69
7	G	86/149 (58%)	85 (99%)	1 (1%)	71	83
8	F	93/109 (85%)	86 (92%)	7 (8%)	13	38
9	N	85/104 (82%)	84 (99%)	1 (1%)	71	83
10	O	106/119 (89%)	99 (93%)	7 (7%)	16	41
11	E	484/597 (81%)	467 (96%)	17 (4%)	36	59
12	D	507/609 (83%)	482 (95%)	25 (5%)	25	50
14	L	87/99 (88%)	83 (95%)	4 (5%)	27	52
15	K	80/82 (98%)	79 (99%)	1 (1%)	69	81
16	J	81/97 (84%)	79 (98%)	2 (2%)	47	68
17	M	78/78 (100%)	74 (95%)	4 (5%)	24	48
All	All	11936/14440 (83%)	11627 (97%)	309 (3%)	49	66

5 of 309 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	B	4540	LYS
12	D	371	THR
6	H	8	GLN
11	E	127	ASP
14	L	71	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 145 such sidechains are listed below:

Mol	Chain	Res	Type
4	B	4177	GLN
17	M	3	HIS
7	G	149	GLN
11	E	481	GLN
2	C	1888	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 18 ligands modelled in this entry, 9 are monoatomic - leaving 9 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
19	ATP	C	4201	20	26,33,33	0.68	0	31,52,52	0.94	2 (6%)
19	ATP	B	4701	20	26,33,33	0.66	0	31,52,52	0.91	1 (3%)
18	ADP	B	4706	20	24,29,29	0.66	0	29,45,45	0.72	1 (3%)
18	ADP	C	4203	20	24,29,29	0.69	1 (4%)	29,45,45	1.04	1 (3%)
18	ADP	C	4206	20	24,29,29	0.66	0	29,45,45	0.87	2 (6%)
19	ATP	A	4702	20	26,33,33	0.65	0	31,52,52	0.86	1 (3%)
18	ADP	A	4701	20	24,29,29	0.70	0	29,45,45	0.78	1 (3%)
18	ADP	A	4703	-	24,29,29	0.65	0	29,45,45	0.80	1 (3%)
18	ADP	B	4705	20	24,29,29	0.72	0	29,45,45	0.83	1 (3%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
19	ATP	C	4201	20	-	4/18/38/38	0/3/3/3
19	ATP	B	4701	20	-	2/18/38/38	0/3/3/3
18	ADP	B	4706	20	-	3/12/32/32	0/3/3/3
18	ADP	C	4203	20	-	5/12/32/32	0/3/3/3
18	ADP	C	4206	20	-	3/12/32/32	0/3/3/3
19	ATP	A	4702	20	-	5/18/38/38	0/3/3/3
18	ADP	A	4701	20	-	5/12/32/32	0/3/3/3
18	ADP	A	4703	-	-	1/12/32/32	0/3/3/3
18	ADP	B	4705	20	-	5/12/32/32	0/3/3/3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
18	C	4203	ADP	C8-N7	-2.07	1.31	1.34

The worst 5 of 11 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
18	C	4203	ADP	C1'-N9-C4	2.70	131.39	126.64
19	C	4201	ATP	PA-O3A-PB	-2.44	124.46	132.83
19	B	4701	ATP	C5-C6-N6	2.38	123.97	120.35
18	C	4206	ADP	C5-C6-N6	2.23	123.74	120.35
19	A	4702	ATP	C5-C6-N6	2.18	123.67	120.35

There are no chirality outliers.

5 of 33 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
18	A	4701	ADP	PA-O3A-PB-O3B
18	C	4203	ADP	C5'-O5'-PA-O1A
18	C	4203	ADP	C5'-O5'-PA-O2A
18	C	4206	ADP	O4'-C4'-C5'-O5'
18	B	4705	ADP	PB-O3A-PA-O5'

There are no ring outliers.

5 monomers are involved in 6 short contacts:

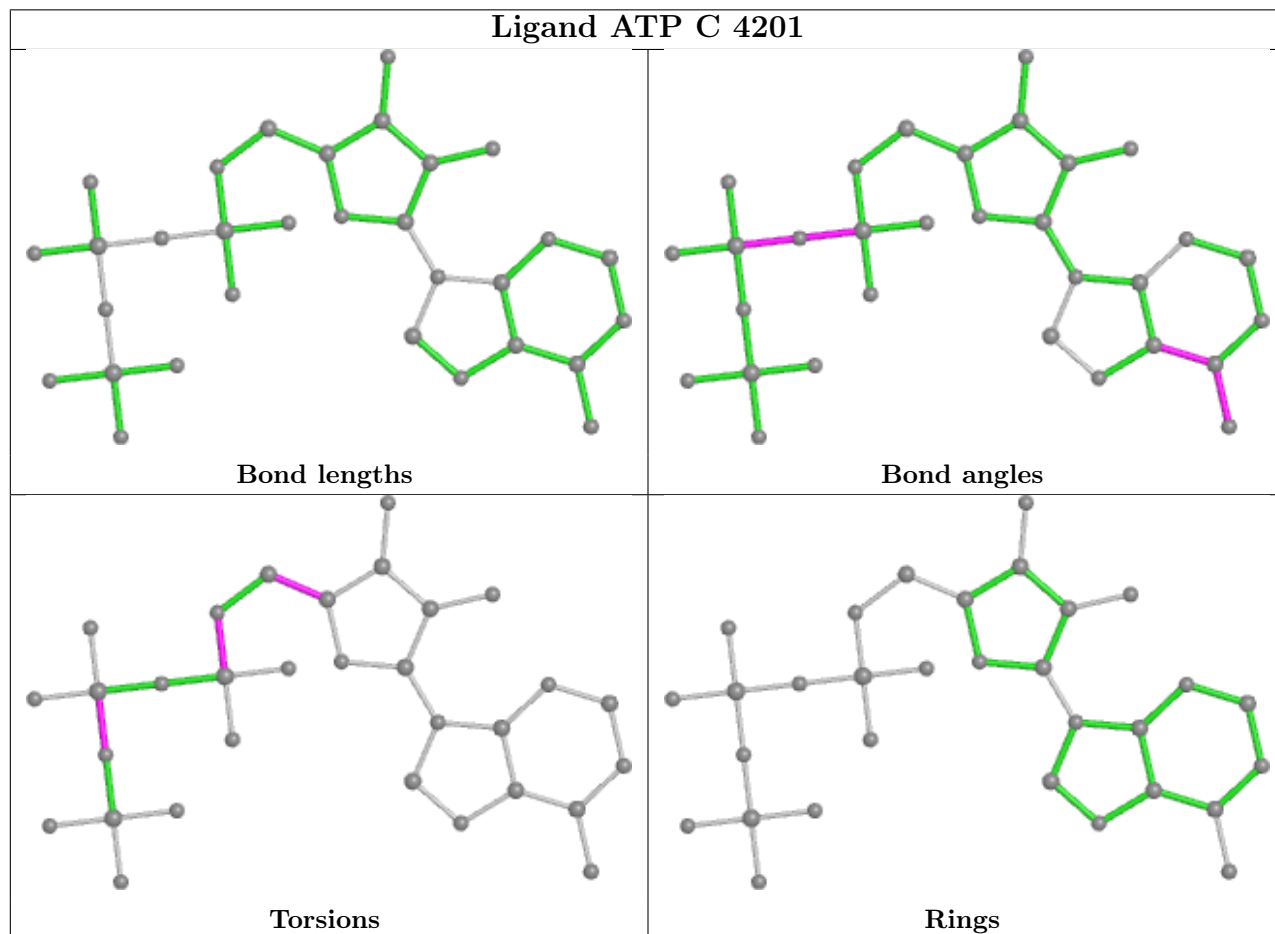
Mol	Chain	Res	Type	Clashes	Symm-Clashes
19	B	4701	ATP	1	0
18	C	4203	ADP	1	0

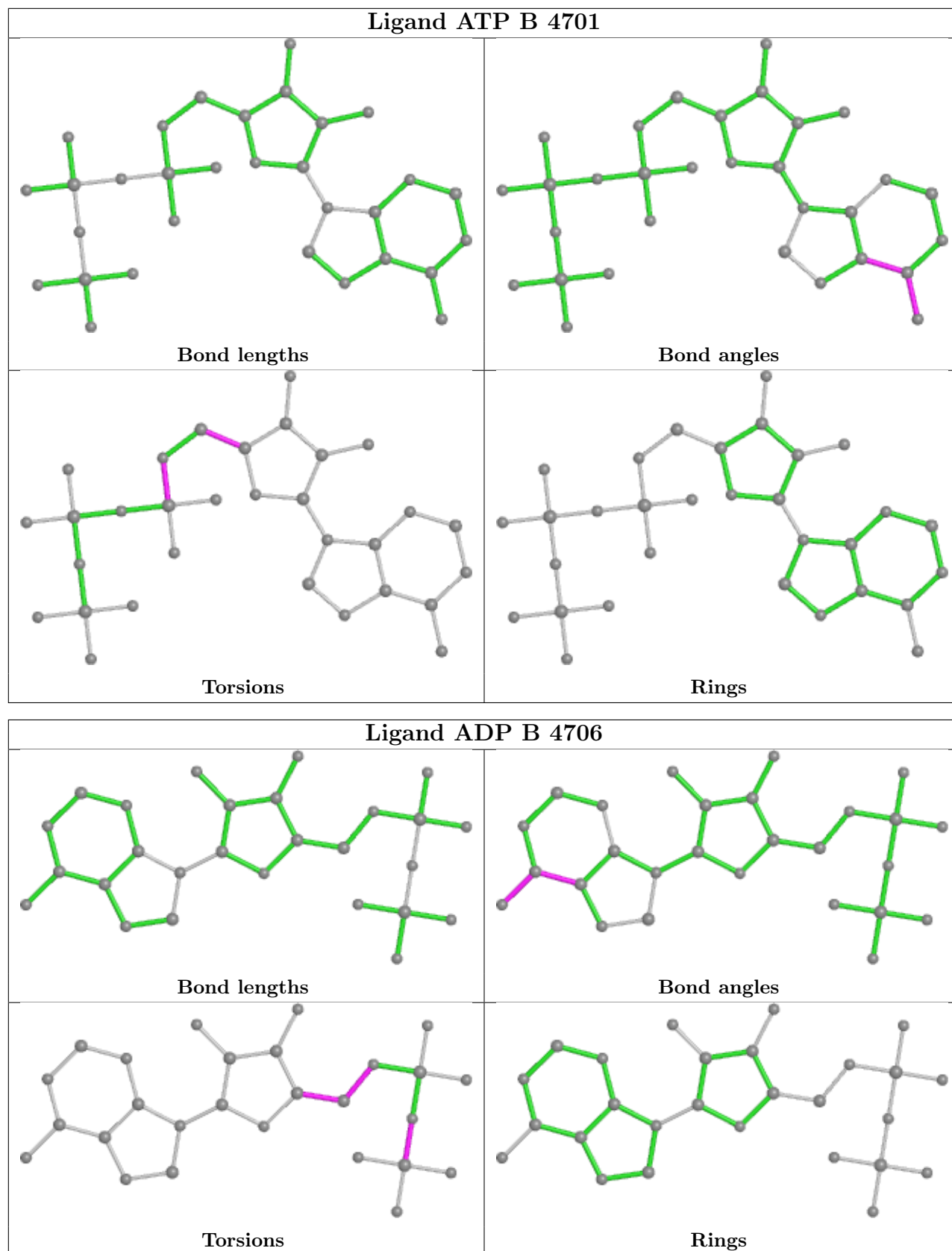
Continued on next page...

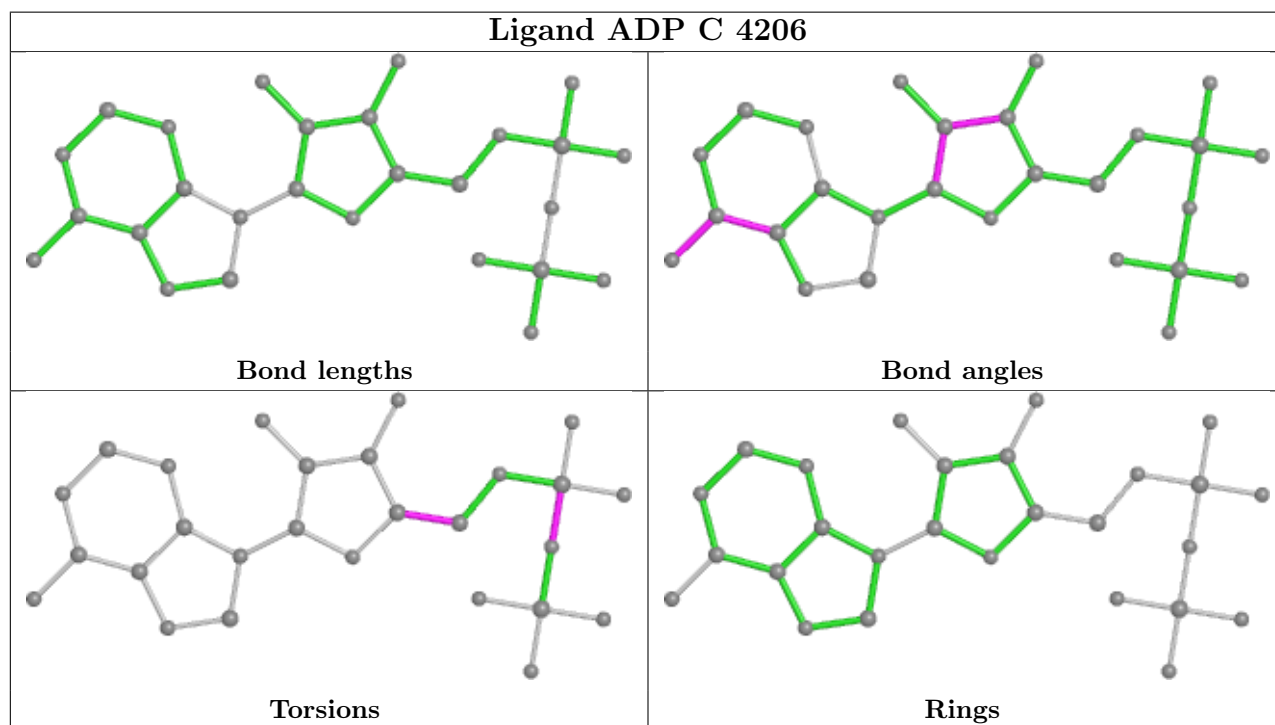
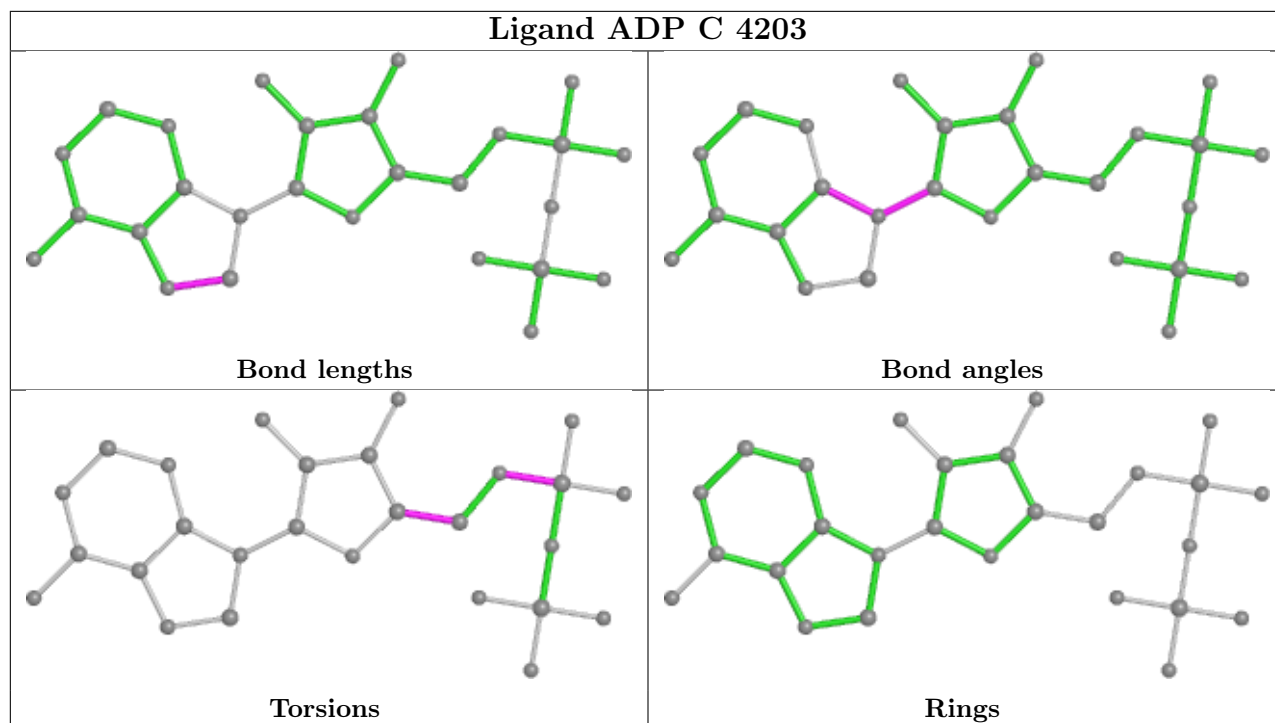
Continued from previous page...

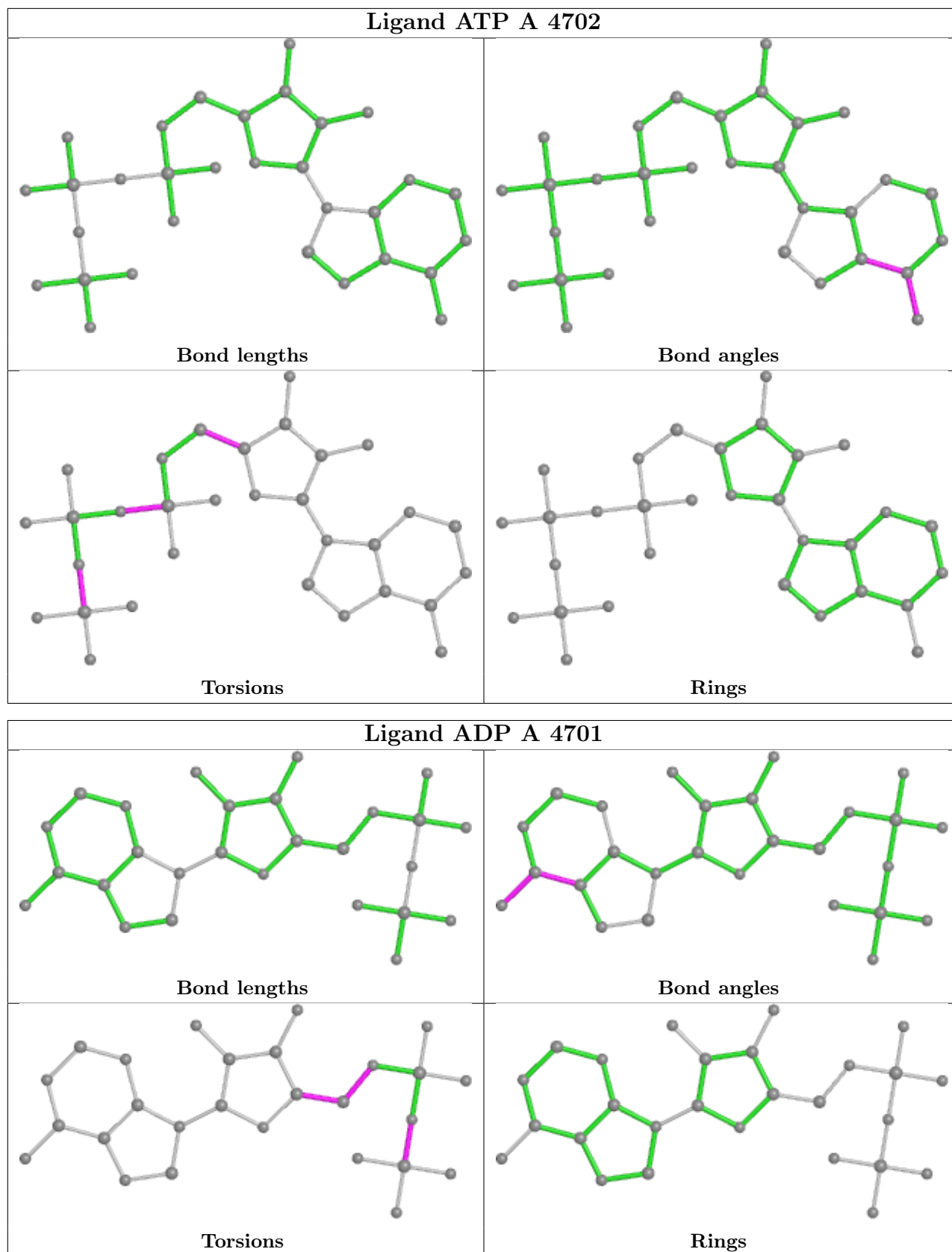
Mol	Chain	Res	Type	Clashes	Symm-Clashes
18	C	4206	ADP	2	0
18	A	4701	ADP	1	0
18	A	4703	ADP	1	0

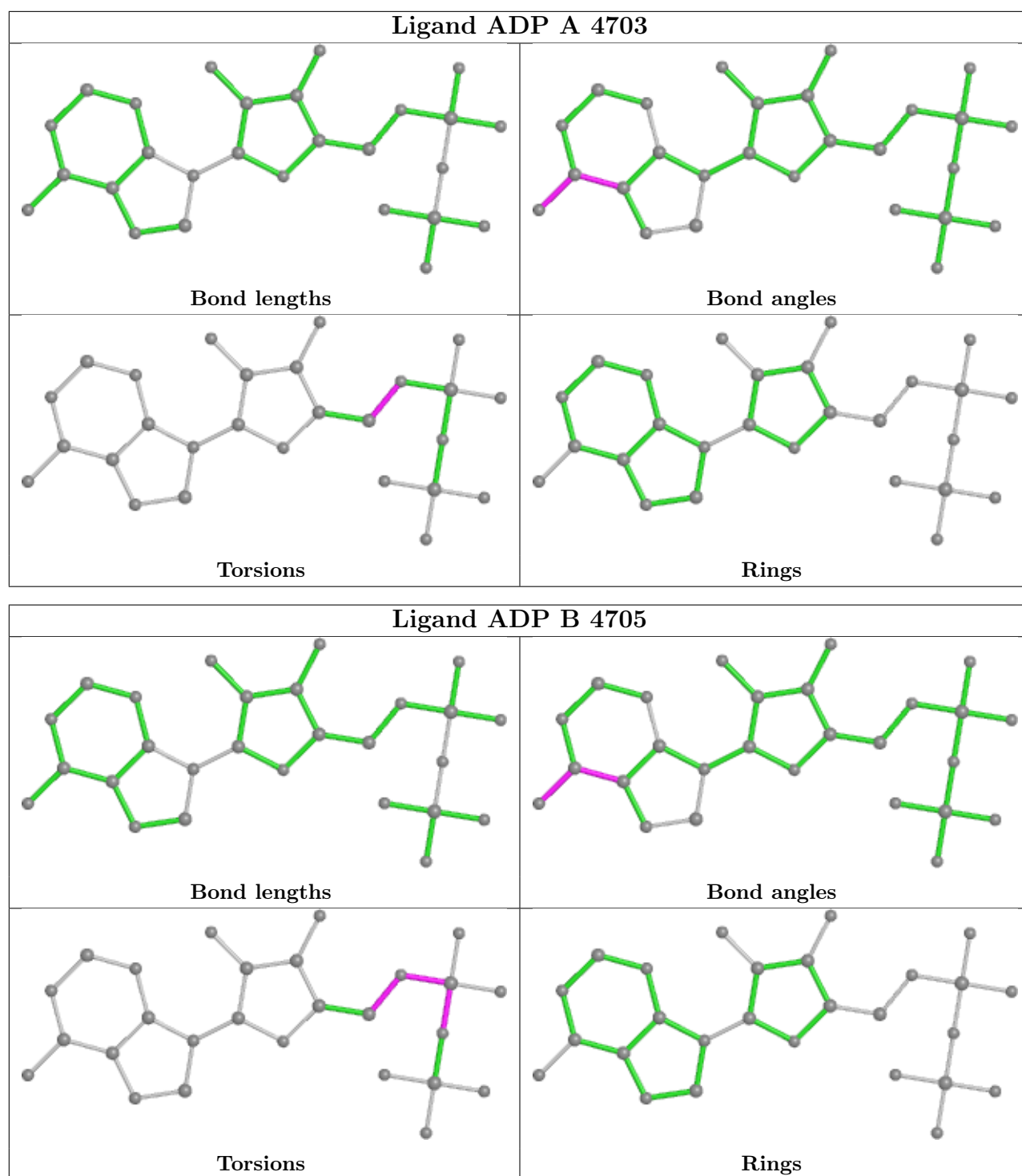
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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











5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	4
2	C	3
4	B	3
12	D	2
13	P	1
7	G	1

The worst 5 of 14 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	C	364:ILE	C	365:PHE	N	4.18
1	B	25:GLN	C	26:LYS	N	3.78
1	D	216:HIS	C	217:GLN	N	3.67
1	A	53:ILE	C	54:PHE	N	3.57
1	A	115:ASP	C	116:ASN	N	3.46

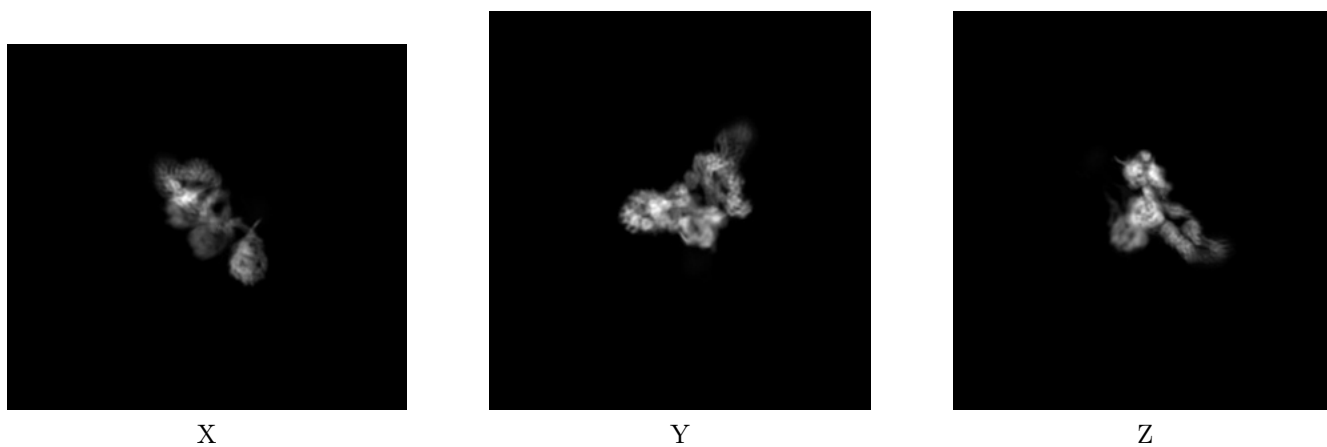
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-22840. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

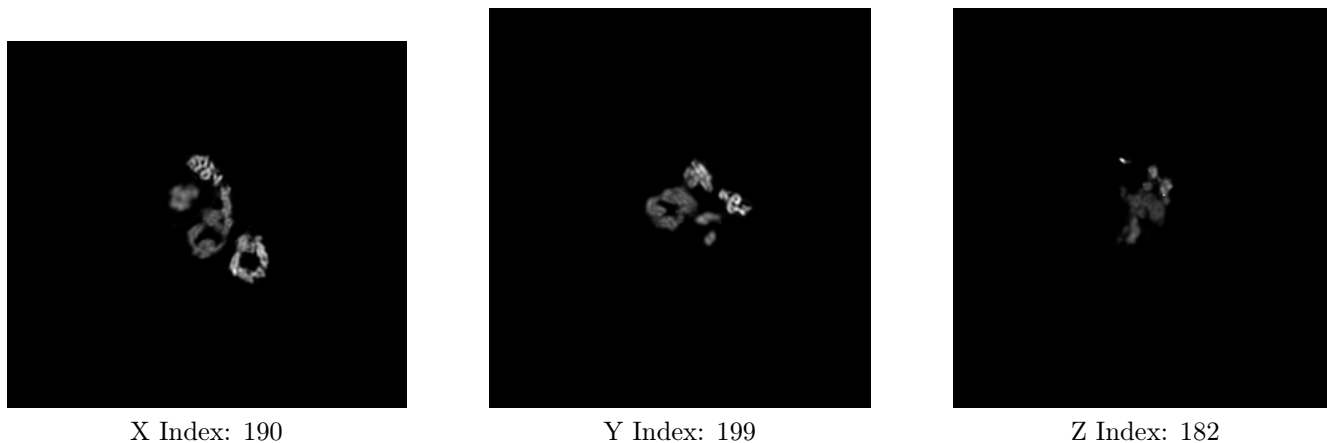
6.1.1 Primary map



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

6.2 Central slices [i](#)

6.2.1 Primary map



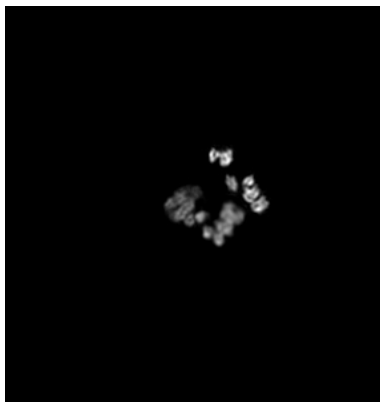
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

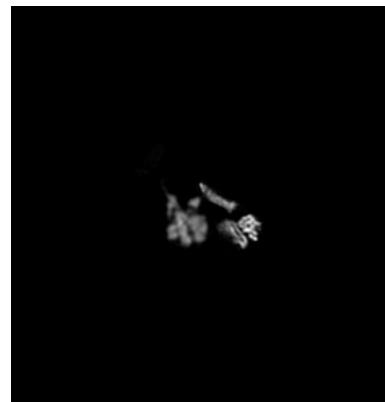
6.3.1 Primary map



X Index: 189



Y Index: 186

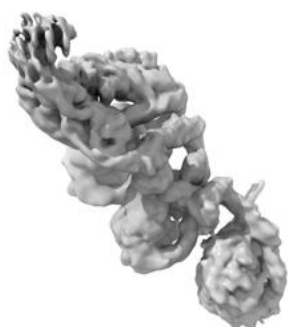


Z Index: 209

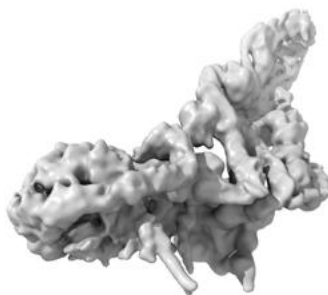
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

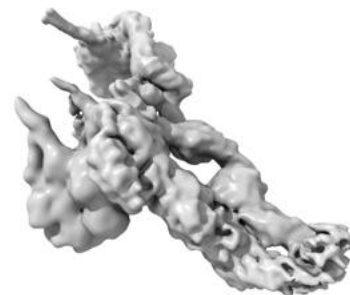
6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.8. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

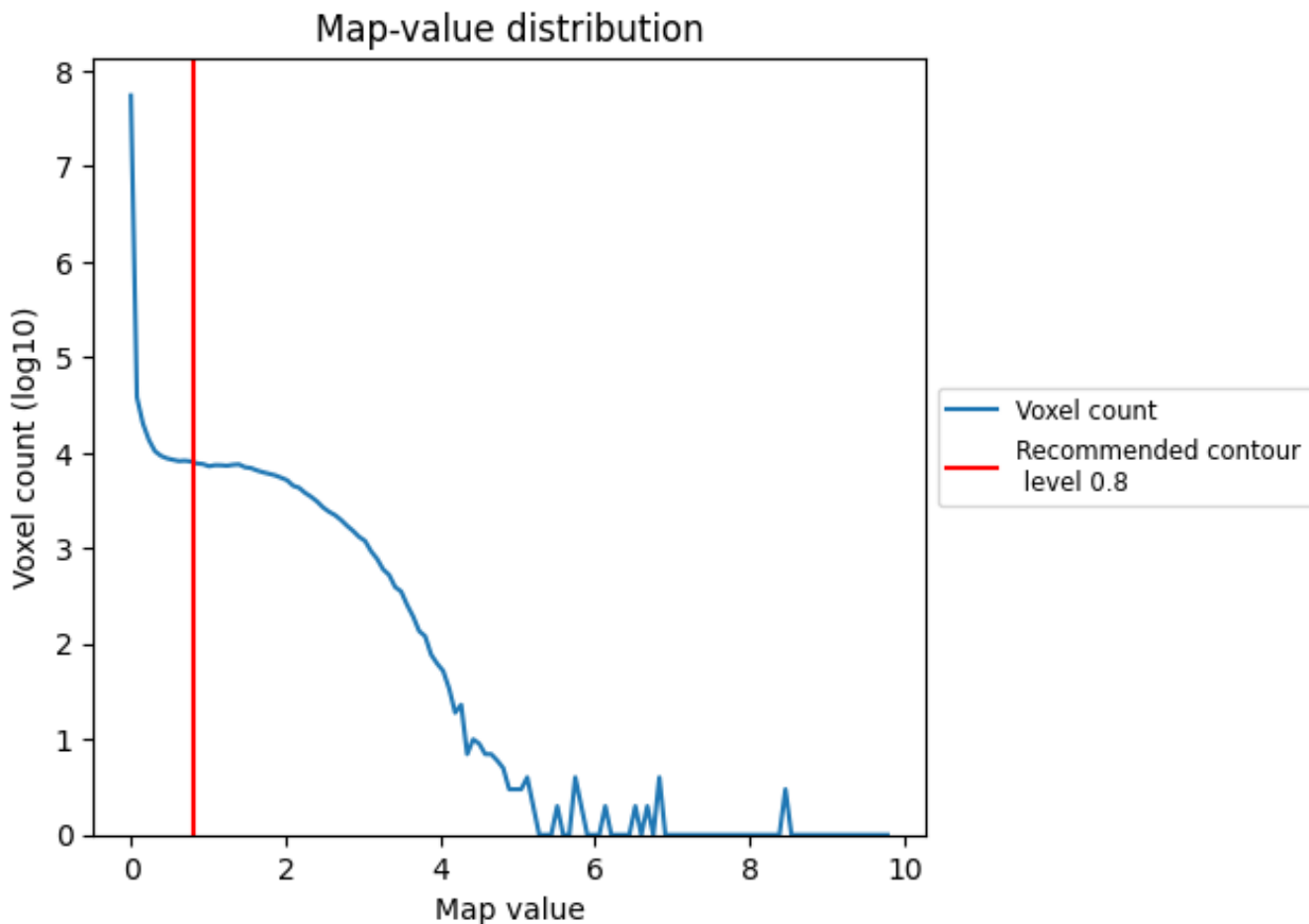
6.5 Mask visualisation

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

7 Map analysis [i](#)

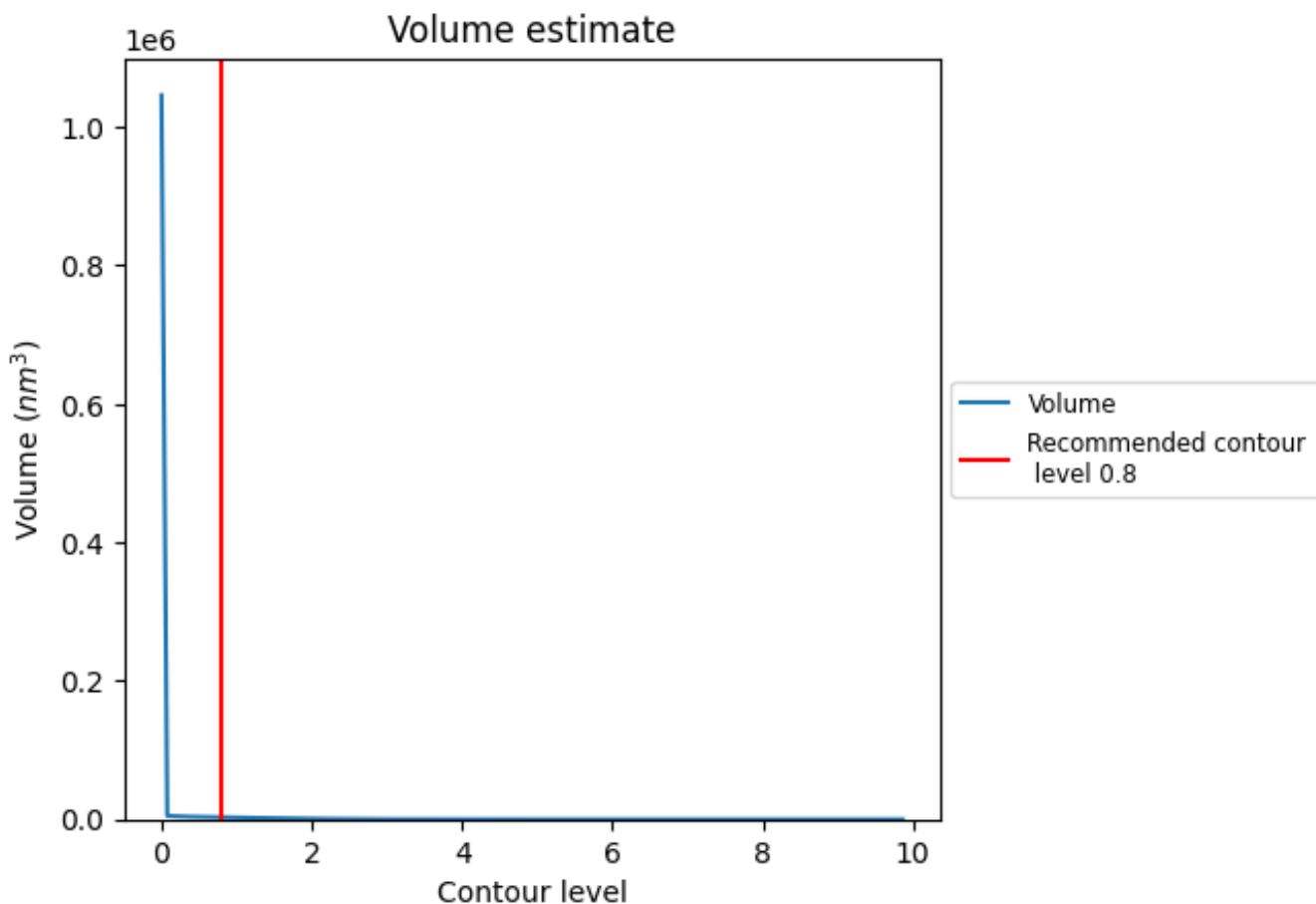
This section contains the results of statistical analysis of the map.

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 2909 nm^3 ; this corresponds to an approximate mass of 2628 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](#)

This section was not generated. The rotationally averaged power spectrum is only generated for cubic maps.

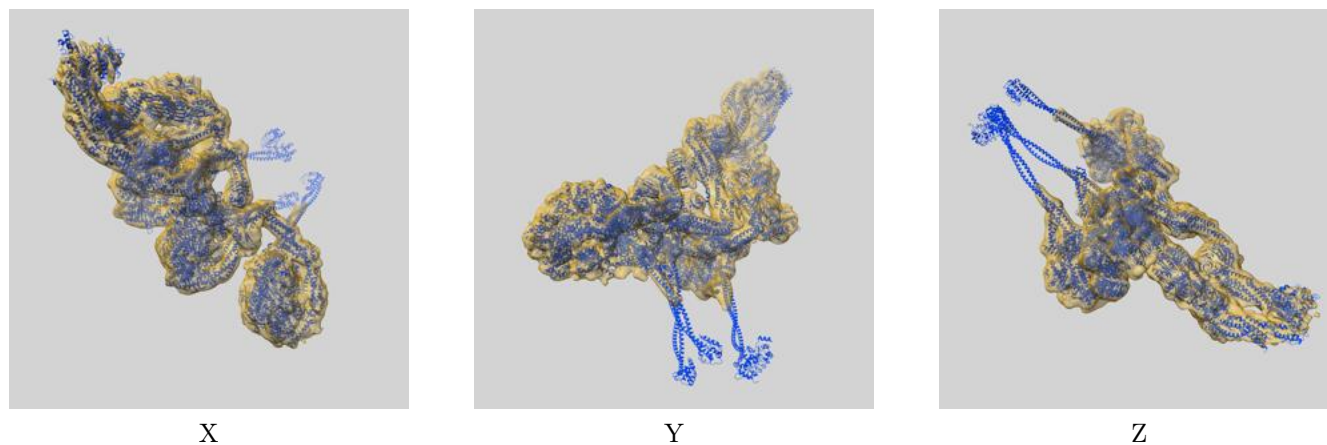
8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

9 Map-model fit [i](#)

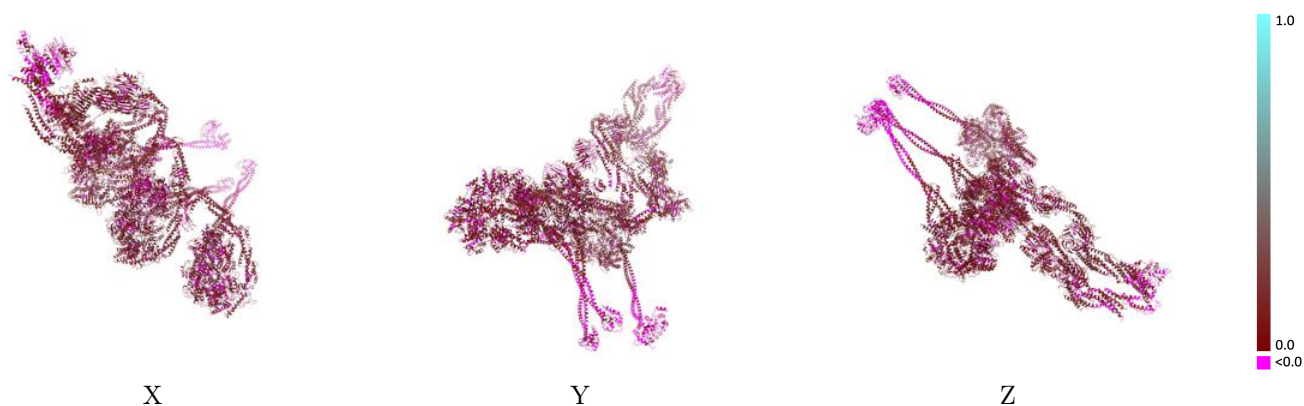
This section contains information regarding the fit between EMDB map EMD-22840 and PDB model 7KEK. Per-residue inclusion information can be found in section 3 on page 9.

9.1 Map-model overlay [i](#)



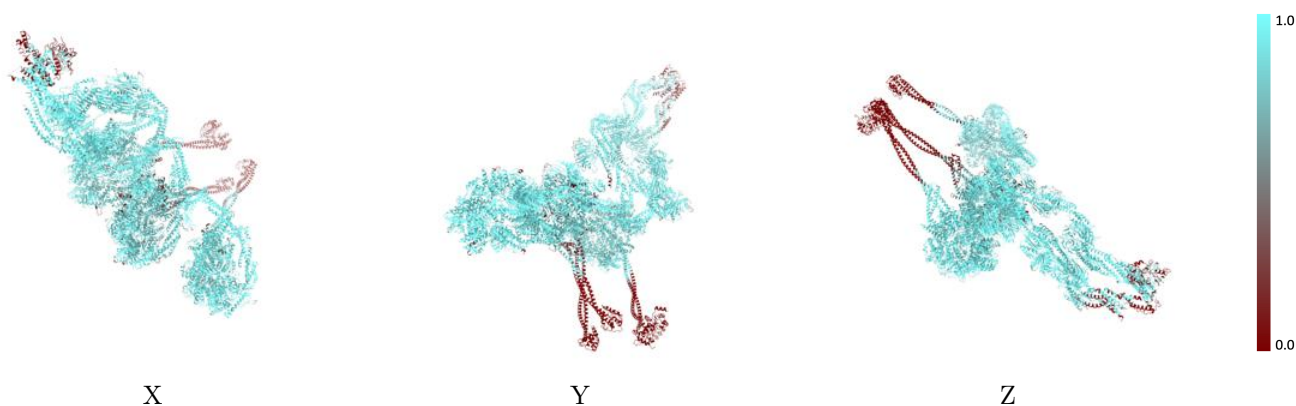
The images above show the 3D surface view of the map at the recommended contour level 0.8 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



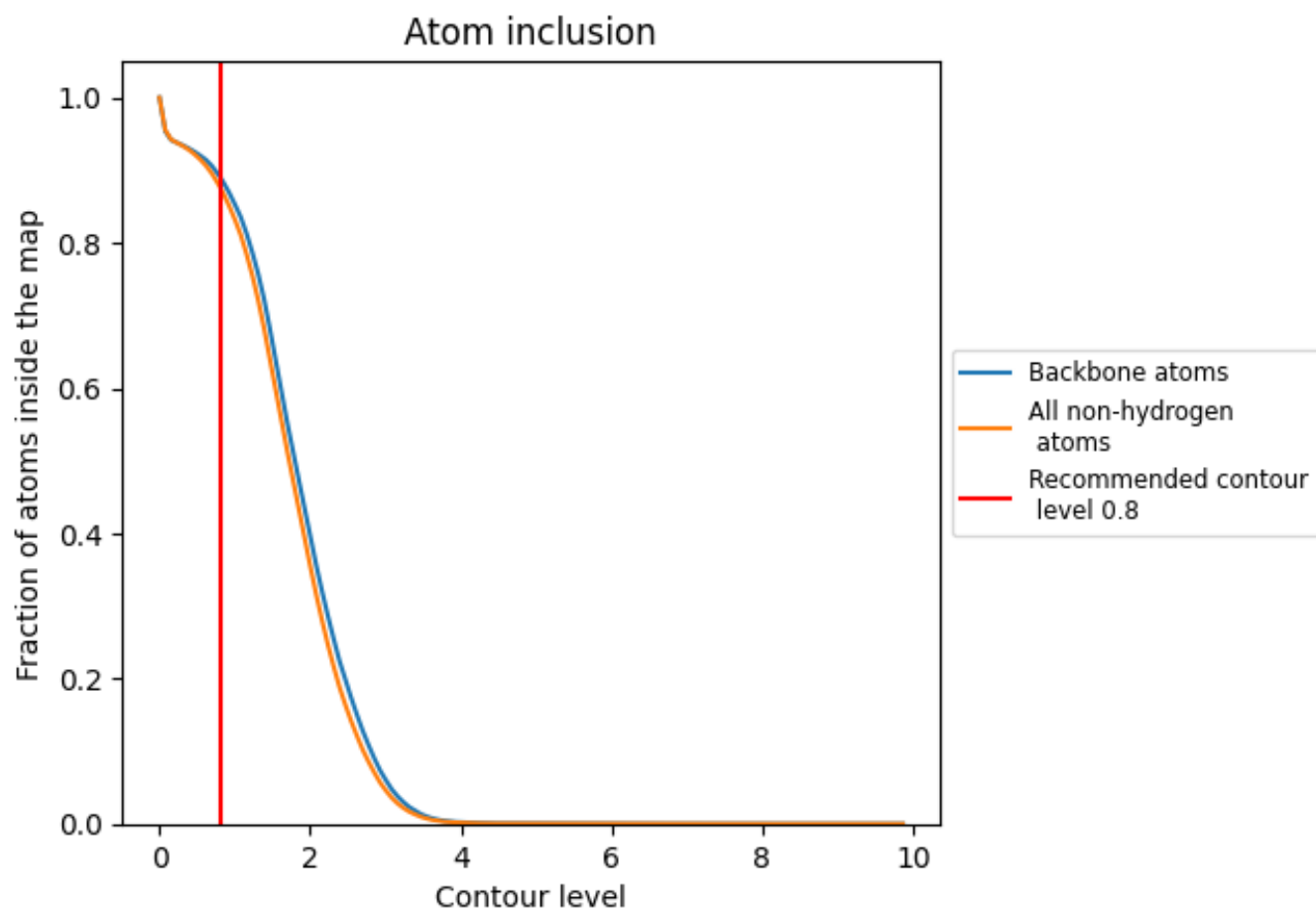
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.8).





































9.4 Atom inclusion [i](#)



At the recommended contour level, 89% of all backbone atoms, 88% 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 (0.8) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8775	 0.0820
A	 0.8686	 0.0750
B	 0.8442	 0.0940
C	 0.8997	 0.0720
D	 0.9769	 0.0930
E	 0.9657	 0.0980
F	 0.9941	 0.1140
G	 0.9729	 0.1140
H	 0.9878	 0.1000
I	 0.9671	 0.1140
J	 0.9861	 0.0810
K	 0.9852	 0.0970
L	 0.9871	 0.1020
M	 0.9724	 0.0830
N	 0.9113	 0.0660
O	 0.9666	 0.0780
P	 0.9760	 0.1150
Q	 0.0000	 -0.0550

