



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 18, 2026 – 11:28 PM UTC

PDB ID : 5CZ4 / pdb_00005cz4
Title : Yeast 20S proteasome at 2.3 Å resolution
Authors : Huber, E.M.; Groll, M.
Deposited on : 2015-07-31
Resolution : 2.30 Å(reported)

This is a Full wwPDB X-ray Structure 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/XrayValidationReportHelp>

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:

MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

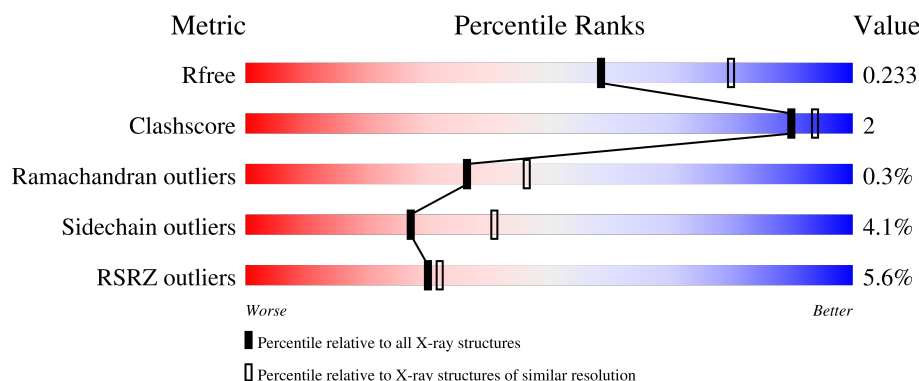
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower 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 electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	250	4% 94% 5%
1	O	250	7% 93% 6%
2	B	258	7% 84% 9% 5%
2	P	258	8% 84% 9% 5%
3	C	254	8% 83% 9% 6%

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Mol	Chain	Length	Quality of chain
3	Q	254	
4	D	260	
4	R	260	
5	E	234	
5	S	234	
6	F	288	
6	T	288	
7	G	252	
7	U	252	
8	H	232	
8	V	232	
9	I	205	
9	W	205	
10	J	198	
10	X	198	
11	K	212	
11	Y	212	
12	L	222	
12	Z	222	
13	M	246	
13	a	246	
14	N	196	
14	b	196	

2 Entry composition

There are 17 unique types of molecules in this entry. The entry contains 50853 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 Proteasome subunit alpha type-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	250	Total	C	N	O	S	0	0	0
			1915	1219	315	377	4			
1	O	250	Total	C	N	O	S	0	0	0
			1915	1219	315	377	4			

- Molecule 2 is a protein called Proteasome subunit alpha type-3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	244	Total	C	N	O	S	0	0	0
			1904	1201	321	379	3			
2	P	244	Total	C	N	O	S	0	0	0
			1904	1201	321	379	3			

- Molecule 3 is a protein called Proteasome subunit alpha type-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	240	Total	C	N	O	S	0	0	0
			1881	1176	329	372	4			
3	Q	240	Total	C	N	O	S	0	0	0
			1881	1176	329	372	4			

- Molecule 4 is a protein called Proteasome subunit alpha type-5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	235	Total	C	N	O	S	0	0	0
			1813	1136	304	366	7			
4	R	235	Total	C	N	O	S	0	0	0
			1813	1136	304	366	7			

- Molecule 5 is a protein called Proteasome subunit alpha type-6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	E	231	Total	C	N	O	S	0	0	0
			1773	1114	307	348	4			
5	S	231	Total	C	N	O	S	0	0	0
			1773	1114	307	348	4			

- Molecule 6 is a protein called Probable proteasome subunit alpha type-7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	F	243	Total	C	N	O	S	0	0	0
			1892	1203	329	356	4			
6	T	243	Total	C	N	O	S	0	0	0
			1892	1203	329	356	4			

- Molecule 7 is a protein called Proteasome subunit alpha type-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
7	G	241	Total	C	N	O	S	0	0	0
			1907	1214	320	365	8			
7	U	241	Total	C	N	O	S	0	0	0
			1907	1214	320	365	8			

- Molecule 8 is a protein called Proteasome subunit beta type-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
8	H	226	Total	C	N	O	S	0	0	0
			1719	1082	298	332	7			
8	V	226	Total	C	N	O	S	0	0	0
			1719	1082	298	332	7			

- Molecule 9 is a protein called Proteasome subunit beta type-3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
9	I	204	Total	C	N	O	S	0	0	0
			1581	1010	258	305	8			
9	W	204	Total	C	N	O	S	0	0	0
			1581	1010	258	305	8			

- Molecule 10 is a protein called Proteasome subunit beta type-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	J	195	Total	C	N	O	S	0	0	0
			1561	992	264	299	6			

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	X	195	Total	C	N	O	S	0	0	0
			1561	992	264	299	6			

- Molecule 11 is a protein called Proteasome subunit beta type-5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
11	K	212	Total	C	N	O	S	0	0	0
			1644	1045	280	312	7			
11	Y	212	Total	C	N	O	S	0	0	0
			1644	1045	280	312	7			

- Molecule 12 is a protein called Proteasome subunit beta type-6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
12	L	222	Total	C	N	O	S	0	0	0
			1757	1115	303	335	4			
12	Z	222	Total	C	N	O	S	0	0	0
			1757	1115	303	335	4			

- Molecule 13 is a protein called Proteasome subunit beta type-7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
13	M	229	Total	C	N	O	S	0	0	0
			1790	1133	306	344	7			
13	a	232	Total	C	N	O	S	0	0	0
			1815	1148	311	349	7			

- Molecule 14 is a protein called Proteasome subunit beta type-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
14	N	196	Total	C	N	O	S	0	0	0
			1512	955	250	300	7			
14	b	196	Total	C	N	O	S	0	0	0
			1512	955	250	300	7			

- Molecule 15 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	G	1	Total	Mg	0	0
			1	1		
15	I	2	Total	Mg	0	0
			2	2		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	K	1	Total 1	Mg 1	0	0
15	L	1	Total 1	Mg 1	0	0
15	N	1	Total 1	Mg 1	0	0
15	W	1	Total 1	Mg 1	0	0
15	Z	1	Total 1	Mg 1	0	0

- Molecule 16 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	G	1	Total 1	Cl 1	0	0
16	U	1	Total 1	Cl 1	0	0

- Molecule 17 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
17	A	69	Total 69	O 69	0	0
17	B	55	Total 55	O 55	0	0
17	C	43	Total 43	O 43	0	0
17	D	36	Total 36	O 36	0	0
17	E	25	Total 25	O 25	0	0
17	F	50	Total 50	O 50	0	0
17	G	76	Total 76	O 76	0	0
17	H	47	Total 47	O 47	0	0
17	I	69	Total 69	O 69	0	0
17	J	64	Total 64	O 64	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
17	K	64	Total 64	O 64	0	0
17	L	74	Total 74	O 74	0	0
17	M	68	Total 68	O 68	0	0
17	N	59	Total 59	O 59	0	0
17	O	31	Total 31	O 31	0	0
17	P	40	Total 40	O 40	0	0
17	Q	34	Total 34	O 34	0	0
17	R	31	Total 31	O 31	0	0
17	S	21	Total 21	O 21	0	0
17	T	37	Total 37	O 37	0	0
17	U	67	Total 67	O 67	0	0
17	V	62	Total 62	O 62	0	0
17	W	65	Total 65	O 65	0	0
17	X	53	Total 53	O 53	0	0
17	Y	74	Total 74	O 74	0	0
17	Z	72	Total 72	O 72	0	0
17	a	76	Total 76	O 76	0	0
17	b	58	Total 58	O 58	0	0

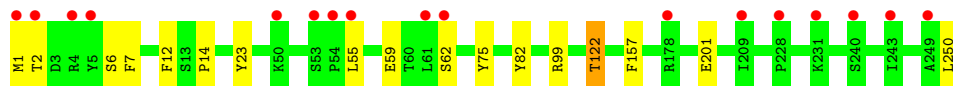
3 Residue-property plots [i](#)

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 electron 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 dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). 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.

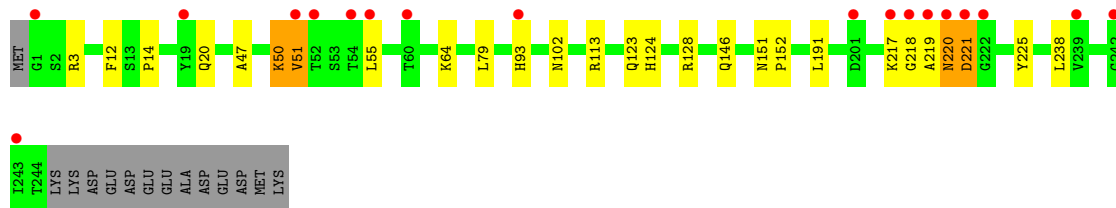
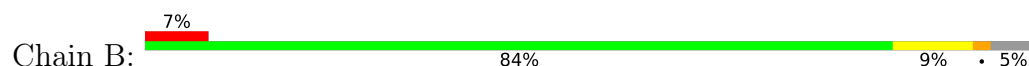
- Molecule 1: Proteasome subunit alpha type-2



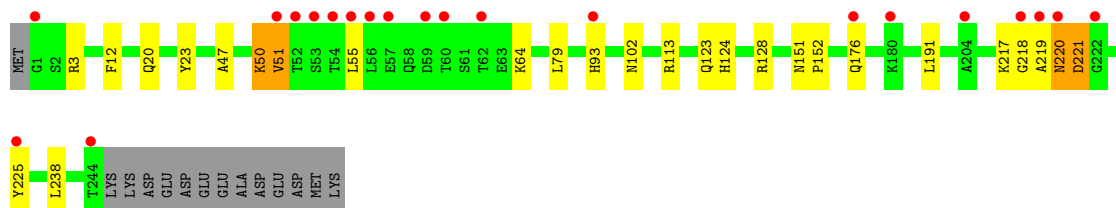
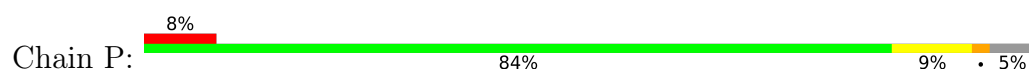
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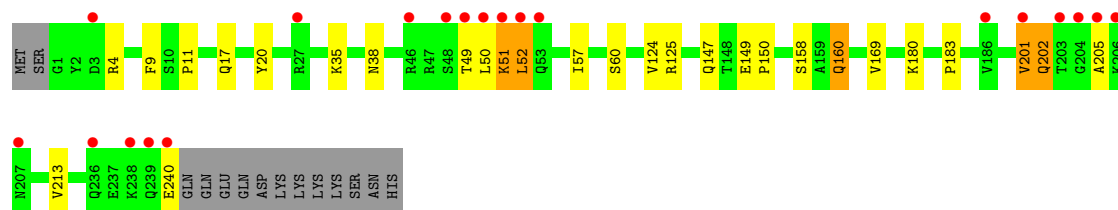
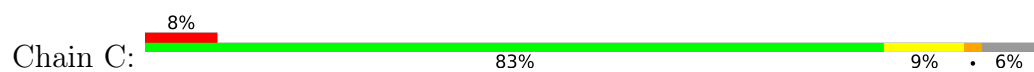
- Molecule 2: Proteasome subunit alpha type-3



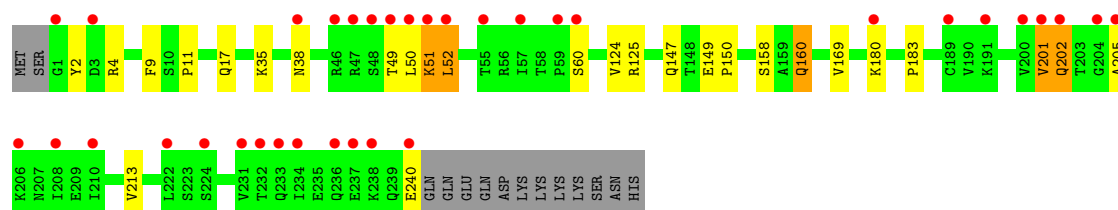
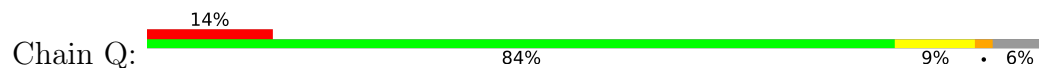
- Molecule 2: Proteasome subunit alpha type-3



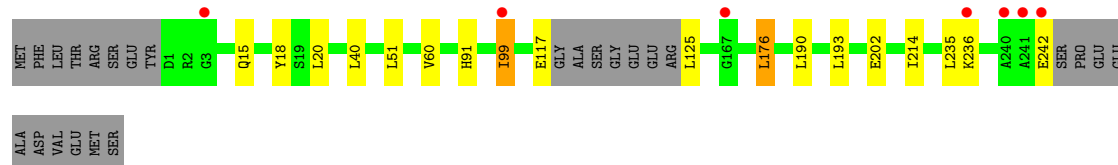
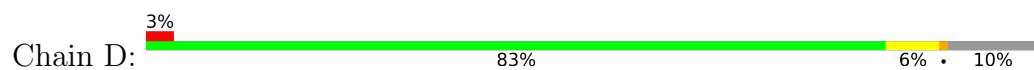
- Molecule 3: Proteasome subunit alpha type-4



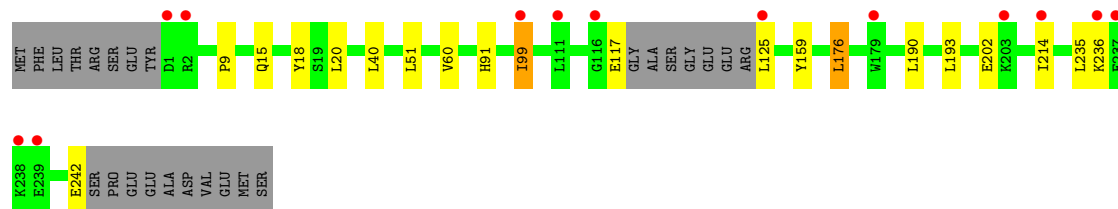
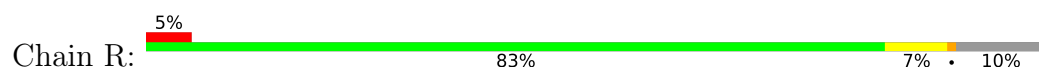
- Molecule 3: Proteasome subunit alpha type-4



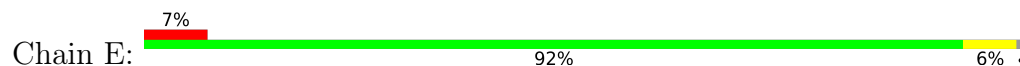
- Molecule 4: Proteasome subunit alpha type-5



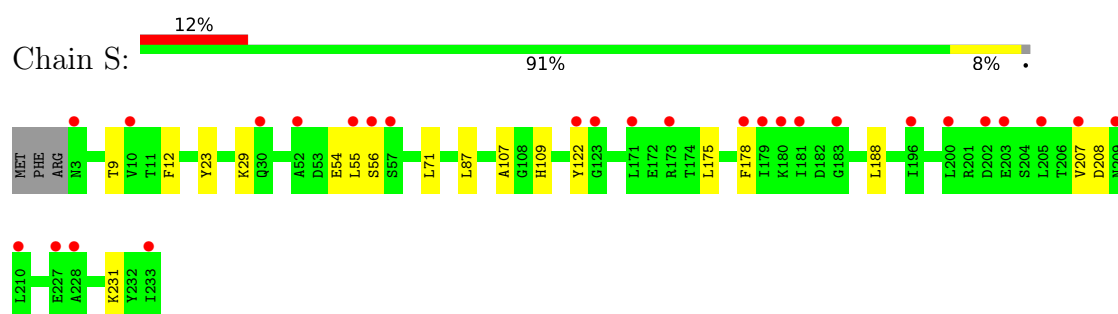
- Molecule 4: Proteasome subunit alpha type-5



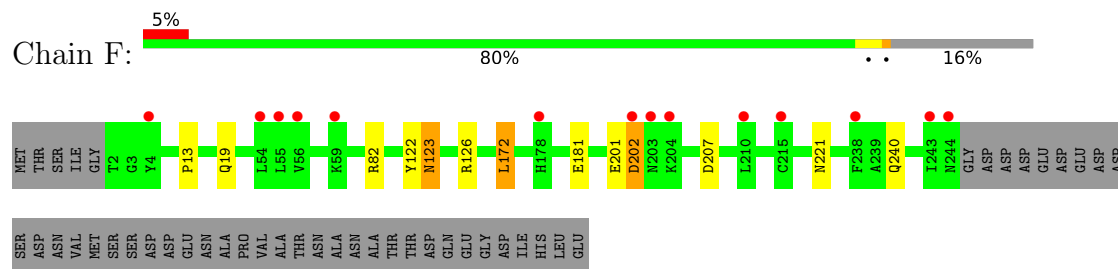
- Molecule 5: Proteasome subunit alpha type-6



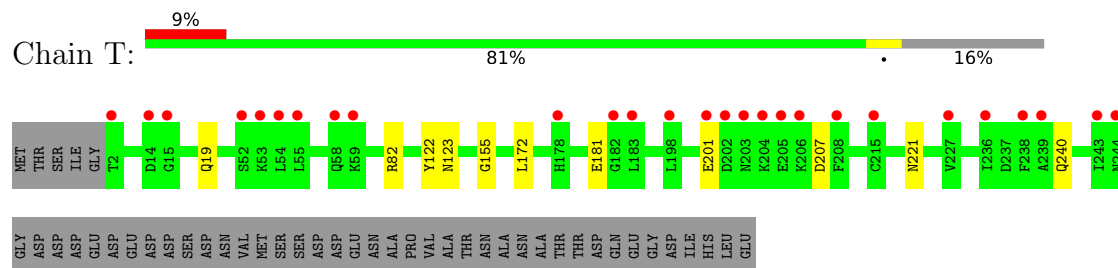
- Molecule 5: Proteasome subunit alpha type-6



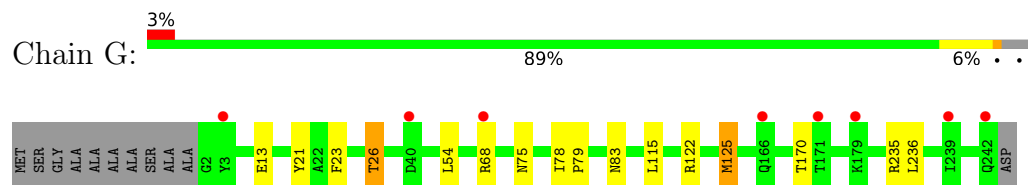
- Molecule 6: Probable proteasome subunit alpha type-7



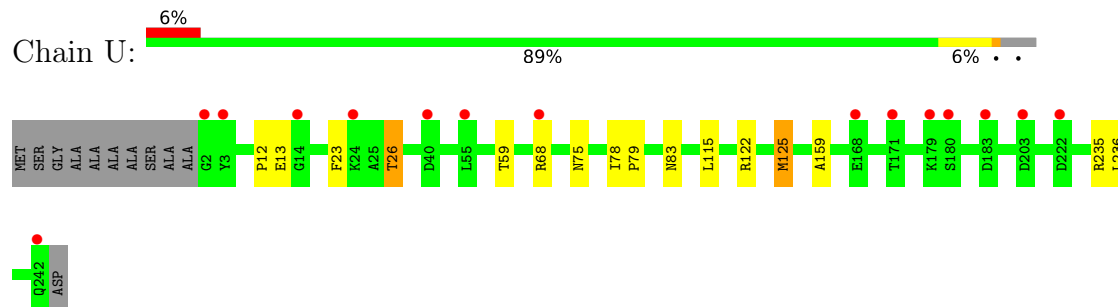
- Molecule 6: Probable proteasome subunit alpha type-7



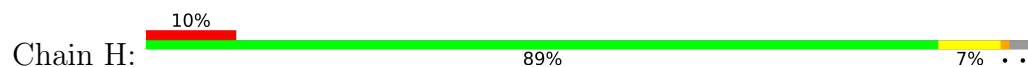
- Molecule 7: Proteasome subunit alpha type-1

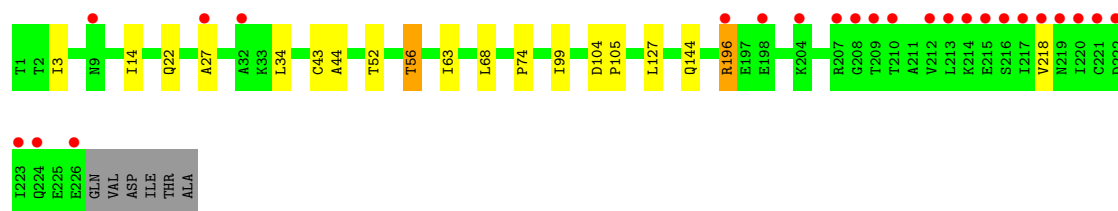


- Molecule 7: Proteasome subunit alpha type-1

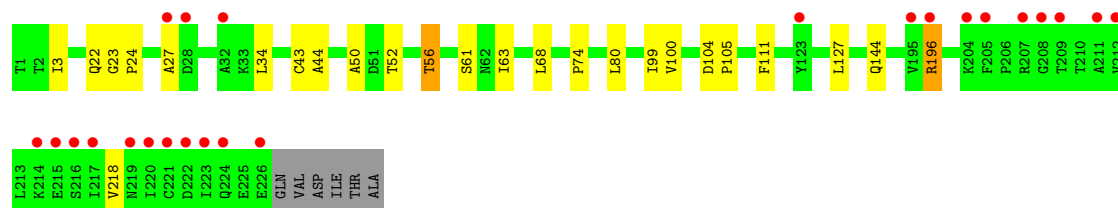
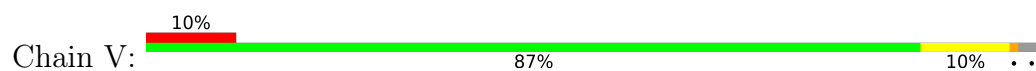


- Molecule 8: Proteasome subunit beta type-2

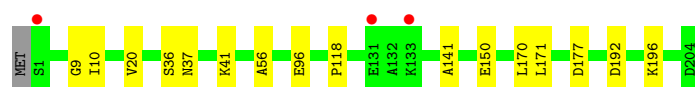
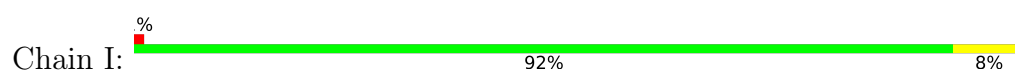




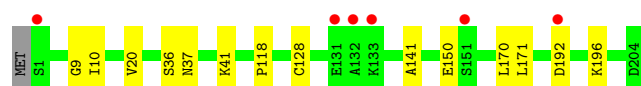
• Molecule 8: Proteasome subunit beta type-2



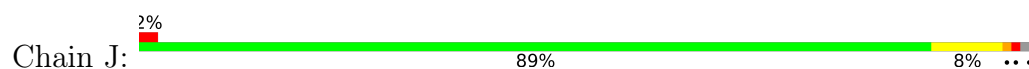
• Molecule 9: Proteasome subunit beta type-3



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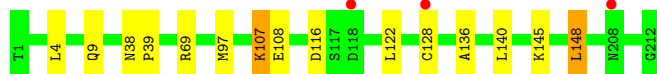
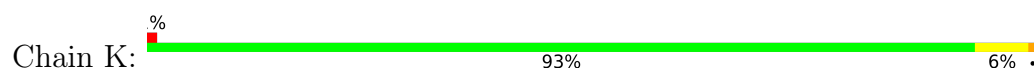
• Molecule 10: Proteasome subunit beta type-4



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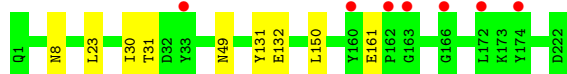
• Molecule 11: Proteasome subunit beta type-5



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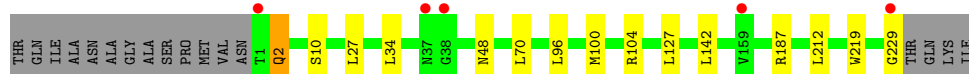
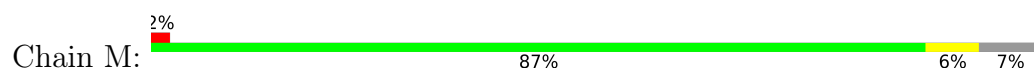
- Molecule 12: Proteasome subunit beta type-6



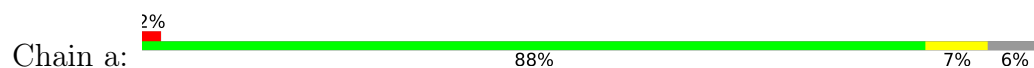
- Molecule 12: Proteasome subunit beta type-6



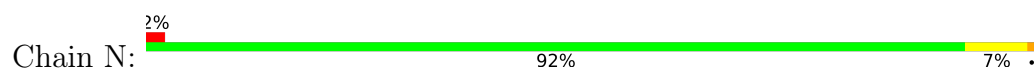
- Molecule 13: Proteasome subunit beta type-7



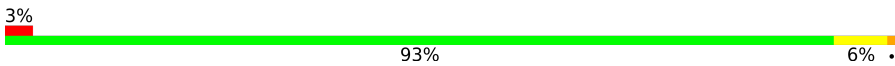
- Molecule 13: Proteasome subunit beta type-7

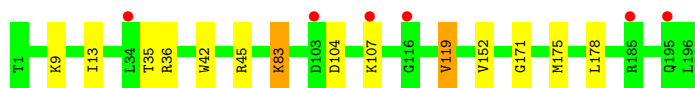


- Molecule 14: Proteasome subunit beta type-1



● Molecule 14: Proteasome subunit beta type-1

Chain b:  3% 93% 6%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	137.02Å 300.93Å 145.76Å 90.00° 113.13° 90.00°	Depositor
Resolution (Å)	15.00 – 2.30 15.00 – 2.30	Depositor EDS
% Data completeness (in resolution range)	98.8 (15.00-2.30) 98.5 (15.00-2.30)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.11 (at 2.29Å)	Xtriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.211 , 0.228 0.214 , 0.233	Depositor DCC
R_{free} test set	23561 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	46.4	Xtriage
Anisotropy	0.078	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 50.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	50853	wwPDB-VP
Average B, all atoms (Å ²)	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.41% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

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: MG, CL

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.45	0/1952	0.69	0/2642
1	O	0.45	0/1952	0.69	0/2642
2	B	0.45	0/1934	0.69	0/2618
2	P	0.45	0/1934	0.69	0/2618
3	C	0.44	0/1910	0.71	1/2586 (0.0%)
3	Q	0.45	0/1910	0.71	1/2586 (0.0%)
4	D	0.44	0/1837	0.69	0/2475
4	R	0.44	0/1837	0.69	0/2475
5	E	0.45	0/1800	0.66	0/2433
5	S	0.44	0/1800	0.66	0/2433
6	F	0.44	0/1932	0.69	0/2609
6	T	0.44	0/1932	0.70	0/2609
7	G	0.44	0/1945	0.69	0/2634
7	U	0.44	0/1945	0.69	0/2634
8	H	0.52	1/1750 (0.1%)	0.68	0/2373
8	V	0.64	1/1750 (0.1%)	0.75	2/2373 (0.1%)
9	I	0.49	0/1611	0.71	0/2174
9	W	0.47	0/1611	0.71	0/2174
10	J	0.56	3/1589 (0.2%)	0.70	1/2142 (0.0%)
10	X	0.46	1/1589 (0.1%)	0.67	0/2142
11	K	0.45	0/1681	0.67	0/2274
11	Y	0.45	0/1681	0.67	0/2274
12	L	0.45	0/1795	0.68	0/2420
12	Z	0.48	0/1795	0.69	0/2420
13	M	0.46	0/1821	0.69	1/2470 (0.0%)
13	a	0.46	0/1846	0.68	1/2503 (0.0%)
14	N	0.42	0/1541	0.66	0/2087
14	b	0.42	0/1541	0.66	0/2087
All	All	0.46	6/50221 (0.0%)	0.69	7/67907 (0.0%)

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	V	23	GLY	C-N	7.77	1.40	1.33
10	J	2	ASP	CA-C	-6.98	1.48	1.52
10	J	3	ILE	C-O	-5.63	1.18	1.24
10	X	2	ASP	CA-C	5.53	1.55	1.52
8	H	14	ILE	C-O	-5.47	1.18	1.24
10	J	4	ILE	C-O	-5.21	1.18	1.24

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	Q	201	VAL	N-CA-C	6.96	117.07	110.53
3	C	201	VAL	N-CA-C	6.94	117.05	110.53
8	V	23	GLY	CA-C-N	-6.20	113.38	120.89
8	V	23	GLY	C-N-CA	-6.20	113.38	120.89
13	a	10	SER	N-CA-C	5.66	117.60	110.24
13	M	10	SER	N-CA-C	5.64	117.57	110.24
10	J	2	ASP	N-CA-C	5.55	116.94	108.12

There are no chirality outliers.

There are no planarity outliers.

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	A	1915	0	1929	6	0
1	O	1915	0	1929	9	0
2	B	1904	0	1904	19	0
2	P	1904	0	1904	17	0
3	C	1881	0	1895	13	0
3	Q	1881	0	1895	13	0
4	D	1813	0	1797	7	0
4	R	1813	0	1797	8	0
5	E	1773	0	1775	10	0
5	S	1773	0	1775	8	0
6	F	1892	0	1883	8	0
6	T	1892	0	1883	4	0
7	G	1907	0	1901	7	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	U	1907	0	1901	7	0
8	H	1719	0	1719	11	0
8	V	1719	0	1719	18	0
9	I	1581	0	1574	9	0
9	W	1581	0	1574	8	0
10	J	1561	0	1569	9	0
10	X	1561	0	1569	9	0
11	K	1644	0	1595	5	0
11	Y	1644	0	1595	6	0
12	L	1757	0	1711	3	0
12	Z	1757	0	1711	0	0
13	M	1790	0	1793	7	0
13	a	1815	0	1821	5	0
14	N	1512	0	1481	8	0
14	b	1512	0	1481	8	0
15	G	1	0	0	0	0
15	I	2	0	0	0	0
15	K	1	0	0	0	0
15	L	1	0	0	0	0
15	N	1	0	0	0	0
15	W	1	0	0	0	0
15	Z	1	0	0	0	0
16	G	1	0	0	0	0
16	U	1	0	0	0	0
17	A	69	0	0	0	0
17	B	55	0	0	1	0
17	C	43	0	0	0	0
17	D	36	0	0	0	0
17	E	25	0	0	0	0
17	F	50	0	0	0	0
17	G	76	0	0	0	0
17	H	47	0	0	0	0
17	I	69	0	0	0	0
17	J	64	0	0	1	0
17	K	64	0	0	0	0
17	L	74	0	0	0	0
17	M	68	0	0	1	0
17	N	59	0	0	0	0
17	O	31	0	0	0	0
17	P	40	0	0	1	0
17	Q	34	0	0	0	0
17	R	31	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
17	S	21	0	0	0	0
17	T	37	0	0	0	0
17	U	67	0	0	0	0
17	V	62	0	0	0	0
17	W	65	0	0	0	0
17	X	53	0	0	1	0
17	Y	74	0	0	0	0
17	Z	72	0	0	0	0
17	a	76	0	0	0	0
17	b	58	0	0	0	0
All	All	50853	0	49080	179	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 2.

All (179) 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)
8:V:22:GLN:HG3	8:V:27:ALA:HB2	1.59	0.84
8:V:52:THR:O	8:V:56:THR:OG1	1.96	0.84
8:H:52:THR:O	8:H:56:THR:OG1	1.95	0.83
10:X:21:VAL:HG11	11:Y:122:LEU:HD11	1.78	0.66
2:B:12:PHE:H	3:C:17:GLN:HE22	1.42	0.66
7:G:68:ARG:HH12	14:N:36:ARG:HH22	1.43	0.66
14:N:35:THR:HG21	14:N:45:ARG:HE	1.61	0.65
2:B:3:ARG:HB3	5:E:122:TYR:OH	1.95	0.65
5:S:12:PHE:H	6:T:19:GLN:HE22	1.46	0.63
10:J:21:VAL:HG11	11:K:122:LEU:HD11	1.80	0.63
5:E:12:PHE:H	6:F:19:GLN:HE22	1.45	0.63
14:b:35:THR:HG21	14:b:45:ARG:HE	1.62	0.63
8:H:3:ILE:HG21	8:H:44:ALA:HB3	1.83	0.60
8:V:3:ILE:HG21	8:V:44:ALA:HB3	1.82	0.60
14:N:152:VAL:HA	14:N:175:MET:HE1	1.85	0.59
11:Y:128:CYS:HB2	11:Y:137:TYR:CZ	2.38	0.59
11:Y:128:CYS:HB2	11:Y:137:TYR:CE2	2.38	0.58
14:b:152:VAL:HA	14:b:175:MET:HE1	1.84	0.58
1:O:23:TYR:CD1	7:U:12:PRO:HA	2.38	0.58
12:L:131:TYR:O	12:L:132:GLU:HG2	2.02	0.58
2:P:217:LYS:C	2:P:219:ALA:H	2.12	0.58
8:V:22:GLN:CG	8:V:27:ALA:HB2	2.34	0.56
2:B:217:LYS:C	2:B:219:ALA:H	2.12	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:O:122:THR:HG22	2:P:128:ARG:HH21	1.71	0.56
13:M:229:GLY:HA2	8:V:111:PHE:CE1	2.41	0.55
9:I:36:SER:HB2	10:J:126:VAL:HG11	1.88	0.55
1:A:122:THR:HG22	2:B:128:ARG:HH21	1.72	0.54
3:C:9:PHE:H	4:D:15:GLN:HE22	1.56	0.54
10:J:25:ILE:O	10:X:139:TYR:OH	2.26	0.54
3:Q:51:LYS:O	3:Q:52:LEU:HB2	2.07	0.54
3:C:51:LYS:O	3:C:52:LEU:HB2	2.07	0.54
2:P:124:HIS:HB3	3:Q:124:VAL:HG12	1.91	0.53
1:O:12:PHE:H	2:P:20:GLN:HE22	1.56	0.53
2:B:146:GLN:HG2	3:C:57:ILE:HG21	1.89	0.53
8:H:3:ILE:HG22	8:H:99:ILE:HD12	1.90	0.53
10:J:3:ILE:HG23	10:J:18:SER:HB3	1.90	0.53
3:Q:9:PHE:H	4:R:15:GLN:HE22	1.58	0.52
2:B:124:HIS:HB3	3:C:124:VAL:HG12	1.92	0.52
3:Q:201:VAL:O	3:Q:202:GLN:CB	2.58	0.52
3:C:160:GLN:HE21	3:C:160:GLN:HA	1.75	0.52
3:C:201:VAL:O	3:C:202:GLN:CB	2.58	0.51
4:R:176:LEU:HD11	5:S:54:GLU:HB2	1.93	0.51
8:V:218:VAL:CG2	9:W:196:LYS:HB2	2.40	0.51
4:D:176:LEU:HD22	5:E:55:LEU:CD2	2.41	0.51
3:Q:160:GLN:HE21	3:Q:160:GLN:HA	1.75	0.51
8:V:3:ILE:HG22	8:V:99:ILE:HD12	1.93	0.50
4:D:91:HIS:HB3	4:D:99:ILE:HG22	1.93	0.50
2:B:3:ARG:CB	5:E:122:TYR:OH	2.58	0.50
4:R:91:HIS:HB3	4:R:99:ILE:HG22	1.94	0.50
10:J:16:ALA:HB2	10:J:161:LEU:HD21	1.94	0.50
12:L:131:TYR:C	12:L:132:GLU:HG2	2.38	0.49
14:N:13:ILE:HG21	14:N:175:MET:HE2	1.94	0.49
1:A:5:TYR:OH	6:F:123:ASN:OD1	2.23	0.49
10:X:16:ALA:HB2	10:X:161:LEU:HD21	1.94	0.49
2:P:47:ALA:HB1	2:P:64:LYS:HD2	1.95	0.49
7:U:68:ARG:HH12	14:b:36:ARG:HH22	1.60	0.49
14:b:13:ILE:HG21	14:b:175:MET:HE2	1.95	0.49
14:N:83:LYS:HG3	14:N:119:VAL:CG2	2.43	0.48
10:X:93:ARG:NH1	17:X:201:HOH:O	2.47	0.48
2:B:47:ALA:HB1	2:B:64:LYS:HD2	1.95	0.48
9:I:10:ILE:HG21	9:I:141:ALA:HB3	1.96	0.48
10:J:139:TYR:OH	10:X:25:ILE:O	2.32	0.48
14:b:83:LYS:HG3	14:b:119:VAL:CG2	2.43	0.48
2:P:176:GLN:HG3	3:Q:52:LEU:HD13	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:H:3:ILE:CG2	8:H:44:ALA:HB3	2.44	0.47
9:I:9:GLY:HA3	9:I:41:LYS:HE2	1.97	0.47
11:K:107:LYS:HG3	11:K:108:GLU:HG3	1.96	0.47
4:R:159:TYR:CE2	5:S:56:SER:HB3	2.50	0.47
10:X:1:MET:HG2	10:X:34:LYS:HE3	1.96	0.47
6:T:155:GLY:HA3	7:U:59:THR:HG21	1.97	0.47
14:b:35:THR:CG2	14:b:45:ARG:HE	2.27	0.47
9:W:10:ILE:HG21	9:W:141:ALA:HB3	1.96	0.47
11:Y:107:LYS:HG3	11:Y:108:GLU:HG3	1.97	0.47
4:D:91:HIS:HB3	4:D:99:ILE:CG2	2.45	0.47
2:B:123:GLN:HA	3:C:125:ARG:HG2	1.98	0.46
1:O:55:LEU:HB3	7:U:159:ALA:O	2.16	0.46
4:R:91:HIS:HB3	4:R:99:ILE:CG2	2.45	0.46
8:V:50:ALA:HB2	9:W:128:CYS:HB2	1.97	0.46
9:W:9:GLY:HA3	9:W:41:LYS:HE2	1.96	0.46
9:W:36:SER:HB2	10:X:126:VAL:HG11	1.97	0.46
7:G:23:PHE:O	7:G:26:THR:HB	2.16	0.46
3:C:11:PRO:HA	4:D:18:TYR:CD1	2.51	0.46
3:C:35:LYS:HG2	3:C:158:SER:O	2.15	0.46
8:H:43:CYS:SG	8:H:56:THR:CG2	3.04	0.46
8:V:43:CYS:SG	8:V:56:THR:CG2	3.04	0.46
3:Q:35:LYS:HG2	3:Q:158:SER:O	2.16	0.46
1:O:14:PRO:HA	2:P:23:TYR:CD1	2.52	0.45
14:b:36:ARG:HG3	14:b:42:TRP:CE2	2.52	0.45
11:K:128:CYS:SG	11:K:136:ALA:HB3	2.56	0.45
8:V:104:ASP:HB2	8:V:105:PRO:HD2	1.99	0.45
2:B:151:ASN:HB2	2:B:152:PRO:CD	2.47	0.45
7:U:23:PHE:O	7:U:26:THR:HB	2.16	0.45
6:F:122:TYR:CE1	7:G:125:MET:HE3	2.52	0.45
3:C:149:GLU:HB2	3:C:150:PRO:HD2	1.99	0.45
8:H:104:ASP:HB2	8:H:105:PRO:HD2	1.99	0.45
2:B:93:HIS:HB3	17:B:301:HOH:O	2.16	0.44
2:P:123:GLN:HA	3:Q:125:ARG:HG2	1.99	0.44
1:A:12:PHE:H	2:B:20:GLN:HE22	1.64	0.44
10:J:1:MET:HG3	10:J:47:ALA:HA	1.99	0.44
2:P:151:ASN:HB2	2:P:152:PRO:CD	2.47	0.44
3:Q:149:GLU:HB2	3:Q:150:PRO:HD2	1.99	0.44
9:I:20:VAL:HG13	9:I:118:PRO:HB3	2.00	0.44
13:M:229:GLY:HA2	8:V:111:PHE:HE1	1.80	0.44
14:N:36:ARG:HG3	14:N:42:TRP:CE2	2.52	0.44
14:N:171:GLY:HA2	13:a:219:TRP:CH2	2.52	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
14:N:35:THR:CG2	14:N:45:ARG:HE	2.27	0.43
13:M:96:LEU:O	13:M:100:MET:HG2	2.18	0.43
1:O:7:PHE:HB3	3:Q:2:TYR:CE1	2.53	0.43
6:T:122:TYR:CE1	7:U:125:MET:HE3	2.54	0.43
9:W:20:VAL:HG13	9:W:118:PRO:HB3	1.99	0.43
10:X:3:ILE:HG23	10:X:18:SER:HB3	2.00	0.43
2:P:93:HIS:HB3	17:P:301:HOH:O	2.18	0.43
8:V:80:LEU:HD21	8:V:100:VAL:HB	2.00	0.43
2:P:12:PHE:H	3:Q:17:GLN:HE22	1.65	0.43
2:P:50:LYS:O	2:P:51:VAL:C	2.61	0.43
2:P:3:ARG:HB3	5:S:122:TYR:OH	2.19	0.43
2:B:50:LYS:O	2:B:51:VAL:C	2.61	0.43
11:K:145:LYS:HB2	11:K:148:LEU:HD13	2.00	0.43
2:P:151:ASN:HB2	2:P:152:PRO:HD2	2.01	0.43
2:P:217:LYS:C	2:P:219:ALA:N	2.76	0.43
8:V:3:ILE:CG2	8:V:44:ALA:HB3	2.46	0.43
8:H:196:ARG:NH2	9:I:150:GLU:O	2.52	0.43
13:M:219:TRP:CH2	14:b:171:GLY:HA2	2.54	0.43
11:Y:145:LYS:HB2	11:Y:148:LEU:HD13	2.00	0.42
13:a:96:LEU:O	13:a:100:MET:HG2	2.19	0.42
2:B:151:ASN:HB2	2:B:152:PRO:HD2	2.01	0.42
6:F:13:PRO:HA	7:G:21:TYR:CD1	2.54	0.42
8:H:104:ASP:HB2	8:H:105:PRO:CD	2.49	0.42
3:Q:11:PRO:HA	4:R:18:TYR:CD1	2.55	0.42
8:V:104:ASP:HB2	8:V:105:PRO:CD	2.49	0.42
10:X:1:MET:HB3	10:X:34:LYS:HE3	2.02	0.42
5:S:87:LEU:HD21	5:S:107:ALA:HB1	2.00	0.42
5:E:175:LEU:HA	5:E:178:PHE:CE2	2.55	0.42
11:Y:38:ASN:HB2	11:Y:39:PRO:CD	2.49	0.42
5:E:87:LEU:HD21	5:E:107:ALA:HB1	2.00	0.42
11:K:38:ASN:HB2	11:K:39:PRO:CD	2.49	0.42
5:E:18:LEU:HD21	6:F:126:ARG:HD2	2.01	0.42
4:R:91:HIS:CD2	4:R:99:ILE:HG22	2.55	0.42
5:S:175:LEU:HA	5:S:178:PHE:CE2	2.55	0.42
10:J:93:ARG:NH1	17:J:201:HOH:O	2.49	0.42
13:a:227:GLY:HA3	13:a:231:GLN:HB3	2.01	0.42
1:O:99:ARG:HE	8:V:61:SER:HG	1.68	0.42
8:H:218:VAL:CG2	9:I:196:LYS:HB2	2.50	0.41
13:M:127:LEU:HG	13:M:142:LEU:HD12	2.02	0.41
13:a:27:LEU:HD21	13:a:34:LEU:HD22	2.02	0.41
4:D:91:HIS:CD2	4:D:99:ILE:HG22	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:M:2:GLN:NE2	17:M:302:HOH:O	2.52	0.41
5:S:109:HIS:HB3	6:T:82:ARG:NH2	2.35	0.41
4:D:176:LEU:HD22	5:E:55:LEU:HD22	2.03	0.41
6:F:172:LEU:HB3	7:G:54:LEU:CD2	2.49	0.41
8:H:22:GLN:HG3	8:H:27:ALA:HB2	2.02	0.41
1:O:6:SER:OG	3:Q:2:TYR:HA	2.20	0.41
2:B:14:PRO:HA	3:C:20:TYR:CD1	2.55	0.41
6:F:202:ASP:OD1	6:F:202:ASP:N	2.54	0.41
1:O:75:TYR:HB3	1:O:82:TYR:CD1	2.55	0.41
2:B:219:ALA:HB2	2:B:225:TYR:HB2	2.02	0.41
13:a:127:LEU:HG	13:a:142:LEU:HD12	2.02	0.41
1:A:4:ARG:HD3	5:E:122:TYR:HD2	1.85	0.41
8:V:63:ILE:HG23	8:V:74:PRO:HB3	2.03	0.41
1:A:55:LEU:HD12	7:G:170:THR:HG23	2.02	0.41
2:B:14:PRO:HA	3:C:20:TYR:CE1	2.56	0.41
9:I:56:ALA:HB3	10:J:124:THR:HG23	2.03	0.41
2:P:219:ALA:HB2	2:P:225:TYR:HB2	2.02	0.41
9:I:170:LEU:C	9:I:170:LEU:HD23	2.46	0.41
7:U:78:ILE:N	7:U:79:PRO:CD	2.84	0.41
2:B:220:ASN:O	2:B:221:ASP:HB2	2.21	0.41
5:E:109:HIS:HB3	6:F:82:ARG:NH2	2.36	0.41
12:L:8:ASN:HA	12:L:30:ILE:O	2.21	0.41
13:M:27:LEU:HD21	13:M:34:LEU:HD22	2.03	0.41
2:P:220:ASN:O	2:P:221:ASP:HB2	2.21	0.41
4:R:9:PRO:HA	5:S:23:TYR:CD1	2.56	0.40
7:G:78:ILE:N	7:G:79:PRO:CD	2.84	0.40
9:I:141:ALA:HB2	9:I:177:ASP:HB2	2.04	0.40
2:B:217:LYS:C	2:B:219:ALA:N	2.76	0.40
8:H:63:ILE:HG23	8:H:74:PRO:HB3	2.03	0.40
8:V:43:CYS:SG	8:V:56:THR:HG23	2.62	0.40
1:A:75:TYR:HB3	1:A:82:TYR:CD1	2.55	0.40
8:V:196:ARG:NH2	9:W:150:GLU:O	2.54	0.40
9:W:170:LEU:HD23	9:W:170:LEU:C	2.46	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	248/250 (99%)	238 (96%)	9 (4%)	1 (0%)	30	38
1	O	248/250 (99%)	238 (96%)	9 (4%)	1 (0%)	30	38
2	B	242/258 (94%)	235 (97%)	3 (1%)	4 (2%)	7	7
2	P	242/258 (94%)	235 (97%)	3 (1%)	4 (2%)	7	7
3	C	238/254 (94%)	233 (98%)	2 (1%)	3 (1%)	9	10
3	Q	238/254 (94%)	233 (98%)	2 (1%)	3 (1%)	9	10
4	D	231/260 (89%)	229 (99%)	2 (1%)	0	100	100
4	R	231/260 (89%)	229 (99%)	2 (1%)	0	100	100
5	E	229/234 (98%)	222 (97%)	7 (3%)	0	100	100
5	S	229/234 (98%)	222 (97%)	7 (3%)	0	100	100
6	F	241/288 (84%)	238 (99%)	3 (1%)	0	100	100
6	T	241/288 (84%)	238 (99%)	3 (1%)	0	100	100
7	G	239/252 (95%)	239 (100%)	0	0	100	100
7	U	239/252 (95%)	239 (100%)	0	0	100	100
8	H	224/232 (97%)	218 (97%)	6 (3%)	0	100	100
8	V	224/232 (97%)	218 (97%)	6 (3%)	0	100	100
9	I	202/205 (98%)	197 (98%)	5 (2%)	0	100	100
9	W	202/205 (98%)	196 (97%)	6 (3%)	0	100	100
10	J	193/198 (98%)	189 (98%)	4 (2%)	0	100	100
10	X	193/198 (98%)	188 (97%)	5 (3%)	0	100	100
11	K	210/212 (99%)	206 (98%)	4 (2%)	0	100	100
11	Y	210/212 (99%)	206 (98%)	4 (2%)	0	100	100
12	L	220/222 (99%)	215 (98%)	5 (2%)	0	100	100
12	Z	220/222 (99%)	215 (98%)	5 (2%)	0	100	100
13	M	227/246 (92%)	220 (97%)	7 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
13	a	230/246 (94%)	222 (96%)	8 (4%)	0	100	100
14	N	194/196 (99%)	190 (98%)	4 (2%)	0	100	100
14	b	194/196 (99%)	190 (98%)	4 (2%)	0	100	100
All	All	6279/6614 (95%)	6138 (98%)	125 (2%)	16 (0%)	36	46

All (16) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	51	VAL
2	B	221	ASP
3	C	202	GLN
2	P	51	VAL
2	P	221	ASP
3	Q	202	GLN
1	A	2	THR
2	B	220	ASN
1	O	2	THR
2	P	220	ASN
2	B	218	GLY
3	C	205	ALA
2	P	218	GLY
3	Q	205	ALA
3	Q	183	PRO
3	C	183	PRO

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 X-ray entries followed by that with respect to entries of similar resolution.

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	209/209 (100%)	202 (97%)	7 (3%)	33	50
1	O	209/209 (100%)	202 (97%)	7 (3%)	33	50
2	B	203/216 (94%)	196 (97%)	7 (3%)	32	49
2	P	203/216 (94%)	196 (97%)	7 (3%)	32	49

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	C	212/226 (94%)	199 (94%)	13 (6%)	17	24
3	Q	212/226 (94%)	199 (94%)	13 (6%)	17	24
4	D	194/215 (90%)	179 (92%)	15 (8%)	12	16
4	R	194/215 (90%)	179 (92%)	15 (8%)	12	16
5	E	190/193 (98%)	182 (96%)	8 (4%)	26	40
5	S	190/193 (98%)	182 (96%)	8 (4%)	26	40
6	F	201/239 (84%)	193 (96%)	8 (4%)	28	42
6	T	201/239 (84%)	194 (96%)	7 (4%)	32	48
7	G	206/210 (98%)	197 (96%)	9 (4%)	25	38
7	U	206/210 (98%)	197 (96%)	9 (4%)	25	38
8	H	185/190 (97%)	179 (97%)	6 (3%)	34	51
8	V	185/190 (97%)	178 (96%)	7 (4%)	29	44
9	I	172/173 (99%)	168 (98%)	4 (2%)	44	63
9	W	172/173 (99%)	169 (98%)	3 (2%)	53	72
10	J	173/175 (99%)	165 (95%)	8 (5%)	24	36
10	X	173/175 (99%)	169 (98%)	4 (2%)	44	63
11	K	169/169 (100%)	161 (95%)	8 (5%)	23	35
11	Y	169/169 (100%)	162 (96%)	7 (4%)	27	41
12	L	185/185 (100%)	180 (97%)	5 (3%)	39	58
12	Z	185/185 (100%)	178 (96%)	7 (4%)	29	44
13	M	195/208 (94%)	189 (97%)	6 (3%)	35	52
13	a	198/208 (95%)	192 (97%)	6 (3%)	36	53
14	N	162/162 (100%)	155 (96%)	7 (4%)	26	39
14	b	162/162 (100%)	156 (96%)	6 (4%)	30	45
All	All	5315/5540 (96%)	5098 (96%)	217 (4%)	27	41

All (217) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	MET
1	A	59	GLU
1	A	62	SER
1	A	122	THR
1	A	157	PHE

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Mol	Chain	Res	Type
1	A	201	GLU
1	A	250	LEU
2	B	50	LYS
2	B	55	LEU
2	B	79	LEU
2	B	102	ASN
2	B	113	ARG
2	B	191	LEU
2	B	238	LEU
3	C	4	ARG
3	C	38	ASN
3	C	49	THR
3	C	50	LEU
3	C	51	LYS
3	C	52	LEU
3	C	60	SER
3	C	147	GLN
3	C	160	GLN
3	C	169	VAL
3	C	180	LYS
3	C	213	VAL
3	C	240	GLU
4	D	20	LEU
4	D	40	LEU
4	D	51	LEU
4	D	60	VAL
4	D	99	ILE
4	D	117	GLU
4	D	125	LEU
4	D	176	LEU
4	D	190	LEU
4	D	193	LEU
4	D	202	GLU
4	D	214	ILE
4	D	235	LEU
4	D	236	LYS
4	D	242	GLU
5	E	9	THR
5	E	29	LYS
5	E	55	LEU
5	E	71	LEU
5	E	188	LEU

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Mol	Chain	Res	Type
5	E	207	VAL
5	E	208	ASP
5	E	231	LYS
6	F	123	ASN
6	F	172	LEU
6	F	181	GLU
6	F	201	GLU
6	F	202	ASP
6	F	207	ASP
6	F	221	ASN
6	F	240	GLN
7	G	13	GLU
7	G	26	THR
7	G	75	ASN
7	G	83	ASN
7	G	115	LEU
7	G	122	ARG
7	G	125	MET
7	G	235	ARG
7	G	236	LEU
8	H	34	LEU
8	H	56	THR
8	H	68	LEU
8	H	127	LEU
8	H	144	GLN
8	H	196	ARG
9	I	37	ASN
9	I	96	GLU
9	I	171	LEU
9	I	192	ASP
10	J	1	MET
10	J	2	ASP
10	J	3	ILE
10	J	23	ARG
10	J	35	THR
10	J	49	GLU
10	J	90	LYS
10	J	99	GLN
11	K	4	LEU
11	K	9	GLN
11	K	69	ARG
11	K	97	MET

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Mol	Chain	Res	Type
11	K	107	LYS
11	K	116	ASP
11	K	140	LEU
11	K	148	LEU
12	L	23	LEU
12	L	31	THR
12	L	49	ASN
12	L	150	LEU
12	L	161	GLU
13	M	2	GLN
13	M	48	ASN
13	M	70	LEU
13	M	104	ARG
13	M	187	ARG
13	M	212	LEU
14	N	9	LYS
14	N	83	LYS
14	N	104	ASP
14	N	107	LYS
14	N	115	LEU
14	N	119	VAL
14	N	178	LEU
1	O	1	MET
1	O	59	GLU
1	O	62	SER
1	O	122	THR
1	O	157	PHE
1	O	201	GLU
1	O	250	LEU
2	P	50	LYS
2	P	55	LEU
2	P	79	LEU
2	P	102	ASN
2	P	113	ARG
2	P	191	LEU
2	P	238	LEU
3	Q	4	ARG
3	Q	38	ASN
3	Q	49	THR
3	Q	50	LEU
3	Q	51	LYS
3	Q	52	LEU

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Mol	Chain	Res	Type
3	Q	60	SER
3	Q	147	GLN
3	Q	160	GLN
3	Q	169	VAL
3	Q	180	LYS
3	Q	213	VAL
3	Q	240	GLU
4	R	20	LEU
4	R	40	LEU
4	R	51	LEU
4	R	60	VAL
4	R	99	ILE
4	R	117	GLU
4	R	125	LEU
4	R	176	LEU
4	R	190	LEU
4	R	193	LEU
4	R	202	GLU
4	R	214	ILE
4	R	235	LEU
4	R	236	LYS
4	R	242	GLU
5	S	9	THR
5	S	29	LYS
5	S	55	LEU
5	S	71	LEU
5	S	188	LEU
5	S	207	VAL
5	S	208	ASP
5	S	231	LYS
6	T	123	ASN
6	T	172	LEU
6	T	181	GLU
6	T	201	GLU
6	T	207	ASP
6	T	221	ASN
6	T	240	GLN
7	U	13	GLU
7	U	26	THR
7	U	75	ASN
7	U	83	ASN
7	U	115	LEU

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Mol	Chain	Res	Type
7	U	122	ARG
7	U	125	MET
7	U	235	ARG
7	U	236	LEU
8	V	24	PRO
8	V	34	LEU
8	V	56	THR
8	V	68	LEU
8	V	127	LEU
8	V	144	GLN
8	V	196	ARG
9	W	37	ASN
9	W	171	LEU
9	W	192	ASP
10	X	3	ILE
10	X	35	THR
10	X	90	LYS
10	X	99	GLN
11	Y	4	LEU
11	Y	9	GLN
11	Y	69	ARG
11	Y	107	LYS
11	Y	116	ASP
11	Y	140	LEU
11	Y	148	LEU
12	Z	23	LEU
12	Z	31	THR
12	Z	49	ASN
12	Z	130	SER
12	Z	132	GLU
12	Z	150	LEU
12	Z	161	GLU
13	a	2	GLN
13	a	48	ASN
13	a	70	LEU
13	a	104	ARG
13	a	187	ARG
13	a	212	LEU
14	b	9	LYS
14	b	83	LYS
14	b	104	ASP
14	b	107	LYS

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Mol	Chain	Res	Type
14	b	119	VAL
14	b	178	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (156) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	20	GLN
2	B	93	HIS
2	B	95	GLN
2	B	119	GLN
2	B	123	GLN
2	B	124	HIS
2	B	146	GLN
2	B	155	ASN
2	B	176	GLN
2	B	232	GLN
3	C	17	GLN
3	C	77	ASN
3	C	115	GLN
3	C	116	GLN
3	C	120	GLN
3	C	147	GLN
3	C	160	GLN
3	C	233	GLN
4	D	15	GLN
4	D	100	ASN
4	D	146	GLN
4	D	225	ASN
5	E	68	HIS
5	E	92	ASN
5	E	99	ASN
5	E	116	GLN
5	E	118	ASN
5	E	120	GLN
5	E	184	ASN
6	F	19	GLN
6	F	86	ASN
6	F	117	GLN
6	F	240	GLN
7	G	6	HIS
7	G	27	ASN
7	G	30	ASN

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Mol	Chain	Res	Type
7	G	83	ASN
7	G	114	ASN
7	G	117	GLN
7	G	121	GLN
7	G	166	GLN
7	G	167	GLN
7	G	175	ASN
8	H	22	GLN
8	H	35	HIS
8	H	66	HIS
8	H	165	ASN
8	H	194	ASN
9	I	37	ASN
9	I	88	GLN
9	I	168	GLN
10	J	10	GLN
10	J	55	GLN
10	J	63	ASN
10	J	146	HIS
10	J	147	HIS
11	K	9	GLN
11	K	85	ASN
11	K	143	ASN
11	K	176	ASN
11	K	208	ASN
12	L	1	GLN
12	L	49	ASN
12	L	70	ASN
12	L	79	HIS
12	L	80	ASN
12	L	155	ASN
12	L	158	ASN
12	L	165	ASN
12	L	197	GLN
13	M	48	ASN
13	M	62	HIS
13	M	108	ASN
13	M	194	ASN
13	M	213	GLN
14	N	38	HIS
14	N	141	ASN
14	N	161	GLN

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Mol	Chain	Res	Type
2	P	20	GLN
2	P	93	HIS
2	P	95	GLN
2	P	119	GLN
2	P	123	GLN
2	P	124	HIS
2	P	176	GLN
2	P	232	GLN
3	Q	17	GLN
3	Q	115	GLN
3	Q	116	GLN
3	Q	120	GLN
3	Q	147	GLN
3	Q	160	GLN
4	R	15	GLN
4	R	91	HIS
4	R	100	ASN
4	R	146	GLN
4	R	225	ASN
5	S	59	GLN
5	S	68	HIS
5	S	92	ASN
5	S	99	ASN
5	S	118	ASN
5	S	120	GLN
5	S	184	ASN
6	T	19	GLN
6	T	86	ASN
6	T	117	GLN
6	T	240	GLN
7	U	27	ASN
7	U	30	ASN
7	U	83	ASN
7	U	114	ASN
7	U	117	GLN
7	U	121	GLN
7	U	166	GLN
7	U	167	GLN
7	U	172	ASN
7	U	175	ASN
8	V	22	GLN
8	V	35	HIS

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Mol	Chain	Res	Type
8	V	66	HIS
8	V	194	ASN
8	V	219	ASN
9	W	37	ASN
9	W	63	ASN
9	W	88	GLN
9	W	203	GLN
10	X	10	GLN
10	X	55	GLN
10	X	63	ASN
10	X	86	GLN
10	X	146	HIS
10	X	147	HIS
11	Y	9	GLN
11	Y	85	ASN
11	Y	143	ASN
11	Y	176	ASN
11	Y	208	ASN
12	Z	1	GLN
12	Z	49	ASN
12	Z	70	ASN
12	Z	80	ASN
12	Z	152	ASN
12	Z	153	GLN
12	Z	155	ASN
12	Z	158	ASN
12	Z	197	GLN
13	a	48	ASN
13	a	62	HIS
13	a	102	GLN
13	a	108	ASN
13	a	194	ASN
13	a	213	GLN
14	b	38	HIS
14	b	141	ASN
14	b	161	GLN

5.3.3 RNA ⓘ

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 10 ligands modelled in this entry, 10 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2		OWAB(Å ²)	Q<0.9
1	A	250/250 (100%)	0.24	10 (4%)	42 44	34, 46, 78, 117	0
1	O	250/250 (100%)	0.40	17 (6%)	23 25	39, 55, 98, 126	0
2	B	244/258 (94%)	0.42	18 (7%)	20 22	33, 51, 91, 136	0
2	P	244/258 (94%)	0.50	21 (8%)	16 17	40, 55, 98, 144	0
3	C	240/254 (94%)	0.36	20 (8%)	17 19	34, 56, 115, 141	0
3	Q	240/254 (94%)	0.72	35 (14%)	6 6	38, 66, 147, 175	0
4	D	235/260 (90%)	0.30	7 (2%)	52 54	38, 57, 89, 131	0
4	R	235/260 (90%)	0.36	13 (5%)	30 32	40, 60, 99, 132	0
5	E	231/234 (98%)	0.53	16 (6%)	23 25	42, 60, 97, 144	0
5	S	231/234 (98%)	0.78	27 (11%)	9 10	46, 70, 110, 154	0
6	F	243/288 (84%)	0.34	14 (5%)	29 31	36, 53, 102, 135	0
6	T	243/288 (84%)	0.64	27 (11%)	10 11	40, 63, 118, 151	0
7	G	241/252 (95%)	0.08	8 (3%)	49 51	27, 47, 80, 130	0
7	U	241/252 (95%)	0.29	15 (6%)	26 28	38, 52, 81, 124	0
8	H	226/232 (97%)	0.34	24 (10%)	11 12	30, 46, 77, 142	0
8	V	226/232 (97%)	0.65	24 (10%)	11 12	37, 50, 82, 152	0
9	I	204/205 (99%)	-0.09	3 (1%)	72 73	31, 42, 68, 90	0
9	W	204/205 (99%)	-0.09	6 (2%)	53 56	33, 44, 71, 97	0
10	J	195/198 (98%)	0.06	4 (2%)	63 65	31, 46, 70, 128	0
10	X	195/198 (98%)	0.10	9 (4%)	37 39	33, 47, 72, 133	0
11	K	212/212 (100%)	-0.09	3 (1%)	73 75	28, 44, 63, 85	0
11	Y	212/212 (100%)	-0.09	3 (1%)	73 75	34, 45, 67, 87	0
12	L	222/222 (100%)	0.15	7 (3%)	50 52	33, 46, 74, 108	0
12	Z	222/222 (100%)	0.04	5 (2%)	61 63	34, 46, 75, 110	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2		OWAB(Å ²)	Q<0.9
13	M	229/246 (93%)	0.10	5 (2%)	62 64	31, 47, 70, 85	0
13	a	232/246 (94%)	0.07	6 (2%)	57 59	30, 47, 66, 82	0
14	N	196/196 (100%)	-0.13	3 (1%)	72 73	31, 42, 70, 96	0
14	b	196/196 (100%)	0.04	6 (3%)	51 53	33, 44, 69, 103	0
All	All	6339/6614 (95%)	0.26	356 (5%)	30 32	27, 50, 94, 175	0

All (356) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
8	V	223	ILE	8.2
10	X	1	MET	7.7
2	B	218	GLY	7.0
10	J	1	MET	6.6
3	Q	50	LEU	6.6
8	H	223	ILE	6.3
2	P	218	GLY	5.7
2	B	219	ALA	5.5
2	P	219	ALA	5.4
2	B	51	VAL	5.1
3	Q	205	ALA	5.1
2	P	52	THR	4.9
3	Q	49	THR	4.8
6	T	243	ILE	4.8
13	a	1	THR	4.6
5	E	122	TYR	4.6
4	D	240	ALA	4.5
14	b	103	ASP	4.5
4	D	241	ALA	4.5
3	C	50	LEU	4.4
6	T	53	LYS	4.4
3	C	205	ALA	4.4
8	V	221	CYS	4.2
9	W	133	LYS	4.2
2	P	51	VAL	4.1
8	V	32	ALA	4.1
6	T	178	HIS	4.1
1	O	2	THR	4.1
8	V	208	GLY	4.1
13	M	229	GLY	4.1
6	T	55	LEU	4.0
6	F	55	LEU	4.0

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Mol	Chain	Res	Type	RSRZ
1	O	53	SER	4.0
9	I	1	SER	4.0
8	H	207	ARG	4.0
12	L	162	PRO	3.9
3	Q	236	GLN	3.9
8	V	215	GLU	3.9
1	O	249	ALA	3.9
13	M	1	THR	3.9
12	L	174	TYR	3.9
5	E	123	GLY	3.9
3	C	204	GLY	3.8
2	P	1	GLY	3.8
5	S	233	ILE	3.7
2	P	55	LEU	3.7
3	Q	240	GLU	3.7
6	F	56	VAL	3.7
8	V	209	THR	3.7
5	S	52	ALA	3.7
5	S	122	TYR	3.6
3	Q	204	GLY	3.6
8	H	208	GLY	3.6
1	A	249	ALA	3.6
2	P	225	TYR	3.5
3	Q	52	LEU	3.5
2	P	53	SER	3.5
1	O	1	MET	3.5
2	B	52	THR	3.5
6	T	203	ASN	3.5
6	T	215	CYS	3.5
2	B	1	GLY	3.5
8	V	220	ILE	3.5
4	D	242	GLU	3.5
6	T	198	LEU	3.5
8	V	212	VAL	3.4
6	F	215	CYS	3.4
3	Q	48	SER	3.4
6	T	244	ASN	3.4
12	Z	174	TYR	3.4
6	T	206	LYS	3.4
12	L	163	GLY	3.3
3	Q	234	ILE	3.3
3	Q	51	LYS	3.3

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Mol	Chain	Res	Type	RSRZ
1	A	1	MET	3.3
7	U	242	GLN	3.3
6	T	15	GLY	3.3
2	P	56	LEU	3.3
8	V	214	LYS	3.3
5	E	207	VAL	3.3
6	T	14	ASP	3.2
3	C	203	THR	3.2
8	V	27	ALA	3.2
8	V	207	ARG	3.2
2	P	220	ASN	3.2
14	b	116	GLY	3.2
5	S	210	LEU	3.2
6	T	2	THR	3.2
6	F	238	PHE	3.2
3	C	201	VAL	3.2
12	L	166	GLY	3.1
8	H	209	THR	3.1
7	U	203	ASP	3.1
14	N	103	ASP	3.1
6	F	59	LYS	3.1
6	F	202	ASP	3.1
8	V	196	ARG	3.1
12	L	160	TYR	3.0
3	C	236	GLN	3.0
4	R	238	LYS	3.0
12	Z	162	PRO	3.0
6	T	204	LYS	3.0
5	S	55	LEU	3.0
3	Q	210	ILE	3.0
5	E	173	ARG	3.0
8	V	226	GLU	3.0
12	L	172	LEU	3.0
8	V	123	TYR	3.0
3	Q	3	ASP	3.0
8	V	219	ASN	3.0
8	H	215	GLU	2.9
8	V	205	PHE	2.9
3	C	51	LYS	2.9
3	Q	200	VAL	2.9
2	B	220	ASN	2.9
2	B	93	HIS	2.9

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Mol	Chain	Res	Type	RSRZ
3	C	49	THR	2.9
7	U	68	ARG	2.9
8	H	32	ALA	2.9
2	P	54	THR	2.9
8	V	222	ASP	2.9
11	Y	118	ASP	2.9
1	A	231	LYS	2.8
14	N	116	GLY	2.8
6	T	54	LEU	2.8
5	S	10	VAL	2.8
3	Q	57	ILE	2.8
8	V	217	ILE	2.8
2	B	221	ASP	2.8
7	G	40	ASP	2.8
8	H	216	SER	2.8
2	B	217	LYS	2.8
3	Q	47	ARG	2.8
3	C	53	GLN	2.8
6	T	201	GLU	2.8
8	H	214	LYS	2.8
3	Q	201	VAL	2.8
7	G	3	TYR	2.8
6	F	243	ILE	2.7
7	U	179	LYS	2.7
5	S	209	ASN	2.7
7	G	171	THR	2.7
7	U	3	TYR	2.7
6	T	238	PHE	2.7
8	H	224	GLN	2.7
8	V	224	GLN	2.7
10	X	98	TYR	2.7
1	A	2	THR	2.7
9	W	131	GLU	2.7
5	S	181	ILE	2.7
5	E	185	PRO	2.7
8	V	216	SER	2.7
5	S	3	ASN	2.6
6	T	205	GLU	2.6
12	Z	161	GLU	2.6
8	H	220	ILE	2.6
8	H	196	ARG	2.6
2	B	222	GLY	2.6

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Mol	Chain	Res	Type	RSRZ
2	B	243	ILE	2.6
9	W	1	SER	2.6
2	B	55	LEU	2.6
5	S	227	GLU	2.6
7	U	40	ASP	2.6
8	H	219	ASN	2.6
11	K	118	ASP	2.6
10	J	195	PHE	2.6
5	S	207	VAL	2.6
5	E	233	ILE	2.6
3	C	206	LYS	2.6
4	R	116	GLY	2.6
1	O	209	ILE	2.6
1	O	55	LEU	2.5
3	C	3	ASP	2.5
5	E	209	ASN	2.5
6	T	182	GLY	2.5
6	T	208	PHE	2.5
2	B	239	VAL	2.5
5	E	3	ASN	2.5
2	P	93	HIS	2.5
8	H	217	ILE	2.5
5	S	183	GLY	2.5
12	Z	172	LEU	2.5
2	P	59	ASP	2.5
8	H	221	CYS	2.4
8	H	226	GLU	2.4
1	O	240	SER	2.4
4	R	99	ILE	2.4
5	S	171	LEU	2.4
5	S	205	LEU	2.4
1	O	50	LYS	2.4
3	Q	206	LYS	2.4
5	E	8	ASP	2.4
3	C	48	SER	2.4
7	U	180	SER	2.4
6	T	236	ILE	2.4
3	Q	238	LYS	2.4
7	U	24	LYS	2.4
14	b	107	LYS	2.4
3	C	52	LEU	2.4
6	F	4	TYR	2.4

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Mol	Chain	Res	Type	RSRZ
3	C	207	ASN	2.4
4	R	2	ARG	2.4
8	H	9	ASN	2.4
13	M	37	ASN	2.4
14	b	195	GLN	2.4
4	D	236	LYS	2.4
5	S	180	LYS	2.4
1	O	5	TYR	2.4
3	C	46	ARG	2.4
5	E	181	ILE	2.4
8	H	212	VAL	2.4
1	O	61	LEU	2.4
14	b	34	LEU	2.4
7	G	68	ARG	2.4
14	b	185	ARG	2.4
3	Q	237	GLU	2.4
2	B	19	TYR	2.3
12	L	33	TYR	2.3
6	T	59	LYS	2.3
5	S	56	SER	2.3
1	O	178	ARG	2.3
3	C	239	GLN	2.3
6	F	54	LEU	2.3
10	X	194	ASP	2.3
3	Q	191	LYS	2.3
5	E	228	ALA	2.3
5	S	179	ILE	2.3
5	S	30	GLN	2.3
2	P	180	LYS	2.3
5	S	173	ARG	2.3
10	X	99	GLN	2.3
8	V	195	VAL	2.3
13	M	159	VAL	2.3
3	Q	222	LEU	2.3
4	R	111	LEU	2.3
6	F	210	LEU	2.3
7	U	222	ASP	2.3
3	Q	59	PRO	2.3
2	P	57	GLU	2.3
6	F	178	HIS	2.3
7	G	242	GLN	2.3
3	Q	208	ILE	2.3

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Mol	Chain	Res	Type	RSRZ
4	R	236	LYS	2.3
2	B	201	ASP	2.2
5	S	202	ASP	2.2
7	U	183	ASP	2.2
9	W	192	ASP	2.2
1	O	4	ARG	2.2
2	P	222	GLY	2.2
10	X	174	MET	2.2
1	A	5	TYR	2.2
5	S	228	ALA	2.2
2	B	54	THR	2.2
2	B	60	THR	2.2
13	a	231	GLN	2.2
9	I	133	LYS	2.2
8	H	222	ASP	2.2
10	J	194	ASP	2.2
1	A	4	ARG	2.2
3	Q	189	CYS	2.2
11	K	128	CYS	2.2
4	D	3	GLY	2.2
4	D	167	GLY	2.2
2	P	60	THR	2.2
7	U	171	THR	2.2
4	R	125	LEU	2.2
13	a	159	VAL	2.2
3	C	27	ARG	2.2
3	Q	46	ARG	2.2
4	R	1	ASP	2.2
1	O	54	PRO	2.2
5	E	183	GLY	2.2
5	S	123	GLY	2.2
5	E	54	GLU	2.2
9	I	131	GLU	2.2
8	H	204	LYS	2.2
2	P	62	THR	2.2
11	Y	18	SER	2.2
4	R	179	TRP	2.2
4	R	214	ILE	2.2
5	E	200	LEU	2.2
10	X	28	LEU	2.2
3	C	240	GLU	2.2
7	G	179	LYS	2.2

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Mol	Chain	Res	Type	RSRZ
3	Q	232	THR	2.2
8	H	27	ALA	2.2
8	V	211	ALA	2.2
10	X	149	ARG	2.1
13	a	43	ILE	2.1
6	T	227	VAL	2.1
3	C	238	LYS	2.1
6	F	204	LYS	2.1
3	Q	1	GLY	2.1
2	P	204	ALA	2.1
3	Q	60	SER	2.1
6	T	239	ALA	2.1
9	W	132	ALA	2.1
14	N	115	LEU	2.1
5	S	203	GLU	2.1
7	U	168	GLU	2.1
3	Q	224	SER	2.1
12	Z	169	LYS	2.1
4	R	237	GLU	2.1
4	R	239	GLU	2.1
5	E	227	GLU	2.1
8	H	198	GLU	2.1
1	O	243	ILE	2.1
4	D	99	ILE	2.1
8	H	213	LEU	2.1
6	F	203	ASN	2.1
6	T	202	ASP	2.1
10	X	11	ASP	2.1
2	P	176	GLN	2.1
7	G	166	GLN	2.1
3	Q	231	VAL	2.1
7	U	2	GLY	2.1
1	O	62	SER	2.1
9	W	151	SER	2.1
3	Q	180	LYS	2.1
6	T	183	LEU	2.1
5	S	196	ILE	2.1
6	F	244	ASN	2.1
6	T	58	GLN	2.1
10	J	2	ASP	2.1
10	X	2	ASP	2.1
13	a	224	ASP	2.1

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Mol	Chain	Res	Type	RSRZ
3	C	186	VAL	2.1
7	U	14	GLY	2.1
13	M	38	GLY	2.1
1	A	178	ARG	2.1
1	A	179	TRP	2.1
1	O	231	LYS	2.0
4	R	203	LYS	2.0
5	S	57	SER	2.0
6	T	52	SER	2.0
3	Q	202	GLN	2.0
13	a	171	GLN	2.0
3	Q	38	ASN	2.0
5	E	188	LEU	2.0
5	S	200	LEU	2.0
7	U	55	LEU	2.0
11	K	208	ASN	2.0
11	Y	208	ASN	2.0
1	O	228	PRO	2.0
8	H	218	VAL	2.0
2	B	242	GLY	2.0
5	S	178	PHE	2.0
8	V	204	LYS	2.0
1	A	59	GLU	2.0
2	P	244	THR	2.0
3	Q	55	THR	2.0
8	H	210	THR	2.0
3	Q	233	GLN	2.0
1	A	245	ASP	2.0
8	V	28	ASP	2.0
7	G	239	ILE	2.0

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
15	MG	I	301	1/1	0.85	0.08	51,51,51,51	0
15	MG	W	301	1/1	0.91	0.07	47,47,47,47	0
15	MG	Z	301	1/1	0.91	0.06	56,56,56,56	0
15	MG	I	302	1/1	0.94	0.11	41,41,41,41	0
15	MG	N	201	1/1	0.94	0.05	40,40,40,40	0
15	MG	K	301	1/1	0.96	0.09	42,42,42,42	0
15	MG	G	301	1/1	0.97	0.05	42,42,42,42	0
16	CL	U	301	1/1	0.98	0.17	30,30,30,30	0
16	CL	G	302	1/1	0.99	0.12	30,30,30,30	0
15	MG	L	301	1/1	0.99	0.08	44,44,44,44	0

6.5 Other polymers [i](#)

There are no such residues in this entry.