



## wwPDB EM Validation Summary Report ⓘ

Jun 22, 2023 – 11:29 AM JST

PDB ID : 7VZ8  
EMDB ID : EMD-32222  
Title : Membrane arm of deactive state CI from Q1-NADH dataset  
Authors : Gu, J.; Yang, M.  
Deposited on : 2021-11-15  
Resolution : 2.70 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](mailto: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>.

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

EMDB validation analysis : 0.0.1.dev50  
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) : 2.33

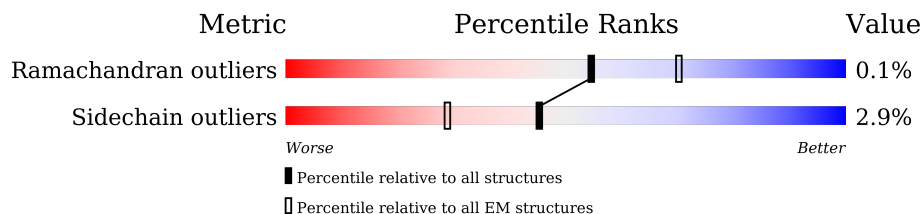
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.70 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)
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  $\geq 3$ , 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	Q	40	
2	S	70	
3	U	83	
4	V	140	
5	W	113	
6	X	88	
7	Y	70	
8	Z	84	
9	a	140	

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Mol	Chain	Length	Quality of chain
10	b	126	 13% 79% 18%
11	c	156	 7% 98%
12	d	175	 8% 97%
13	e	107	 13% 98%
14	f	42	 21% 100%
15	g	121	 1% 98%
16	h	105	 10% 96%
17	i	347	 1% 97%
18	j	113	 18% 83% 12%
19	k	98	 8% 97%
20	l	603	 1% 97%
21	m	175	 8% 70% 28%
22	n	56	 18% 98%
23	o	128	 5% 98%
24	p	178	 1% 98%
25	r	459	 0% 98%
26	s	318	 5% 93% 5%
27	u	171	 6% 97%
28	v	124	 21% 91% 9%
29	w	320	 11% 96%

## 2 Entry composition

There are 36 unique types of molecules in this entry. The entry contains 39019 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 NADH dehydrogenase [ubiquinone] iron-sulfur protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	Q	40	333	217	56	59	1	0	0

- Molecule 2 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	S	70	567	364	104	94	5	0	0

- Molecule 3 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	U	83	643	417	110	115	1	0	0

- Molecule 4 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	V	140	1021	651	174	190	6	0	0

- Molecule 5 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	W	113	949	614	160	167	8	0	0

- Molecule 6 is a protein called Acyl carrier protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	X	88	Total	C	N	O	S	0	0
			696	449	103	139	5		

- Molecule 7 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	Y	70	Total	C	N	O	S	0	0
			597	392	98	106	1		

- Molecule 8 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	Z	84	Total	C	N	O	S	0	0
			674	437	116	120	1		

- Molecule 9 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	a	140	Total	C	N	O	S	0	0
			1165	762	199	201	3		

- Molecule 10 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	b	103	Total	C	N	O	S	0	0
			879	573	158	147	1		

- Molecule 11 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	c	156	Total	C	N	O	S	0	0
			1315	853	213	241	8		

- Molecule 12 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	d	175	1461	916	265	272	8	0	0

- Molecule 13 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	e	107	890	568	145	173	4	0	0

- Molecule 14 is a protein called NADH dehydrogenase [ubiquinone] 1 subunit C1.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
14	f	42	342	225	58	59	0	0

- Molecule 15 is a protein called NADH dehydrogenase [ubiquinone] 1 subunit C2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	g	121	1000	650	173	171	6	0	0

- Molecule 16 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	h	105	867	550	161	150	6	0	0

- Molecule 17 is a protein called NADH-ubiquinone oxidoreductase chain 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	i	347	2710	1782	420	462	46	0	0

- Molecule 18 is a protein called NADH-ubiquinone oxidoreductase chain 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	j	99	800	545	118	132	5	0	0

- Molecule 19 is a protein called NADH-ubiquinone oxidoreductase chain 4L.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	k	97	740	488	112	127	13	0	0

- Molecule 20 is a protein called NADH-ubiquinone oxidoreductase chain 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	l	603	4782	3172	740	819	51	0	0

- Molecule 21 is a protein called NADH-ubiquinone oxidoreductase chain 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	m	126	925	622	135	162	6	0	0

- Molecule 22 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	n	56	479	311	88	79	1	0	0

- Molecule 23 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
23	o	128	1062	691	182	189	0	0

- Molecule 24 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	p	178	1534	982	279	265	8	0	0

- Molecule 25 is a protein called NADH-ubiquinone oxidoreductase chain 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	r	459	3631	2412	572	609	38	0	0

- Molecule 26 is a protein called NADH-ubiquinone oxidoreductase chain 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	s	303	2394	1607	369	397	21	0	0

- Molecule 27 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	u	171	1398	887	250	251	10	0	0

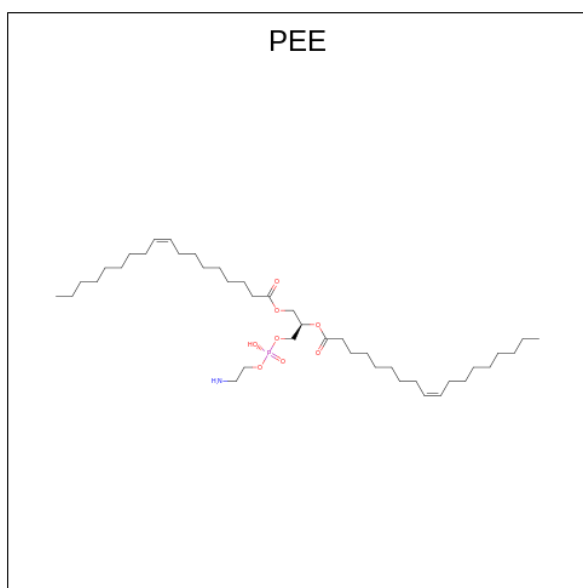
- Molecule 28 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	v	124	1028	642	195	182	9	0	0

- Molecule 29 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	w	320	2582	1643	438	491	10	0	0

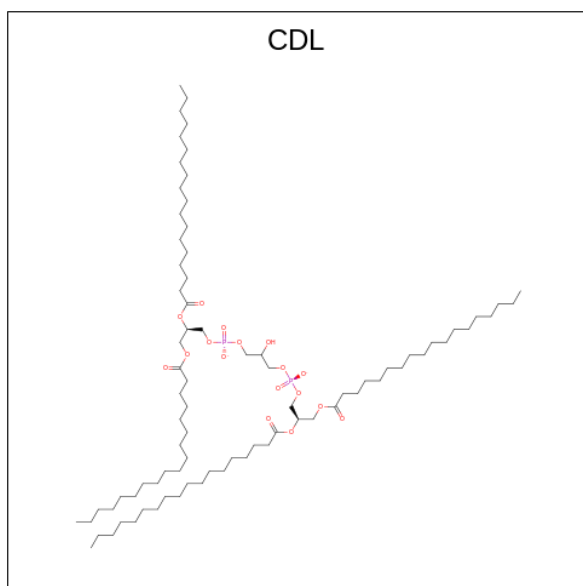
- Molecule 30 is 1,2-dioleoyl-sn-glycero-3-phosphoethanolamine (three-letter code: PEE) (formula:  $C_{41}H_{78}NO_8P$ ) (labeled as "Ligand of Interest" by depositor).





Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
30	Q	1	Total 47	C 37	N 1	O 8	P 1	0
30	U	1	Total 51	C 41	N 1	O 8	P 1	0
30	b	1	Total 46	C 36	N 1	O 8	P 1	0
30	l	1	Total 46	C 36	N 1	O 8	P 1	0
30	m	1	Total 41	C 31	N 1	O 8	P 1	0
30	r	1	Total 51	C 41	N 1	O 8	P 1	0
30	s	1	Total 51	C 41	N 1	O 8	P 1	0

- Molecule 31 is CARDIOLIPIN (three-letter code: CDL) (formula:  $C_{81}H_{156}O_{17}P_2$ ) (labeled as "Ligand of Interest" by depositor).



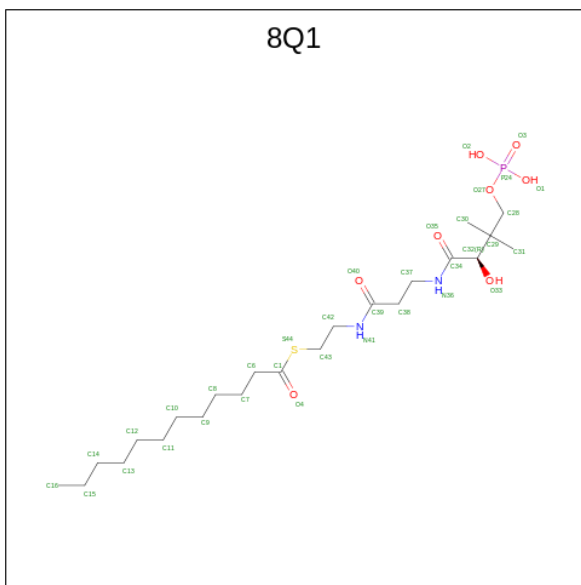
Mol	Chain	Residues	Atoms				AltConf
			Total	C	O	P	
31	V	1	Total 71	C 52	O 17	P 2	0
31	a	1	Total 91	C 72	O 17	P 2	0
31	i	1	Total 66	C 47	O 17	P 2	0
31	l	1	Total 100	C 81	O 17	P 2	0

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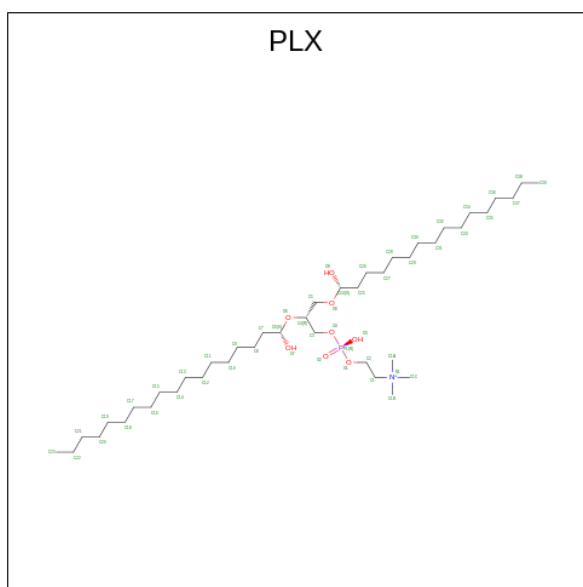
Mol	Chain	Residues	Atoms				AltConf
31	r	1	Total	C	O	P	0
			99	80	17	2	
31	r	1	Total	C	O	P	0
			100	81	17	2	

- Molecule 32 is S-[2-({N-[(2R)-2-hydroxy-3,3-dimethyl-4-(phosphonoxy)butanoyl]-beta-alanyl}amino)ethyl] dodecanethioate (three-letter code: 8Q1) (formula: C<sub>23</sub>H<sub>45</sub>N<sub>2</sub>O<sub>8</sub>PS) (labeled as "Ligand of Interest" by depositor).



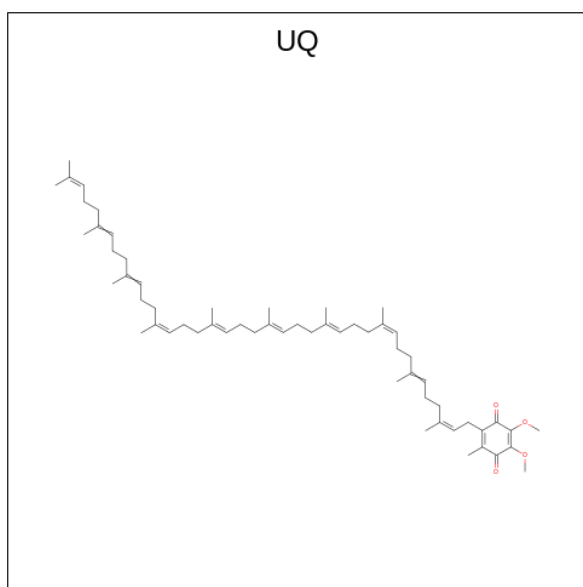
Mol	Chain	Residues	Atoms					AltConf	
32	X	1	Total	C	N	O	P	S	0
			35	23	2	8	1	1	

- Molecule 33 is (9R,11S)-9-({[(1S)-1-HYDROXYHEXADECYL]OXY}METHYL)-2,2-DIMETHYL-5,7,10-TRIOXA-2LAMBDA 5 -AZA-6LAMBDA 5 -PHOSPHAOCTACOSANE-6,6,11-TRIOL (three-letter code: PLX) (formula: C<sub>42</sub>H<sub>89</sub>NO<sub>8</sub>P) (labeled as "Ligand of Interest" by depositor).



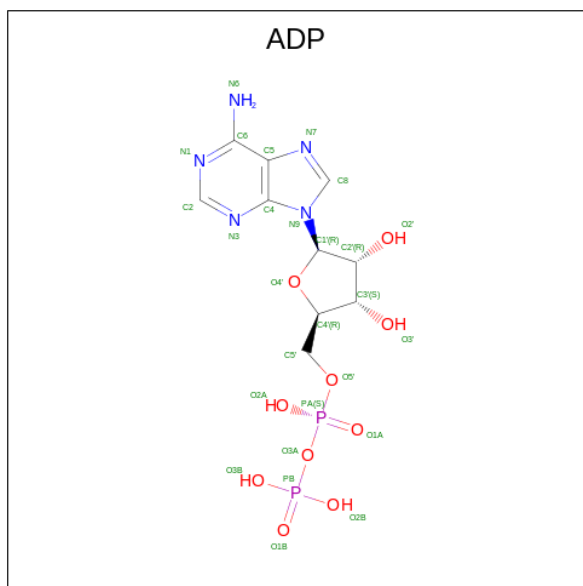
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
33	e	1	52	42	1	8	1	0
33	g	1	52	42	1	8	1	0
33	m	1	52	42	1	8	1	0
33	r	1	52	42	1	8	1	0
33	r	1	52	42	1	8	1	0

- Molecule 34 is Coenzyme Q10, (2Z,6E,10Z,14E,18E,22E,26Z)-isomer (three-letter code: UQ) (formula: C<sub>59</sub>H<sub>90</sub>O<sub>4</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
34	s	1	Total	C	O	0
			28	24	4	

- Molecule 35 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula:  $C_{10}H_{15}N_5O_{10}P_2$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
35	w	1	Total	C	N	O	P	0
			27	10	5	10	2	

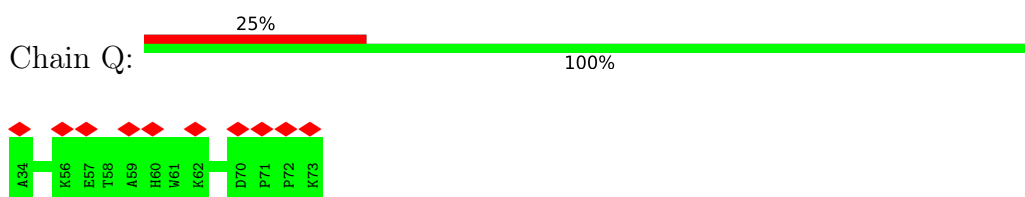
- Molecule 36 is water.

Mol	Chain	Residues	Atoms	AltConf
36	Q	5	Total O 5 5	0
36	S	7	Total O 7 7	0
36	U	3	Total O 3 3	0
36	W	3	Total O 3 3	0
36	Z	1	Total O 1 1	0
36	c	4	Total O 4 4	0
36	d	1	Total O 1 1	0
36	e	2	Total O 2 2	0
36	g	2	Total O 2 2	0
36	h	4	Total O 4 4	0
36	i	64	Total O 64 64	0
36	j	13	Total O 13 13	0
36	k	17	Total O 17 17	0
36	l	55	Total O 55 55	0
36	m	11	Total O 11 11	0
36	n	2	Total O 2 2	0
36	p	2	Total O 2 2	0
36	r	83	Total O 83 83	0
36	s	61	Total O 61 61	0
36	u	2	Total O 2 2	0
36	w	3	Total O 3 3	0

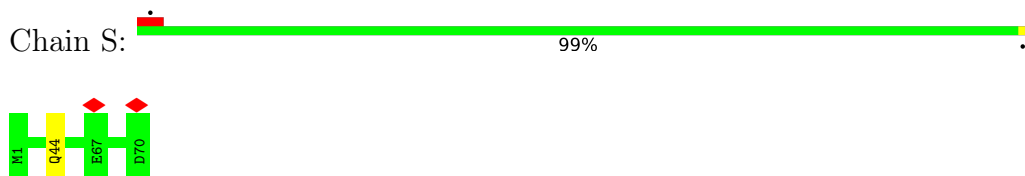
### 3 Residue-property plots [i](#)

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

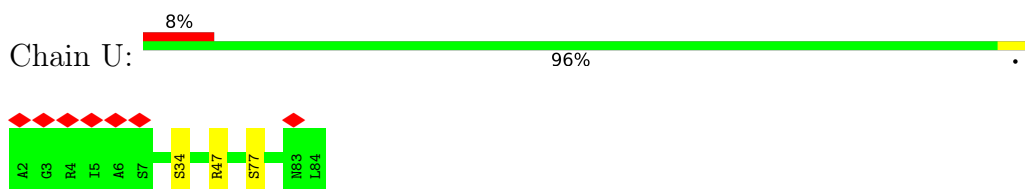
- Molecule 1: NADH dehydrogenase [ubiquinone] iron-sulfur protein 2



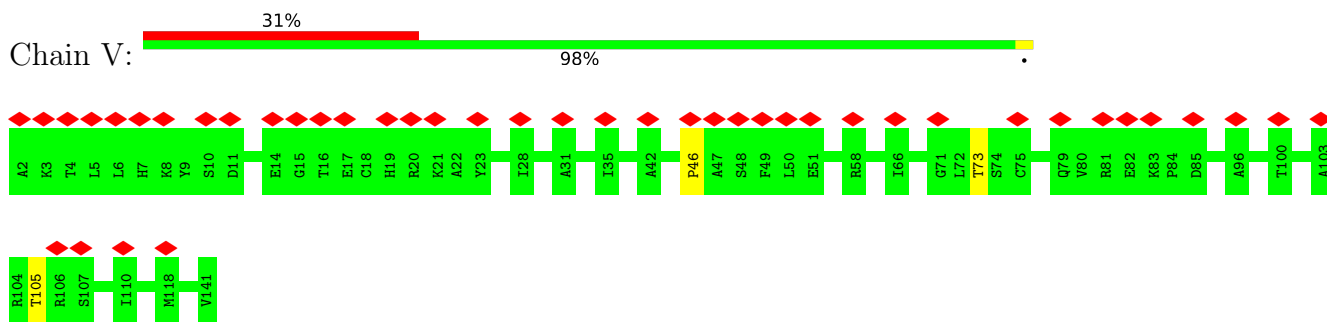
- Molecule 2: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 1



- Molecule 3: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 3

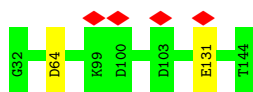


- Molecule 4: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 11

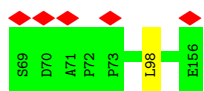


- Molecule 5: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13

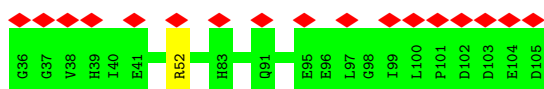




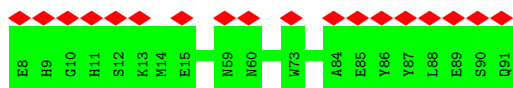
- Molecule 6: Acyl carrier protein



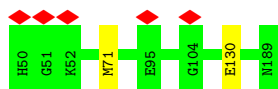
- Molecule 7: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2



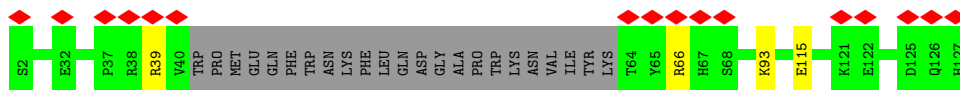
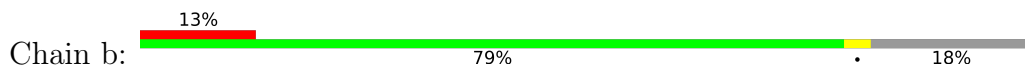
- Molecule 8: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3



- Molecule 9: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 5



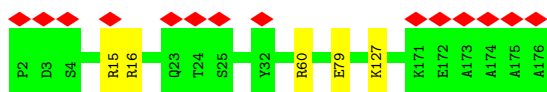
- Molecule 10: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 6



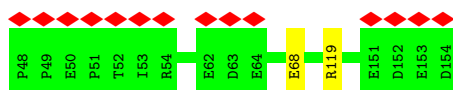
- Molecule 11: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8



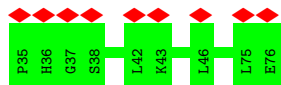
- Molecule 12: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10



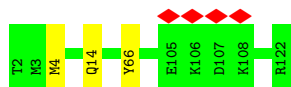
- Molecule 13: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11



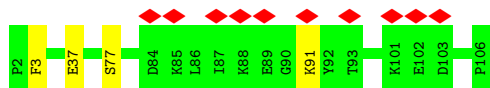
- Molecule 14: NADH dehydrogenase [ubiquinone] 1 subunit C1



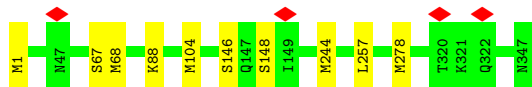
- Molecule 15: NADH dehydrogenase [ubiquinone] 1 subunit C2



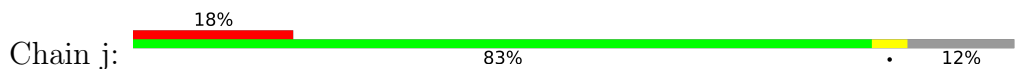
- Molecule 16: NADH dehydrogenase [ubiquinone] iron-sulfur protein 5



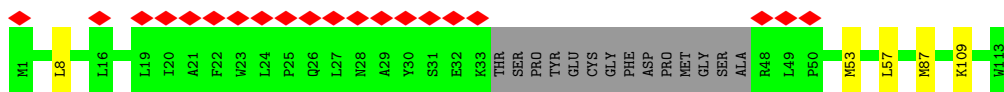
- Molecule 17: NADH-ubiquinone oxidoreductase chain 2



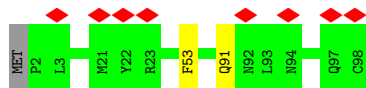
- Molecule 18: NADH-ubiquinone oxidoreductase chain 3







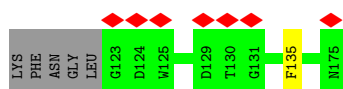
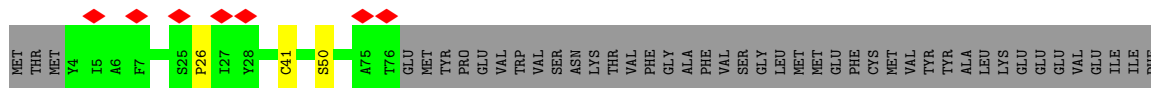
- Molecule 19: NADH-ubiquinone oxidoreductase chain 4L



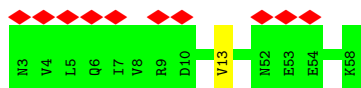
- Molecule 20: NADH-ubiquinone oxidoreductase chain 5



- Molecule 21: NADH-ubiquinone oxidoreductase chain 6



- Molecule 22: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 1

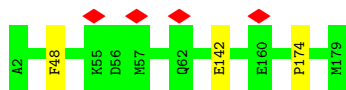


- Molecule 23: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4



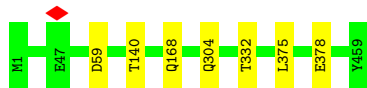
- Molecule 24: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9





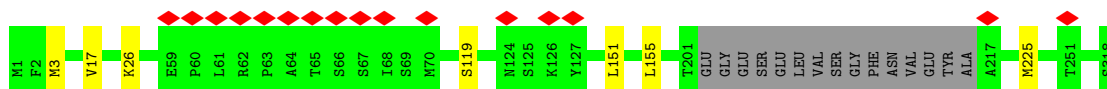
- Molecule 25: NADH-ubiquinone oxidoreductase chain 4

Chain r: 98%



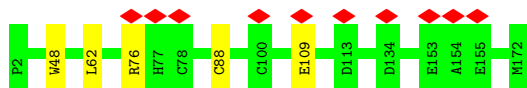
- Molecule 26: NADH-ubiquinone oxidoreductase chain 1

Chain s: 5% 93% 5%



- Molecule 27: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8

Chain u: 6% 97% 5%



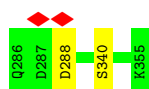
- Molecule 28: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7

Chain v: 21% 91% 9%



- Molecule 29: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10

Chain w: 11% 96% 5%



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	209056	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 ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	1300	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.074	Depositor
Minimum map value	-0.039	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.013	Depositor
Map size (Å)	263.496, 263.496, 263.496	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.54895, 0.54895, 0.54895	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: PEE, ADP, PLX, 8Q1, CDL, UQ

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	Q	0.26	0/350	0.42	0/483
2	S	0.26	0/582	0.49	0/783
3	U	0.25	0/664	0.43	0/912
4	V	0.25	0/1042	0.45	0/1411
5	W	0.27	0/973	0.48	0/1312
6	X	0.26	0/708	0.44	0/959
7	Y	0.26	0/623	0.46	0/853
8	Z	0.25	0/695	0.44	0/939
9	a	0.28	0/1199	0.48	0/1623
10	b	0.27	0/906	0.53	0/1232
11	c	0.27	0/1371	0.47	0/1875
12	d	0.27	0/1494	0.51	0/2015
13	e	0.27	0/916	0.48	0/1246
14	f	0.25	0/350	0.40	0/473
15	g	0.29	0/1031	0.48	0/1394
16	h	0.26	0/889	0.50	0/1190
17	i	0.26	0/2773	0.45	0/3768
18	j	0.27	0/819	0.48	0/1117
19	k	0.26	0/751	0.44	0/1018
20	l	0.27	0/4911	0.46	0/6679
21	m	0.28	0/947	0.48	0/1286
22	n	0.24	0/491	0.48	0/663
23	o	0.27	0/1092	0.49	0/1481
24	p	0.29	0/1590	0.53	0/2155
25	r	0.27	0/3723	0.47	0/5078
26	s	0.27	0/2464	0.47	0/3369
27	u	0.27	0/1436	0.49	0/1938
28	v	0.26	0/1052	0.56	0/1411
29	w	0.27	0/2642	0.49	0/3580
All	All	0.27	0/38484	0.48	0/52243

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

## 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	Q	38/40 (95%)	38 (100%)	0	0	100	100
2	S	68/70 (97%)	66 (97%)	2 (3%)	0	100	100
3	U	81/83 (98%)	78 (96%)	3 (4%)	0	100	100
4	V	138/140 (99%)	131 (95%)	6 (4%)	1 (1%)	22	46
5	W	111/113 (98%)	108 (97%)	3 (3%)	0	100	100
6	X	86/88 (98%)	83 (96%)	3 (4%)	0	100	100
7	Y	68/70 (97%)	63 (93%)	5 (7%)	0	100	100
8	Z	82/84 (98%)	81 (99%)	1 (1%)	0	100	100
9	a	138/140 (99%)	135 (98%)	3 (2%)	0	100	100
10	b	99/126 (79%)	93 (94%)	6 (6%)	0	100	100
11	c	154/156 (99%)	148 (96%)	6 (4%)	0	100	100
12	d	173/175 (99%)	171 (99%)	2 (1%)	0	100	100
13	e	105/107 (98%)	101 (96%)	4 (4%)	0	100	100
14	f	40/42 (95%)	40 (100%)	0	0	100	100
15	g	119/121 (98%)	115 (97%)	4 (3%)	0	100	100
16	h	103/105 (98%)	100 (97%)	3 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
17	i	345/347 (99%)	332 (96%)	13 (4%)	0	100	100
18	j	95/113 (84%)	89 (94%)	6 (6%)	0	100	100
19	k	95/98 (97%)	89 (94%)	6 (6%)	0	100	100
20	l	601/603 (100%)	583 (97%)	18 (3%)	0	100	100
21	m	122/175 (70%)	108 (88%)	13 (11%)	1 (1%)	19	43
22	n	54/56 (96%)	53 (98%)	1 (2%)	0	100	100
23	o	126/128 (98%)	118 (94%)	8 (6%)	0	100	100
24	p	176/178 (99%)	164 (93%)	11 (6%)	1 (1%)	25	50
25	r	457/459 (100%)	447 (98%)	10 (2%)	0	100	100
26	s	299/318 (94%)	286 (96%)	13 (4%)	0	100	100
27	u	169/171 (99%)	162 (96%)	7 (4%)	0	100	100
28	v	122/124 (98%)	115 (94%)	7 (6%)	0	100	100
29	w	318/320 (99%)	307 (96%)	10 (3%)	1 (0%)	41	66
All	All	4582/4750 (96%)	4404 (96%)	174 (4%)	4 (0%)	54	78

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	V	46	PRO
24	p	174	PRO
21	m	26	PRO
29	w	340	SER

### 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	Q	34/34 (100%)	34 (100%)	0	100	100
2	S	58/58 (100%)	57 (98%)	1 (2%)	60	84
3	U	69/69 (100%)	66 (96%)	3 (4%)	29	57

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	V	101/101 (100%)	99 (98%)	2 (2%)	55	81
5	W	99/99 (100%)	97 (98%)	2 (2%)	55	81
6	X	77/81 (95%)	76 (99%)	1 (1%)	69	87
7	Y	62/63 (98%)	61 (98%)	1 (2%)	62	85
8	Z	65/65 (100%)	65 (100%)	0	100	100
9	a	122/122 (100%)	120 (98%)	2 (2%)	62	85
10	b	98/119 (82%)	94 (96%)	4 (4%)	30	59
11	c	141/141 (100%)	138 (98%)	3 (2%)	53	80
12	d	155/155 (100%)	150 (97%)	5 (3%)	39	68
13	e	99/99 (100%)	97 (98%)	2 (2%)	55	81
14	f	35/38 (92%)	35 (100%)	0	100	100
15	g	108/108 (100%)	105 (97%)	3 (3%)	43	73
16	h	93/93 (100%)	89 (96%)	4 (4%)	29	57
17	i	311/311 (100%)	301 (97%)	10 (3%)	39	68
18	j	88/99 (89%)	83 (94%)	5 (6%)	20	44
19	k	84/85 (99%)	82 (98%)	2 (2%)	49	77
20	l	536/537 (100%)	518 (97%)	18 (3%)	37	66
21	m	95/141 (67%)	92 (97%)	3 (3%)	39	68
22	n	53/53 (100%)	52 (98%)	1 (2%)	57	82
23	o	113/113 (100%)	110 (97%)	3 (3%)	44	74
24	p	159/159 (100%)	157 (99%)	2 (1%)	69	87
25	r	410/410 (100%)	403 (98%)	7 (2%)	60	84
26	s	263/275 (96%)	256 (97%)	7 (3%)	44	74
27	u	153/153 (100%)	148 (97%)	5 (3%)	38	67
28	v	104/111 (94%)	93 (89%)	11 (11%)	6	15
29	w	281/283 (99%)	270 (96%)	11 (4%)	32	61
All	All	4066/4175 (97%)	3948 (97%)	118 (3%)	45	71

5 of 118 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
20	l	336	LYS
29	w	116	LYS

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Mol	Chain	Res	Type
22	n	13	VAL
29	w	115	GLU
28	v	36	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
15	g	119	HIS
17	i	221	HIS
19	k	91	GLN
20	l	2	ASN
29	w	107	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](#)

21 ligands are modelled in this entry.

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	$\# Z  > 2$
30	PEE	s	401	-	50,50,50	1.15	6 (12%)	53,55,55	1.00	2 (3%)



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
31	CDL	r	503	-	98,98,99	0.93	4 (4%)	104,110,111	1.10	7 (6%)
35	ADP	w	401	-	24,29,29	3.12	6 (25%)	29,45,45	1.43	4 (13%)
31	CDL	r	505	-	99,99,99	1.08	8 (8%)	105,111,111	0.85	4 (3%)
33	PLX	e	201	-	51,51,51	1.13	4 (7%)	55,59,59	0.59	1 (1%)
30	PEE	Q	101	-	46,46,50	1.20	6 (13%)	49,51,55	1.01	2 (4%)
33	PLX	m	201	-	51,51,51	1.15	4 (7%)	55,59,59	0.60	1 (1%)
33	PLX	g	201	-	51,51,51	1.12	3 (5%)	55,59,59	0.63	1 (1%)
30	PEE	U	101	-	50,50,50	1.15	6 (12%)	53,55,55	0.94	2 (3%)
30	PEE	b	201	-	45,45,50	1.21	6 (13%)	48,50,55	0.96	2 (4%)
30	PEE	r	501	-	50,50,50	1.15	6 (12%)	53,55,55	1.00	2 (3%)
31	CDL	V	201	-	70,70,99	1.22	8 (11%)	76,82,111	0.99	4 (5%)
33	PLX	r	502	-	51,51,51	1.13	4 (7%)	55,59,59	0.63	1 (1%)
32	8Q1	X	201	6	31,34,34	1.69	6 (19%)	40,43,43	1.59	7 (17%)
34	UQ	s	402	-	28,28,63	0.52	0	34,37,79	1.17	4 (11%)
33	PLX	r	504	-	51,51,51	1.14	4 (7%)	55,59,59	0.65	1 (1%)
31	CDL	a	201	-	90,90,99	1.12	9 (10%)	96,102,111	0.96	4 (4%)
30	PEE	m	202	-	40,40,50	1.14	5 (12%)	43,45,55	1.01	2 (4%)
30	PEE	l	702	-	45,45,50	1.22	6 (13%)	48,50,55	0.99	2 (4%)
31	CDL	l	701	-	99,99,99	1.08	8 (8%)	105,111,111	0.86	4 (3%)
31	CDL	i	401	-	65,65,99	1.28	8 (12%)	71,77,111	1.03	4 (5%)

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
30	PEE	s	401	-	-	23/54/54/54	-
31	CDL	r	503	-	-	37/109/109/110	-
35	ADP	w	401	-	-	3/12/32/32	0/3/3/3
31	CDL	r	505	-	-	68/110/110/110	-
33	PLX	e	201	-	-	32/55/55/55	-
30	PEE	Q	101	-	-	25/50/50/54	-
33	PLX	m	201	-	-	30/55/55/55	-
33	PLX	g	201	-	-	24/55/55/55	-
30	PEE	U	101	-	-	22/54/54/54	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
30	PEE	b	201	-	-	21/49/49/54	-
30	PEE	r	501	-	-	27/54/54/54	-
31	CDL	V	201	-	-	48/81/81/110	-
33	PLX	r	502	-	-	27/55/55/55	-
32	8Q1	X	201	6	-	20/41/41/41	-
34	UQ	s	402	-	-	6/21/45/87	0/1/1/1
33	PLX	r	504	-	-	24/55/55/55	-
31	CDL	a	201	-	-	42/101/101/110	-
30	PEE	m	202	-	-	17/44/44/54	-
30	PEE	l	702	-	-	22/49/49/54	-
31	CDL	l	701	-	-	51/110/110/110	-
31	CDL	i	401	-	-	42/76/76/110	-

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
35	w	401	ADP	C3'-C4'	-8.80	1.30	1.53
35	w	401	ADP	O4'-C4'	7.72	1.62	1.45
35	w	401	ADP	O4'-C1'	-6.86	1.31	1.41
32	X	201	8Q1	C34-N36	5.42	1.45	1.33
32	X	201	8Q1	C39-N41	5.30	1.45	1.33

The worst 5 of 61 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
32	X	201	8Q1	C6-C1-S44	6.24	120.72	113.46
31	r	503	CDL	OA6-CA5-C11	4.78	121.81	111.50
35	w	401	ADP	N3-C2-N1	-4.47	121.69	128.68
31	i	401	CDL	OA6-CA5-C11	4.37	120.92	111.50
31	a	201	CDL	OA6-CA5-C11	4.36	120.90	111.50

There are no chirality outliers.

5 of 611 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
30	U	101	PEE	C17-C18-C19-C20
30	U	101	PEE	C1-O3P-P-O1P
30	b	201	PEE	C1-O3P-P-O1P
30	l	702	PEE	C11-C10-O2-C2

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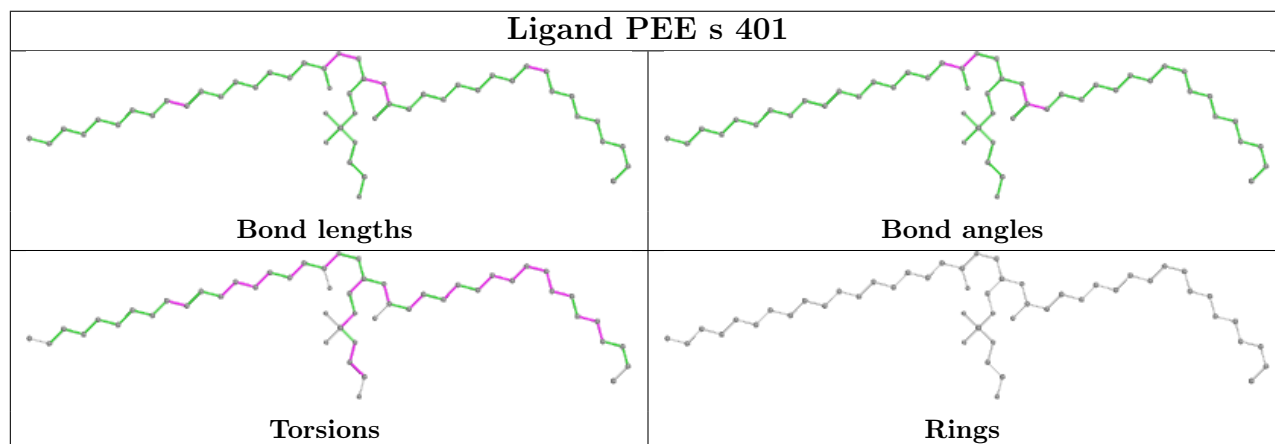
*Continued from previous page...*

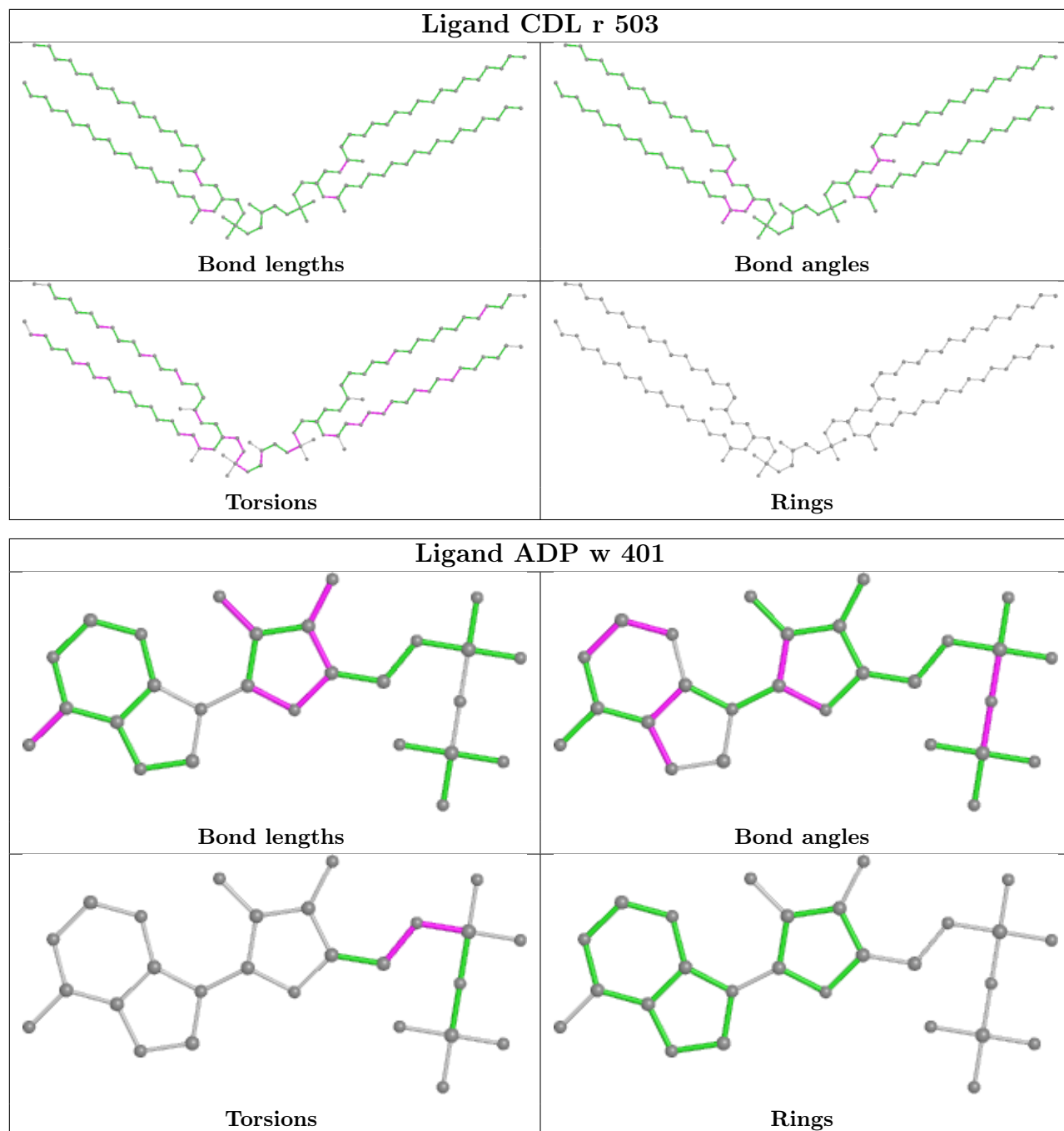
Mol	Chain	Res	Type	Atoms
30	1	702	PEE	C4-O4P-P-O2P

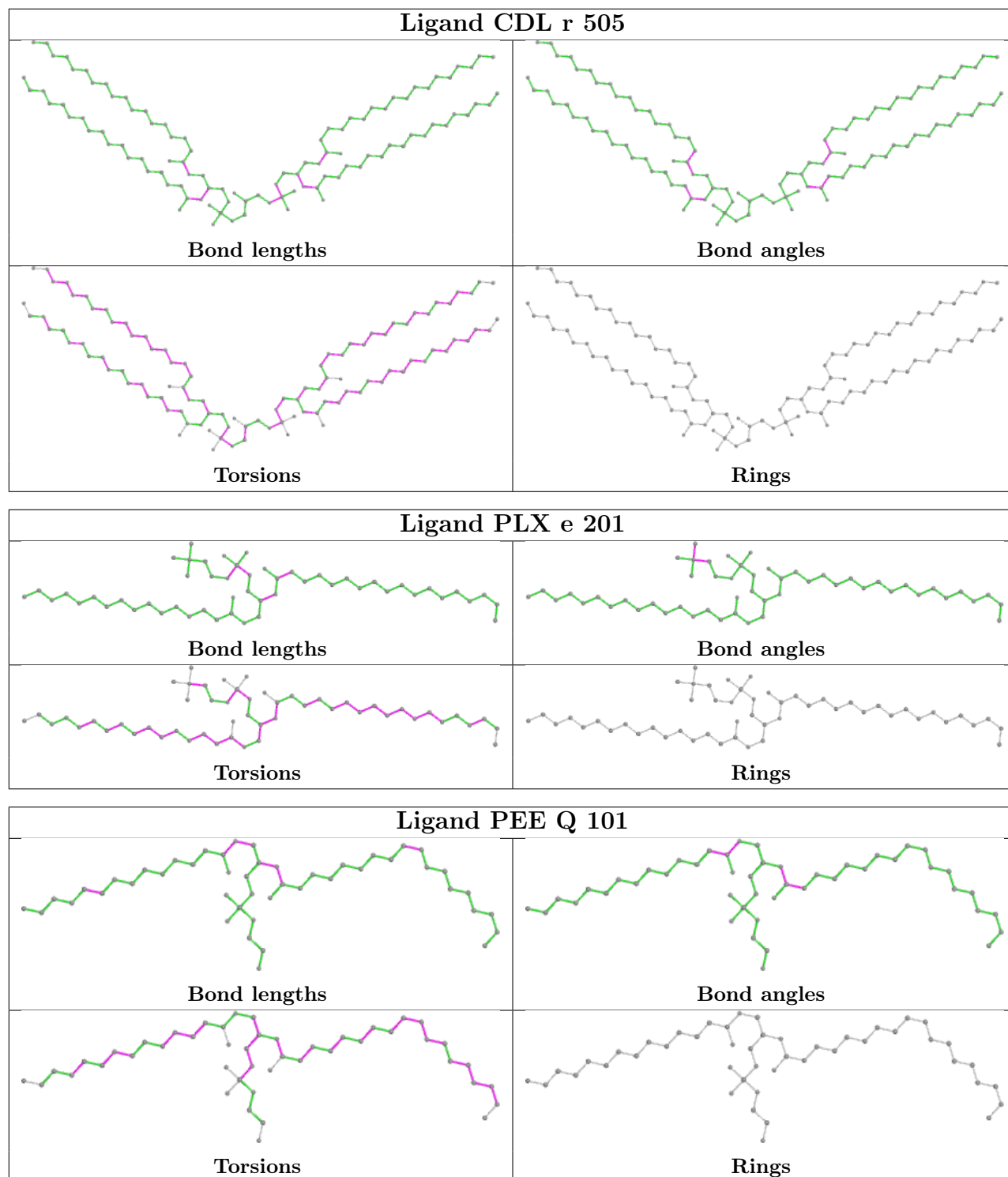
There are no ring outliers.

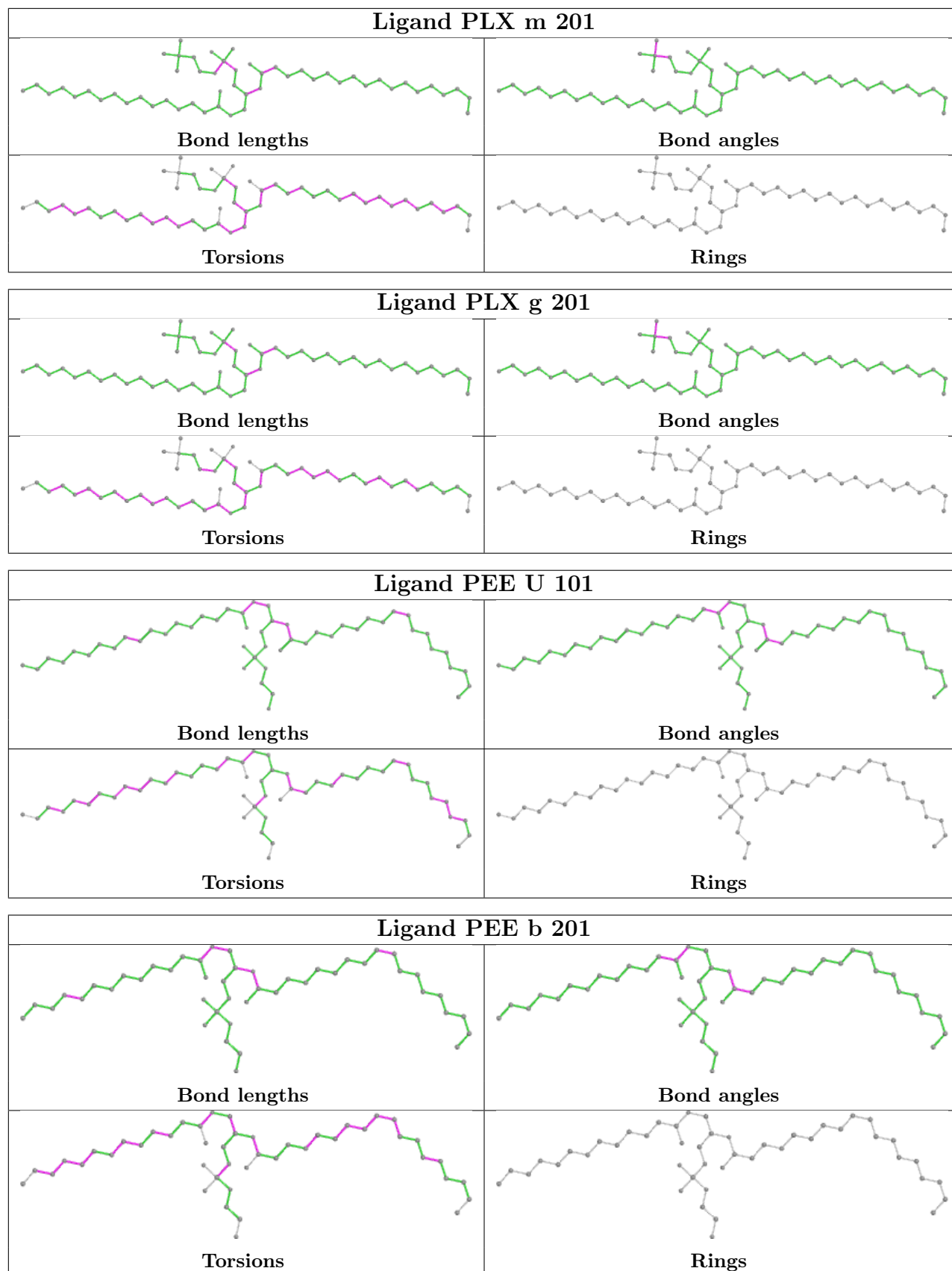
No monomer is involved in short contacts.

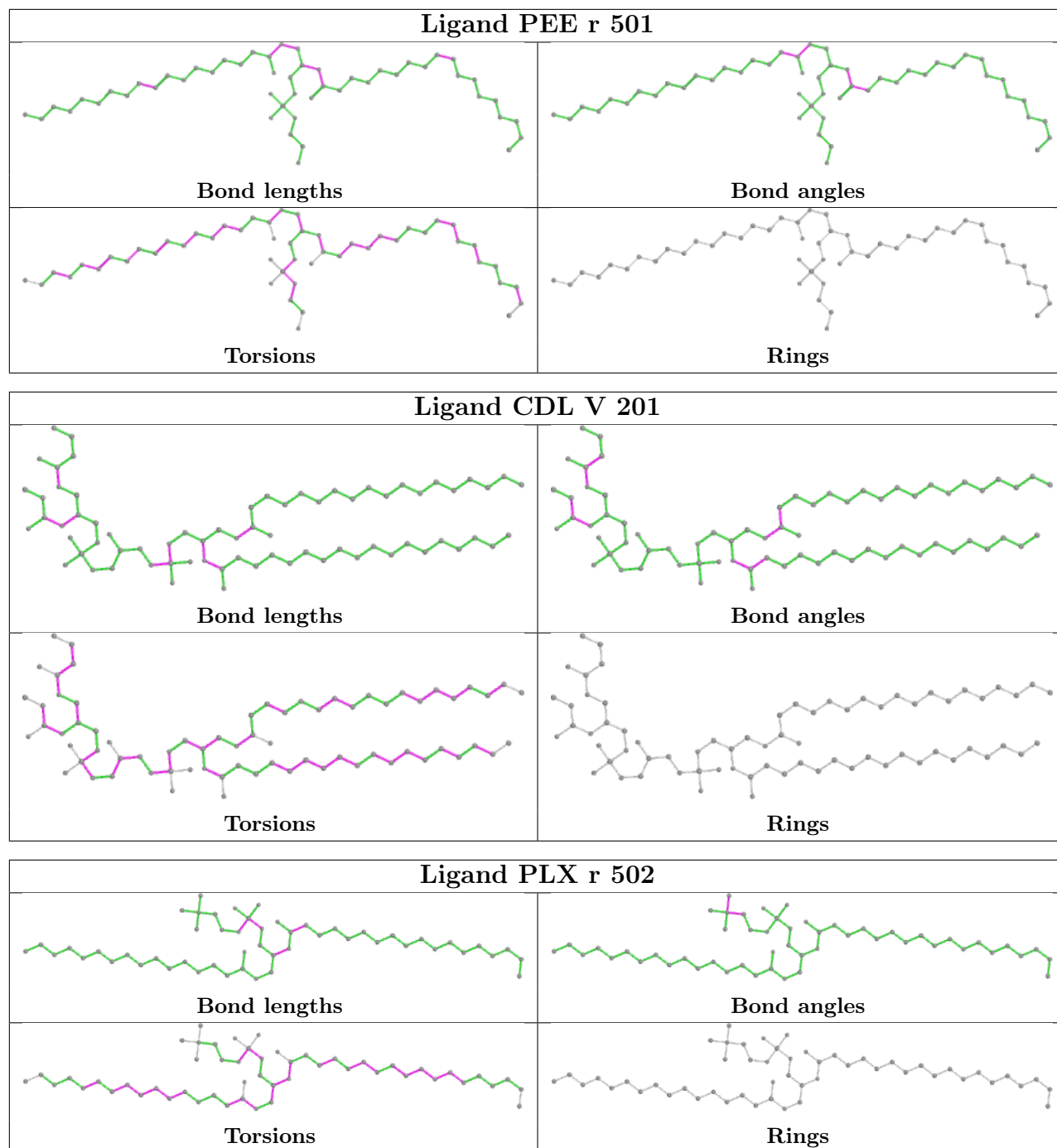
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

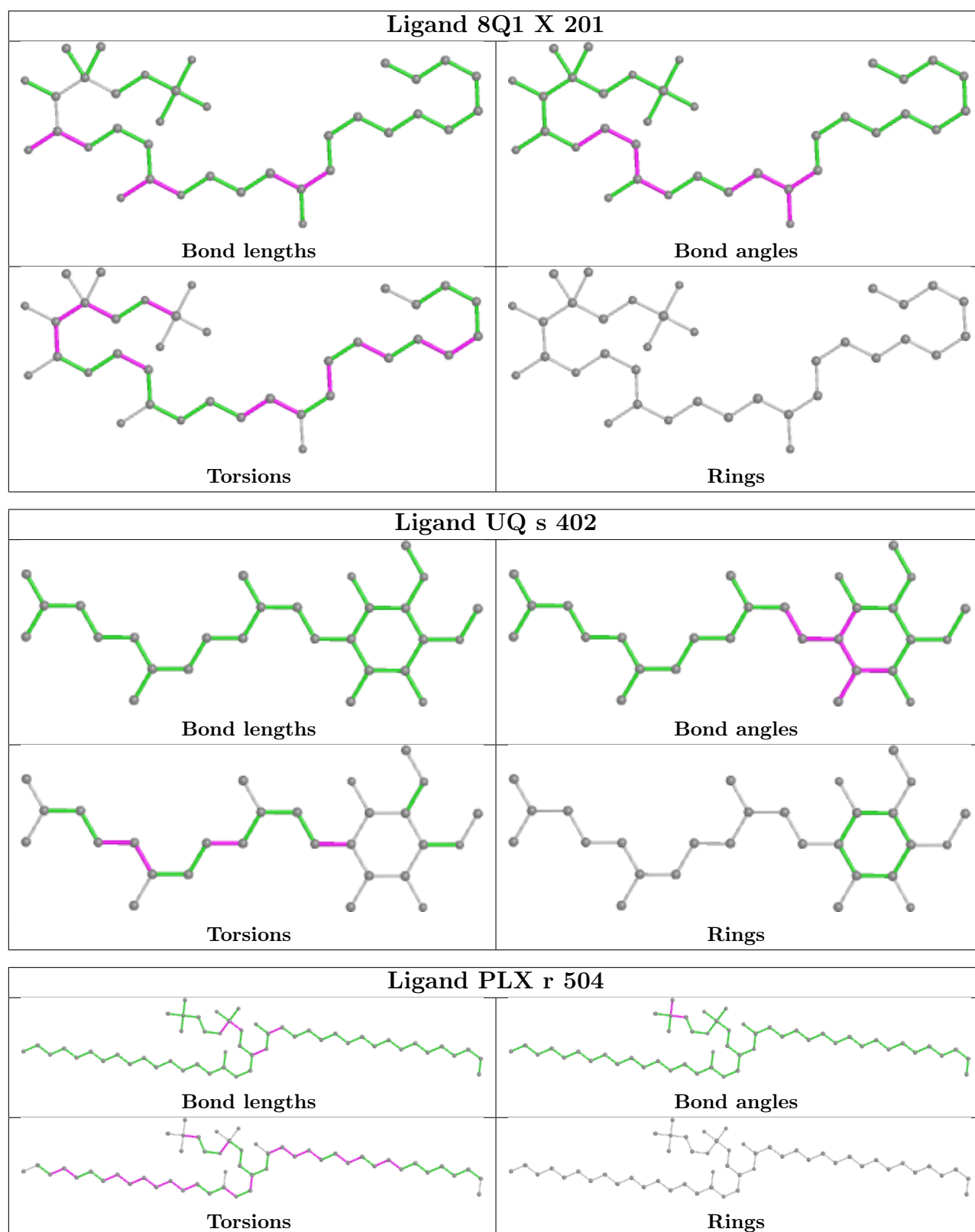




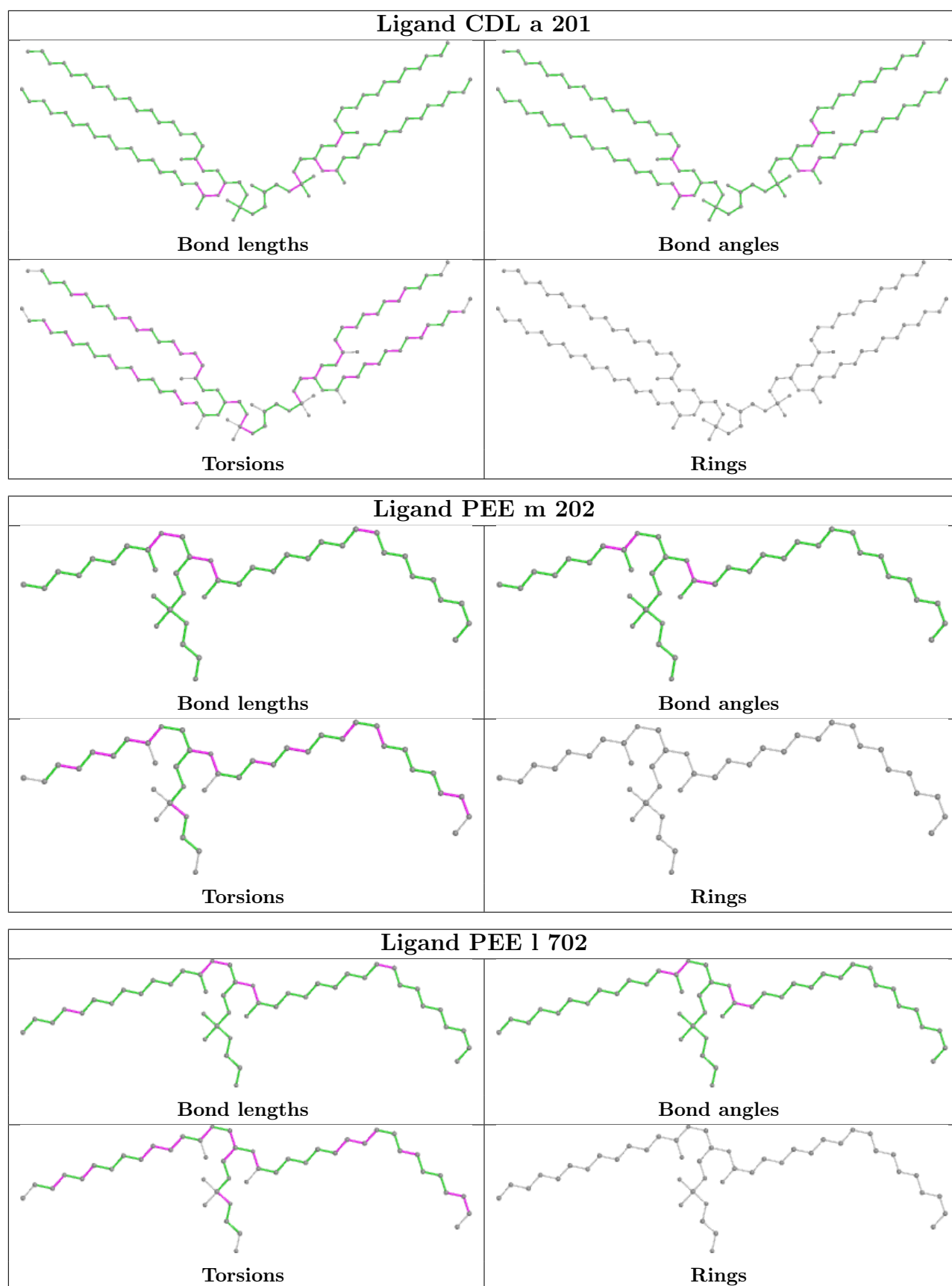


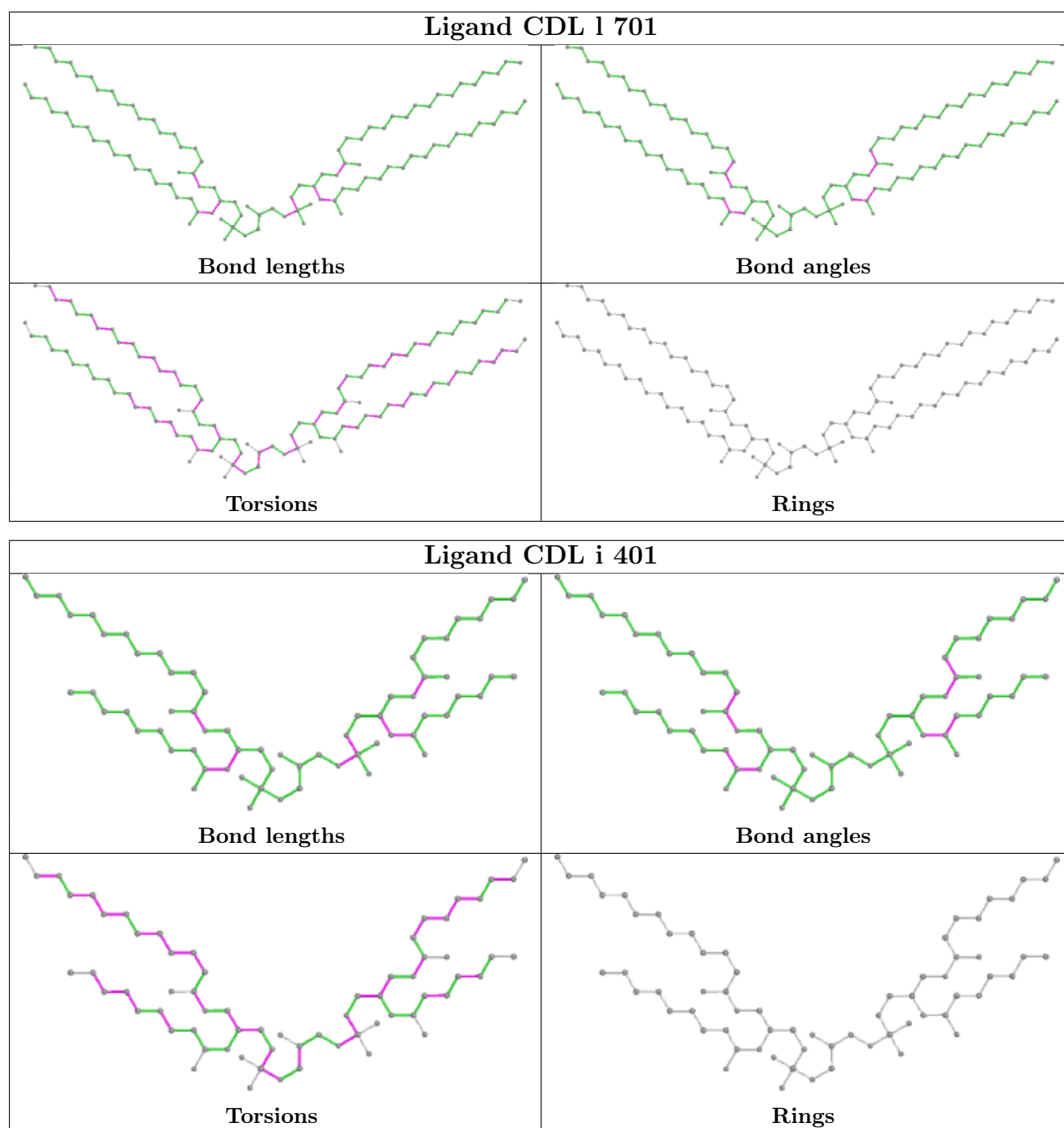












## 5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [\(i\)](#)

There are no chain breaks in this entry.

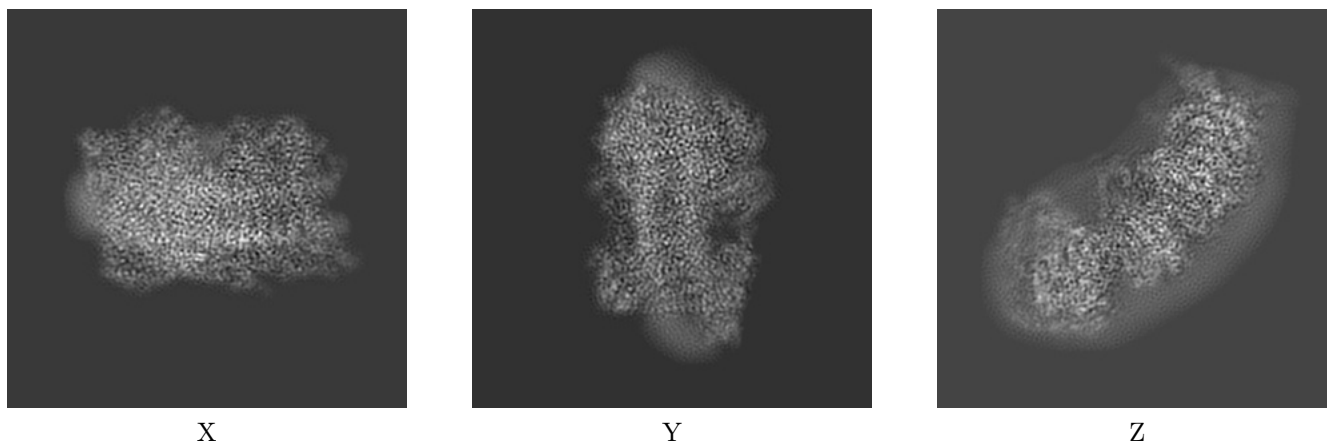
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-32222. 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](#)

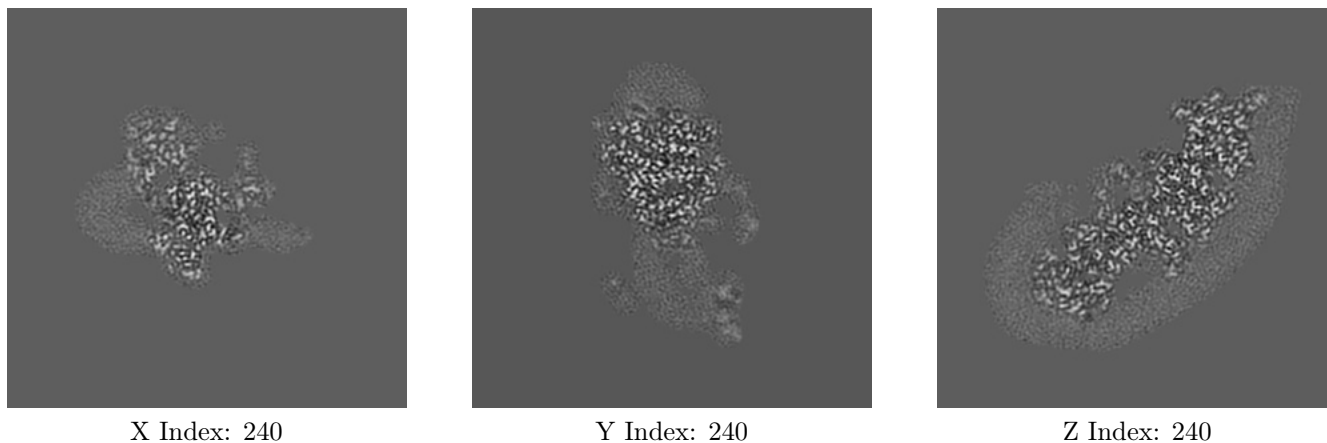
#### 6.1.1 Primary map



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

### 6.2 Central slices [i](#)

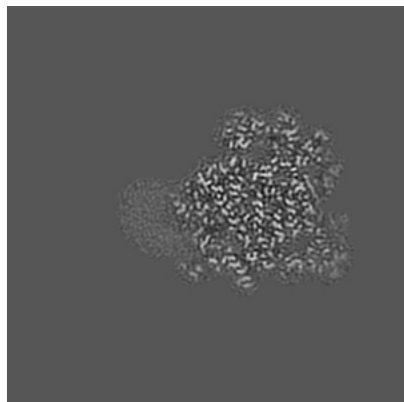
#### 6.2.1 Primary map



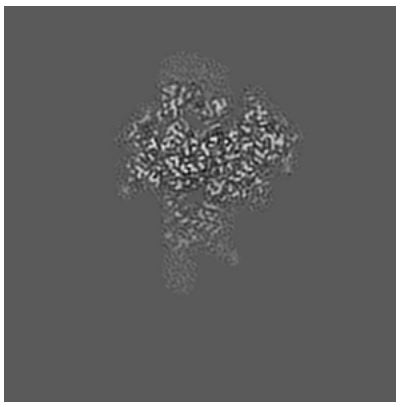
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

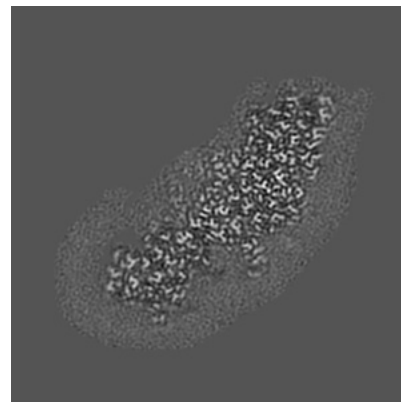
### 6.3.1 Primary map



X Index: 323



Y Index: 281

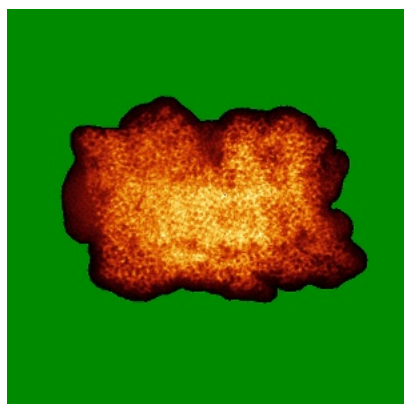


Z Index: 254

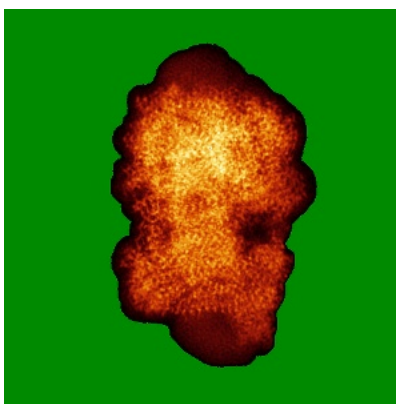
The images above show the largest variance slices of the map in three orthogonal directions.

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

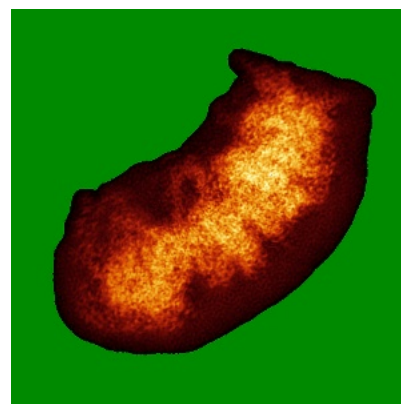
### 6.4.1 Primary map



X



Y



Z

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 0.013. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

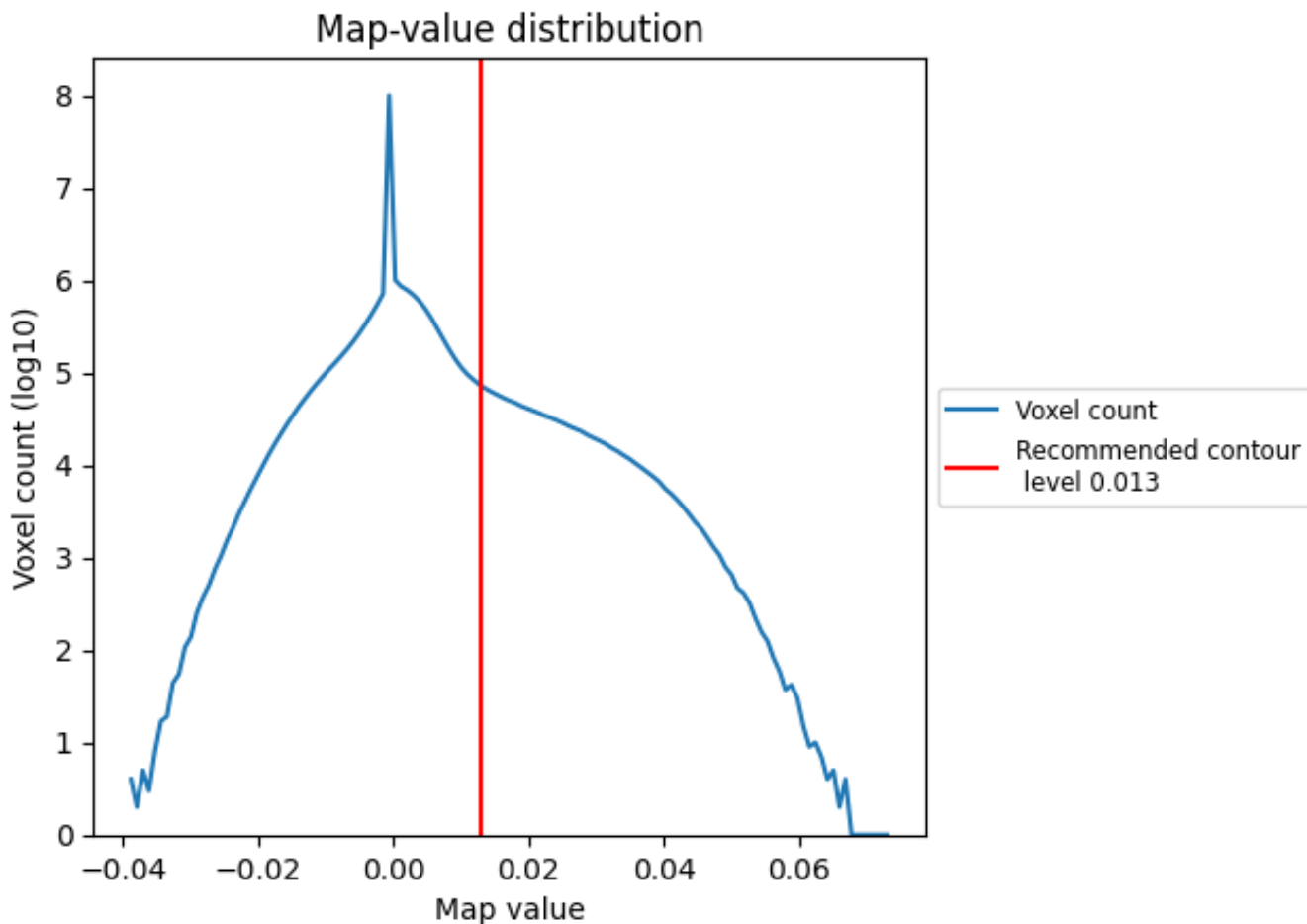
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

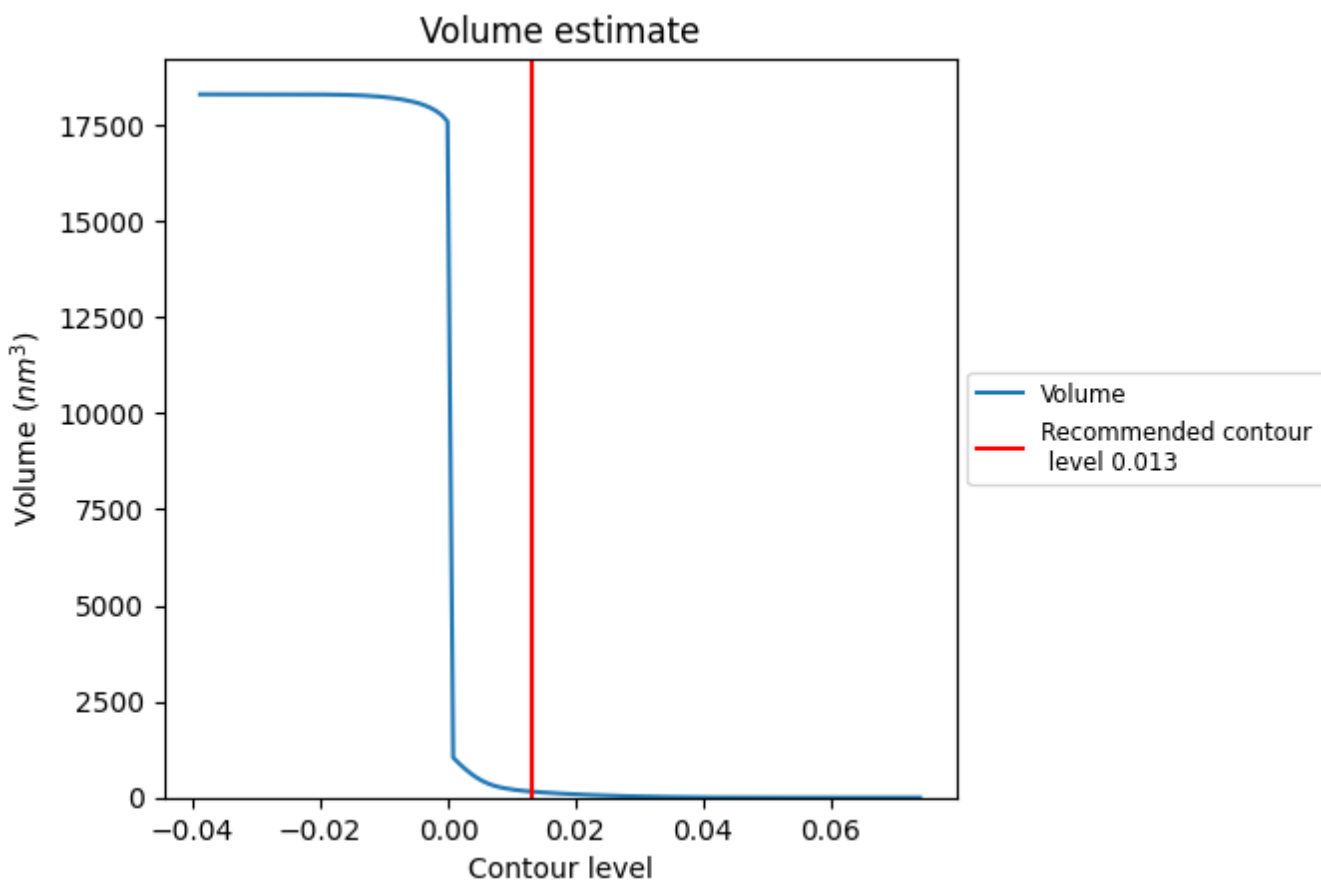
This section contains the results of statistical analysis of the map.

### 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.

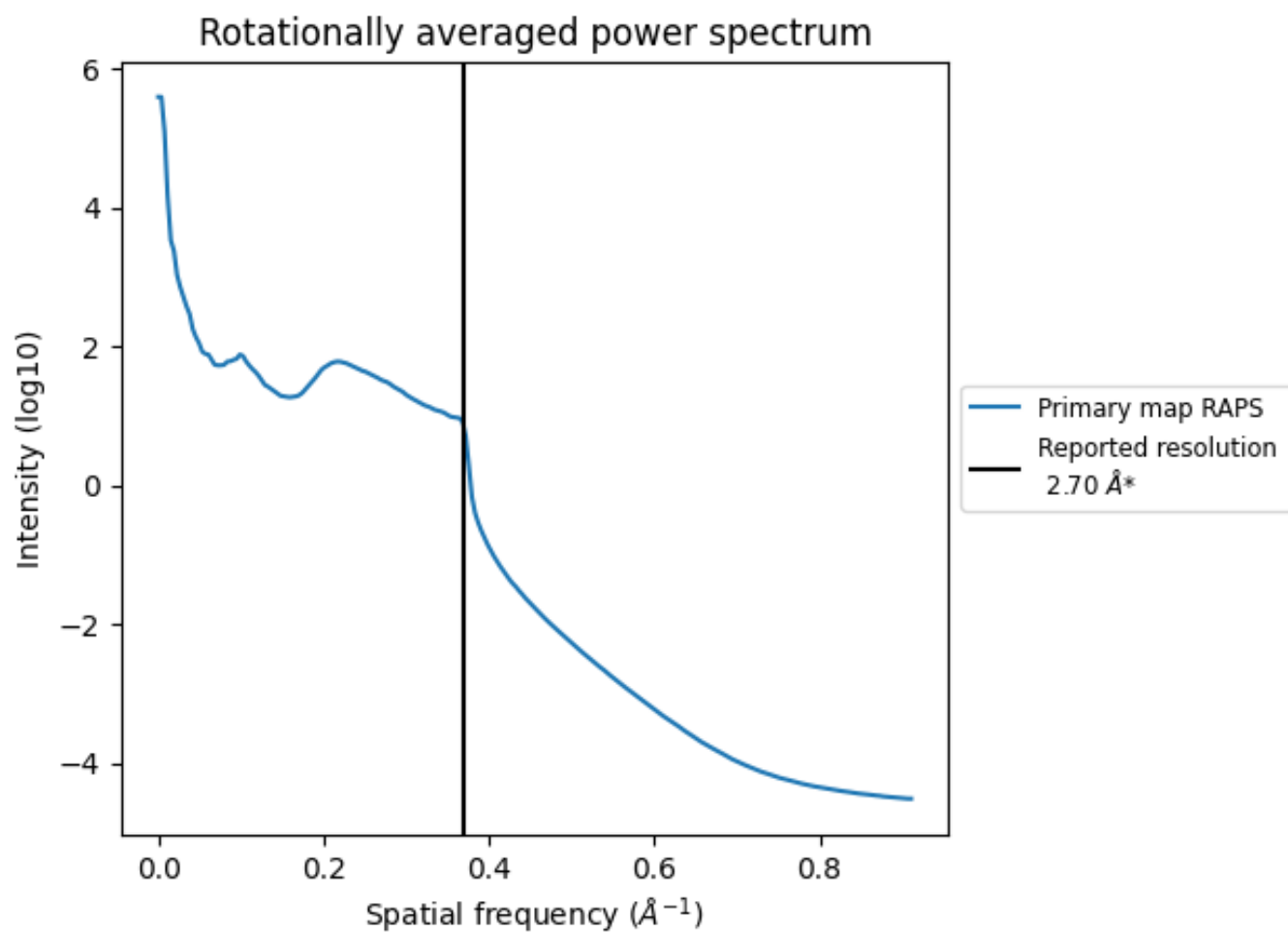
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 158 nm<sup>3</sup>; this corresponds to an approximate mass of 143 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  $0.370 \text{\AA}^{-1}$



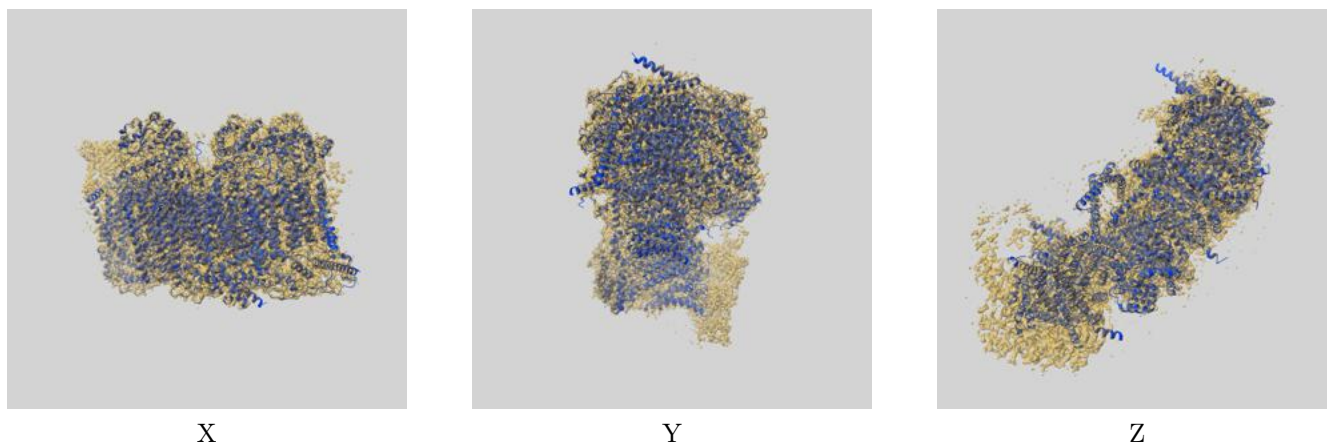
## 8 Fourier-Shell correlation

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

## 9 Map-model fit [i](#)

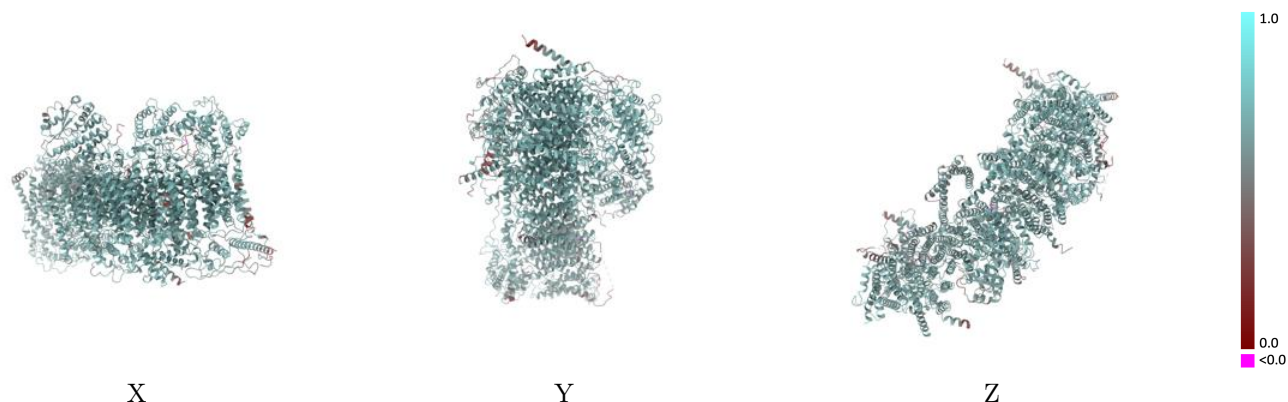
This section contains information regarding the fit between EMDB map EMD-32222 and PDB model 7VZ8. Per-residue inclusion information can be found in section 3 on page 14.

### 9.1 Map-model overlay [i](#)



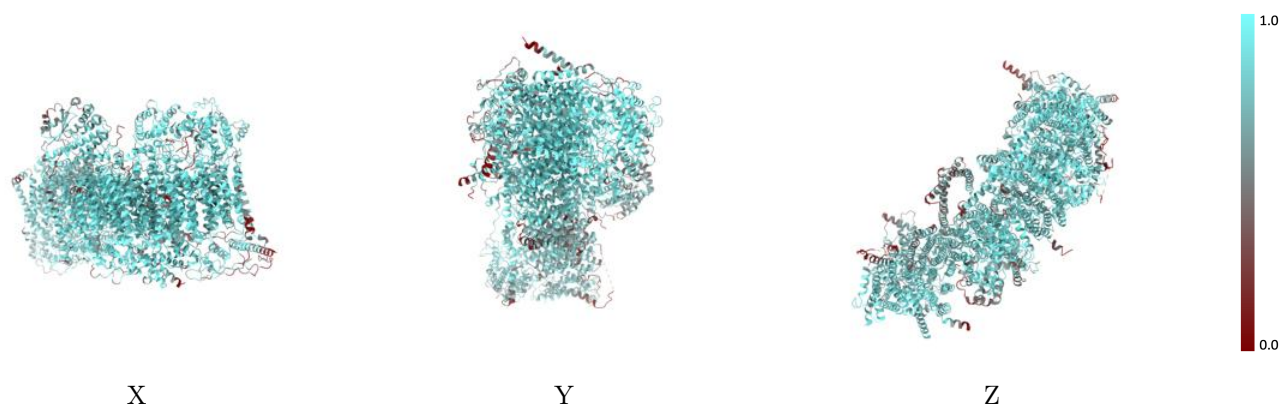
The images above show the 3D surface view of the map at the recommended contour level 0.013 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



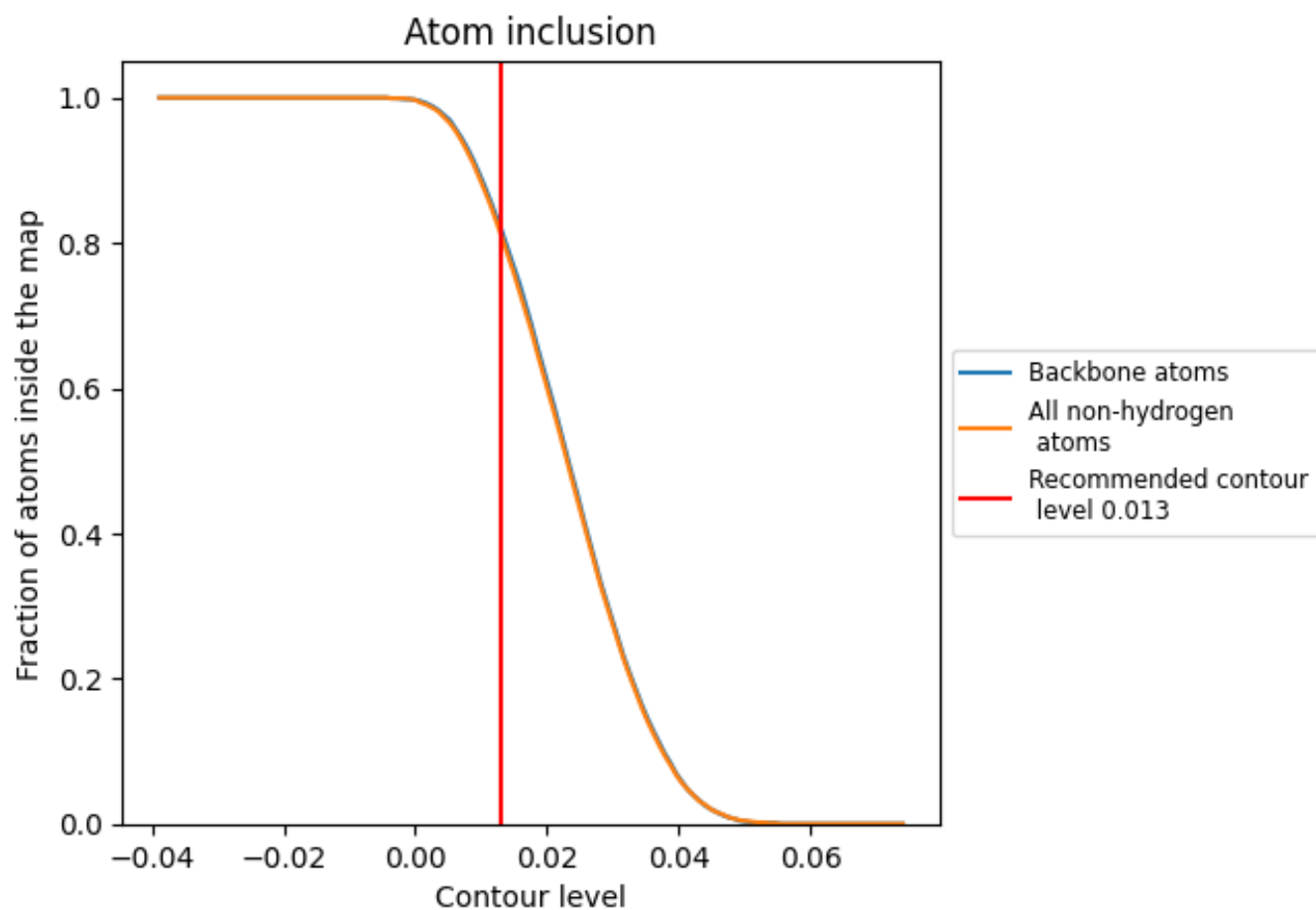
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.013).





























































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 82% of all backbone atoms, 81% 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 (0.013) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8120	 0.6280
Q	 0.6620	 0.5990
S	 0.8320	 0.6210
U	 0.7440	 0.5990
V	 0.5350	 0.5630
W	 0.8400	 0.6390
X	 0.8260	 0.6180
Y	 0.6720	 0.5850
Z	 0.6260	 0.5420
a	 0.8690	 0.6490
b	 0.7140	 0.5850
c	 0.8390	 0.6360
d	 0.8120	 0.6300
e	 0.7710	 0.6100
f	 0.6680	 0.5770
g	 0.8850	 0.6520
h	 0.7950	 0.6260
i	 0.9330	 0.6640
j	 0.6980	 0.5790
k	 0.7970	 0.6290
l	 0.8880	 0.6560
m	 0.7620	 0.6040
n	 0.7090	 0.5960
o	 0.8220	 0.6400
p	 0.8640	 0.6380
r	 0.9140	 0.6580
s	 0.8320	 0.6300
u	 0.7910	 0.6210
v	 0.6590	 0.5770
w	 0.7380	 0.6070

