WORLDWIDE PDB
PROTEIN DATA BANK

wwPDB EM Validation Summary Report (i)

Mar 16, 2026 – 06:51 PM JST

PDB ID	:	9MBP / pdb_00009mbp
EMDB ID	:	EMD-63776
Title	:	Substrate-engaged human 26S proteasome bound to midnolin with RPT1 at top of spiral staircase
Authors	:	Zhu, C.; Qin, L.; Liang, L.
Deposited on	:	2025-03-17
Resolution	:	2.75 Å(reported)

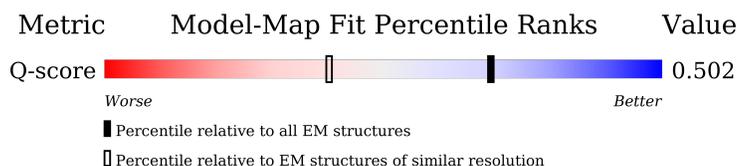The following versions of software and data (see references (i)) were used in the production of this report:

EMDB validation analysis	:	0.0.1.dev132
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.48.1

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 2.75 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.
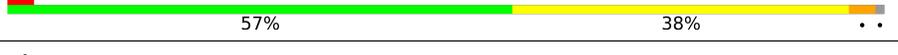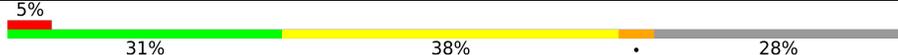
Metric	Percentile Ranks	Value
Clashscore		12
Ramachandran outliers		0.6%
Sidechain outliers		3.3%

Worse   *Better*

▐ Percentile relative to all structures
▯ Percentile relative to all EM structures

Metric	Model-Map Fit Percentile Ranks	Value
Q-score		0.502

Worse   *Better*

▐ Percentile relative to all EM structures
▯ Percentile relative to EM structures of similar resolution

Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	10570 (2.25 - 3.25)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	U	953	· 57% 29% · 11%
2	V	533	12% 51% 38% · 10%
3	W	456	5% 48% 47% · ·
4	X	422	· 64% 24% · 10%

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Mol	Chain	Length	Quality of chain
5	Y	389	61% 35%
6	Z	324	60% 26% 12%
7	a	376	57% 38%
8	b	377	25% 23% 49%
9	c	309	58% 31% 7%
10	d	349	5% 31% 38% 28%
11	e	70	6% 27% 27% 43%
12	A	433	68% 25% 5%
13	B	440	69% 21% 8%
14	C	398	75% 23%
15	D	418	64% 25% 9%
16	E	403	10% 55% 36% 5%
17	F	439	9% 61% 27% 10%
18	v	14	86% 14%
19	G	245	82% 15%
19	g	245	77% 21%
20	H	233	79% 18%
20	h	233	82% 17%
21	I	260	79% 16% 5%
21	i	260	83% 12%
22	J	247	85% 14%
22	j	247	77% 17%
23	K	240	82% 14%
23	k	240	78% 16% 5%
24	L	268	76% 12% 11%
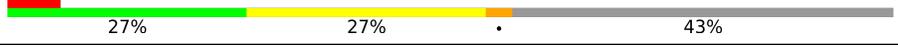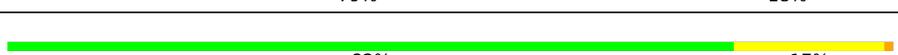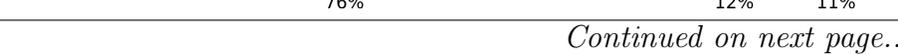
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Mol	Chain	Length	Quality of chain
24	l	268	71% 18% 11%
25	M	254	76% 17% 6%
25	m	254	78% 16% 6%
26	N	238	74% 9% 17%
26	n	238	74% 9% 17%
27	O	276	69% 10% 20%
27	o	276	69% 10% 20%
28	P	204	83% 17%
28	p	204	86% 13%
29	Q	201	89% 10%
29	q	201	86% 12%
30	R	262	65% 11% 23%
30	r	262	69% 7% 23%
31	S	240	82% 7% 11%
31	s	240	80% 9% 11%
32	T	263	71% 10% 18%
32	t	263	78% 18%
33	f	468	6% 92%
34	u	908	67% 24% 8%

2 Entry composition ⓘ

There are 39 unique types of molecules in this entry. The entry contains 105160 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 26S proteasome non-ATPase regulatory subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	U	845	Total 6595	C 4186	N 1120	O 1245	S 44	0	0

- Molecule 2 is a protein called 26S proteasome non-ATPase regulatory subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	V	480	Total 3852	C 2444	N 684	O 710	S 14	0	0

- Molecule 3 is a protein called 26S proteasome non-ATPase regulatory subunit 12.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	W	452	Total 3667	C 2314	N 631	O 697	S 25	0	0

- Molecule 4 is a protein called 26S proteasome non-ATPase regulatory subunit 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	X	380	Total 3009	C 1918	N 509	O 570	S 12	0	0

- Molecule 5 is a protein called 26S proteasome non-ATPase regulatory subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	Y	378	Total 3115	C 1987	N 533	O 578	S 17	0	0

- Molecule 6 is a protein called 26S proteasome non-ATPase regulatory subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	Z	286	Total 2281	C 1457	N 392	O 427	S 5	0	0

- Molecule 7 is a protein called 26S proteasome non-ATPase regulatory subunit 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	a	373	Total	C	N	O	S	0	0
			2995	1911	510	559	15		

- Molecule 8 is a protein called 26S proteasome non-ATPase regulatory subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	b	191	Total	C	N	O	S	0	0
			1454	908	261	277	8		

- Molecule 9 is a protein called 26S proteasome non-ATPase regulatory subunit 14.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	c	287	Total	C	N	O	S	0	0
			2260	1430	389	422	19		

- Molecule 10 is a protein called 26S proteasome non-ATPase regulatory subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	d	253	Total	C	N	O	S	0	0
			2078	1348	340	381	9		

- Molecule 11 is a protein called 26S proteasome complex subunit SEM1.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	e	40	Total	C	N	O	S	0	0
			334	200	55	77	2		

- Molecule 12 is a protein called 26S proteasome regulatory subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	A	413	Total	C	N	O	S	0	0
			3229	2034	566	611	18		

- Molecule 13 is a protein called 26S proteasome regulatory subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	B	405	Total	C	N	O	S	0	0
			3162	1994	538	615	15		

- Molecule 14 is a protein called 26S proteasome regulatory subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	C	396	Total	C	N	O	S	0	0
			3105	1954	558	576	17		

- Molecule 15 is a protein called 26S proteasome regulatory subunit 6B.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	D	380	Total	C	N	O	S	0	0
			3040	1923	524	580	13		

- Molecule 16 is a protein called Proteasome 26S subunit, ATPase 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	E	381	Total	C	N	O	S	0	0
			3031	1903	542	569	17		

- Molecule 17 is a protein called 26S proteasome regulatory subunit 6A.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	F	395	Total	C	N	O	S	0	0
			3098	1951	533	596	18		

- Molecule 18 is a protein called substrate peptide.

Mol	Chain	Residues	Atoms				AltConf	Trace
18	v	14	Total	C	N	O	0	0
			70	42	14	14		

- Molecule 19 is a protein called Proteasome subunit alpha type-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	G	237	Total	C	N	O	S	0	0
			1809	1151	302	343	13		
19	g	240	Total	C	N	O	S	0	0
			1830	1163	306	348	13		

- Molecule 20 is a protein called Proteasome subunit alpha type-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	H	231	Total	C	N	O	S	0	0
			1726	1097	293	331	5		
20	h	232	Total	C	N	O	S	0	0
			1727	1096	292	334	5		

- Molecule 21 is a protein called Proteasome subunit alpha type-4.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	I	248	Total 1895	C 1195	N 324	O 368	S 8	0	0
21	i	250	Total 1912	C 1204	N 329	O 371	S 8	0	0

- Molecule 22 is a protein called Proteasome subunit alpha type-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	J	247	Total 1844	C 1148	N 331	O 360	S 5	0	0
22	j	239	Total 1704	C 1056	N 308	O 335	S 5	0	0

- Molecule 23 is a protein called Proteasome subunit alpha type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	K	230	Total 1746	C 1096	N 286	O 353	S 11	0	0
23	k	228	Total 1722	C 1080	N 284	O 348	S 10	0	0

- Molecule 24 is a protein called Isoform Long of Proteasome subunit alpha type-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	L	238	Total 1850	C 1159	N 334	O 346	S 11	0	0
24	l	238	Total 1850	C 1159	N 334	O 346	S 11	0	0

- Molecule 25 is a protein called Proteasome subunit alpha type-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	M	240	Total 1856	C 1178	N 314	O 353	S 11	0	0
25	m	240	Total 1862	C 1181	N 317	O 353	S 11	0	0

- Molecule 26 is a protein called Proteasome subunit beta type-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	N	197	Total 1482	C 928	N 253	O 289	S 12	0	0
26	n	197	Total 1482	C 928	N 253	O 289	S 12	0	0

- Molecule 27 is a protein called Proteasome subunit beta type-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	O	220	Total 1643	C 1033	N 280	O 318	S 12	0	0
27	o	220	Total 1643	C 1033	N 280	O 318	S 12	0	0

- Molecule 28 is a protein called Proteasome subunit beta type-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	P	204	Total 1591	C 1013	N 265	O 294	S 19	0	0
28	p	204	Total 1591	C 1013	N 265	O 294	S 19	0	0

- Molecule 29 is a protein called Proteasome subunit beta type-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	Q	199	Total 1570	C 1006	N 265	O 290	S 9	0	0
29	q	199	Total 1574	C 1009	N 266	O 290	S 9	0	0

- Molecule 30 is a protein called Proteasome subunit beta type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	R	201	Total 1548	C 974	N 273	O 292	S 9	0	0
30	r	201	Total 1548	C 974	N 273	O 292	S 9	0	0

- Molecule 31 is a protein called Proteasome subunit beta type-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	S	213	Total 1641	C 1036	N 282	O 313	S 10	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
31	s	213	Total	C	N	O	S	0	0
			1641	1036	282	313	10		

- Molecule 32 is a protein called Proteasome subunit beta type-4.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	T	215	Total	C	N	O	S	0	0
			1667	1052	285	318	12		
32	t	215	Total	C	N	O	S	0	0
			1673	1055	288	318	12		

- Molecule 33 is a protein called Midnolin.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	f	39	Total	C	N	O	S	0	0
			331	196	80	54	1		

- Molecule 34 is a protein called 26S proteasome non-ATPase regulatory subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	u	832	Total	C	N	O	S	0	0
			6439	4072	1090	1232	45		

- Molecule 35 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
35	c	1	Total	Zn	0
			1	1	

- Molecule 36 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).

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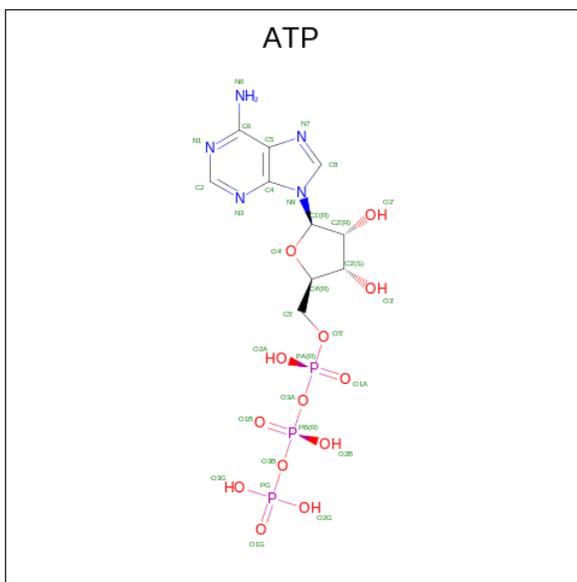
Mol	Chain	Residues	Atoms					AltConf
36	A	1	Total	C	N	O	P	0
			31	10	5	13	3	
36	B	1	Total	C	N	O	P	0
			31	10	5	13	3	
36	C	1	Total	C	N	O	P	0
			31	10	5	13	3	
36	F	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 37 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

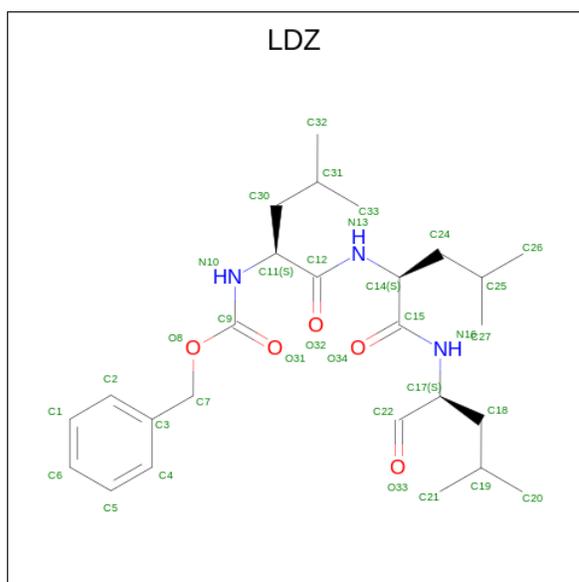| Mol	Chain	Residues	Atoms		AltConf
37	A	1	Total	Mg	0
			1	1	
37	B	1	Total	Mg	0
			1	1	
37	C	1	Total	Mg	0
			1	1	
37	D	1	Total	Mg	0
			1	1	
37	F	1	Total	Mg	0
			1	1	

- Molecule 38 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).

ADP
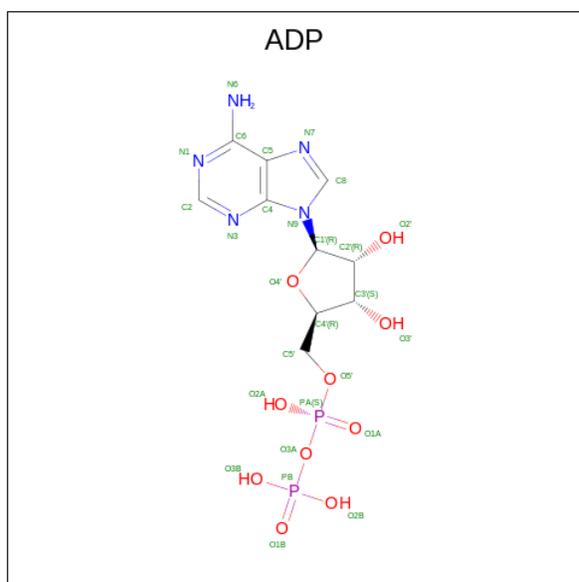
Mol	Chain	Residues	Atoms					AltConf
38	D	1	Total	C	N	O	P	0
			27	10	5	10	2	
38	E	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 39 is N-[(benzyloxy)carbonyl]-L-leucyl-N-[(2S)-4-methyl-1-oxopentan-2-yl]-L-leucinamide (CCD ID: LDZ) (formula: $C_{26}H_{41}N_3O_5$) (labeled as "Ligand of Interest" by depositor).
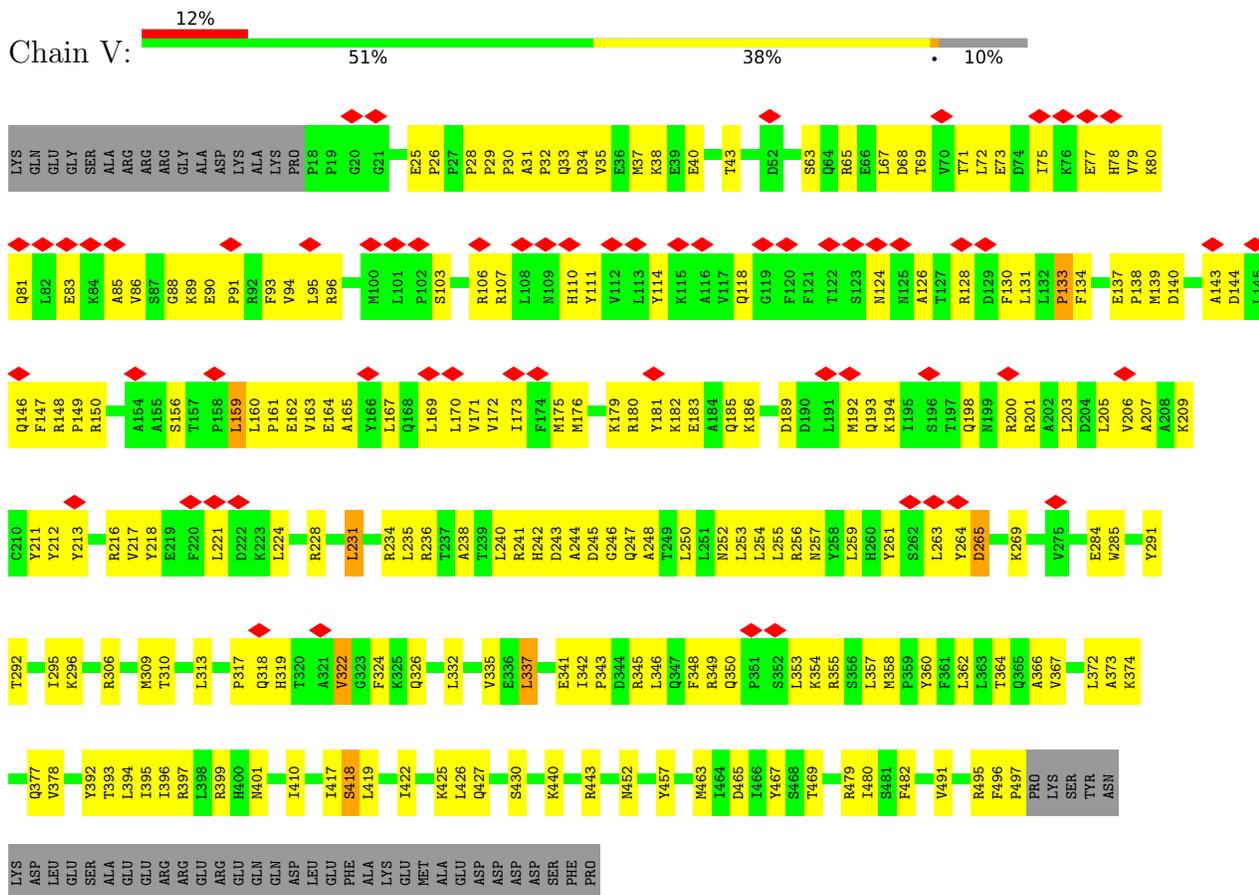
LDZ

Mol	Chain	Residues	Atoms				AltConf
39	N	1	Total	C	N	O	0
			34	26	3	5	

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Mol	Chain	Residues	Atoms				AltConf
39	O	1	Total	C	N	O	0
			34	26	3	5	
39	R	1	Total	C	N	O	0
			34	26	3	5	
39	n	1	Total	C	N	O	0
			34	26	3	5	
39	o	1	Total	C	N	O	0
			34	26	3	5	
39	r	1	Total	C	N	O	0
			34	26	3	5	

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.
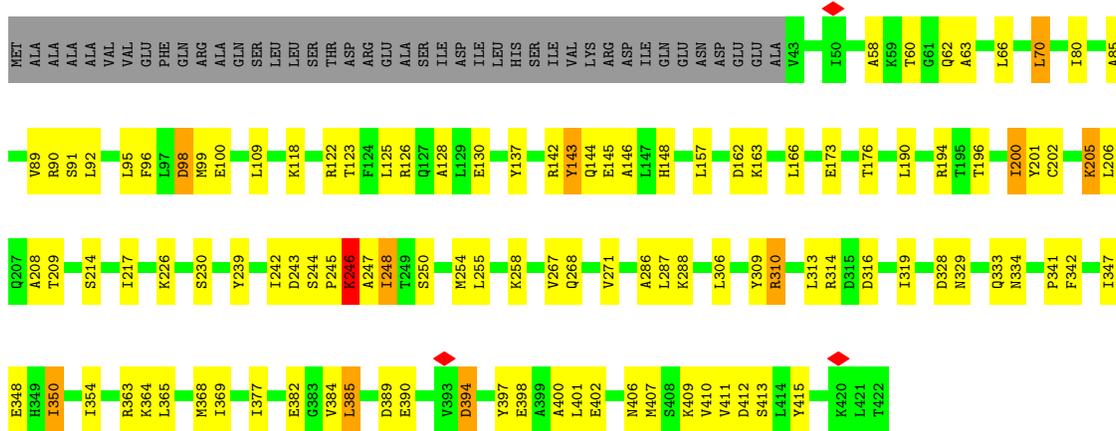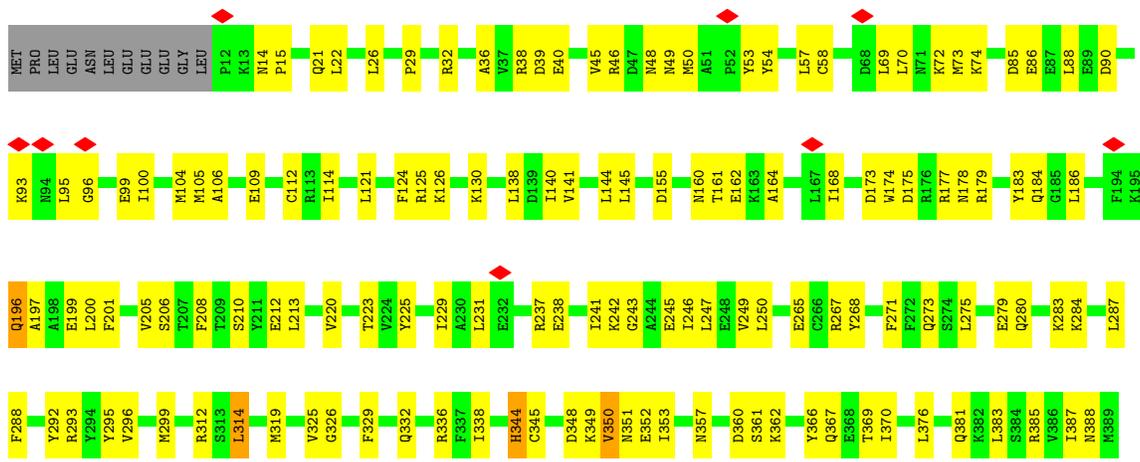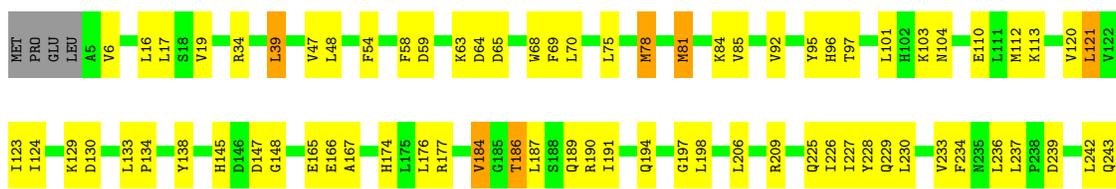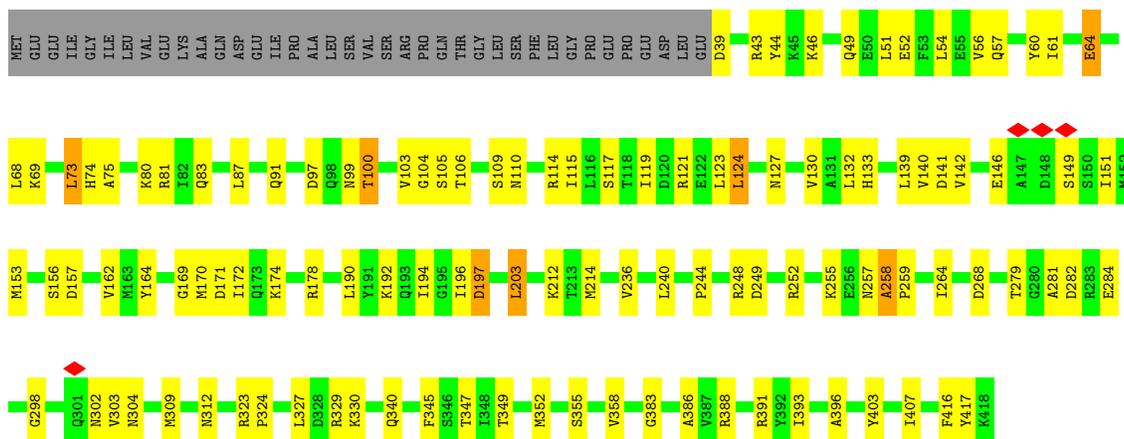
• Molecule 1: 26S proteasome non-ATPase regulatory subunit 1

• Molecule 2: 26S proteasome non-ATPase regulatory subunit 3

Chain V:

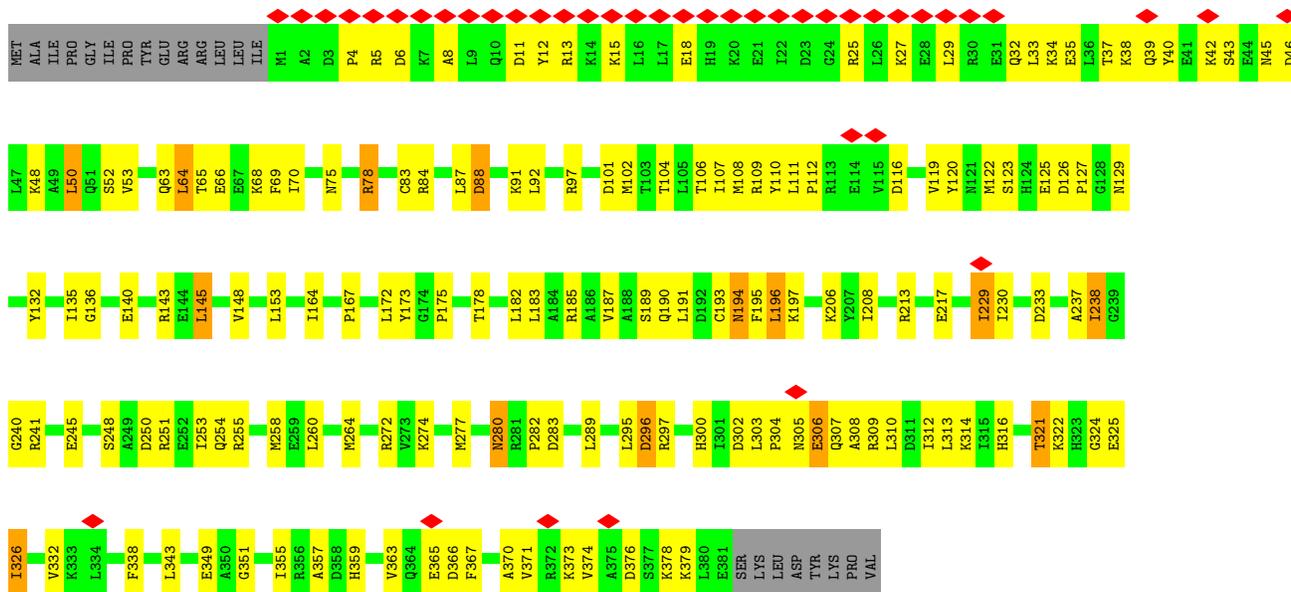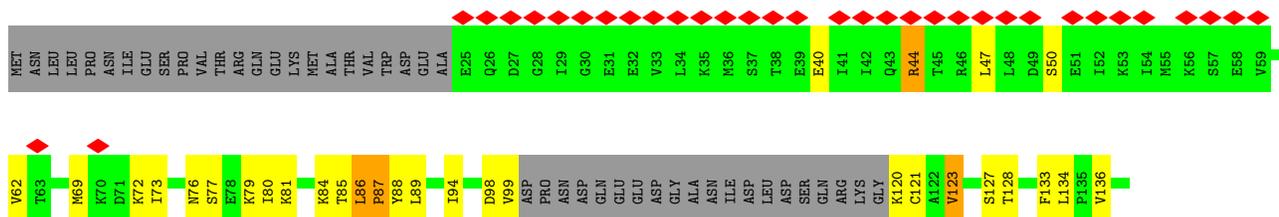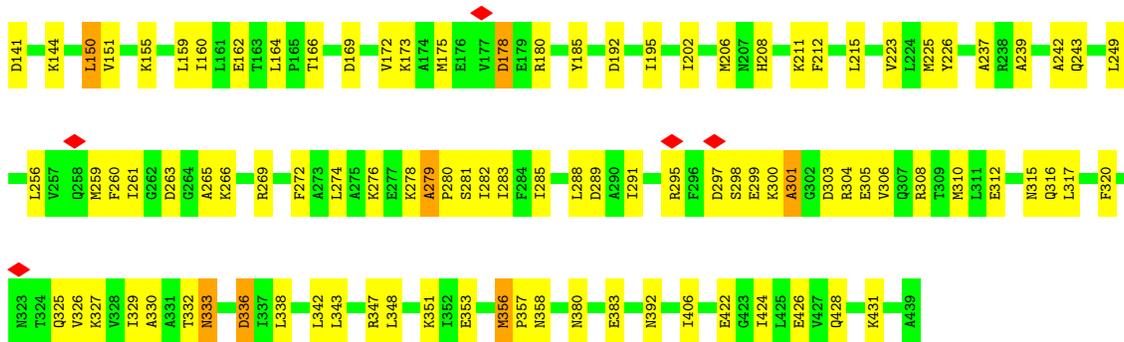• Molecule 3: 26S proteasome non-ATPase regulatory subunit 12

Chain W:

S385 V386 D387 E388 S389 E390 N395 L396 V397 V398 F403 A404 K405 V406 I412 I413 R417 S434 L435 M436 V439 N440 K441 T442 T443 H444 L445 I446 M451 I452 Q456

• Molecule 4: 26S proteasome non-ATPase regulatory subunit 11

Chain X:

64%   24%   •   10%

MET ALA ALA ALA ALA VAL VAL GLU PHE GLN ARG ALA GLN ALA SER LEU LEU SER THR ASP ARG GLU ALA SER ILE ILE LEU SER ILE VAL LYS ARG ASP ILE GLN GLU ASN ASP GLU GLU ALA V43 I50 A58 K59 T60 G61 Q62 A63 L66 L70 I80 A85

V89 R90 S91 L92 L95 F96 L97 D98 M99 E100 L109 K118 R122 T123 F124 L125 R126 Q127 A128 L129 E130 Y137 R142 Y143 Q144 E145 A146 L147 H148 L157 D162 K163 L166 E173 T176 L190 R194 T195 T196 I200 Y201 C202 K205 L206

Q207 A208 T209 S214 I217 K226 S230 Y239 I242 D243 S244 P245 K246 A247 I248 T249 S250 M254 L255 K258 V267 Q268 V271 A286 L287 K288 L306 Y309 R310 L313 R314 D315 D316 I319 D328 N329 Q333 N334 P341 F342 I347

E348 H349 I350 I354 R363 K364 L365 M368 I369 I377 E382 G383 V384 L385 D389 E390 V393 D394 Y397 E398 A399 A400 L401 E402 N406 M407 S408 K409 V410 V411 D412 S413 L414 Y415 K420 L421 T422

• Molecule 5: 26S proteasome non-ATPase regulatory subunit 6

Chain Y:

61%   35%   • •

MET PRO LEU GLU ASN LEU GLU GLU GLY LEU P12 K13 N14 P15 Q21 L22 L26 P29 R32 A36 V37 R38 D39 E40 V45 R46 N48 N49 M50 A51 P52 Y53 Y54 L57 C58 D68 L69 L70 N71 K72 M73 K74 D85 E86 E87 L88 E89 D90

K93 N94 L95 G96 E99 I100 M104 M105 A106 E109 C112 R113 I114 L121 F124 R125 K126 K130 L138 D139 I140 V141 L144 L145 D155 N160 T161 E162 K163 A164 L167 I168 D173 W174 D175 R176 R177 N178 R179 Y183 Q184 G185 L186 F194 K195

Q196 A197 A198 E199 L200 F201 V205 S206 T207 F208 T209 S210 Y211 E212 L213 V220 T223 V224 Y225 I229 A230 L231 E232 R237 E238 I241 K242 G243 A244 E245 I246 L247 E248 V249 L250 E265 C266 R267 Y268 F271 F272 Q273 S274 L275 E279 Q280 K283 K284 L287

F288 Y292 R293 Y294 V295 V296 M299 R312 S313 L314 M319 V325 G326 F329 Q332 R336 F337 I338 H344 C345 D348 K349 V350 N351 E352 I353 N357 D360 S361 K362 Y366 Q367 E368 T369 I370 L376 Q381 K382 L383 S384 V386 I387 N388 M389

• Molecule 6: 26S proteasome non-ATPase regulatory subunit 7

Chain Z:

60%   26%   •   12%

MET PRO GLU LEU A5 V6 L16 L17 S18 V19 R34 L39 V47 L48 F54 F58 D59 K63 D64 D65 W68 F69 L70 L75 M78 M81 K84 V85 V92 Y95 H96 T97 L101 H102 K103 N104 E110 L111 M112 K113 V120 L121 V122

I123 I124 K129 D130 L133 P134 Y138 H145 D146 D147 G148 E165 E166 A167 H174 L175 L176 R177 V184 G185 T186 L187 S188 Q189 R190 I191 Q194 G197 L198 L206 R209 Q225 I226 I227 Y228 Q229 L230 V233 F234 N235 L236 L237 P238 D239 L242 Q243

V246 K252 Q256 M257 V258 V259 V260 Y261 L262 L265 I266 L272 I276 N277 N278 N282 R283 K288 E289 G290 GLU LYS GLU GLU SER LYS LYS ASP ARG LYS GLU ASP LYS GLU ASP LYS GLU LYS GLU LYS SER ASP VAL LYS LYS GLU GLU LYS LYS GLU

LYS LYS

• Molecule 7: 26S proteasome non-ATPase regulatory subunit 13

Chain a: 57%   38%

MET LYS ASP V4 F7 L8 Q12 N13 G17 Q18 P19 A20 V21 W22 E26 E27 T30 K31 K32 L33 W34 H35 Q36 L37 V41 L42 V45 Q52 G53 D54 G55 L56 I57 Y60 E61 N62 F63 I64 S65 E66 F67 E68 H69 R70 V71 L76 V77 E78 I79 I80

L81 N91 R101 V104 K105 S106 S107 D108 E109 A110 V111 I112 K115 T116 G119 K122 L123 D127 V130 T131 K132 E133 T134 I135 E136 D137 V138 E139 E140 M141 L142 N143 N144 L145 S150 V151 H152 S153 R154 D157 K161 Y162 Y163 Q164 T165 I166 G167 N168 H169

Y172 Y173 A176 L180 G181 I185 K186 D187 L188 S191 Q194 A197 F198 T199 L200 L206 F211 N212 F213 G214 E215 L216 L217 M218 H219 P220 V221 L222 E223 S224 L225 R226 N227 Q231 W232 L233 I234 D235 T236 L237 F240 N244 V245 E246 R247 F248 Q249 T250

L251 D260 L261 A262 A263 N264 L268 L269 I272 Q273 L274 L275 C276 E279 R284 P285 A286 R289 Q290 L291 T292 A300 K301 V304 V307 E308 V311 M312 S316 L319 V320 I324 D325 E326 V327 R330 M333 T334 W335 P338 R339 V340 L341

Q345 I346 K350 E354 T358 M365 E368 H369 Q370 T376

• Molecule 8: 26S proteasome non-ATPase regulatory subunit 4

Chain b: 25%   23%   49%

M1 V2 L3 T6 M7 V8 C9 N12 S13 E14 Y15 M16 R17 F21 L22 P23 T24 R25 L26 Q27 A28 Q29 Q30 D31 A32 V33 N34 I35 V36 C37 H38 N44 N47 N48 V49 G50 L51 I52 T53 L54 C58 E59 V60 L61 T62 T63 I71 K74 Q79 K83

V92 A93 H94 L95 A96 L97 K98 H99 R100 H105 K106 M107 R108 I109 I110 V113 V125 K126 L127 A128 K129 R130 L131 L132 K133 E134 K135 V136 N137 V138 D139 I140 I141 N142 F143 G144 E145 E146 E147 V148 N149 T150 E151 T154 A155 F156 V157 N158 T159 N161 G162 K163

D164 G165 T166 G167 S168 H169 L170 V171 P177 S178 L179 A180 D181 A182 L183 L184 S185 S186 P187 I188 L189 A190 G191 GLU GLY GLY ALA MET LEU GLY LEU GLY ALA SER ASP PHE GLU GLY PHE VAL ASP PRO SER ALA ASP PRO LEU ALA LEU ALA LEU ARG VAL SER MET GLU GLU GLN

ARG GLN ARG GLU GLU ALA ARG ALA ALA ALA SER ALA ALA GLU GLY ALA ILE ALA THR THR GLY THR GLU ASP SER ASP ALA ASP ALA ALA LEU LEU LYS MET THR ILE SER GLN GLU GLU PHE GLY ARG THR GLY PRO ASP LEU ALA SER SER THR GLU GLU GLN ILE

ALA TYR ALA MET GLN MET GLU SER LEU GLN ALA GLY ALA PHE GLY GLN ALA ALA GLU SER ALA ASP ILE ALA ALA SER ALA MET ASP ASP THR SER ASP ASP ALA ALA LYS LEU LEU LYS GLU GLU ASP ASP TYR ASP VAL MET GLN ASP PRO GLU PHE LEU GLN SER VAL LEU GLU GLU THR GLU GLN GLN ILE

ASN ASN GLU ALA ILE ARG ALA ASN MET ALA SER LEU SER GLN ALA THR LYS ASP GLY LYS ASP LYS GLU GLY ASP LYS LYS

• Molecule 9: 26S proteasome non-ATPase regulatory subunit 14

Chain c:

• Molecule 10: 26S proteasome non-ATPase regulatory subunit 8

Chain d:

• Molecule 11: 26S proteasome complex subunit SEM1

Chain e:

• Molecule 12: 26S proteasome regulatory subunit 7

Chain A:

• Molecule 13: 26S proteasome regulatory subunit 4

Chain B:

• Molecule 14: 26S proteasome regulatory subunit 8

Chain C:

• Molecule 15: 26S proteasome regulatory subunit 6B

Chain D:

64%   25%   9%

• Molecule 16: Proteasome 26S subunit, ATPase 6

Chain E:

10%

55%   36%   5%

• Molecule 17: 26S proteasome regulatory subunit 6A

Chain F:

9%

61%   27%   10%

D141 K144 L150 V151 K155 L159 I160 L161 E162 T163 L164 P165 T166 D169 V172 K173 A174 M175 E176 V177 D178 E179 R180 Y185 D192 I195 I202 M206 N207 H208 K211 F212 L215 V223 L224 M225 Y226 A237 R238 A239 A242 Q243 L249

L256 V257 Q258 M259 F260 I261 G262 D263 G264 A265 K266 R269 F272 A273 L274 A275 K276 E277 K278 A279 P280 S281 I282 I283 F284 I285 L288 D289 A290 I291 R295 F296 D297 S298 E299 K300 A301 G302 D303 R304 E305 V306 Q307 R308 T309 M310 L311 E312 N315 Q316 L317 F320

N323 T324 Q325 V326 K327 V328 I329 A330 A331 T332 N333 D336 I337 L338 L342 L343 R347 L348 K351 I352 E353 M356 P357 N358 N380 E383 N392 I406 E422 G423 I424 L425 E426 V427 Q428 K431 A439

• Molecule 18: substrate peptide

Chain v:

86%　　　　　　　　　　　　　　　　　14%

A11 A21 A22 A23 A24

• Molecule 19: Proteasome subunit alpha type-6

Chain G:

82%　　　　　　　　　　　　15%　　•

SER ARG GLY SER ALA G8 F9 D10 S17 P18 L22 E26 G36 L37 G44 A48 V49 I50 Q53 T67 H68 L69 F70 K71 I72 T73 E74 V79 M80 S87 R95 D120 A129 E130 M131 M138 D144 Q147 G158 A165

V170 L179 T194 I208 K211 V220 E244 ARG ASP

• Molecule 19: Proteasome subunit alpha type-6

Chain g:

77%　　　　　　　　　　　　21%　　•

SER ARG GLY S5 R11 E19 L22 Y23 Q24 V25 E26 L37 T38 S39 V40 A48 V49 I50 L61 T67 H68 L69 F70 K71 I72 T73 E74 V79 M80 T81 R95 Y96 E97 D112 R117 T126 A129 E130 C137 I141 V151 Y152 K153

G158 A165 T166 S175 L179 K182 V183 L184 K185 F191 E192 Q193 T200 C201 L202 S203 T204 F210 S213 E216 V219 V220 E244 ARG ASP

• Molecule 20: Proteasome subunit alpha type-2

Chain H:

79%　　　　　　　　　　　18%　　••

ALA GLU R4 L10 L19 V20 Q21 V29 K39 K64 I68 T69 K70 H71 V75 Y76 S77 G78 M79 R84 V85 L86 R91 K92 L93 A94 Q95 T107 L110 V111 Q112 R113 S133 L134 L135 I136 C137 G138 V168 N179 E180 D181 L182 E183 L184

A187 I188 H189 T190 A191 I192 L193 T194 S198 T204 E205 D206 T222 E225 A232 I233 A234

• Molecule 20: Proteasome subunit alpha type-2

Chain h:

82%　　　　　17%

ALA E3 Y6 S7 F8 S9 T12 F13 A33 L56 V65 T69 K70 L74 V75 Y76 S77 D82 Y83 R84 V87 R91 P106 Q109 L110 V111 M118 Q119 T122 G125 R128 P129 F130 L135 I136 N179 L182 E183 L184 E185 D186

A187 I188 H189 T190 F199 N207 R220 T224 Y229 A232 I233 A234

• Molecule 21: Proteasome subunit alpha type-4

Chain I:

79%　　　　　16%　　• 5%

SER ARG R4 Y5 D6 S7 R8 T9 T10 I11 L18 Y19 Q20 V21 E22 M25 E26 N40 D41 L44 L68 M72 A73 C74 T80 P106 C107 C115 D116 Q119 Q123 R128 P129 F130 S150 D151 P152 S153 G154 C163 I164 G165 N166 M174

G182 K187 L190 K199 R218 T223 K239 H240 E244 A245 R249 E250 K251 LYS GLU LYS GLU GLN LYS GLU LYS ASP LYS

• Molecule 21: Proteasome subunit alpha type-4

Chain i:

83%　　　　　12%　　• •

S2 D6 S7 R8 T9 T10 I11 Q20 L38 V43 F61 L68 M72 S75 S81 L90 I105 P106 C107 L110 Q119 T122 Q123 F124 F130 D140 Q149 S150 D151 P152 M174 L186 N198 K199 L206 K239 E243

E244 A245 R249 E250 K251 LYS GLU LYS GLU GLN LYS GLU LYS ASP LYS

• Molecule 22: Proteasome subunit alpha type-7

Chain J:

85%　　　　　14%　　•

S2 A6 V41 V45 A64 L65 D66 D67 N68 V69 L76 T77 A78 R81 R88 V102 T103 V104 I107 T108 T119 R125 I129 S130 I133 V134 L144 Y145 S167 F171 N175 Y176 T177 D178 E179 A180 T183 D184 D185 V199

R213 K241 Q244 K245 K246 A247 S248

• Molecule 22: Proteasome subunit alpha type-7

Chain j:

77%　　　　　17%　　• •

S2 Y3 D4 R5 A6 I7 T8 D13 Q23 V26 V35 R38 V41 A51 K52 D66 D67 N68 V69 A78 D79 A80 C91 E99 V102 T103 V104 I107 T108 S121 N122 G123 R124 R125 P126 I129 L132 I133 V134 R143 L144 Y145

D148 A155 A158 N159 L172 A180 D184 T187 I188 V191 V199 M211 D214 Y228 E231 E240 LYS LYS LYS GLN LYS LYS ALA SER

• Molecule 23: Proteasome subunit alpha type-5

Chain K: 82% 14% •

PHE LEU THR ARG SER E7 V12 V24 E25 I28 E29 T42 S43 M59 I64 L88 N98 N104 T108 S111 S117 L121 D127 ALA ASP PRO GLY ALA M133 F137 V146 M156 D157 P158 S159 G160 G171 S174 Q178

L181 Q182 N214 L217 P222 E233 V237 I238 I241

• Molecule 23: Proteasome subunit alpha type-5

Chain k: 78% 16% • 5%

PHE LEU THR ARG SER GLU Y8 D9 R10 N13 S16 R20 V24 I28 S35 T36 A37 I40 Q41 T42 C47 L48 A49 V50 E51 K66 S79 T87 K91 A92 R93 V94 E95 T96 Q97 S117 N118 L119 D127 ALA ASP PRO GLY ALA MET S134

R135 V146 D147 E148 D157 P158 S159 I170 Q178 I195 K196 K203 L210 L217 A218 T219 P222 G223 Q224 N225 F226 H227 E233 I241

• Molecule 24: Isoform Long of Proteasome subunit alpha type-1

Chain L: 76% 12% 11%

GLN LEU SER LYS VAL LYS PHE ARG N4 D9 V10 T11 S33 V47 L56 H65 V66 D67 I72 A75 G76 R82 L83 L84 M88 L93 L103 P104 Q117 Q121 R125 R126 P127 Y128 G129 V130 I134 P149 C156 A158 I161

L172 M176 N185 K189 L195 S211 Q241 ARG LYS ALA GLN PRO ALA GLN PRO ALA ASP GLU PRO ALA GLU LYS ALA ASP GLU PRO MET GLU HIS

• Molecule 24: Isoform Long of Proteasome subunit alpha type-1

Chain l: 71% 18% 11%

GLN LEU SER LYS VAL LYS PHE ARG N4 D7 I19 H20 Q21 I22 E23 M26 E27 K30 V36 G37 L38 V47 K50 H59 Q60 H65 V66 D67 G71 D80 A81 R82 L83 L84 M88 D94 P104 R107 L108 I112 G113 S114 Q117

T120 G124 R125 R126 V130 S160 E178 K189 T198 L199 P200 A201 E202 Q203 T206 S211 I212 F221 V229 S230 E234 R239 P240 Q241 ARG LYS ALA GLN PRO ALA GLN PRO ALA ASP GLU PRO ALA GLU LYS ALA ASP GLU PRO MET GLU HIS

• Molecule 25: Proteasome subunit alpha type-3

Chain M: 76% 17% • 6%

SER SER ILE GLY T5 D8 S15 R19 Q22 S34 I37 V46 V49 R65 M75 A82 L87 I106 L111 M117 L124 R129 L137 D144 I151 S157 Y158 R169 T174 E175 K178 L179 E183 M184 T185

C186 R187 D188 I189 V190 K191 E192 V193 H201 D202 F209 W215 L219 T220 K229 E233 E234 K237 E241 K244 GLU GLU ASP GLU SER ASP ASP ASN MET

• Molecule 25: Proteasome subunit alpha type-3

Chain m:　　　　　78%　　　　　16%　　• 6%

SER SER ILE GLY T5 D8 Q22 S34 I37 G38 I39 R40 C41 K42 D43 G44 V45 V46 L52 V53 L54 L66 V69 H72 M75 A82 N105 D152 P153 S154 S157 R169 A172 K173 T174 E175 I176 E177 K178 L179 M184 T185 C186 R187

D188 E192 V193 A194 K195 I196 V200 H201 D202 F209 S214 W215 L219 V227 E234 K244 GLU GLU ASP GLU SER ASP ASP ASN MET

• Molecule 26: Proteasome subunit beta type-6

Chain N:　　　　　74%　　　　　9%　　　17%

ALA ALA THR LEU LEU ALA ALA ARG GLY ALA GLY PRO ALA PRO ALA TRP GLY PRO GLU ALA PHE THR PRO ASP TRP GLU SER ARG GLU VAL SER THR GLY T1 L14 S18 R19 T20 T31 T35 R40 C43 D51 L70 N71 E72 S81 E85 A101

I127 S132 V139 D140 S170 G183 L190 F197 ALA VAL ALA THR LEU PRO PRO ALA

• Molecule 26: Proteasome subunit beta type-6

Chain n:　　　　　74%　　　　　9%　　　17%

ALA ALA THR LEU LEU ALA ALA ARG GLY ALA GLY PRO ALA PRO ALA TRP GLY PRO GLU ALA PHE THR PRO ASP TRP GLU SER ARG GLU VAL SER THR GLY T1 Q7 G11 L14 R19 T22 I26 C44 R45 S46 T52 L75 T78 S81 K84

E85 R91 E92 M120 E150 I179 V184 F197 ALA VAL ALA THR LEU PRO PRO ALA

• Molecule 27: Proteasome subunit beta type-7

Chain O:　　　　　69%　　　　　10%　　•　　20%

ALA ALA VAL SER VAL TYR ALA PRO PRO VAL GLY GLY PHE SER PHE ASP ASN CYS ARG ARG ASN ALA VAL LEU GLU ALA ASP PHE ALA LYS ARG GLY TYR LYS LEU PRO LYS VAL ARG LYS THR GLY T1 T2 V6 V7 I12 D17 T18 R19 K33 N40 L65

L68 A97 S112 K121 Y124 M127 V155 I159 G162 I163 L167 G168 S169 G170 S171 N172 I173 T190 C204 T208 I216 E220 ILE GLU VAL LEU GLU GLU THR VAL GLN THR MET ASP THR SER

• Molecule 27: Proteasome subunit beta type-7

Chain o:　　　　　69%　　　　　10%　　　20%

ALA ALA VAL SER VAL TYR ALA PRO VAL GLY GLY PHE SER PHE ASP ASN CYS ARG ARG ASN ALA VAL LEU GLU ALA ASP PHE ALA LYS ARG GLY TYR LYS LEU PRO LYS VAL ARG LYS THR GLY T1 V6 V7 I12 D17 T18 R19 K33 T48 A49 A50 L68

Y124 L132 V137 M146 L154 E157 I163 S169 G170 S171 S179 K180 T190 V191 P192 N193 K194 L199 R203 I216 E220 ILE GLU VAL LEU GLU GLU THR VAL GLN THR MET ASP THR SER

• Molecule 28: Proteasome subunit beta type-3

Chain P: 83%   17%

S2 M12 A13 M14 V20 R26 Q31 A32 V35 T36 I37 D38 Q65 M88 E106 D113 T116 F117 K118 P119 F120 S123 L124 D125 C129 V132 F136 V137 V138 C142 M146 I167 V175 D176 R177 I186 I190 E191 K192 D193

K194 I195 T196 D205

• Molecule 28: Proteasome subunit beta type-3

Chain p: 86%   13%

S2 I3 M12 A13 V20 D25 K41 R48 L49 Y50 L73 P107 T116 C122 S123 L124 D125 L126 D135 F136 V137 V138 C142 M146 M149 M158 N173 R177 I190 E191 K192 T196 M204 D205

• Molecule 29: Proteasome subunit beta type-2

Chain Q: 89%   10%

M1 E2 D30 D31 K34 S39 E40 E49 R86 H99 V100 N101 M118 L124 H132 D144 R155 K162 R170 R181 S195 F196 P197 K198 Q199 GLY SER

• Molecule 29: Proteasome subunit beta type-2

Chain q: 86%   12%

M1 E2 Q27 D31 K37 M38 K41 V47 G48 E49 V54 E58 Q61 Q65 K68 E74 S94 H99 L102 G106 Y107 D108 E111 M118 D144 I182 H189 P197 K198 Q199 GLY SER

• Molecule 30: Proteasome subunit beta type-5

Chain R: 65%   11%   23%

ALA LEU ALA SER VAL LEU GLU ARG PRO LEU PRO VAL ASN GLN ARG GLY PHE PHE GLY LEU GLY GLY ARG ALA ASP LEU LEU ASP LEU GLY PRO GLY SER LEU SER ASP GLY LEU SER LEU ALA ALA PRO GLY TRP GLY VAL PRO GLU GLU PRO GLY ILE MET LEU HIS GLY T1

L4 A5 F6 D17 Q29 K32 K33 I37 N38 L41 T44 M45 A49 C52 R61 K91 M97 M100 I101 C102 E117 T125 G129 A135 Y143 S144 Y145 D146 R166 V179 D182 G183 W184 I185 R186 G201 SER THR PRO

• Molecule 30: Proteasome subunit beta type-5

Chain r:

69%   7%   23%

ALA LEU ALA SER VAL LEU GLU ARG PRO LEU PRO VAL ASN GLN ARG GLY PHE PHE GLY LEU GLY GLY ARG ALA ASP LEU LEU ASP LEU GLY PRO GLY SER SER ASP GLY LEU SER LEU ALA ALA PRO GLY TRP GLY VAL PRO GLU GLU PRO GLY ILE GLU MET LEU HIS GLY T1

M45 A46 G47 R64 I65 Y66 E67 L68 T99 M100 I101 C102 D105 K106 Y113 V114 D115 R120 R141 R166 N191 V192 G201 SER THR PRO

• Molecule 31: Proteasome subunit beta type-1

Chain S:

82%   7%   11%

LEU SER SER THR ALA MET TYR SER ALA PRO GLY ARG ASP LEU GLY MET GLU PRO HIS ARG ALA ALA GLY PRO LEU GLN LEU R1 A16 I68 L72 M83 A87 M91 L92 V121 V127 S142 L145 D150 R173 V178 G190 D191 L210

D213

• Molecule 31: Proteasome subunit beta type-1

Chain s:

80%   9%   11%

LEU SER SER THR ALA MET TYR SER ALA PRO GLY ARG ASP LEU GLY MET GLU PRO HIS ARG ALA ALA GLY PRO LEU GLN LEU R1 L13 D19 R28 K42 M83 M91 D114 D125 S134 L145 L148 L149 D150 D169 R173 V178 A182

A183 E184 G190 D191 R211 K212 D213

• Molecule 32: Proteasome subunit beta type-4

Chain T:

71%   10%   18%

GLU ALA PHE LEU GLY SER ARG SER GLY LEU TRP ALA GLY GLY PRO ALA PRO GLY GLN PHE TYR ARG ILE PRO SER THR PRO ASP SER PHE MET ASP PRO ALA SER ALA LEU TYR ARG GLY PRO ILE THR ARG T1 Q2 N3 T9 D25 R41 N46 N47 S48 T49 M50

L92 M96 M110 L122 D126 M127 S136 L137 Q147 E155 D180 S183 F187 T191 V192 E200 T205 I211 M214 I215 SER GLY PHE GLU

• Molecule 32: Proteasome subunit beta type-4

Chain t:

78%   ·   18%

GLU ALA PHE LEU GLY SER ARG SER GLY LEU TRP ALA GLY GLY PRO ALA PRO GLY GLN PHE TYR ARG ILE PRO SER THR PRO ASP SER PHE MET ASP PRO ALA SER ALA LEU TYR ARG GLY PRO ILE THR ARG T1 D25 T49 L92 M110 D126 M127 R166 F187

E200 I215 SER GLY PHE GLU

• Molecule 33: Midnolin

Chain f: 6%   92%

MET	GLU	PRO	GLN	PRO	GLY	GLY	ALA	ARG	SER	CYS	ARG	ARG	GLY	ALA	PRO	GLY	GLY	ALA	CYS	GLU	GLU	LEU	GLY	PRO	ALA	ALA	GLU	ALA	PRO	MET	SER	LEU	ALA	ILE	HIS	SER	THR	THR	GLY	THR	ARG

(residue grid continues)

• Molecule 34: 26S proteasome non-ATPase regulatory subunit 2

Chain u: 67%   24%   8%

R838 P839 V846 V850 D851 V852 V853 G854 Q855 K860 F865 H868 T869 T870 P871 V872 R879 A880 E881 T884 E885 E886 F887 T891 L894 L900 R901 K902 Y906 D907 L908

4   Experimental information   ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	40572	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	40	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	29.637	Depositor
Minimum map value	-16.829	Depositor
Average map value	0.004	Depositor
Map value standard deviation	0.997	Depositor
Recommended contour level	2	Depositor
Map size (Å)	510.0, 510.0, 510.0	wwPDB
Map dimensions	600, 600, 600	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.85, 0.85, 0.85	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: MG, LDZ, ATP, ZN, ADP

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	U	0.24	0/6710	0.54	2/9074 (0.0%)
2	V	0.20	0/3929	0.56	1/5309 (0.0%)
3	W	0.26	0/3713	0.59	3/4988 (0.1%)
4	X	0.30	0/3053	0.50	1/4115 (0.0%)
5	Y	0.18	0/3173	0.48	0/4273
6	Z	0.19	0/2324	0.51	0/3150
7	a	0.23	0/3053	0.52	1/4133 (0.0%)
8	b	0.32	0/1474	0.59	2/1996 (0.1%)
9	c	0.33	0/2302	0.63	3/3110 (0.1%)
10	d	0.28	0/2122	0.64	2/2864 (0.1%)
11	e	0.21	0/338	0.66	0/450
12	A	0.26	0/3283	0.51	1/4433 (0.0%)
13	B	0.18	0/3208	0.46	2/4327 (0.0%)
14	C	0.19	0/3146	0.44	3/4226 (0.1%)
15	D	0.17	0/3090	0.42	0/4168
16	E	0.15	0/3077	0.42	0/4141
17	F	0.22	0/3137	0.47	0/4223
18	v	1.10	0/69	1.52	0/95
19	G	0.18	0/1842	0.41	1/2500 (0.0%)
19	g	0.15	0/1863	0.34	0/2527
20	H	0.27	0/1762	0.47	0/2394
20	h	0.15	0/1764	0.31	0/2399
21	I	0.29	0/1925	0.46	1/2606 (0.0%)
21	i	0.16	0/1942	0.37	0/2628
22	J	0.16	0/1869	0.37	0/2531
22	j	0.15	0/1728	0.37	0/2358
23	K	0.17	0/1772	0.33	0/2397
23	k	0.15	0/1747	0.33	0/2364
24	L	0.16	0/1885	0.33	0/2552
24	l	0.15	0/1885	0.34	0/2552
25	M	0.27	0/1891	0.47	0/2552
25	m	0.19	0/1897	0.41	0/2559

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
26	N	0.17	0/1508	0.34	0/2040
26	n	0.18	0/1508	0.35	0/2040
27	O	0.19	0/1670	0.39	0/2265
27	o	0.17	0/1670	0.41	0/2265
28	P	0.18	0/1620	0.36	0/2184
28	p	0.17	0/1620	0.35	0/2184
29	Q	0.17	0/1603	0.35	0/2174
29	q	0.17	0/1607	0.37	0/2178
30	R	0.18	0/1579	0.36	0/2134
30	r	0.16	0/1579	0.31	0/2134
31	S	0.17	0/1671	0.35	0/2253
31	s	0.17	0/1671	0.33	0/2253
32	T	0.18	0/1700	0.36	0/2305
32	t	0.17	0/1706	0.33	0/2312
33	f	0.12	0/331	0.31	0/436
34	u	0.15	0/6548	0.39	0/8864
All	All	0.21	0/106564	0.45	23/144015 (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	W	0	1
12	A	0	1
25	M	0	2
All	All	0	4

There are no bond length outliers.

The worst 5 of 23 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
13	B	43	PRO	CA-N-CD	-10.43	97.39	112.00
1	U	119	PRO	CA-N-CD	-10.40	97.43	112.00
13	B	435	PRO	CA-N-CD	-9.68	98.45	112.00
12	A	75	PRO	CA-N-CD	-9.07	99.31	112.00
4	X	341	PRO	CA-N-CD	-8.35	100.31	112.00

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
12	A	312	ARG	Sidechain
25	M	183	GLU	Mainchain
25	M	187	ARG	Sidechain
3	W	65	ARG	Sidechain

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	U	6595	0	6648	239	0
2	V	3852	0	3893	182	0
3	W	3667	0	3786	218	0
4	X	3009	0	3113	92	0
5	Y	3115	0	3120	107	0
6	Z	2281	0	2312	93	0
7	a	2995	0	3012	125	0
8	b	1454	0	1501	83	0
9	c	2260	0	2276	110	0
10	d	2078	0	2107	169	0
11	e	334	0	294	19	0
12	A	3229	0	3263	89	0
13	B	3162	0	3224	78	0
14	C	3105	0	3219	70	0
15	D	3040	0	3076	81	0
16	E	3031	0	3103	117	0
17	F	3098	0	3187	111	0
18	v	70	0	69	1	0
19	G	1809	0	1781	22	0
19	g	1830	0	1807	30	0
20	H	1726	0	1646	33	0
20	h	1727	0	1619	25	0
21	I	1895	0	1833	28	0
21	i	1912	0	1851	23	0
22	J	1844	0	1747	19	0
22	j	1704	0	1517	31	0
23	K	1746	0	1695	19	0
23	k	1722	0	1673	24	0
24	L	1850	0	1822	18	0
24	l	1850	0	1822	29	0

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W O R L D W I D E
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PROTEIN DATA BANK

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
25	M	1856	0	1816	28	0
25	m	1862	0	1827	25	0
26	N	1482	0	1450	10	0
26	n	1482	0	1450	12	0
27	O	1643	0	1644	22	0
27	o	1643	0	1644	20	0
28	P	1591	0	1609	21	0
28	p	1591	0	1609	16	0
29	Q	1570	0	1547	13	0
29	q	1574	0	1558	17	0
30	R	1548	0	1499	20	0
30	r	1548	0	1499	13	0
31	S	1641	0	1618	10	0
31	s	1641	0	1618	13	0
32	T	1667	0	1628	14	0
32	t	1673	0	1639	5	0
33	f	331	0	361	12	0
34	u	6439	0	6456	161	0
35	c	1	0	0	0	0
36	A	31	0	12	0	0
36	B	31	0	12	1	0
36	C	31	0	12	0	0
36	F	31	0	12	0	0
37	A	1	0	0	0	0
37	B	1	0	0	0	0
37	C	1	0	0	0	0
37	D	1	0	0	0	0
37	F	1	0	0	0	0
38	D	27	0	12	2	0
38	E	27	0	12	1	0
39	N	34	0	41	1	0
39	O	34	0	41	3	0
39	R	34	0	41	4	0
39	n	34	0	41	3	0
39	o	34	0	41	3	0
39	r	34	0	41	4	0
All	All	105160	0	104806	2526	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 12.

The worst 5 of 2526 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)
10:d:218:GLY:CA	10:d:222:TYR:HA	1.64	1.25
6:Z:16:LEU:HD13	9:c:216:MET:CE	1.73	1.16
10:d:218:GLY:HA3	10:d:222:TYR:HA	1.22	1.16
10:d:186:TYR:HB2	10:d:221:ASN:HB2	1.36	1.07
6:Z:16:LEU:CD1	9:c:216:MET:HE2	1.85	1.05

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	U	839/953 (88%)	745 (89%)	86 (10%)	8 (1%)	13	23
2	V	478/533 (90%)	421 (88%)	56 (12%)	1 (0%)	44	63
3	W	448/456 (98%)	407 (91%)	39 (9%)	2 (0%)	30	47
4	X	378/422 (90%)	358 (95%)	16 (4%)	4 (1%)	12	21
5	Y	376/389 (97%)	334 (89%)	40 (11%)	2 (0%)	25	41
6	Z	284/324 (88%)	250 (88%)	31 (11%)	3 (1%)	12	21
7	a	371/376 (99%)	326 (88%)	41 (11%)	4 (1%)	12	21
8	b	189/377 (50%)	166 (88%)	20 (11%)	3 (2%)	8	13
9	c	285/309 (92%)	238 (84%)	43 (15%)	4 (1%)	9	16
10	d	249/349 (71%)	194 (78%)	48 (19%)	7 (3%)	4	6
11	e	36/70 (51%)	26 (72%)	8 (22%)	2 (6%)	1	1
12	A	411/433 (95%)	365 (89%)	41 (10%)	5 (1%)	11	19
13	B	403/440 (92%)	359 (89%)	40 (10%)	4 (1%)	13	23
14	C	394/398 (99%)	361 (92%)	29 (7%)	4 (1%)	13	23
15	D	378/418 (90%)	345 (91%)	28 (7%)	5 (1%)	10	17
16	E	379/403 (94%)	330 (87%)	44 (12%)	5 (1%)	10	17

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
17	F	391/439 (89%)	352 (90%)	35 (9%)	4 (1%)	13	23
18	v	12/14 (86%)	10 (83%)	2 (17%)	0	100	100
19	G	235/245 (96%)	226 (96%)	7 (3%)	2 (1%)	14	26
19	g	238/245 (97%)	227 (95%)	11 (5%)	0	100	100
20	H	229/233 (98%)	216 (94%)	12 (5%)	1 (0%)	30	47
20	h	230/233 (99%)	224 (97%)	5 (2%)	1 (0%)	30	47
21	I	246/260 (95%)	228 (93%)	17 (7%)	1 (0%)	30	47
21	i	248/260 (95%)	230 (93%)	17 (7%)	1 (0%)	30	47
22	J	245/247 (99%)	230 (94%)	11 (4%)	4 (2%)	8	13
22	j	237/247 (96%)	213 (90%)	23 (10%)	1 (0%)	30	47
23	K	226/240 (94%)	219 (97%)	7 (3%)	0	100	100
23	k	224/240 (93%)	212 (95%)	12 (5%)	0	100	100
24	L	236/268 (88%)	231 (98%)	5 (2%)	0	100	100
24	l	236/268 (88%)	227 (96%)	9 (4%)	0	100	100
25	M	238/254 (94%)	230 (97%)	7 (3%)	1 (0%)	30	47
25	m	238/254 (94%)	223 (94%)	14 (6%)	1 (0%)	30	47
26	N	195/238 (82%)	189 (97%)	5 (3%)	1 (0%)	25	41
26	n	195/238 (82%)	187 (96%)	8 (4%)	0	100	100
27	O	218/276 (79%)	212 (97%)	5 (2%)	1 (0%)	25	41
27	o	218/276 (79%)	201 (92%)	17 (8%)	0	100	100
28	P	202/204 (99%)	194 (96%)	8 (4%)	0	100	100
28	p	202/204 (99%)	191 (95%)	11 (5%)	0	100	100
29	Q	197/201 (98%)	184 (93%)	13 (7%)	0	100	100
29	q	197/201 (98%)	187 (95%)	10 (5%)	0	100	100
30	R	199/262 (76%)	196 (98%)	1 (0%)	2 (1%)	13	23
30	r	199/262 (76%)	195 (98%)	4 (2%)	0	100	100
31	S	211/240 (88%)	207 (98%)	3 (1%)	1 (0%)	25	41
31	s	211/240 (88%)	206 (98%)	5 (2%)	0	100	100
32	T	213/263 (81%)	206 (97%)	7 (3%)	0	100	100
32	t	213/263 (81%)	205 (96%)	8 (4%)	0	100	100
33	f	37/468 (8%)	37 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
34	u	826/908 (91%)	803 (97%)	23 (3%)	0	100	100
All	All	13340/15341 (87%)	12323 (92%)	932 (7%)	85 (1%)	24	36

5 of 85 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	U	41	SER
1	U	173	VAL
1	U	875	PHE
3	W	45	GLU
3	W	375	MET

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	U	722/816 (88%)	694 (96%)	28 (4%)	27	48
2	V	414/459 (90%)	401 (97%)	13 (3%)	35	56
3	W	412/416 (99%)	392 (95%)	20 (5%)	21	38
4	X	327/362 (90%)	314 (96%)	13 (4%)	27	47
5	Y	334/344 (97%)	322 (96%)	12 (4%)	30	51
6	Z	257/295 (87%)	246 (96%)	11 (4%)	25	44
7	a	333/336 (99%)	313 (94%)	20 (6%)	16	29
8	b	166/312 (53%)	157 (95%)	9 (5%)	18	34
9	c	252/267 (94%)	229 (91%)	23 (9%)	7	13
10	d	226/293 (77%)	213 (94%)	13 (6%)	17	31
11	e	38/63 (60%)	37 (97%)	1 (3%)	41	63
12	A	348/372 (94%)	338 (97%)	10 (3%)	37	59
13	B	352/385 (91%)	344 (98%)	8 (2%)	45	67
14	C	340/346 (98%)	332 (98%)	8 (2%)	44	65
15	D	333/366 (91%)	319 (96%)	14 (4%)	25	44

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
16	E	333/353 (94%)	315 (95%)	18 (5%)	18	34
17	F	340/379 (90%)	326 (96%)	14 (4%)	26	46
19	G	191/209 (91%)	191 (100%)	0	100	100
19	g	194/209 (93%)	185 (95%)	9 (5%)	23	41
20	H	169/190 (89%)	161 (95%)	8 (5%)	22	40
20	h	167/190 (88%)	163 (98%)	4 (2%)	44	65
21	I	191/220 (87%)	190 (100%)	1 (0%)	86	92
21	i	193/220 (88%)	188 (97%)	5 (3%)	41	63
22	J	179/210 (85%)	172 (96%)	7 (4%)	27	48
22	j	152/210 (72%)	140 (92%)	12 (8%)	10	18
23	K	189/202 (94%)	185 (98%)	4 (2%)	48	69
23	k	186/202 (92%)	179 (96%)	7 (4%)	28	49
24	L	198/229 (86%)	195 (98%)	3 (2%)	60	76
24	l	198/229 (86%)	193 (98%)	5 (2%)	42	64
25	M	192/211 (91%)	188 (98%)	4 (2%)	48	69
25	m	193/211 (92%)	187 (97%)	6 (3%)	35	56
26	N	154/180 (86%)	150 (97%)	4 (3%)	41	63
26	n	154/180 (86%)	151 (98%)	3 (2%)	52	71
27	O	177/227 (78%)	174 (98%)	3 (2%)	56	74
27	o	177/227 (78%)	174 (98%)	3 (2%)	56	74
28	P	173/173 (100%)	170 (98%)	3 (2%)	56	74
28	p	173/173 (100%)	168 (97%)	5 (3%)	37	59
29	Q	164/171 (96%)	160 (98%)	4 (2%)	44	65
29	q	165/171 (96%)	163 (99%)	2 (1%)	67	81
30	R	153/201 (76%)	148 (97%)	5 (3%)	33	55
30	r	153/201 (76%)	148 (97%)	5 (3%)	33	55
31	S	174/198 (88%)	172 (99%)	2 (1%)	70	83
31	s	174/198 (88%)	173 (99%)	1 (1%)	84	90
32	T	175/214 (82%)	168 (96%)	7 (4%)	27	47
32	t	176/214 (82%)	174 (99%)	2 (1%)	70	83
33	f	34/377 (9%)	34 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
34	u	702/763 (92%)	690 (98%)	12 (2%)	56	74
All	All	11197/12974 (86%)	10826 (97%)	371 (3%)	35	55

5 of 371 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
17	F	356	MET
32	T	155	GLU
20	H	133	SER
25	M	174	THR
20	h	77	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 116 such sidechains are listed below:

Mol	Chain	Res	Type
17	F	434	ASN
34	u	118	ASN
29	Q	24	ASN
34	u	53	GLN
29	q	101	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 18 ligands modelled in this entry, 6 are monoatomic - leaving 12 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
39	LDZ	n	301	-	33,34,34	0.52	1 (3%)	42,44,44	1.55	3 (7%)
36	ATP	A	501	37	26,33,33	0.65	0	31,52,52	0.73	2 (6%)
36	ATP	F	501	37	26,33,33	0.62	0	31,52,52	0.80	2 (6%)
39	LDZ	R	301	-	33,34,34	0.18	0	42,44,44	0.45	1 (2%)
36	ATP	C	501	37	26,33,33	0.64	0	31,52,52	0.76	2 (6%)
38	ADP	E	401	-	24,29,29	0.95	1 (4%)	29,45,45	1.51	4 (13%)
39	LDZ	o	301	-	33,34,34	0.48	0	42,44,44	0.84	2 (4%)
39	LDZ	r	301	-	33,34,34	0.48	0	42,44,44	0.64	1 (2%)
36	ATP	B	501	37	26,33,33	0.64	0	31,52,52	0.74	1 (3%)
38	ADP	D	501	37	24,29,29	0.92	1 (4%)	29,45,45	1.50	4 (13%)
39	LDZ	O	301	-	33,34,34	0.37	0	42,44,44	1.51	2 (4%)
39	LDZ	N	301	-	33,34,34	0.42	0	42,44,44	0.71	2 (4%)

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
39	LDZ	n	301	-	-	21/38/39/39	0/1/1/1
36	ATP	A	501	37	-	5/18/38/38	0/3/3/3
36	ATP	F	501	37	-	5/18/38/38	0/3/3/3
39	LDZ	R	301	-	-	10/38/39/39	0/1/1/1
36	ATP	C	501	37	-	3/18/38/38	0/3/3/3
38	ADP	E	401	-	-	5/12/32/32	0/3/3/3
39	LDZ	o	301	-	-	17/38/39/39	0/1/1/1
39	LDZ	r	301	-	-	7/38/39/39	0/1/1/1
36	ATP	B	501	37	-	5/18/38/38	0/3/3/3
38	ADP	D	501	37	-	2/12/32/32	0/3/3/3
39	LDZ	O	301	-	-	17/38/39/39	0/1/1/1
39	LDZ	N	301	-	-	6/38/39/39	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
38	E	401	ADP	C5-C4	2.50	1.47	1.40
38	D	501	ADP	C5-C4	2.34	1.47	1.40
39	n	301	LDZ	C17-N16	-2.11	1.43	1.46

The worst 5 of 26 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
39	O	301	LDZ	C17-N16-C15	8.05	138.00	123.15
39	n	301	LDZ	C14-N13-C12	7.81	138.41	121.67
38	E	401	ADP	C3'-C2'-C1'	3.83	106.74	100.98
38	E	401	ADP	PA-O3A-PB	-3.77	119.90	132.83
38	D	501	ADP	C3'-C2'-C1'	3.71	106.56	100.98

There are no chirality outliers.

5 of 103 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
36	A	501	ATP	PB-O3B-PG-O3G
36	A	501	ATP	C5'-O5'-PA-O1A
36	B	501	ATP	C5'-O5'-PA-O3A
36	C	501	ATP	C5'-O5'-PA-O3A
36	F	501	ATP	C5'-O5'-PA-O1A

There are no ring outliers.

9 monomers are involved in 22 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
39	n	301	LDZ	3	0
39	R	301	LDZ	4	0
38	E	401	ADP	1	0
39	o	301	LDZ	3	0
39	r	301	LDZ	4	0
36	B	501	ATP	1	0
38	D	501	ADP	2	0
39	O	301	LDZ	3	0
39	N	301	LDZ	1	0

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

Ligand LDZ n 301

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP A 501

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP F 501

Bond lengths

Bond angles

Torsions

Rings

Ligand LDZ R 301

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP C 501

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP E 401

Bond lengths

Bond angles

Torsions

Rings

Ligand LDZ o 301

Bond lengths

Bond angles

Torsions

Rings

Ligand LDZ r 301

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP B 501

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP D 501

Bond lengths

Bond angles

Torsions

Rings

Ligand LDZ O 301

Bond lengths

Bond angles

Torsions

Rings

Ligand LDZ N 301

Bond lengths

Bond angles

Torsions

Rings

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 ⓘ

This section contains visualisations of the EMDB entry EMD-63776. 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 ⓘ

6.1.1 Primary map

X

Y

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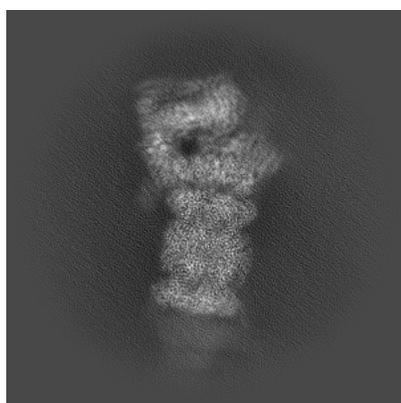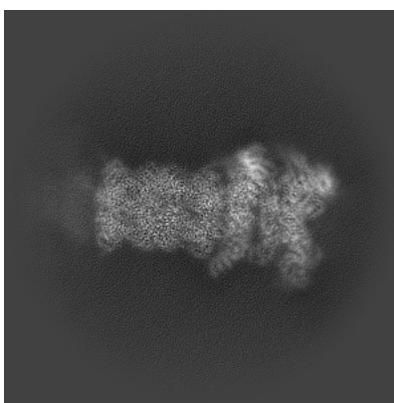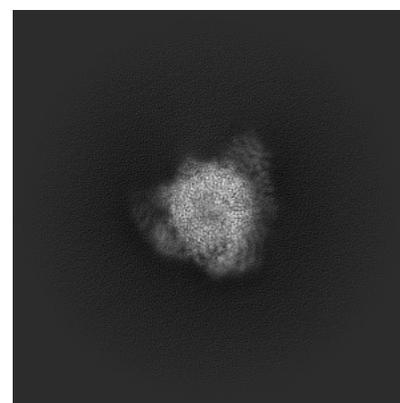
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
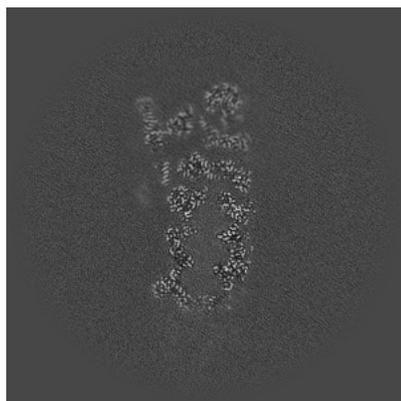
6.2.1 Primary map

X Index: 300
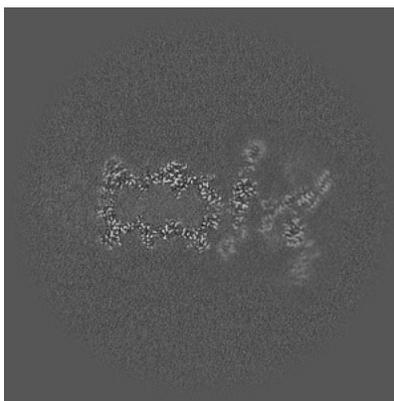
Y Index: 300
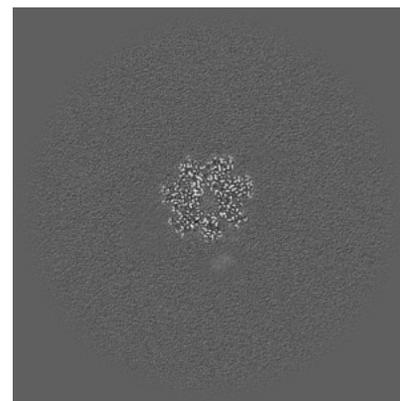
Z Index: 300

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

6.3   Largest variance slices ⓘ
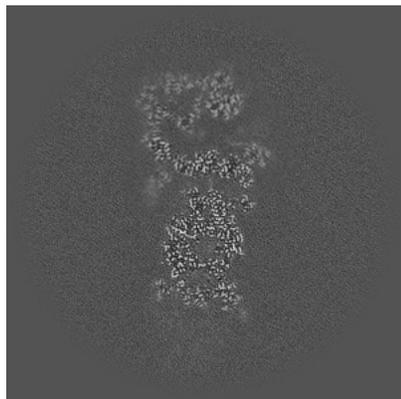
6.3.1   Primary map
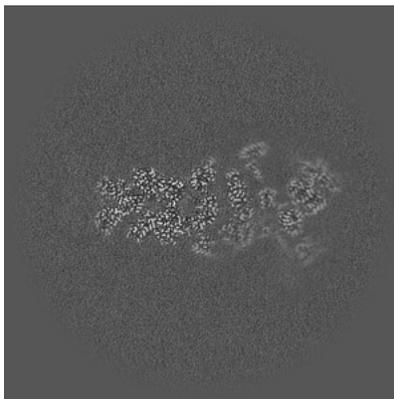
| X Index: 327 | Y Index: 330 | Z Index: 255 |
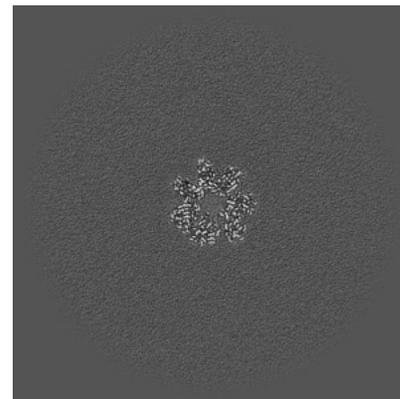
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1   Primary map

| X | Y | Z |
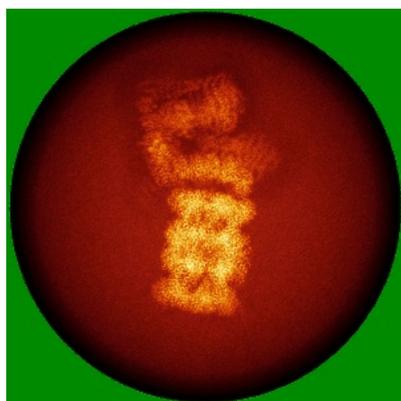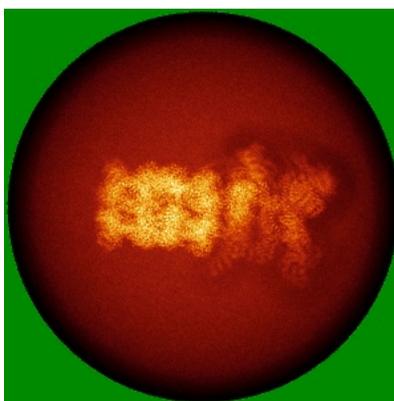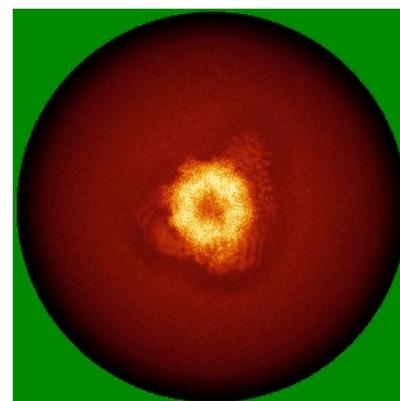
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map

| X | Y | Z |
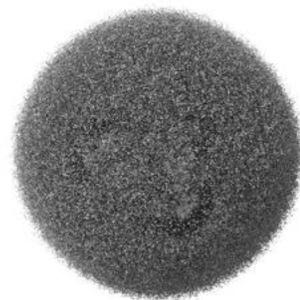
The images above show the 3D surface view of the map at the recommended contour level 2.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.6 Mask visualisation (i)

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

7   Map analysis ⓘ

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

7.1   Map-value distribution ⓘ
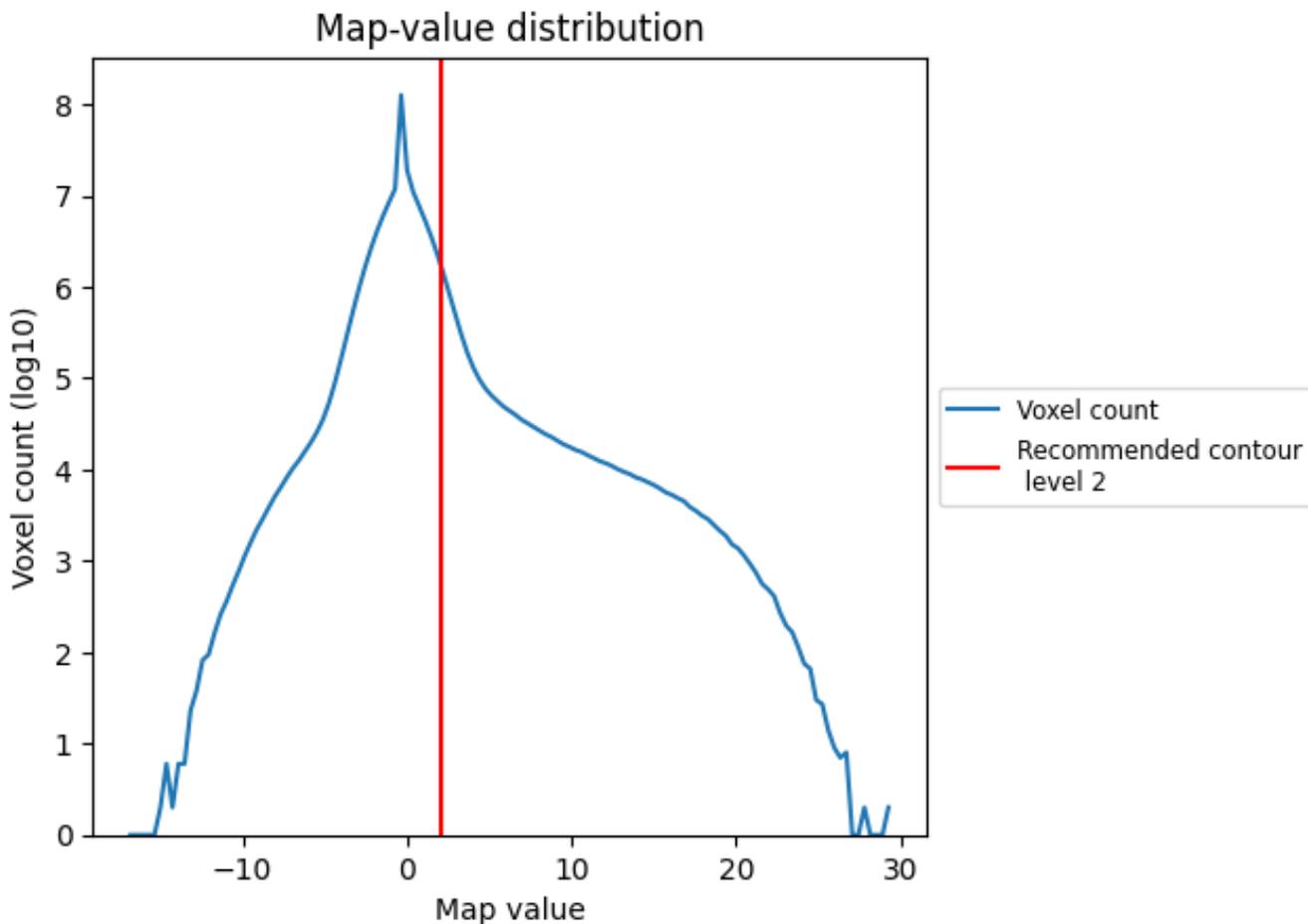
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2　Volume estimate ⓘ
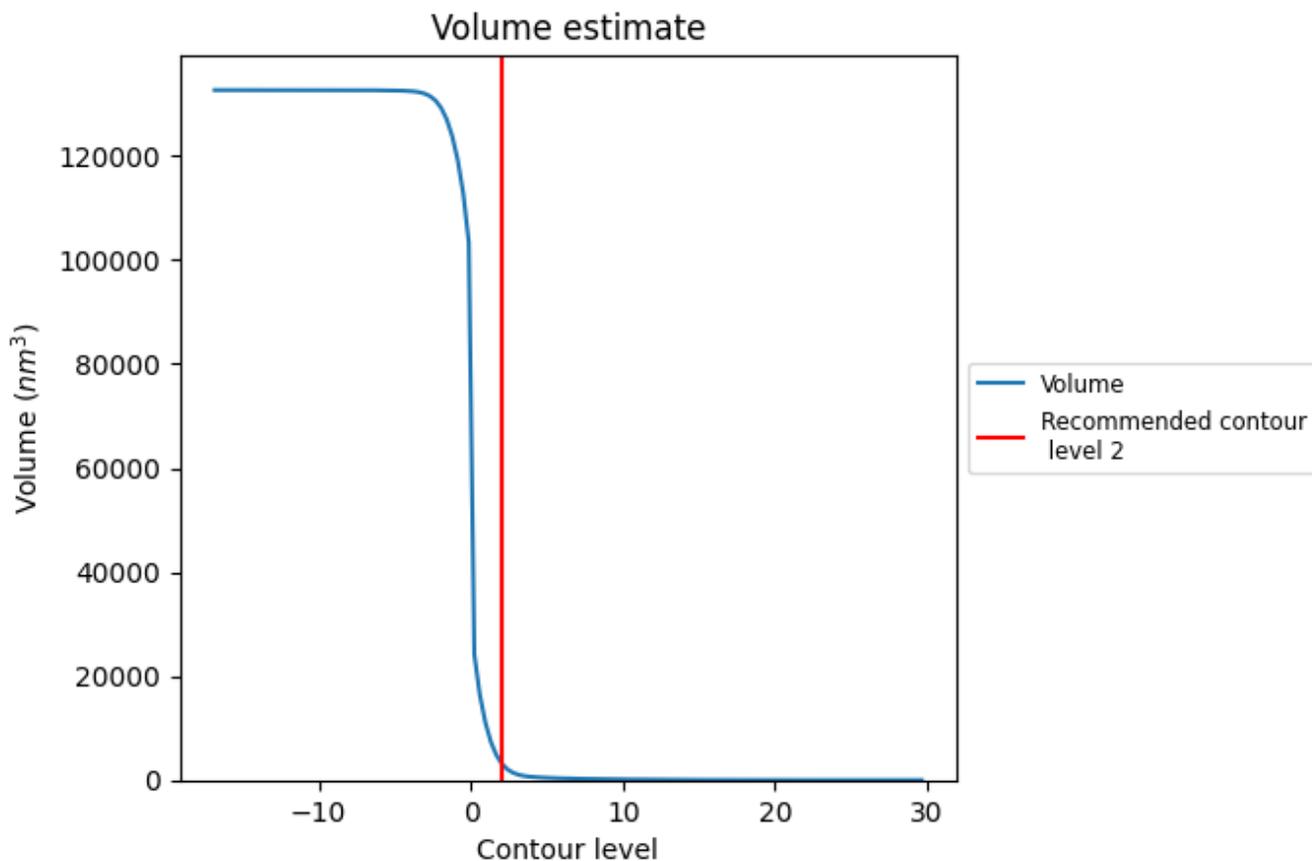
The volume at the recommended contour level is 3329 nm^3; this corresponds to an approximate mass of 3007 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3   Rotationally averaged power spectrum ⓘ
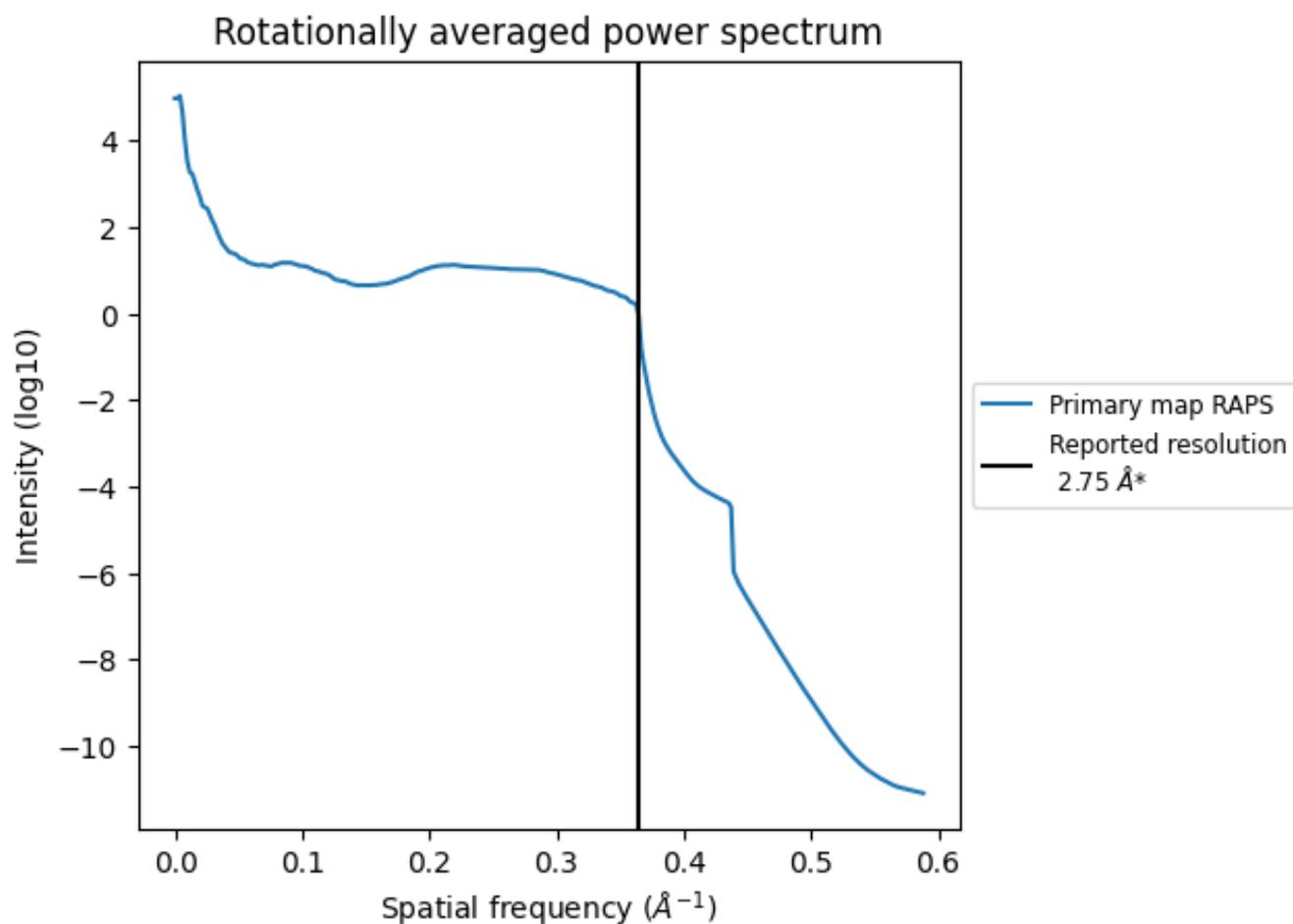
*Reported resolution corresponds to spatial frequency of 0.364 Å^{-1}

8 Fourier-Shell correlation ⓘ

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

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-63776 and PDB model 9MBP. Per-residue inclusion information can be found in section 3 on page 14.

9.1 Map-model overlay ⓘ

X	Y	Z
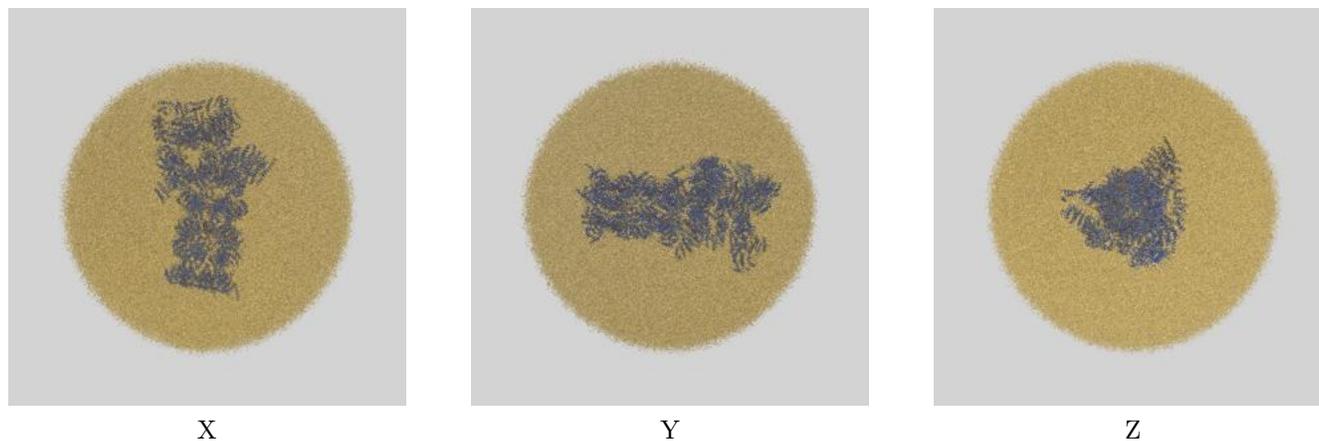
The images above show the 3D surface view of the map at the recommended contour level 2.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model ⓘ
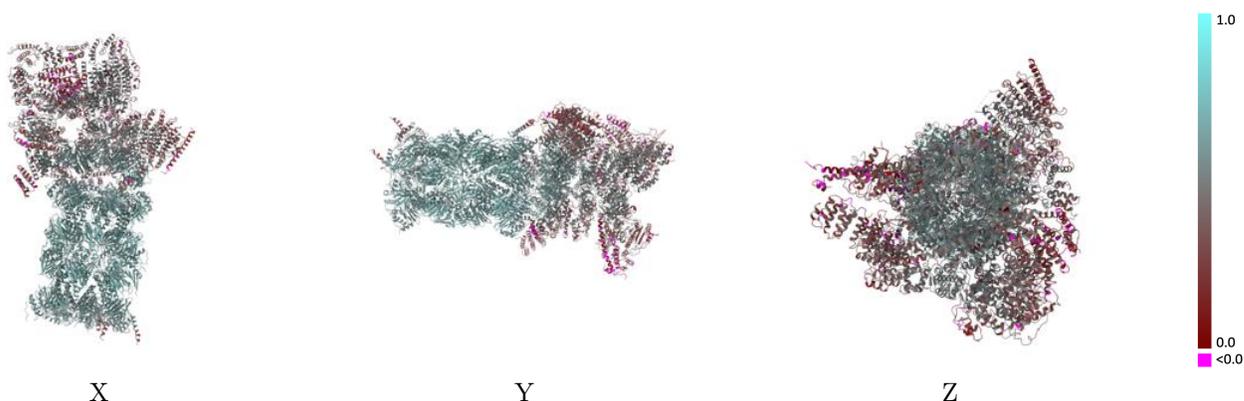
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3   Atom inclusion mapped to coordinate model ⓘ
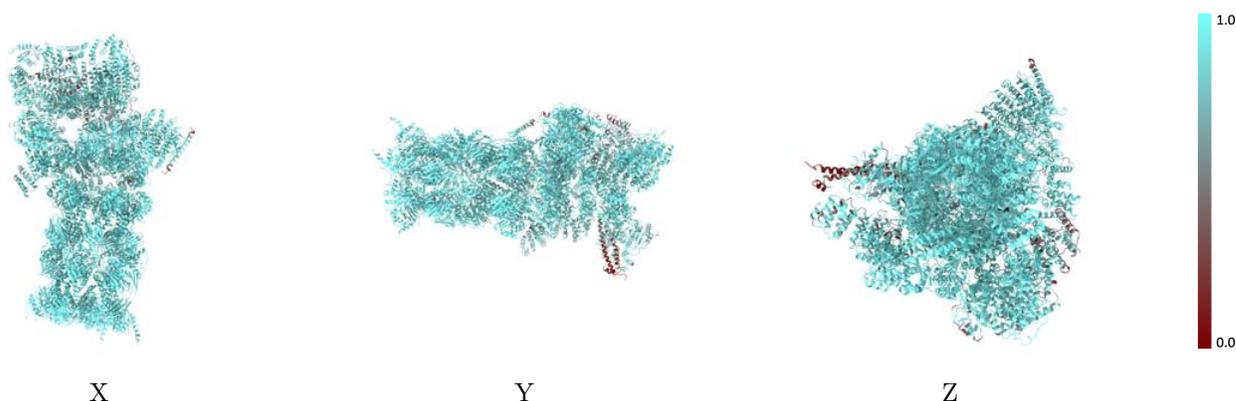
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (2).

9.4　Atom inclusion ⓘ
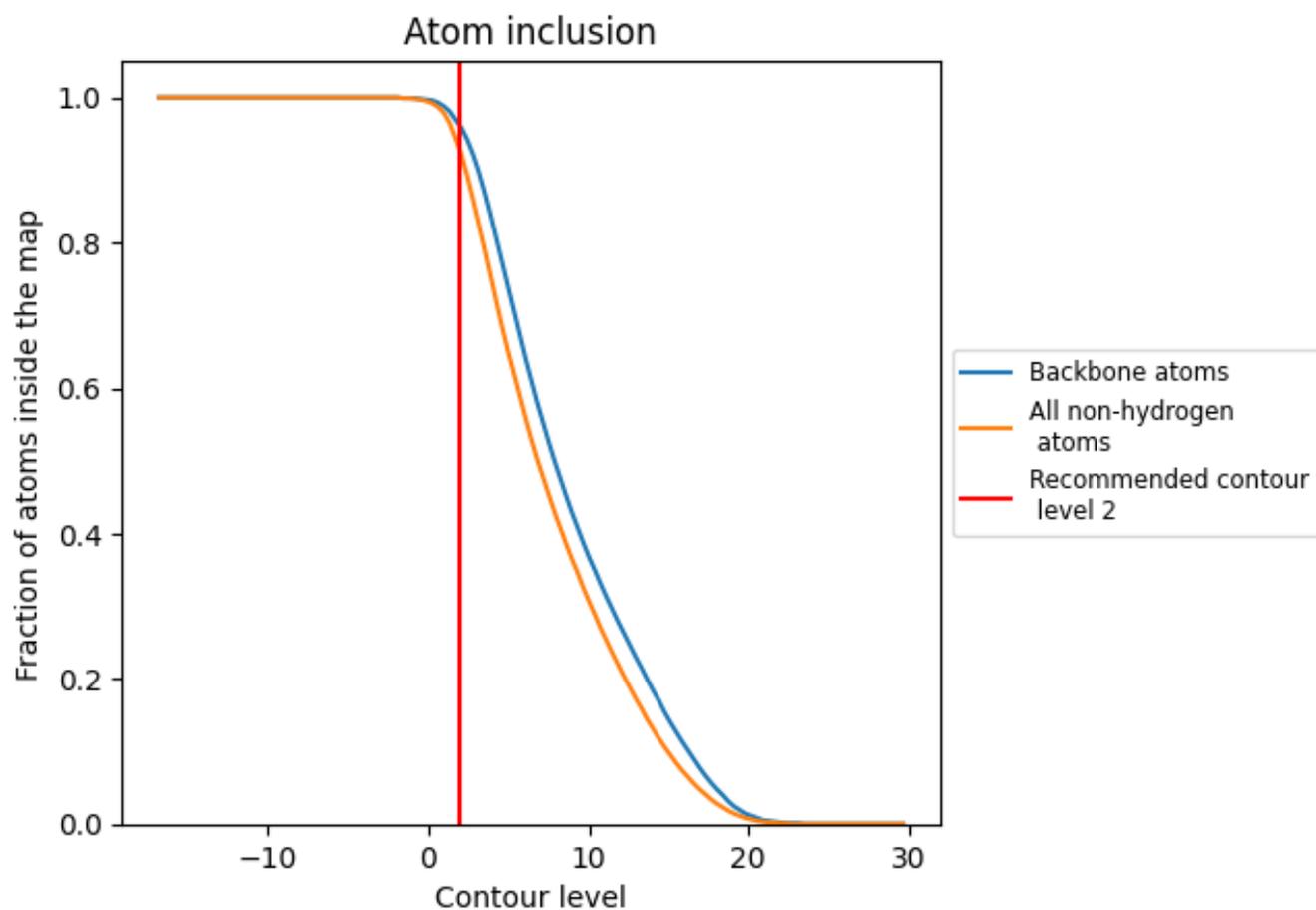
At the recommended contour level, 96% of all backbone atoms, 92% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9250	0.5020
A	0.9250	0.5040
B	0.9260	0.5200
C	0.9450	0.5380
D	0.9410	0.5300
E	0.7980	0.3780
F	0.8250	0.4170
G	0.9790	0.6080
H	0.9840	0.6210
I	0.9740	0.5930
J	0.9470	0.5760
K	0.9840	0.6210
L	0.9910	0.6320
M	0.9820	0.6150
N	0.9890	0.6380
O	0.9850	0.6250
P	0.9910	0.6320
Q	0.9940	0.6360
R	0.9940	0.6410
S	0.9940	0.6400
T	0.9930	0.6390
U	0.9090	0.4150
V	0.7530	0.2940
W	0.8310	0.3150
X	0.9060	0.4260
Y	0.9000	0.4040
Z	0.9190	0.4360
a	0.8600	0.3410
b	0.7700	0.2930
c	0.8980	0.4320
d	0.8230	0.3520
e	0.7700	0.2610
f	0.5890	0.1430
g	0.9900	0.6020
h	0.9810	0.6000

1.0

0.0
<0.0

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W O R L D W I D E
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PROTEIN DATA BANK

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Chain	Atom inclusion	Q-score
i	0.9680	0.5600
j	0.9500	0.5200
k	0.9650	0.5660
l	0.9880	0.5980
m	0.9780	0.5950
n	0.9930	0.6320
o	0.9820	0.6160
p	0.9920	0.6360
q	0.9900	0.6310
r	0.9930	0.6320
s	0.9950	0.6380
t	0.9910	0.6330
u	0.9120	0.3900
v	0.9430	0.5640