



Full wwPDB EM Validation Report

Sep 22, 2022 – 04:15 am BST


PDB ID : 7Z7R
EMDB ID : EMD-14535
Title : Complex I from E. coli, LMNG-purified, Apo, Open-ready state
Authors : Kravchuk, V.; Kampjut, D.; Sazanov, L.
Deposited on : 2022-03-16
Resolution : 3.36 Å (reported)
Based on initial models : 3RKO, 4HEA

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.dev8
Mogul : 1.8.4, 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)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.30

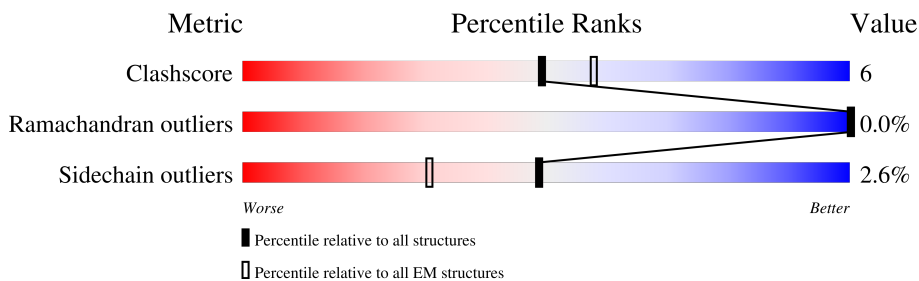
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.36 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.







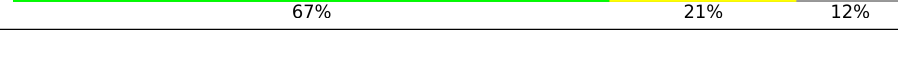
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	F	445	
2	E	166	
3	G	908	
4	C	596	
5	B	220	
6	I	180	
7	H	325	
8	A	147	

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Mol	Chain	Length	Quality of chain
9	L	613	 81% 17%
10	M	509	 76% 20%
11	N	485	 73% 23%
12	K	100	 71% 28%
13	J	184	 67% 21% 12%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
14	SF4	G	1001	-	-	X	-

2 Entry composition [i](#)

There are 19 unique types of molecules in this entry. The entry contains 37252 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-quinone oxidoreductase subunit F.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	F	439	3407	2162	596	629	20	0	0

- Molecule 2 is a protein called NADH dehydrogenase I subunit E.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	E	156	1220	768	215	229	8	0	0

- Molecule 3 is a protein called NADH-quinone oxidoreductase.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	G	905	7027	4392	1269	1329	37	0	0

- Molecule 4 is a protein called NADH-quinone oxidoreductase subunit C/D.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	C	586	4736	3036	825	851	24	0	0

- Molecule 5 is a protein called NADH-quinone oxidoreductase subunit B.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	B	208	1656	1051	288	301	16	0	0

- Molecule 6 is a protein called NADH-quinone oxidoreductase subunit I.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	I	180	1436	915	242	264	15	0	0

- Molecule 7 is a protein called NADH-quinone oxidoreductase subunit H.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	H	322	Total	C	N	O	S	0	0
			2529	1696	398	417	18		

- Molecule 8 is a protein called NADH-quinone oxidoreductase subunit A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	A	113	Total	C	N	O	S	0	0
			894	606	143	141	4		

- Molecule 9 is a protein called NADH dehydrogenase subunit L.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	L	605	Total	C	N	O	S	0	0
			4627	3076	740	779	32		

- Molecule 10 is a protein called NADH dehydrogenase I subunit M.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	M	504	Total	C	N	O	S	0	0
			3953	2661	617	646	29		

- Molecule 11 is a protein called NADH-quinone oxidoreductase subunit N.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	N	470	Total	C	N	O	S	0	0
			3563	2382	563	598	20		

- Molecule 12 is a protein called NADH-quinone oxidoreductase subunit K.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	K	100	Total	C	N	O	S	0	0
			760	494	132	129	5		

- Molecule 13 is a protein called NADH-quinone oxidoreductase subunit J.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	J	162	Total	C	N	O	S	0	0
			1226	824	188	207	7		

- Molecule 14 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe₄S₄).



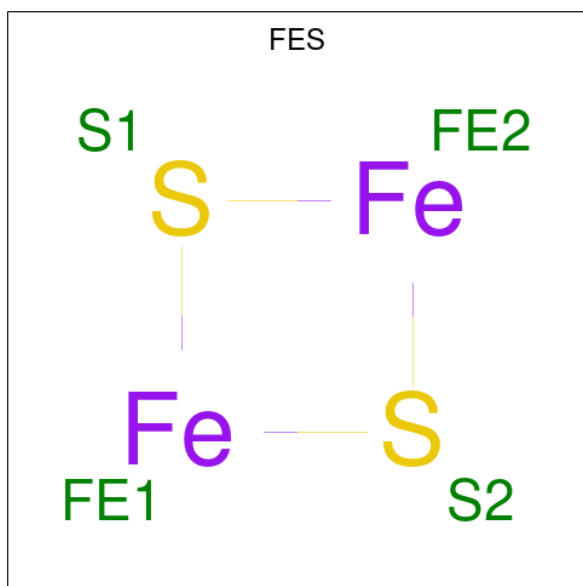
Mol	Chain	Residues	Atoms			AltConf
			Total	Fe	S	
14	F	1	8	4	4	0
14	G	1	24	12	12	0
14	G	1	24	12	12	0
14	G	1	24	12	12	0
14	B	1	8	4	4	0
14	I	1	16	8	8	0
14	I	1	16	8	8	0

- Molecule 15 is FLAVIN MONONUCLEOTIDE (three-letter code: FMN) (formula: C₁₇H₂₁N₄O₉P).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
15	F	1	31	17	4	9	1	0

- Molecule 16 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe₂S₂).

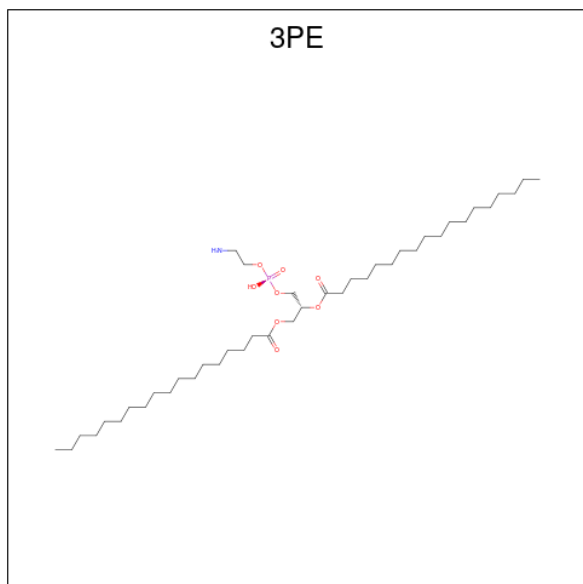


Mol	Chain	Residues	Atoms			AltConf
			Total	Fe	S	
16	E	1	4	2	2	0
16	G	1	4	2	2	0

- Molecule 17 is CALCIUM ION (three-letter code: CA) (formula: Ca).

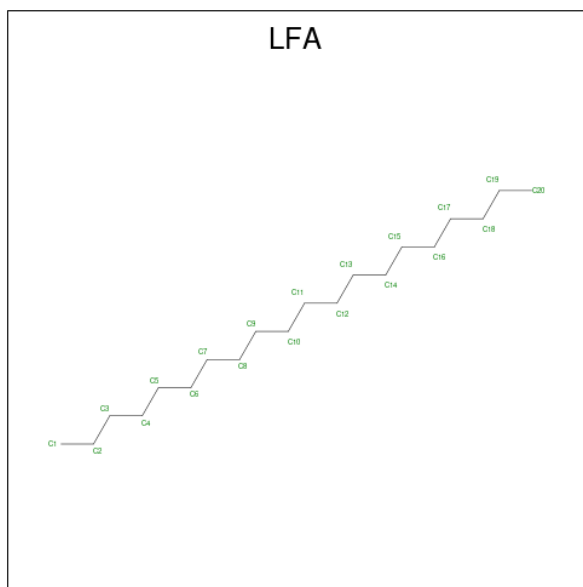
Mol	Chain	Residues	Atoms		AltConf
17	G	1	Total	Ca	0
			1	1	

- Molecule 18 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (three-letter code: 3PE) (formula: $C_{41}H_{82}NO_8P$).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
18	C	1	51	41	1	8	1	0
18	L	1	Total	C	N	O	P	0
			51	41	1	8	1	

- Molecule 19 is EICOSANE (three-letter code: LFA) (formula: $C_{20}H_{42}$).

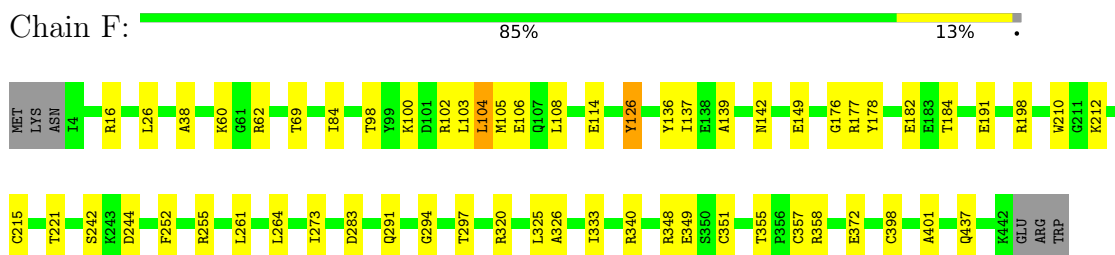


Mol	Chain	Residues	Atoms	AltConf
19	H	1	Total C 20 20	0

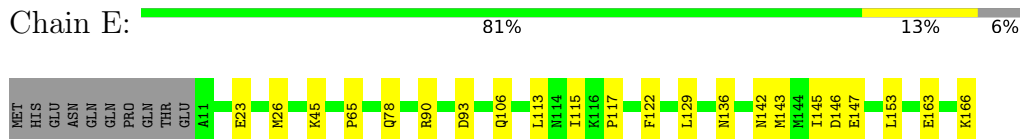
3 Residue-property plots [i](#)

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.

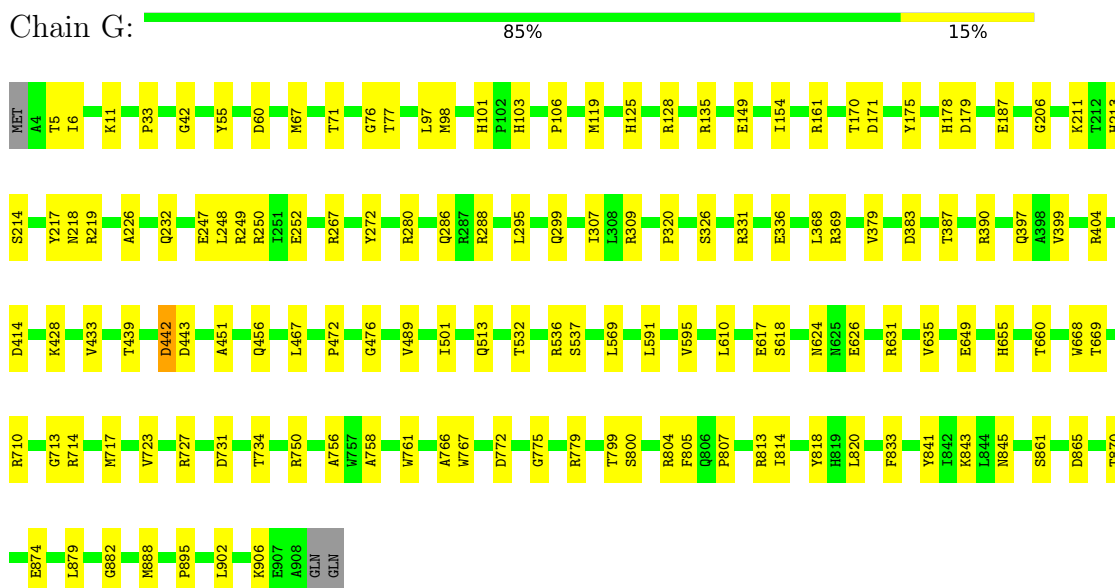
- Molecule 1: NADH-quinone oxidoreductase subunit F




- Molecule 2: NADH dehydrogenase I subunit E

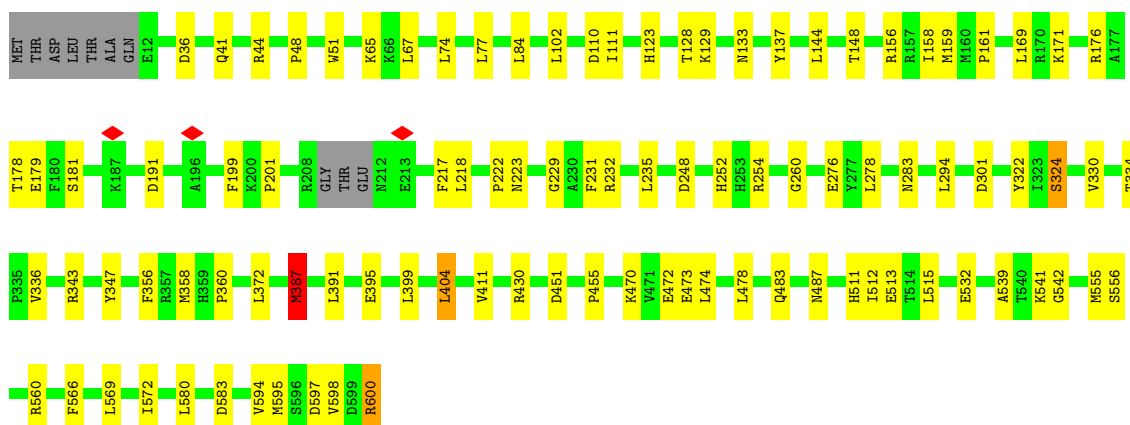


- Molecule 3: NADH-quinone oxidoreductase




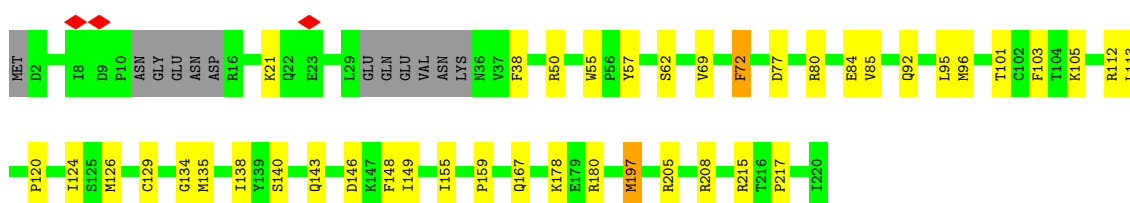
- Molecule 4: NADH-quinone oxidoreductase subunit C/D

Chain C:  82% 16%




• Molecule 5: NADH-quinone oxidoreductase subunit B

Chain B:  75% 18% 5%




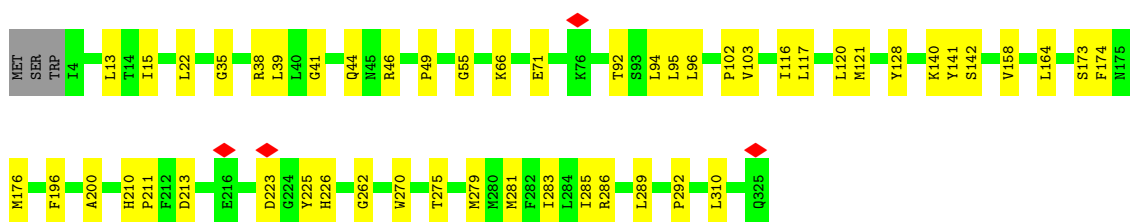
• Molecule 6: NADH-quinone oxidoreductase subunit I

Chain I:  87% 13%



• Molecule 7: NADH-quinone oxidoreductase subunit H

Chain H:  83% 16%

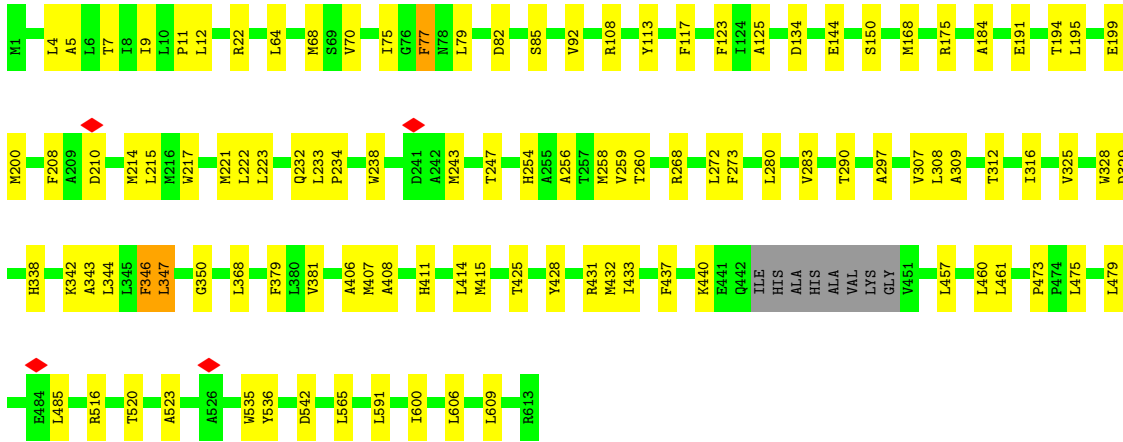
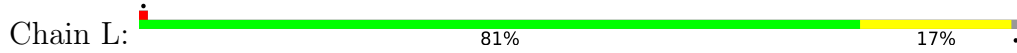


• Molecule 8: NADH-quinone oxidoreductase subunit A

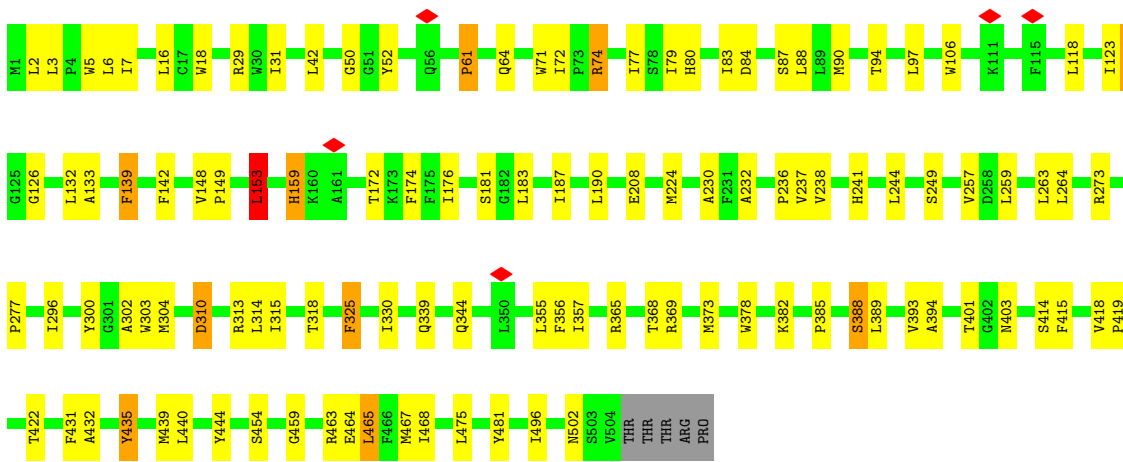
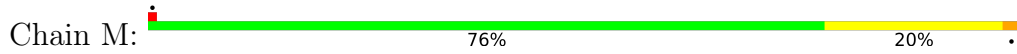
Chain A:  62% 15% 23%



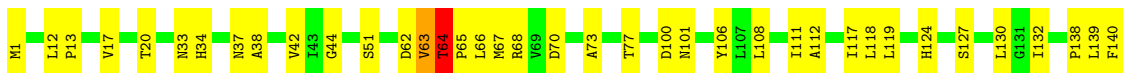
• Molecule 9: NADH dehydrogenase subunit L

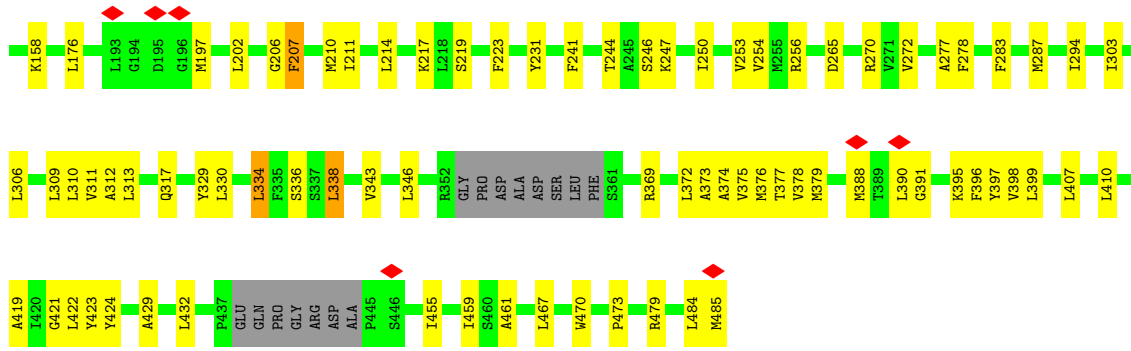


• Molecule 10: NADH dehydrogenase I subunit M



• Molecule 11: NADH-quinone oxidoreductase subunit N

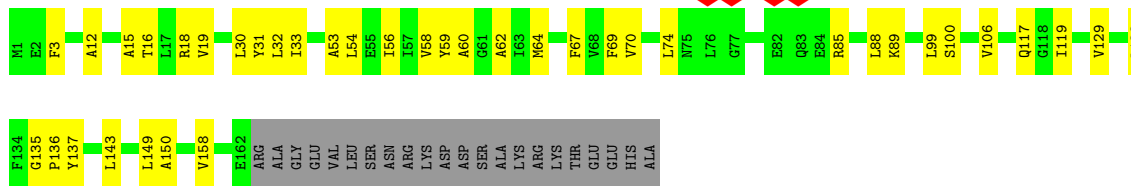




● Molecule 12: NADH-quinone oxidoreductase subunit K



● Molecule 13: NADH-quinone oxidoreductase subunit J



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	108991	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS GLACIOS	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	74	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	120000	Depositor
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.481	Depositor
Minimum map value	0.000	Depositor
Average map value	0.006	Depositor
Map value standard deviation	0.020	Depositor
Recommended contour level	0.05	Depositor
Map size (Å)	154.88, 215.38, 237.16	wwPDB
Map dimensions	128, 178, 196	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.21, 1.21, 1.21	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: FES, 3PE, LFA, SF4, FMN, CA

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	F	0.27	0/3486	0.54	1/4713 (0.0%)
2	E	0.25	0/1248	0.50	0/1691
3	G	0.26	0/7178	0.52	0/9733
4	C	0.27	0/4866	0.55	1/6602 (0.0%)
5	B	0.28	0/1692	0.60	1/2292 (0.0%)
6	I	0.27	0/1470	0.53	0/1985
7	H	0.31	0/2603	0.60	1/3540 (0.0%)
8	A	0.29	0/921	0.64	3/1251 (0.2%)
9	L	0.28	0/4745	0.57	4/6465 (0.1%)
10	M	0.30	0/4074	0.61	6/5546 (0.1%)
11	N	0.30	0/3649	0.61	3/4977 (0.1%)
12	K	0.30	0/769	0.67	1/1040 (0.1%)
13	J	0.31	0/1252	0.59	1/1708 (0.1%)
All	All	0.28	0/37953	0.57	22/51543 (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
3	G	0	1
11	N	0	2
All	All	0	3

There are no bond length outliers.

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
10	M	61	PRO	CA-N-CD	-7.12	101.53	111.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	L	210	ASP	CB-CG-OD2	7.03	124.63	118.30
1	F	104	LEU	CA-CB-CG	6.71	130.72	115.30
9	L	368	LEU	CA-CB-CG	6.64	130.58	115.30
9	L	347	LEU	CA-CB-CG	6.61	130.49	115.30
11	N	334	LEU	CA-CB-CG	6.59	130.46	115.30
10	M	61	PRO	N-CD-CG	-6.47	93.50	103.20
4	C	387	MET	CB-CG-SD	5.92	130.17	112.40
12	K	95	VAL	CA-CB-CG1	5.86	119.69	110.90
10	M	124	LEU	CA-CB-CG	-5.81	101.93	115.30
7	H	281	MET	CB-CG-SD	5.71	129.53	112.40
13	J	149	LEU	CA-CB-CG	5.70	128.40	115.30
10	M	153	LEU	CA-CB-CG	5.67	128.35	115.30
11	N	338	LEU	CA-CB-CG	5.62	128.22	115.30
8	A	124	ASP	CB-CG-OD2	5.44	123.19	118.30
5	B	197	MET	CB-CG-SD	5.35	128.46	112.40
8	A	49	PRO	CA-N-CD	-5.23	104.18	111.50
10	M	224	MET	CA-CB-CG	5.23	122.18	113.30
8	A	64	LEU	CA-CB-CG	5.22	127.30	115.30
10	M	465	LEU	CA-CB-CG	5.07	126.97	115.30
11	N	64	THR	N-CA-C	-5.05	97.35	111.00
9	L	79	LEU	CA-CB-CG	5.01	126.82	115.30

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	G	668	TRP	Peptide
11	N	63	VAL	Peptide
11	N	64	THR	Peptide

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	3407	0	3374	33	0
2	E	1220	0	1187	14	0
3	G	7027	0	6829	74	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	C	4736	0	4656	59	0
5	B	1656	0	1644	29	0
6	I	1436	0	1415	18	0
7	H	2529	0	2581	33	0
8	A	894	0	904	13	0
9	L	4627	0	4770	63	0
10	M	3953	0	4053	65	0
11	N	3563	0	3741	71	0
12	K	760	0	817	21	0
13	J	1226	0	1297	30	0
14	B	8	0	0	0	0
14	F	8	0	0	0	0
14	G	24	0	0	3	0
14	I	16	0	0	0	0
15	F	31	0	19	0	0
16	E	4	0	0	1	0
16	G	4	0	0	0	0
17	G	1	0	0	0	0
18	C	51	0	82	2	0
18	L	51	0	82	2	0
19	H	20	0	42	1	0
All	All	37252	0	37493	459	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.

All (459) 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)
11:N:375:VAL:HG23	11:N:461:ALA:HB2	1.70	0.74
9:L:223:LEU:HD13	9:L:283:VAL:HG22	1.75	0.68
10:M:181:SER:HB2	10:M:230:ALA:HA	1.75	0.68
4:C:276:GLU:O	4:C:283:ASN:ND2	2.26	0.68
7:H:116:ILE:HB	7:H:164:LEU:HD21	1.75	0.67
11:N:77:THR:HG23	11:N:117:ILE:HG12	1.76	0.67
4:C:358:MET:HE3	5:B:159:PRO:HG3	1.75	0.66
9:L:12:LEU:HD21	18:L:801:3PE:H3H1	1.77	0.66
5:B:126:MET:HG3	5:B:155:ILE:HD12	1.79	0.65
9:L:297:ALA:HA	9:L:535:TRP:HB3	1.79	0.64
1:F:264:LEU:HD11	1:F:273:ILE:HD13	1.80	0.64
7:H:141:TYR:HB3	7:H:223:ASP:HA	1.79	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:26:LEU:HD12	1:F:149:GLU:HB3	1.80	0.63
3:G:807:PRO:HB3	3:G:882:GLY:HA3	1.79	0.63
11:N:112:ALA:HB2	11:N:138:PRO:HG2	1.80	0.63
9:L:82:ASP:H	9:L:85:SER:HB2	1.64	0.63
11:N:63:VAL:O	11:N:67:MET:HB3	1.99	0.63
9:L:11:PRO:HB2	9:L:125:ALA:HB2	1.81	0.63
11:N:214:LEU:HD13	11:N:254:VAL:HG22	1.81	0.62
4:C:229:GLY:HA3	4:C:595:MET:HB2	1.82	0.62
11:N:369:ARG:HB3	11:N:372:LEU:HB2	1.81	0.62
10:M:259:LEU:HD11	10:M:357:ILE:HD11	1.82	0.62
3:G:368:LEU:HD21	3:G:390:ARG:HB3	1.82	0.61
7:H:142:SER:HB2	7:H:225:TYR:HA	1.82	0.61
10:M:325:PHE:HB3	10:M:344:GLN:HE22	1.65	0.61
4:C:158:ILE:HG23	4:C:159:MET:HG2	1.82	0.61
6:I:13:GLN:HG3	7:H:289:LEU:HD22	1.83	0.61
7:H:39:LEU:HB3	7:H:283:ILE:HG21	1.80	0.61
5:B:69:VAL:HA	5:B:72:PHE:HB2	1.83	0.61
13:J:85:ARG:O	13:J:89:LYS:NZ	2.34	0.60
11:N:244:THR:HG21	11:N:338:LEU:HD12	1.80	0.60
5:B:72:PHE:HE1	5:B:84:GLU:HA	1.66	0.60
10:M:315:ILE:HD13	10:M:355:LEU:HB3	1.84	0.60
12:K:32:LEU:HD13	12:K:77:LEU:HD22	1.82	0.59
3:G:845:ASN:ND2	3:G:879:LEU:O	2.36	0.59
1:F:355:THR:OG1	1:F:358:ARG:NH2	2.36	0.59
8:A:80:VAL:HA	8:A:83:LEU:HD23	1.85	0.59
4:C:395:GLU:HA	4:C:399:LEU:HB2	1.84	0.58
3:G:655:HIS:ND1	3:G:669:THR:OG1	2.36	0.58
4:C:278:LEU:HD12	4:C:541:LYS:HZ1	1.68	0.58
7:H:103:VAL:HG21	19:H:601:LFA:H61	1.86	0.58
10:M:87:SER:OG	10:M:273:ARG:NH2	2.36	0.58
9:L:473:PRO:HB2	9:L:475:LEU:HG	1.86	0.58
3:G:97:LEU:HD22	3:G:154:ILE:HB	1.86	0.57
1:F:98:THR:HA	1:F:325:LEU:HD12	1.87	0.57
3:G:55:TYR:HB3	3:G:60:ASP:HB3	1.86	0.57
4:C:598:VAL:O	4:C:600:ARG:NH1	2.37	0.57
6:I:51:THR:HG22	6:I:139:ILE:HD11	1.85	0.57
9:L:329:ASP:OD1	9:L:329:ASP:N	2.36	0.57
2:E:163:GLU:O	2:E:166:LYS:NZ	2.37	0.57
11:N:277:ALA:HB2	11:N:310:LEU:HD23	1.85	0.57
11:N:309:LEU:HD11	11:N:330:LEU:HD21	1.86	0.57
4:C:566:PHE:HA	4:C:598:VAL:HG13	1.87	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:M:414:SER:O	10:M:418:VAL:N	2.31	0.57
10:M:71:TRP:HB2	10:M:79:ILE:HG13	1.87	0.56
1:F:103:LEU:HD13	1:F:261:LEU:HD23	1.87	0.56
9:L:328:TRP:HB3	9:L:479:LEU:HD13	1.86	0.56
4:C:343:ARG:NH2	4:C:347:TYR:OH	2.39	0.56
3:G:247:GLU:HG3	3:G:249:ARG:HE	1.71	0.56
4:C:594:VAL:HG23	4:C:597:ASP:HB2	1.87	0.56
12:K:1:MET:N	13:J:119:ILE:O	2.36	0.56
7:H:15:ILE:HG23	8:A:18:ILE:HG21	1.88	0.56
9:L:325:VAL:HG21	9:L:406:ALA:HA	1.88	0.56
3:G:451:ALA:O	3:G:456:GLN:NE2	2.35	0.55
9:L:200:MET:HB3	9:L:272:LEU:HD21	1.87	0.55
11:N:419:ALA:HA	11:N:422:LEU:HD12	1.88	0.55
11:N:100:ASP:OD1	11:N:101:ASN:N	2.33	0.55
18:C:701:3PE:H3B2	7:H:285:ILE:HG21	1.88	0.55
12:K:82:GLN:OE1	12:K:86:ARG:NH1	2.40	0.55
2:E:142:ASN:ND2	16:E:201:FES:S1	2.79	0.55
4:C:41:GLN:NE2	4:C:532:GLU:OE2	2.40	0.55
9:L:208:PHE:HE2	9:L:214:MET:HB2	1.72	0.55
11:N:231:TYR:OH	11:N:247:LYS:NZ	2.40	0.55
3:G:326:SER:HB2	3:G:569:LEU:HD11	1.88	0.55
3:G:472:PRO:HG3	3:G:799:THR:HA	1.89	0.55
9:L:475:LEU:HD13	9:L:479:LEU:HD12	1.88	0.54
10:M:388:SER:HB3	10:M:444:TYR:HE2	1.73	0.54
12:K:28:LEU:HD23	12:K:80:LEU:HD12	1.89	0.54
1:F:283:ASP:OD1	1:F:283:ASP:N	2.39	0.54
4:C:322:TYR:HE1	4:C:470:LYS:HG3	1.72	0.54
5:B:217:PRO:HG3	6:I:144:LYS:HD2	1.90	0.54
11:N:20:THR:HG21	11:N:44:GLY:HA3	1.88	0.54
4:C:301:ASP:N	4:C:301:ASP:OD1	2.40	0.54
4:C:430:ARG:NH2	4:C:473:GLU:OE2	2.40	0.54
9:L:600:ILE:HG13	13:J:99:LEU:HD21	1.88	0.54
11:N:111:ILE:HG21	13:J:150:ALA:HB2	1.88	0.54
12:K:9:ILE:O	12:K:13:ILE:HD12	2.07	0.54
12:K:83:LEU:O	12:K:87:ARG:HB2	2.07	0.54
3:G:101:HIS:CD2	14:G:1001:SF4:S4	2.74	0.54
4:C:252:HIS:NE2	5:B:62:SER:OG	2.39	0.54
11:N:118:LEU:HD22	13:J:143:LEU:HD13	1.90	0.54
3:G:369:ARG:NH2	3:G:775:GLY:O	2.40	0.54
4:C:110:ASP:OD1	4:C:110:ASP:N	2.41	0.54
4:C:128:THR:OG1	4:C:129:LYS:NZ	2.41	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:167:GLN:HG3	6:I:121:GLU:HG2	1.90	0.54
9:L:232:GLN:HB3	9:L:290:THR:HG21	1.90	0.54
5:B:134:GLY:O	6:I:98:ARG:NH1	2.41	0.53
4:C:254:ARG:HG3	5:B:103:PHE:HE1	1.73	0.53
1:F:291:GLN:NE2	1:F:294:GLY:O	2.41	0.53
3:G:295:LEU:HB3	3:G:299:GLN:HG3	1.90	0.53
3:G:103:HIS:HA	4:C:512:ILE:HD13	1.91	0.53
5:B:178:LYS:NZ	5:B:197:MET:SD	2.75	0.53
10:M:187:ILE:HD11	11:N:399:LEU:HD22	1.91	0.53
11:N:1:MET:HB3	11:N:65:PRO:HD3	1.90	0.53
1:F:291:GLN:O	1:F:326:ALA:HA	2.09	0.52
10:M:236:PRO:HD3	10:M:244:LEU:HD13	1.91	0.52
11:N:343:VAL:HG11	11:N:376:MET:HB2	1.91	0.52
9:L:184:ALA:HB2	9:L:221:MET:HB2	1.92	0.52
9:L:70:VAL:HG21	10:M:339:GLN:HG3	1.90	0.52
10:M:64:GLN:N	10:M:83:ILE:O	2.42	0.52
10:M:72:ILE:HB	10:M:77:ILE:HB	1.92	0.52
11:N:176:LEU:HD22	11:N:202:LEU:HD11	1.90	0.52
3:G:536:ARG:NH2	3:G:818:TYR:OH	2.43	0.52
3:G:727:ARG:HD3	4:C:181:SER:HA	1.91	0.52
4:C:74:LEU:HB3	4:C:133:ASN:HD21	1.75	0.52
1:F:38:ALA:HB2	1:F:114:GLU:HG3	1.91	0.52
11:N:65:PRO:HG2	13:J:136:PRO:HB3	1.91	0.52
1:F:16:ARG:HG3	1:F:108:LEU:HD11	1.92	0.52
18:C:701:3PE:H3C2	7:H:200:ALA:HB1	1.90	0.52
10:M:365:ARG:NH1	10:M:459:GLY:O	2.43	0.52
1:F:69:THR:HG21	1:F:221:THR:HG21	1.92	0.52
4:C:44:ARG:NH1	4:C:294:LEU:O	2.43	0.52
4:C:455:PRO:HB3	4:C:472:GLU:HG2	1.92	0.52
11:N:312:ALA:HB2	11:N:398:VAL:HG23	1.91	0.52
1:F:357:CYS:HB2	1:F:401:ALA:HB2	1.91	0.51
4:C:191:ASP:OD1	8:A:44:ARG:NH2	2.41	0.51
3:G:286:GLN:OE1	3:G:288:ARG:NH2	2.43	0.51
7:H:102:PRO:HG3	7:H:176:MET:HB3	1.91	0.51
3:G:309:ARG:NH2	3:G:660:THR:O	2.43	0.51
4:C:41:GLN:OE1	4:C:51:TRP:NE1	2.41	0.51
10:M:249:SER:OG	10:M:313:ARG:NH1	2.43	0.51
4:C:232:ARG:HB3	4:C:248:ASP:HB3	1.92	0.51
8:A:83:LEU:HB2	13:J:54:LEU:HD11	1.93	0.51
9:L:433:ILE:O	9:L:437:PHE:HB2	2.11	0.51
9:L:144:GLU:OE1	9:L:175:ARG:NH1	2.43	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:501:ILE:HG12	3:G:532:THR:HB	1.93	0.50
3:G:513:GLN:NE2	3:G:800:SER:OG	2.41	0.50
4:C:334:THR:HG23	7:H:44:GLN:HG2	1.92	0.50
5:B:143:GLN:OE1	6:I:98:ARG:NH2	2.43	0.50
1:F:348:ARG:NH2	2:E:93:ASP:OD1	2.38	0.50
5:B:208:ARG:NH1	6:I:132:TYR:OH	2.41	0.50
7:H:310:LEU:HD22	8:A:107:ILE:HD12	1.94	0.50
9:L:338:HIS:O	9:L:342:LYS:HB2	2.12	0.50
3:G:125:HIS:NE2	4:C:513:GLU:OE2	2.39	0.50
3:G:624:ASN:HD21	3:G:626:GLU:HG2	1.76	0.49
9:L:92:VAL:HG12	9:L:256:ALA:HB1	1.92	0.49
13:J:85:ARG:HD2	13:J:88:LEU:HD12	1.92	0.49
4:C:324:SER:HB2	4:C:336:VAL:HA	1.94	0.49
11:N:421:GLY:HA2	11:N:424:TYR:CZ	2.47	0.49
3:G:149:GLU:OE2	6:I:163:LYS:NZ	2.45	0.49
3:G:414:ASP:OD1	3:G:414:ASP:N	2.44	0.49
3:G:714:ARG:NH1	4:C:178:THR:OG1	2.46	0.49
7:H:35:GLY:O	7:H:39:LEU:HB2	2.12	0.49
11:N:369:ARG:HG2	11:N:372:LEU:HD12	1.95	0.49
8:A:101:VAL:O	8:A:105:ILE:HD12	2.12	0.49
9:L:343:ALA:O	9:L:347:LEU:HD12	2.12	0.49
12:K:80:LEU:HD21	13:J:74:LEU:HD11	1.94	0.49
10:M:263:LEU:HD11	10:M:356:PHE:HD2	1.77	0.49
3:G:399:VAL:HG13	3:G:428:LYS:HB2	1.95	0.49
4:C:36:ASP:OD1	4:C:36:ASP:N	2.39	0.49
4:C:176:ARG:HB2	4:C:179:GLU:HG2	1.95	0.49
4:C:123:HIS:HA	4:C:148:THR:O	2.13	0.48
5:B:95:LEU:HD11	5:B:124:ILE:HG13	1.94	0.48
5:B:205:ARG:NE	6:I:136:ASP:OD1	2.43	0.48
8:A:63:ARG:NH1	13:J:74:LEU:O	2.45	0.48
1:F:102:ARG:O	1:F:106:GLU:HB2	2.13	0.48
1:F:176:GLY:HA3	2:E:78:GLN:HG2	1.95	0.48
11:N:391:GLY:O	11:N:395:LYS:HG2	2.14	0.48
3:G:217:TYR:OH	3:G:219:ARG:NH1	2.46	0.48
4:C:144:LEU:HB3	4:C:169:LEU:HG	1.96	0.48
11:N:33:ASN:O	11:N:37:ASN:ND2	2.46	0.48
13:J:117:GLN:N	13:J:117:GLN:OE1	2.46	0.48
1:F:437:GLN:NE2	4:C:372:LEU:O	2.45	0.48
4:C:218:LEU:HB3	4:C:235:LEU:HB2	1.96	0.48
3:G:267:ARG:HB2	3:G:820:LEU:HG	1.96	0.48
3:G:710:ARG:NH2	6:I:68:VAL:O	2.47	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:L:64:LEU:HD12	9:L:77:PHE:HD2	1.79	0.48
10:M:238:VAL:HG21	10:M:296:ILE:HG22	1.96	0.48
12:K:77:LEU:HD12	13:J:70:VAL:HG11	1.96	0.48
3:G:206:GLY:N	14:G:1001:SF4:S2	2.83	0.48
8:A:85:LEU:O	8:A:89:SER:OG	2.30	0.48
9:L:273:PHE:HB3	9:L:280:LEU:HD13	1.95	0.48
9:L:591:LEU:HD21	11:N:158:LYS:HA	1.94	0.48
7:H:275:THR:O	7:H:279:MET:HG3	2.13	0.48
11:N:346:LEU:HD12	11:N:372:LEU:HD21	1.95	0.48
4:C:569:LEU:HD13	4:C:572:ILE:HD12	1.96	0.48
9:L:329:ASP:HA	9:L:475:LEU:HD12	1.95	0.48
10:M:123:ILE:HD11	10:M:149:PRO:HD2	1.95	0.48
10:M:84:ASP:N	10:M:84:ASP:OD1	2.47	0.47
10:M:310:ASP:OD2	10:M:369:ARG:NH1	2.47	0.47
12:K:77:LEU:HD12	13:J:70:VAL:HG21	1.95	0.47
3:G:106:PRO:HD3	4:C:515:LEU:HD21	1.94	0.47
11:N:395:LYS:HA	11:N:398:VAL:HG12	1.96	0.47
13:J:58:VAL:HG23	13:J:62:ALA:HB3	1.95	0.47
3:G:758:ALA:HB3	3:G:761:TRP:HB2	1.96	0.47
9:L:150:SER:HB2	9:L:258:MET:HE1	1.96	0.47
4:C:451:ASP:N	4:C:483:GLN:OE1	2.44	0.47
1:F:137:ILE:HG13	2:E:147:GLU:HG3	1.97	0.47
3:G:467:LEU:HG	3:G:489:VAL:HG23	1.95	0.47
3:G:280:ARG:NH2	3:G:617:GLU:OE1	2.38	0.47
10:M:133:ALA:HB3	10:M:139:PHE:HB2	1.96	0.47
10:M:464:GLU:HA	10:M:467:MET:HG2	1.96	0.47
11:N:246:SER:O	11:N:250:ILE:HG13	2.15	0.47
9:L:408:ALA:HB2	9:L:485:LEU:HG	1.97	0.47
7:H:117:LEU:HA	7:H:120:LEU:HD12	1.97	0.47
9:L:22:ARG:HH22	10:M:382:LYS:HE3	1.80	0.47
12:K:43:ALA:HB1	12:K:62:TYR:HD1	1.80	0.47
13:J:15:ALA:O	13:J:19:VAL:HG23	2.15	0.47
5:B:57:TYR:HE2	5:B:113:LEU:HD13	1.80	0.46
7:H:211:PRO:HB2	7:H:292:PRO:HD3	1.97	0.46
9:L:217:TRP:O	9:L:221:MET:HG2	2.15	0.46
10:M:153:LEU:HD11	10:M:257:VAL:HG11	1.96	0.46
11:N:334:LEU:HD23	11:N:338:LEU:HD13	1.97	0.46
9:L:307:VAL:HG11	9:L:432:MET:HG3	1.97	0.46
10:M:97:LEU:HD12	10:M:264:LEU:HG	1.98	0.46
11:N:70:ASP:HB3	11:N:484:LEU:HD13	1.97	0.46
9:L:520:THR:HA	9:L:523:ALA:HB3	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:L:542:ASP:OD1	9:L:542:ASP:N	2.47	0.46
10:M:16:LEU:HG	10:M:31:ILE:HG21	1.97	0.46
1:F:340:ARG:NH1	1:F:372:GLU:OE1	2.48	0.46
13:J:19:VAL:HG21	13:J:32:LEU:HB2	1.98	0.46
3:G:888:MET:HB3	3:G:895:PRO:HA	1.98	0.46
5:B:92:GLN:NE2	7:H:226:HIS:O	2.48	0.46
7:H:173:SER:OG	7:H:174:PHE:N	2.49	0.46
2:E:45:LYS:HB2	2:E:45:LYS:HE2	1.73	0.46
3:G:843:LYS:HD3	3:G:874:GLU:HB2	1.97	0.46
10:M:300:TYR:O	10:M:304:MET:HG2	2.16	0.46
11:N:283:PHE:O	11:N:287:MET:HG2	2.16	0.46
5:B:80:ARG:HA	7:H:49:PRO:HA	1.98	0.46
2:E:113:LEU:HB3	2:E:115:ILE:HG12	1.98	0.46
4:C:74:LEU:HA	4:C:102:LEU:HD23	1.98	0.46
10:M:29:ARG:NH1	10:M:106:TRP:O	2.48	0.46
11:N:73:ALA:O	11:N:77:THR:OG1	2.28	0.46
9:L:256:ALA:O	9:L:260:THR:OG1	2.23	0.45
3:G:618:SER:HB2	3:G:649:GLU:HG3	1.97	0.45
6:I:2:THR:OG1	6:I:3:LEU:N	2.48	0.45
10:M:18:TRP:HB2	10:M:118:LEU:HG	1.98	0.45
3:G:861:SER:HB2	3:G:870:THR:HG22	1.99	0.45
4:C:77:LEU:HB3	4:C:137:TYR:HB3	1.98	0.45
4:C:84:LEU:HD12	4:C:171:LYS:HD2	1.99	0.45
11:N:13:PRO:O	11:N:17:VAL:HG23	2.17	0.45
3:G:250:ARG:NH2	3:G:252:GLU:OE2	2.50	0.45
5:B:101:THR:HA	5:B:129:CYS:HB3	1.99	0.45
6:I:48:ILE:HG13	6:I:116:LEU:HG	1.97	0.45
11:N:374:ALA:O	11:N:378:VAL:HG12	2.16	0.45
11:N:132:ILE:HG23	11:N:217:LYS:HE3	1.98	0.45
13:J:129:VAL:O	13:J:133:LEU:HB2	2.16	0.45
3:G:171:ASP:OD1	3:G:171:ASP:N	2.50	0.45
3:G:178:HIS:ND1	3:G:179:ASP:OD1	2.36	0.45
4:C:48:PRO:HG2	4:C:111:ILE:HG13	1.99	0.45
11:N:12:LEU:HG	11:N:51:SER:HB2	1.98	0.45
11:N:206:GLY:O	11:N:210:MET:HG3	2.17	0.45
4:C:201:PRO:HB3	4:C:217:PHE:HE2	1.80	0.45
11:N:66:LEU:HA	11:N:124:HIS:HB2	1.99	0.45
4:C:222:PRO:HG3	4:C:232:ARG:HD3	1.99	0.45
10:M:277:PRO:HG3	10:M:496:ILE:HG23	1.98	0.45
8:A:43:ALA:HB3	8:A:46:LYS:HB2	1.99	0.45
1:F:60:LYS:O	1:F:62:ARG:NH1	2.49	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:713:GLY:O	3:G:717:MET:HG3	2.17	0.45
4:C:77:LEU:HD22	4:C:137:TYR:HB3	1.98	0.45
9:L:208:PHE:CG	9:L:215:LEU:HD23	2.52	0.45
10:M:94:THR:HA	10:M:264:LEU:HD11	1.98	0.45
1:F:333:ILE:HD13	1:F:333:ILE:HA	1.88	0.44
3:G:213:HIS:CG	3:G:250:ARG:HD3	2.52	0.44
9:L:191:GLU:HG3	9:L:214:MET:HB3	1.99	0.44
10:M:123:ILE:HD13	10:M:123:ILE:HA	1.76	0.44
10:M:190:LEU:HD21	11:N:396:PHE:HE1	1.82	0.44
10:M:401:THR:HG23	10:M:475:LEU:HG	1.98	0.44
10:M:415:PHE:HB2	10:M:422:THR:HG21	1.98	0.44
1:F:106:GLU:O	1:F:142:ASN:ND2	2.50	0.44
1:F:348:ARG:NH1	2:E:93:ASP:OD2	2.51	0.44
5:B:215:ARG:HB2	6:I:42:PRO:HB3	1.99	0.44
9:L:238:TRP:CH2	9:L:258:MET:HG2	2.52	0.44
10:M:176:ILE:HD11	11:N:423:TYR:HB2	1.99	0.44
2:E:90:ARG:HA	2:E:129:LEU:O	2.17	0.44
3:G:5:THR:O	3:G:76:GLY:N	2.50	0.44
11:N:119:LEU:HD22	11:N:253:VAL:HG11	1.99	0.44
11:N:336:SER:HA	11:N:379:MET:SD	2.57	0.44
10:M:90:MET:O	10:M:94:THR:HG23	2.18	0.44
11:N:429:ALA:HA	11:N:432:LEU:HD12	1.99	0.44
12:K:39:ILE:HG21	12:K:69:ALA:HB2	2.00	0.44
3:G:320:PRO:HB2	3:G:537:SER:HB2	1.99	0.44
3:G:814:ILE:HD11	3:G:902:LEU:HD13	2.00	0.44
4:C:161:PRO:HD3	5:B:105:LYS:HG3	1.98	0.44
7:H:279:MET:O	7:H:283:ILE:HG12	2.18	0.44
10:M:232:ALA:HB1	10:M:237:VAL:HB	1.98	0.44
10:M:389:LEU:O	10:M:393:VAL:HG12	2.17	0.44
11:N:329:TYR:HE1	11:N:395:LYS:HZ2	1.66	0.44
2:E:23:GLU:HA	2:E:26:MET:HG2	2.00	0.44
7:H:38:ARG:HD2	7:H:38:ARG:HA	1.69	0.44
9:L:308:LEU:O	9:L:312:THR:HG23	2.18	0.44
12:K:57:ASP:OD2	13:J:137:TYR:OH	2.28	0.44
13:J:18:ARG:HE	13:J:18:ARG:HB3	1.63	0.44
3:G:267:ARG:HA	3:G:833:PHE:HZ	1.82	0.44
7:H:158:VAL:HB	8:A:75:PHE:HD1	1.83	0.44
4:C:260:GLY:O	4:C:556:SER:OG	2.36	0.44
7:H:262:GLY:HA3	7:H:270:TRP:CD1	2.53	0.44
10:M:126:GLY:HA2	10:M:142:PHE:HD1	1.83	0.44
3:G:6:ILE:HG22	3:G:77:THR:HB	1.98	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:L:243:MET:SD	9:L:309:ALA:HB2	2.58	0.43
3:G:232:GLN:HB2	14:G:1003:SF4:S3	2.58	0.43
10:M:368:THR:HG21	10:M:373:MET:HG2	2.00	0.43
1:F:182:GLU:OE1	1:F:184:THR:OG1	2.32	0.43
3:G:731:ASP:OD2	3:G:734:THR:OG1	2.36	0.43
9:L:184:ALA:HB1	9:L:222:LEU:HG	1.99	0.43
10:M:50:GLY:HA3	10:M:52:TYR:CE2	2.52	0.43
11:N:62:ASP:OD2	11:N:68:ARG:NH2	2.48	0.43
12:K:16:VAL:HB	13:J:100:SER:HB3	2.00	0.43
9:L:565:LEU:HB2	10:M:241:HIS:HE1	1.83	0.43
10:M:314:LEU:O	10:M:318:THR:HG23	2.17	0.43
4:C:411:VAL:HG13	4:C:583:ASP:HB3	2.01	0.43
5:B:138:ILE:HG23	5:B:140:SER:H	1.83	0.43
10:M:465:LEU:HA	10:M:468:ILE:HG22	2.00	0.43
11:N:390:LEU:HD13	11:N:467:LEU:HB3	2.00	0.43
1:F:178:TYR:HB3	1:F:349:GLU:HB3	2.00	0.43
7:H:41:GLY:HA2	7:H:46:ARG:HG3	2.01	0.43
10:M:2:LEU:HD12	10:M:42:LEU:HD11	1.99	0.43
10:M:378:TRP:HA	10:M:385:PRO:HG2	2.00	0.43
11:N:108:LEU:HD22	11:N:138:PRO:HB3	2.01	0.43
13:J:12:ALA:O	13:J:16:THR:HG22	2.19	0.43
4:C:330:VAL:HG11	4:C:404:LEU:HD12	1.99	0.43
9:L:247:THR:HG21	9:L:350:GLY:HA2	2.01	0.43
9:L:254:HIS:HB2	9:L:346:PHE:HE2	1.84	0.43
10:M:6:LEU:HD23	10:M:6:LEU:HA	1.89	0.43
10:M:7:ILE:HD11	10:M:132:LEU:HD12	2.00	0.43
10:M:124:LEU:HD23	10:M:124:LEU:HA	1.69	0.43
3:G:397:GLN:O	3:G:404:ARG:NH2	2.49	0.43
9:L:4:LEU:O	9:L:7:THR:OG1	2.36	0.43
11:N:470:TRP:HD1	11:N:473:PRO:HD3	1.84	0.43
12:K:16:VAL:O	12:K:20:THR:HG23	2.19	0.43
3:G:33:PRO:HA	3:G:119:MET:HE1	2.01	0.43
7:H:213:ASP:OD1	7:H:213:ASP:N	2.52	0.43
9:L:233:LEU:HA	9:L:234:PRO:HA	1.82	0.43
10:M:3:LEU:HB3	10:M:132:LEU:HD13	2.01	0.43
10:M:71:TRP:HB3	10:M:77:ILE:HG22	2.01	0.43
10:M:74:ARG:HG3	11:N:479:ARG:HD2	2.00	0.43
12:K:52:TYR:HA	13:J:119:ILE:HG12	2.01	0.43
6:I:154:ALA:O	6:I:161:LYS:NZ	2.36	0.43
11:N:139:LEU:HD23	11:N:139:LEU:HA	1.82	0.43
1:F:136:TYR:HB3	1:F:139:ALA:HB3	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:177:ARG:HA	1:F:177:ARG:HD3	1.75	0.42
1:F:210:TRP:O	1:F:212:LYS:NZ	2.45	0.42
3:G:476:GLY:O	3:G:804:ARG:NH2	2.45	0.42
3:G:772:ASP:HB3	3:G:779:ARG:HA	2.01	0.42
5:B:77:ASP:O	5:B:80:ARG:NE	2.52	0.42
9:L:194:THR:HG21	9:L:199:GLU:HB3	2.01	0.42
12:K:79:LEU:HD23	13:J:158:VAL:HG11	2.01	0.42
1:F:100:LYS:O	1:F:104:LEU:HD12	2.18	0.42
1:F:297:THR:HG22	1:F:320:ARG:HB2	2.00	0.42
5:B:55:TRP:CE2	5:B:85:VAL:HG21	2.54	0.42
7:H:96:LEU:HD11	8:A:20:LEU:HD22	2.01	0.42
7:H:121:MET:HE1	13:J:53:ALA:HA	2.02	0.42
11:N:254:VAL:HG12	11:N:313:LEU:HD11	2.02	0.42
11:N:407:LEU:HD12	11:N:410:LEU:HD22	2.00	0.42
5:B:112:ARG:HD2	8:A:53:GLY:HA2	2.00	0.42
9:L:85:SER:OG	9:L:268:ARG:NH2	2.52	0.42
10:M:389:LEU:HA	10:M:440:LEU:HD21	2.02	0.42
11:N:277:ALA:HB1	11:N:311:VAL:HG23	2.00	0.42
11:N:306:LEU:HD13	11:N:309:LEU:HD12	2.00	0.42
2:E:106:GLN:HE21	2:E:117:PRO:HG2	1.85	0.42
3:G:331:ARG:HH21	3:G:336:GLU:HG3	1.84	0.42
9:L:194:THR:OG1	9:L:199:GLU:OE1	2.27	0.42
10:M:61:PRO:HB3	10:M:208:GLU:HG2	2.01	0.42
3:G:11:LYS:HB2	3:G:11:LYS:HE2	1.77	0.42
3:G:439:THR:OG1	3:G:442:ASP:OD1	2.32	0.42
5:B:146:ASP:OD1	5:B:146:ASP:N	2.48	0.42
9:L:108:ARG:HD3	9:L:108:ARG:HA	1.91	0.42
10:M:263:LEU:HD21	10:M:356:PHE:HE2	1.84	0.42
12:K:34:GLY:HA2	12:K:37:ILE:HG12	2.01	0.42
13:J:135:GLY:HA3	13:J:136:PRO:HD3	1.84	0.42
9:L:238:TRP:HH2	9:L:258:MET:HG2	1.85	0.42
10:M:302:ALA:HB1	10:M:431:PHE:HB3	2.01	0.42
10:M:418:VAL:HA	10:M:419:PRO:HD3	1.83	0.42
11:N:119:LEU:HD23	11:N:119:LEU:HA	1.91	0.42
11:N:294:ILE:H	11:N:294:ILE:HD12	1.85	0.42
3:G:756:ALA:HB1	3:G:766:ALA:HB3	2.01	0.42
4:C:360:PRO:O	6:I:45:ARG:NH1	2.39	0.42
11:N:330:LEU:HD23	11:N:330:LEU:HA	1.77	0.42
12:K:2:ILE:O	13:J:119:ILE:N	2.47	0.42
12:K:89:ASN:OD1	12:K:89:ASN:N	2.53	0.42
3:G:179:ASP:OD1	3:G:179:ASP:N	2.53	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:226:ALA:HB3	3:G:635:VAL:HG22	2.01	0.42
3:G:595:VAL:HG22	3:G:610:LEU:HB2	2.01	0.42
9:L:411:HIS:HB3	9:L:414:LEU:HD23	2.02	0.42
7:H:22:LEU:HD11	7:H:95:LEU:HD21	2.02	0.42
9:L:407:MET:SD	9:L:415:MET:HG3	2.60	0.42
4:C:595:MET:HA	4:C:595:MET:HE2	2.01	0.41
5:B:148:PHE:HD2	5:B:149:ILE:HG23	1.85	0.41
7:H:38:ARG:NH1	7:H:55:GLY:O	2.53	0.41
9:L:591:LEU:HD11	11:N:158:LYS:HA	2.01	0.41
3:G:128:ARG:HB3	4:C:511:HIS:CD2	2.55	0.41
4:C:560:ARG:HH12	4:C:600:ARG:HH21	1.68	0.41
5:B:21:LYS:HA	5:B:21:LYS:HD3	1.71	0.41
7:H:94:LEU:HD13	7:H:94:LEU:HA	1.93	0.41
10:M:172:THR:O	10:M:176:ILE:HG13	2.20	0.41
11:N:64:THR:HB	11:N:67:MET:H	1.83	0.41
9:L:259:VAL:HB	9:L:316:ILE:HD11	2.01	0.41
10:M:159:HIS:CE1	10:M:369:ARG:HE	2.39	0.41
10:M:183:LEU:HD12	10:M:183:LEU:HA	1.87	0.41
12:K:6:HIS:HA	12:K:9:ILE:HD12	2.02	0.41
7:H:210:HIS:NE2	7:H:289:LEU:O	2.49	0.41
9:L:381:VAL:HG21	9:L:461:LEU:HD23	2.03	0.41
10:M:330:ILE:HD12	10:M:330:ILE:HA	1.86	0.41
13:J:64:MET:HA	13:J:67:PHE:HB2	2.02	0.41
1:F:273:ILE:HD12	1:F:273:ILE:HA	1.91	0.41
3:G:390:ARG:HA	3:G:390:ARG:HD2	1.89	0.41
3:G:723:VAL:HG21	6:I:127:ARG:HB3	2.03	0.41
3:G:756:ALA:HB2	3:G:767:TRP:CE2	2.55	0.41
9:L:75:ILE:HD11	9:L:195:LEU:HD12	2.03	0.41
11:N:34:HIS:NE2	11:N:106:TYR:OH	2.44	0.41
11:N:455:ILE:O	11:N:459:ILE:HG23	2.21	0.41
2:E:145:ILE:HG22	2:E:146:ASP:H	1.85	0.41
5:B:50:ARG:NE	5:B:120:PRO:HG3	2.35	0.41
9:L:342:LYS:HD3	9:L:342:LYS:HA	1.77	0.41
4:C:129:LYS:HA	4:C:129:LYS:HD3	1.93	0.41
10:M:432:ALA:HA	10:M:435:TYR:CE2	2.55	0.41
11:N:219:SER:HB3	11:N:303:ILE:HG12	2.02	0.41
3:G:307:ILE:HG22	3:G:591:LEU:HD22	2.02	0.41
4:C:67:LEU:HD23	4:C:67:LEU:HA	1.94	0.41
4:C:391:LEU:HD22	4:C:474:LEU:HD22	2.02	0.41
7:H:66:LYS:HE2	7:H:66:LYS:HB3	1.84	0.41
7:H:92:THR:HG22	7:H:96:LEU:HD23	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:L:346:PHE:HD1	9:L:346:PHE:HA	1.82	0.41
9:L:609:LEU:HG	11:N:272:VAL:HG21	2.03	0.41
18:L:801:3PE:H262	18:L:801:3PE:H322	2.02	0.41
11:N:207:PHE:O	11:N:211:ILE:HG13	2.20	0.41
12:K:75:ILE:HD13	12:K:75:ILE:HA	1.95	0.41
13:J:30:LEU:HA	13:J:33:ILE:HD12	2.03	0.41
3:G:248:LEU:HD23	3:G:272:TYR:HB2	2.03	0.41
10:M:394:ALA:HB1	10:M:401:THR:HG21	2.03	0.41
11:N:38:ALA:O	11:N:42:VAL:HG22	2.21	0.41
4:C:387:MET:HG2	4:C:478:LEU:HD21	2.03	0.40
9:L:344:LEU:HB2	9:L:460:LEU:HB3	2.02	0.40
9:L:347:LEU:HD22	9:L:457:LEU:HD12	2.02	0.40
13:J:56:ILE:HA	13:J:60:ALA:HB3	2.02	0.40
2:E:143:MET:HB2	2:E:153:LEU:HD11	2.03	0.40
3:G:67:MET:O	3:G:71:THR:OG1	2.28	0.40
3:G:211:LYS:HA	3:G:214:SER:HB3	2.04	0.40
11:N:265:ASP:O	11:N:270:ARG:NH2	2.55	0.40
1:F:84:ILE:HG23	1:F:126:TYR:CE1	2.56	0.40
1:F:191:GLU:OE2	1:F:198:ARG:NH2	2.49	0.40
1:F:242:SER:OG	1:F:244:ASP:O	2.39	0.40
2:E:65:PRO:HB3	3:G:170:THR:HB	2.03	0.40
3:G:42:GLY:O	3:G:161:ARG:NH2	2.53	0.40
3:G:379:VAL:HB	3:G:433:VAL:HG12	2.03	0.40
3:G:383:ASP:O	3:G:387:THR:OG1	2.37	0.40
4:C:539:ALA:N	4:C:542:GLY:O	2.52	0.40
9:L:5:ALA:O	9:L:9:ILE:HG12	2.20	0.40
3:G:805:PHE:HE1	3:G:813:ARG:HG3	1.87	0.40
6:I:92:PHE:HE1	6:I:94:ILE:HD11	1.87	0.40
9:L:425:THR:HA	9:L:428:TYR:CE2	2.56	0.40
9:L:606:LEU:HB3	13:J:106:VAL:HG11	2.03	0.40
11:N:34:HIS:CD2	11:N:106:TYR:HH	2.39	0.40
11:N:64:THR:HB	11:N:66:LEU:H	1.86	0.40
5:B:135:MET:HB3	6:I:100:ILE:HG21	2.04	0.40
8:A:119:ARG:HD2	8:A:119:ARG:HA	1.88	0.40
10:M:148:VAL:HG13	10:M:149:PRO:HD3	2.04	0.40
11:N:130:LEU:HD12	11:N:130:LEU:HA	1.91	0.40
11:N:373:ALA:O	11:N:377:THR:HG22	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	F	437/445 (98%)	428 (98%)	9 (2%)	0	100	100
2	E	154/166 (93%)	149 (97%)	5 (3%)	0	100	100
3	G	903/908 (99%)	870 (96%)	33 (4%)	0	100	100
4	C	582/596 (98%)	567 (97%)	15 (3%)	0	100	100
5	B	202/220 (92%)	195 (96%)	7 (4%)	0	100	100
6	I	178/180 (99%)	175 (98%)	3 (2%)	0	100	100
7	H	320/325 (98%)	313 (98%)	7 (2%)	0	100	100
8	A	109/147 (74%)	109 (100%)	0	0	100	100
9	L	601/613 (98%)	583 (97%)	18 (3%)	0	100	100
10	M	502/509 (99%)	485 (97%)	17 (3%)	0	100	100
11	N	464/485 (96%)	455 (98%)	8 (2%)	1 (0%)	47	78
12	K	98/100 (98%)	96 (98%)	2 (2%)	0	100	100
13	J	160/184 (87%)	156 (98%)	4 (2%)	0	100	100
All	All	4710/4878 (97%)	4581 (97%)	128 (3%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
11	N	64	THR

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	F	353/359 (98%)	346 (98%)	7 (2%)	55	78
2	E	129/139 (93%)	127 (98%)	2 (2%)	62	81
3	G	733/736 (100%)	721 (98%)	12 (2%)	62	81
4	C	506/515 (98%)	493 (97%)	13 (3%)	46	73
5	B	181/192 (94%)	177 (98%)	4 (2%)	52	76
6	I	154/154 (100%)	152 (99%)	2 (1%)	69	84
7	H	266/269 (99%)	260 (98%)	6 (2%)	50	75
8	A	89/119 (75%)	86 (97%)	3 (3%)	37	66
9	L	480/485 (99%)	467 (97%)	13 (3%)	44	72
10	M	413/418 (99%)	394 (95%)	19 (5%)	27	59
11	N	374/385 (97%)	362 (97%)	12 (3%)	39	68
12	K	79/79 (100%)	76 (96%)	3 (4%)	33	63
13	J	128/146 (88%)	124 (97%)	4 (3%)	40	69
All	All	3885/3996 (97%)	3785 (97%)	100 (3%)	49	73

All (100) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	105	MET
1	F	126	TYR
1	F	215	CYS
1	F	252	PHE
1	F	255	ARG
1	F	351	CYS
1	F	398	CYS
2	E	122	PHE
2	E	136	ASN
3	G	98	MET
3	G	135	ARG
3	G	175	TYR
3	G	187	GLU
3	G	218	ASN
3	G	442	ASP
3	G	443	ASP
3	G	631	ARG
3	G	750	ARG
3	G	841	TYR
3	G	865	ASP

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Mol	Chain	Res	Type
3	G	906	LYS
4	C	65	LYS
4	C	156	ARG
4	C	199	PHE
4	C	223	ASN
4	C	231	PHE
4	C	324	SER
4	C	356	PHE
4	C	387	MET
4	C	404	LEU
4	C	487	ASN
4	C	555	MET
4	C	580	LEU
4	C	600	ARG
5	B	38	PHE
5	B	72	PHE
5	B	96	MET
5	B	180	ARG
6	I	86	ARG
6	I	159	ASP
7	H	13	LEU
7	H	71	GLU
7	H	128	TYR
7	H	140	LYS
7	H	196	PHE
7	H	286	ARG
8	A	42	ARG
8	A	69	TYR
8	A	79	ASP
9	L	68	MET
9	L	77	PHE
9	L	113	TYR
9	L	117	PHE
9	L	123	PHE
9	L	134	ASP
9	L	168	MET
9	L	346	PHE
9	L	379	PHE
9	L	431	ARG
9	L	440	LYS
9	L	516	ARG
9	L	536	TYR

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Mol	Chain	Res	Type
10	M	5	TRP
10	M	74	ARG
10	M	80	HIS
10	M	88	LEU
10	M	139	PHE
10	M	153	LEU
10	M	159	HIS
10	M	174	PHE
10	M	303	TRP
10	M	310	ASP
10	M	325	PHE
10	M	388	SER
10	M	403	ASN
10	M	435	TYR
10	M	439	MET
10	M	454	SER
10	M	463	ARG
10	M	481	TYR
10	M	502	ASN
11	N	127	SER
11	N	140	PHE
11	N	197	MET
11	N	207	PHE
11	N	223	PHE
11	N	241	PHE
11	N	256	ARG
11	N	278	PHE
11	N	317	GLN
11	N	388	MET
11	N	397	TYR
11	N	485	MET
12	K	26	ARG
12	K	46	PHE
12	K	82	GLN
13	J	3	PHE
13	J	31	TYR
13	J	59	TYR
13	J	69	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
3	G	845	ASN
10	M	344	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 14 ligands modelled in this entry, 1 is monoatomic - leaving 13 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
16	FES	E	201	2	0,4,4	-	-	-		
19	LFA	H	601	-	19,19,19	0.16	0	18,18,18	0.12	0
14	SF4	B	301	5	0,12,12	-	-	-		
14	SF4	G	1002	3	0,12,12	-	-	-		
15	FMN	F	502	-	33,33,33	1.05	2 (6%)	48,50,50	1.22	6 (12%)
16	FES	G	1004	3	0,4,4	-	-	-		
14	SF4	G	1003	3	0,12,12	-	-	-		
18	3PE	C	701	-	50,50,50	0.30	0	53,55,55	0.29	0
14	SF4	I	202	6	0,12,12	-	-	-		
18	3PE	L	801	-	50,50,50	0.30	0	53,55,55	0.29	0
14	SF4	I	201	6	0,12,12	-	-	-		
14	SF4	G	1001	3	0,12,12	-	-	-		
14	SF4	F	501	1	0,12,12	-	-	-		

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	LFA	H	601	-	-	1/17/17/17	-
16	FES	E	201	2	-	-	0/1/1/1
14	SF4	B	301	5	-	-	0/6/5/5
14	SF4	G	1002	3	-	-	0/6/5/5
16	FES	G	1004	3	-	-	0/1/1/1
14	SF4	G	1003	3	-	-	0/6/5/5
18	3PE	C	701	-	-	11/54/54/54	-
14	SF4	I	202	6	-	-	0/6/5/5
18	3PE	L	801	-	-	6/54/54/54	-
15	FMN	F	502	-	-	9/18/18/18	0/3/3/3
14	SF4	G	1001	3	-	-	0/6/5/5
14	SF4	F	501	1	-	-	0/6/5/5
14	SF4	I	201	6	-	-	0/6/5/5

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
15	F	502	FMN	C4A-N5	3.70	1.37	1.30
15	F	502	FMN	C10-N1	2.29	1.37	1.33

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
15	F	502	FMN	C4-N3-C2	-3.18	119.77	125.64
15	F	502	FMN	C4A-C10-N10	2.86	120.66	116.48
15	F	502	FMN	C4A-C4-N3	2.64	119.89	113.19
15	F	502	FMN	O4-C4-C4A	-2.49	119.98	126.60
15	F	502	FMN	C10-C4A-N5	-2.27	120.04	124.86
15	F	502	FMN	C4A-C10-N1	-2.25	119.52	124.73

There are no chirality outliers.

All (27) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
15	F	502	FMN	N10-C1'-C2'-O2'
15	F	502	FMN	N10-C1'-C2'-C3'
15	F	502	FMN	C1'-C2'-C3'-C4'

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Mol	Chain	Res	Type	Atoms
15	F	502	FMN	C5'-O5'-P-O2P
15	F	502	FMN	C5'-O5'-P-O3P
18	C	701	3PE	C11-O13-P-O14
18	C	701	3PE	O13-C11-C12-N
19	H	601	LFA	C14-C15-C16-C17
18	L	801	3PE	C37-C38-C39-C3A
15	F	502	FMN	O2'-C2'-C3'-C4'
18	L	801	3PE	C2C-C2D-C2E-C2F
15	F	502	FMN	O2'-C2'-C3'-O3'
15	F	502	FMN	C5'-O5'-P-O1P
18	C	701	3PE	C3D-C3E-C3F-C3G
18	L	801	3PE	C25-C26-C27-C28
18	C	701	3PE	C11-O13-P-O11
18	L	801	3PE	C34-C35-C36-C37
18	L	801	3PE	C23-C24-C25-C26
18	C	701	3PE	C3C-C3D-C3E-C3F
18	C	701	3PE	C29-C2A-C2B-C2C
18	C	701	3PE	O31-C31-C32-C33
18	C	701	3PE	C25-C26-C27-C28
18	C	701	3PE	C23-C24-C25-C26
18	C	701	3PE	C3F-C3G-C3H-C3I
18	C	701	3PE	O32-C31-C32-C33
18	L	801	3PE	C1-O11-P-O14
15	F	502	FMN	C1'-C2'-C3'-O3'

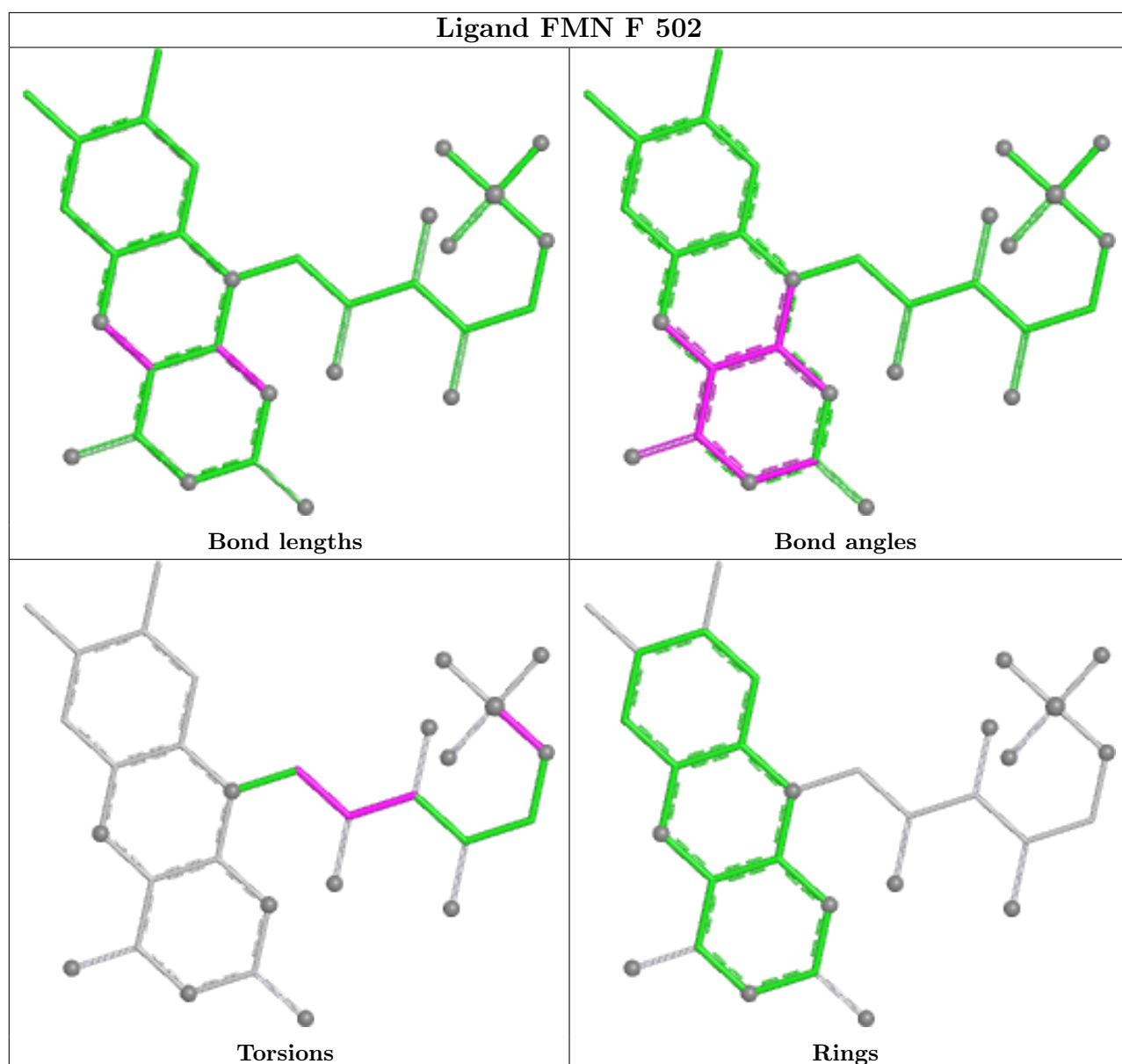
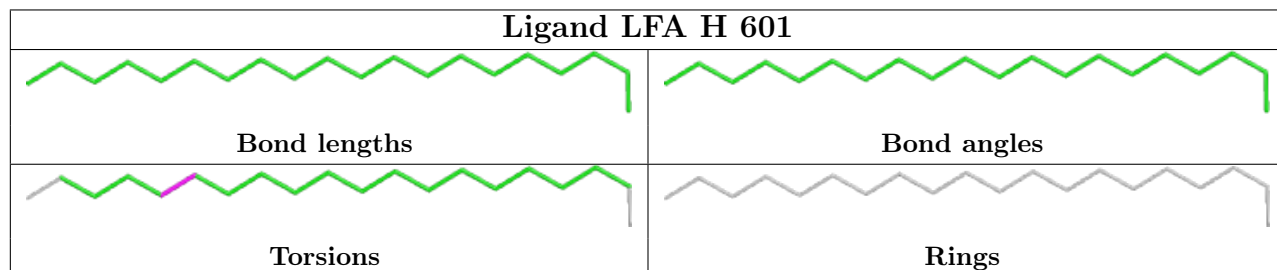
There are no ring outliers.

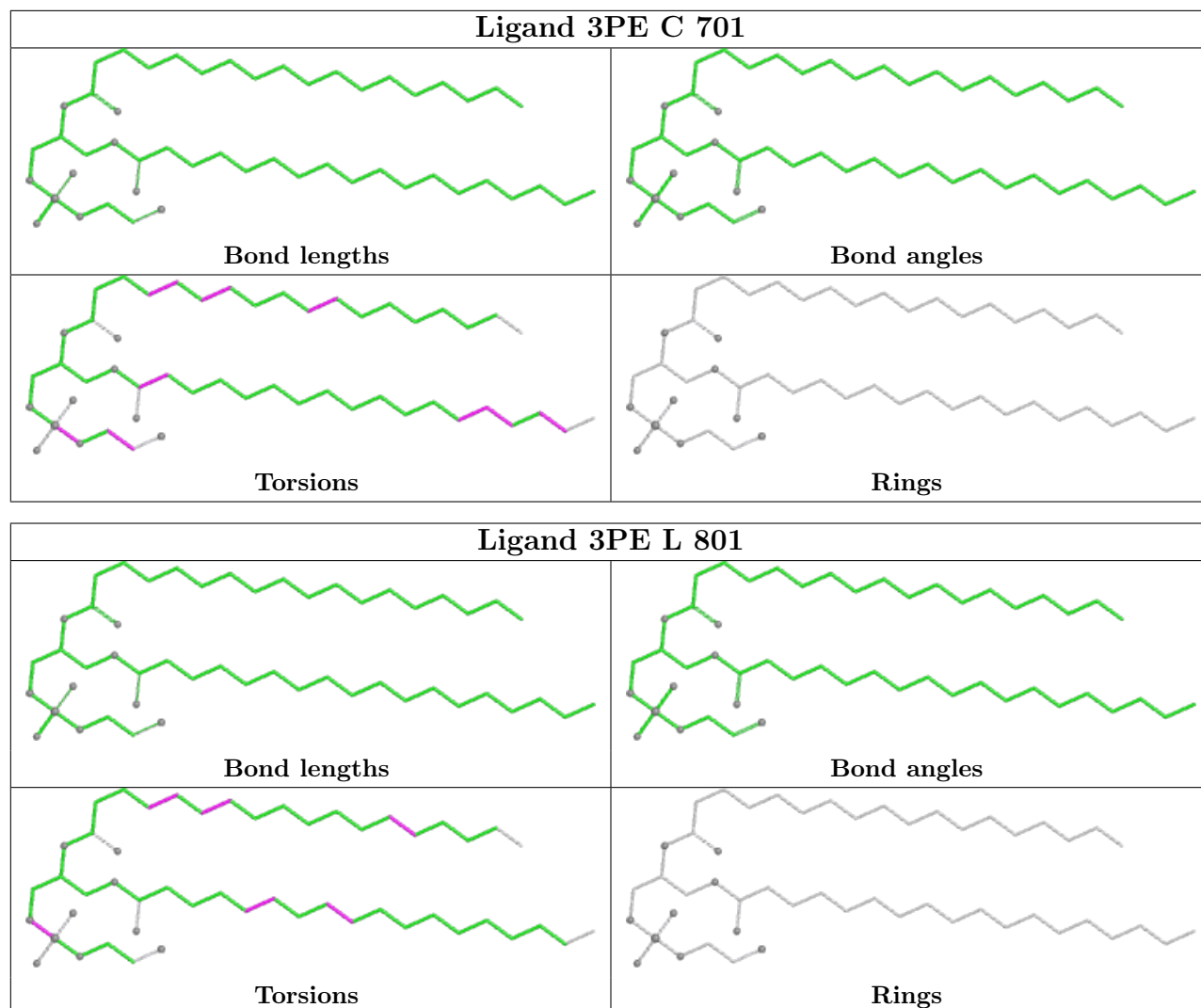
6 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
16	E	201	FES	1	0
19	H	601	LFA	1	0
14	G	1003	SF4	1	0
18	C	701	3PE	2	0
18	L	801	3PE	2	0
14	G	1001	SF4	2	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 [i](#)

There are no chain breaks in this entry.

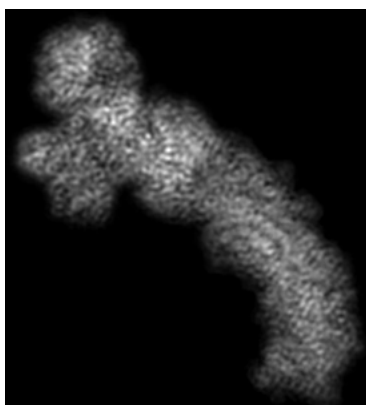
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-14535. These allow visual inspection of the internal detail of the map and identification of artifacts.

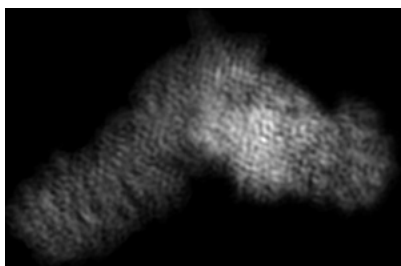
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

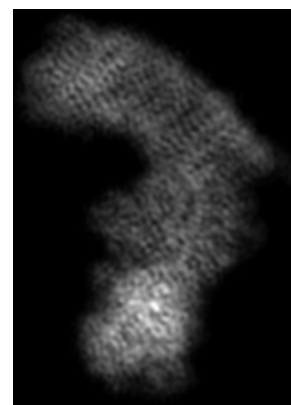
6.1.1 Primary map



X



Y

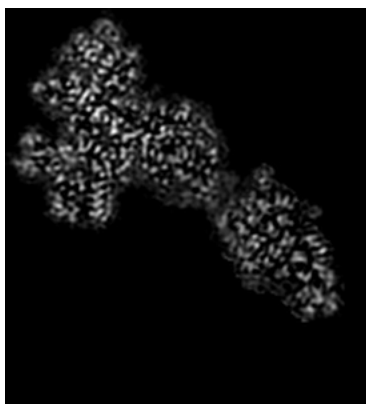


Z

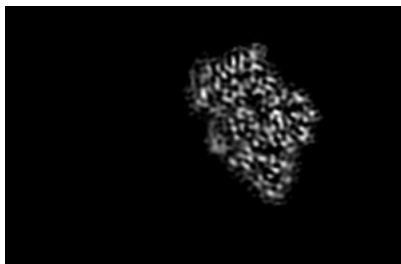
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

6.2.1 Primary map



X Index: 64



Y Index: 89



Z Index: 98

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: 63



Y Index: 45



Z Index: 127

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

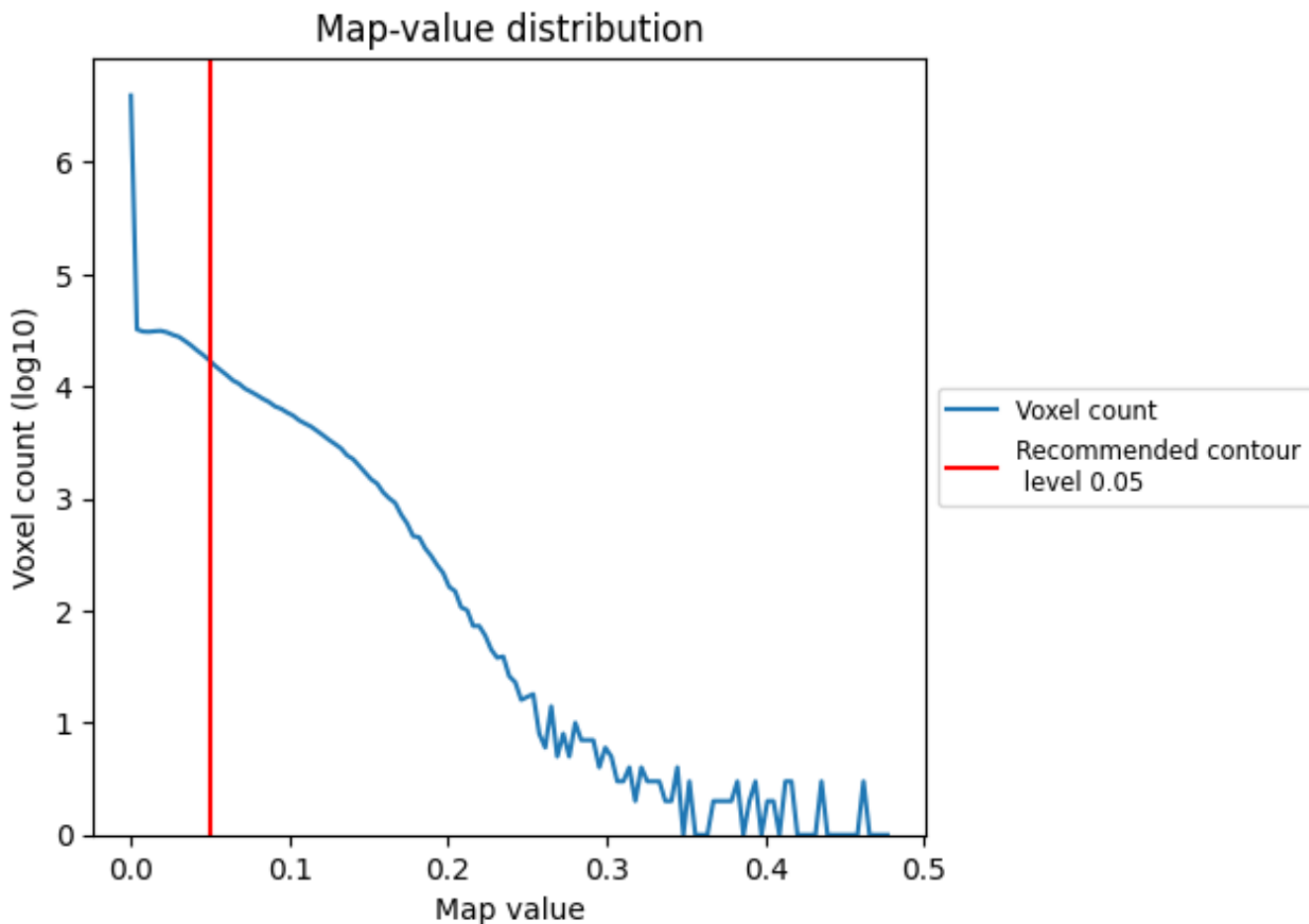
6.5 Mask visualisation

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

7 Map analysis [i](#)

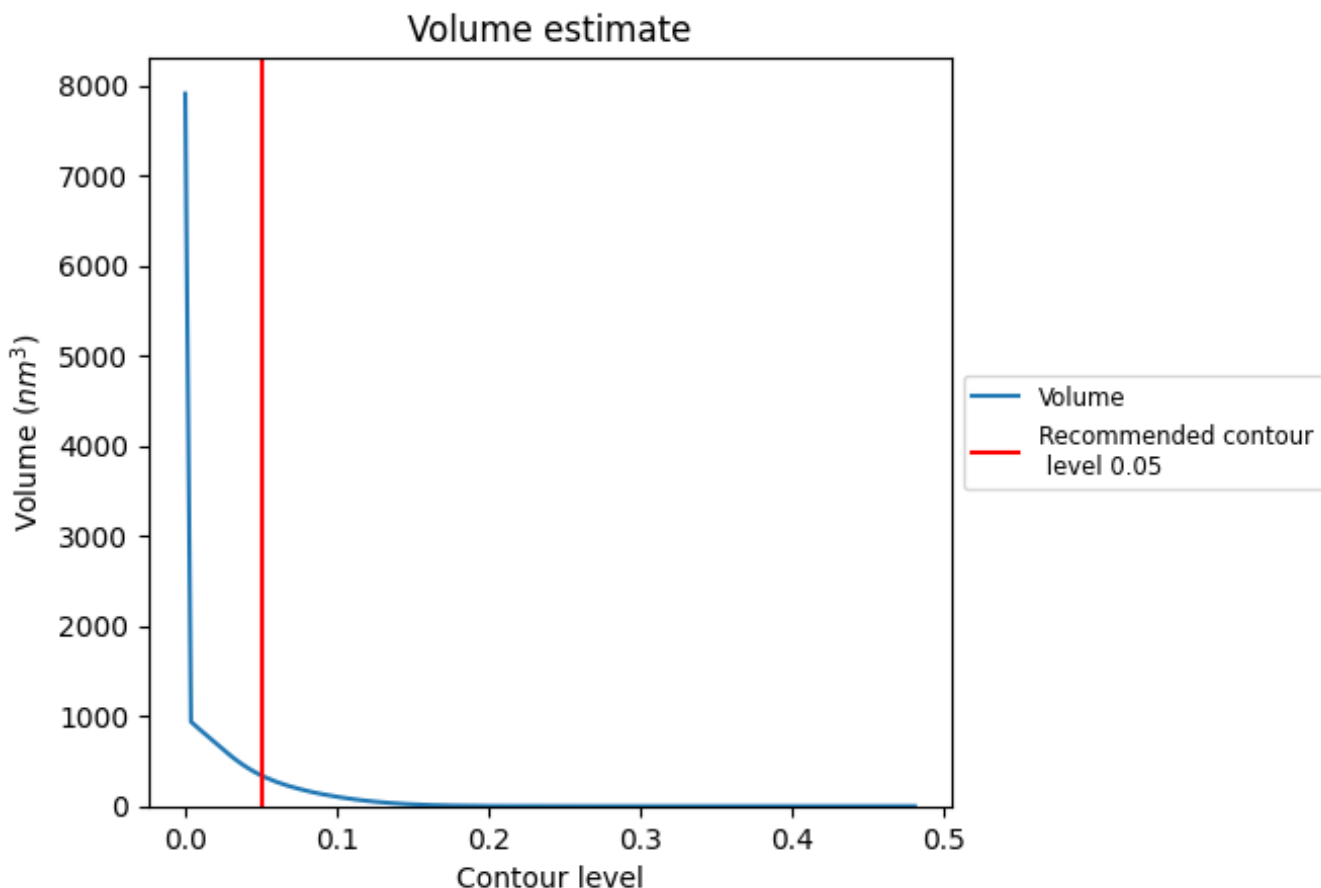
This section contains the results of statistical analysis of the map.

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 342 nm^3 ; this corresponds to an approximate mass of 309 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.

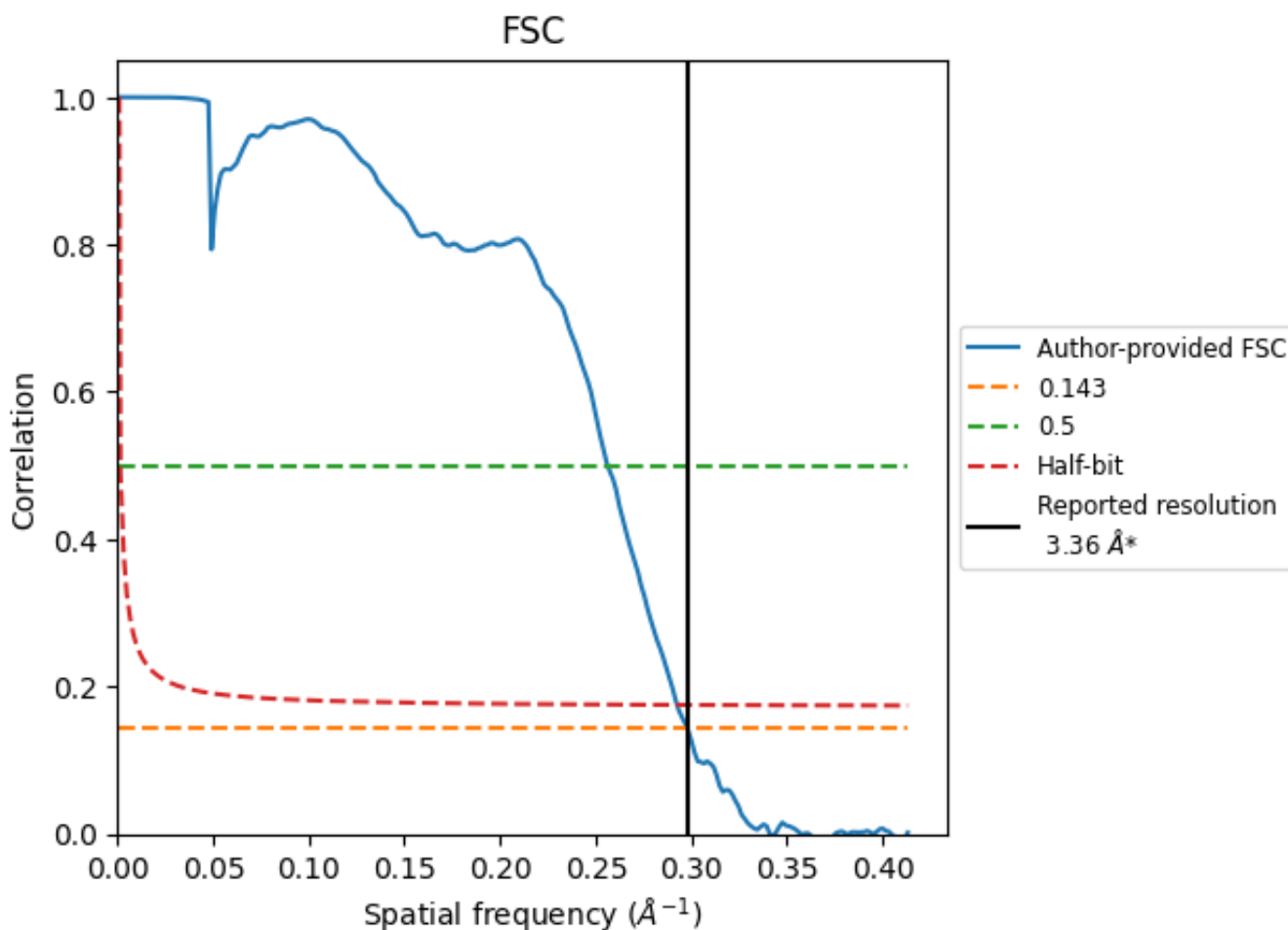
7.3 Rotationally averaged power spectrum [i](#)

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

8 Fourier-Shell correlation [\(i\)](#)

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 0.298 Å⁻¹

8.2 Resolution estimates [i](#)

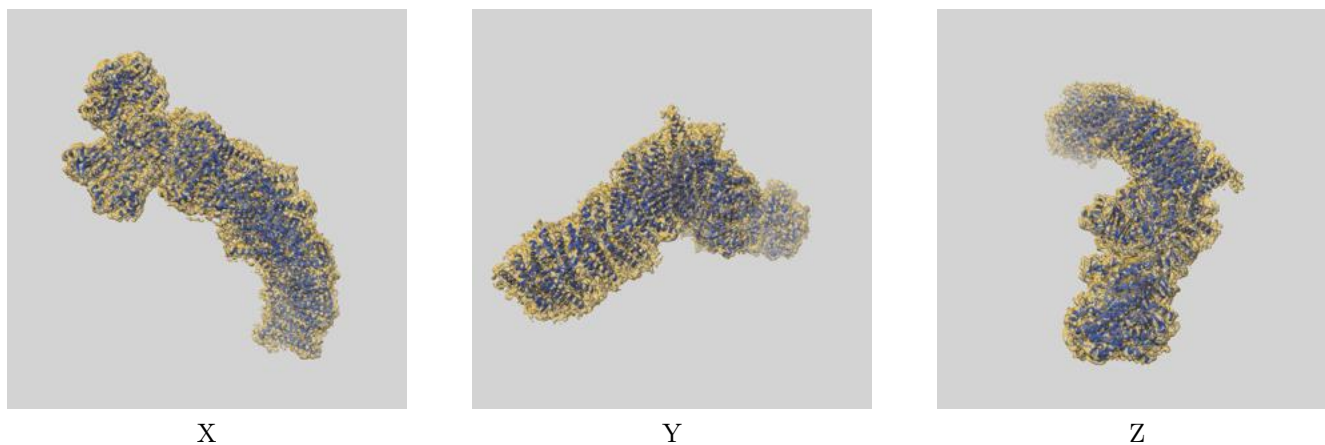
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.36	-	-
Author-provided FSC curve	3.36	3.90	3.42
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

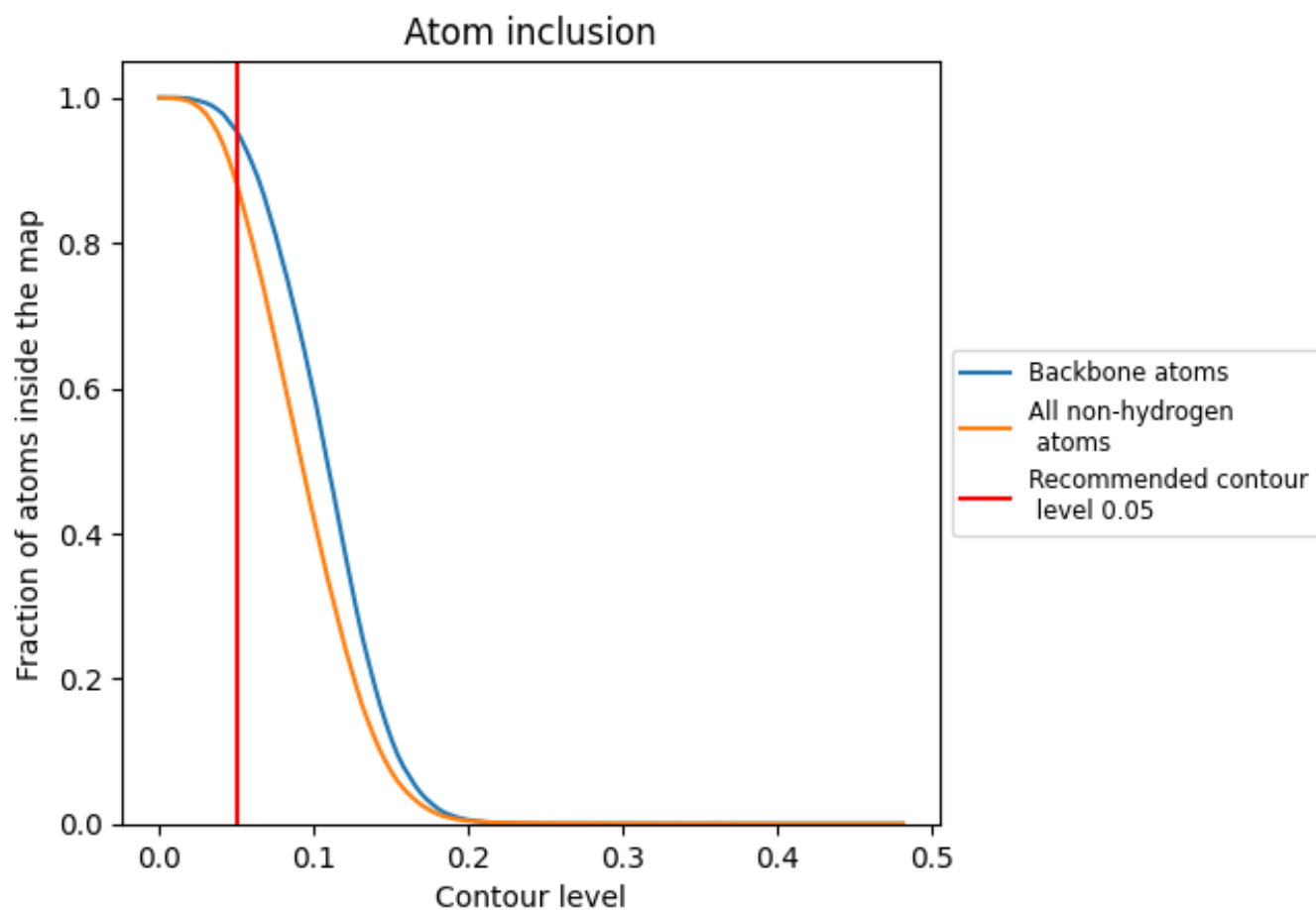
This section contains information regarding the fit between EMDB map EMD-14535 and PDB model 7Z7R. Per-residue inclusion information can be found in section 3 on page 10.

9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.05 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 Atom inclusion [i](#)



At the recommended contour level, 95% of all backbone atoms, 88% of all non-hydrogen atoms, are inside the map.