



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 12:41 PM UTC

PDB ID : 4MD8 / pdb_00004md8
Title : Crystal Structure of full-length symmetric CK2 holoenzyme with mutated alpha subunit (F121E)
Authors : Lolli, G.; Ranchio, A.; Battistutta, R.
Deposited on : 2013-08-22
Resolution : 3.30 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:

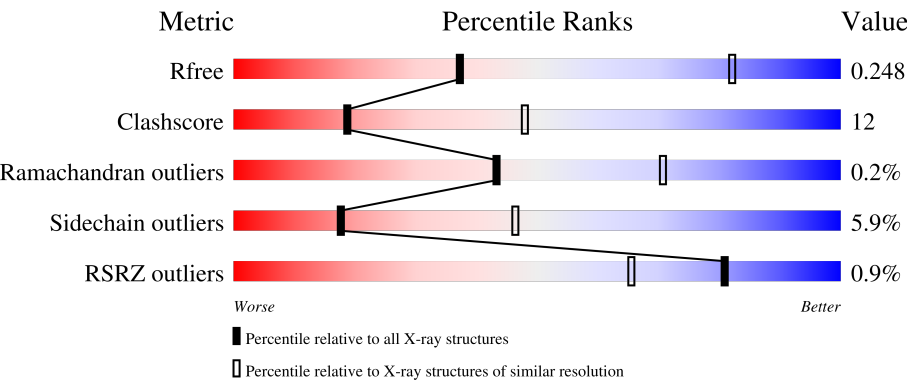
MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)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

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 3.30 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	1169 (3.32-3.28)
Clashscore	190562	1209 (3.32-3.28)
Ramachandran outliers	187476	1188 (3.32-3.28)
Sidechain outliers	187428	1187 (3.32-3.28)
RSRZ outliers	180081	1169 (3.32-3.28)

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	215	76%14%• 7%
1	B	215	% 75%14%• 9%
1	C	215	76%13%• 8%
1	D	215	% 76%12%• 9%
2	E	391	66%15%• • 15%

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Mol	Chain	Length	Quality of chain
2	F	391	% 66% 15% 15%
2	G	391	% 65% 15% 15%
2	H	391	% 64% 17% 15%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 17617 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 Casein kinase II subunit beta.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	199	Total	C	N	O	S	0	0	0
			1622	1040	273	294	15			
1	B	195	Total	C	N	O	S	0	0	0
			1592	1024	268	285	15			
1	C	197	Total	C	N	O	S	0	0	0
			1605	1031	271	288	15			
1	D	195	Total	C	N	O	S	0	0	0
			1592	1024	268	285	15			

- Molecule 2 is a protein called Casein kinase II subunit alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	E	332	Total	C	N	O	S	0	0	0
			2802	1791	495	505	11			
2	F	332	Total	C	N	O	S	0	0	0
			2802	1791	495	505	11			
2	G	332	Total	C	N	O	S	0	0	0
			2802	1791	495	505	11			
2	H	331	Total	C	N	O	S	0	0	0
			2796	1788	494	503	11			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	121	GLU	PHE	engineered mutation	UNP P68400
F	121	GLU	PHE	engineered mutation	UNP P68400
G	121	GLU	PHE	engineered mutation	UNP P68400
H	121	GLU	PHE	engineered mutation	UNP P68400

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn).

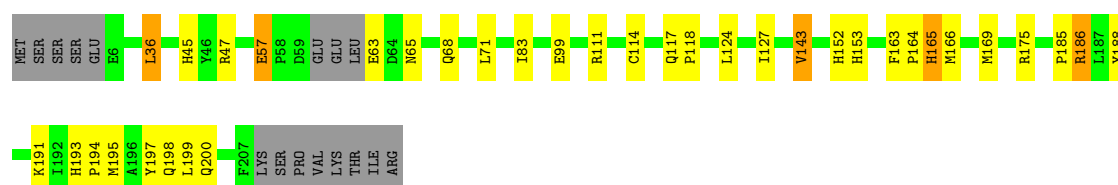
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total 1	Zn 1	0	0
3	B	1	Total 1	Zn 1	0	0
3	C	1	Total 1	Zn 1	0	0
3	D	1	Total 1	Zn 1	0	0

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.

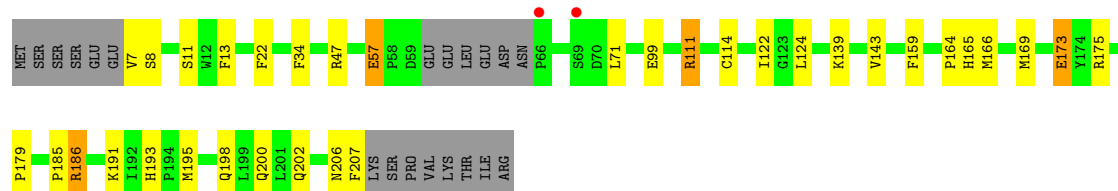
- Molecule 1: Casein kinase II subunit beta

Chain A: 



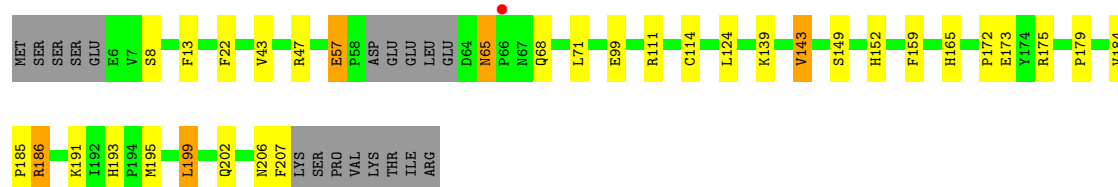
- Molecule 1: Casein kinase II subunit beta

Chain B: 



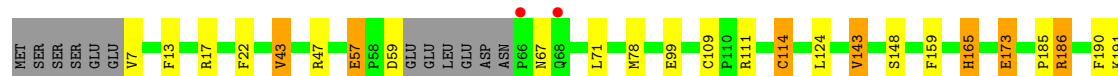
- Molecule 1: Casein kinase II subunit beta

Chain C: 



- Molecule 1: Casein kinase II subunit beta

Chain D: 





4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	141.52Å 57.62Å 185.69Å 90.00° 102.60° 90.00°	Depositor
Resolution (Å)	181.21 – 3.30 181.21 – 3.30	Depositor EDS
% Data completeness (in resolution range)	98.2 (181.21-3.30) 98.4 (181.21-3.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.18	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.04 (at 3.33Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.222 , 0.249 0.221 , 0.248	Depositor DCC
R_{free} test set	2230 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	57.0	Xtriage
Anisotropy	0.411	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 41.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.42$, $\langle L^2 \rangle = 0.25$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.88	EDS
Total number of atoms	17617	wwPDB-VP
Average B, all atoms (Å ²)	64.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.52% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN

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	1.06	5/1671 (0.3%)	1.08	3/2265 (0.1%)
1	B	0.93	0/1641	1.03	2/2223 (0.1%)
1	C	0.92	1/1654 (0.1%)	1.00	6/2242 (0.3%)
1	D	0.85	1/1641 (0.1%)	0.96	4/2223 (0.2%)
2	E	1.03	2/2876 (0.1%)	1.10	12/3889 (0.3%)
2	F	0.98	7/2876 (0.2%)	1.15	22/3889 (0.6%)
2	G	0.95	3/2876 (0.1%)	1.11	16/3889 (0.4%)
2	H	0.94	0/2870	1.11	21/3881 (0.5%)
All	All	0.97	19/18105 (0.1%)	1.08	86/24501 (0.4%)

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
2	F	0	1
2	G	0	1
2	H	0	1
All	All	0	3

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	228	ARG	CA-C	-9.94	1.44	1.53
2	F	127	THR	N-CA	-8.85	1.37	1.46
2	F	121	GLU	CA-C	-8.21	1.45	1.52
1	A	153	HIS	ND1-CE1	6.46	1.39	1.32
2	F	59	ILE	CA-CB	-6.23	1.46	1.54
1	A	153	HIS	CG-CD2	6.06	1.42	1.35
2	F	63	GLU	CA-C	-6.04	1.45	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	45	HIS	CG-CD2	5.91	1.42	1.35
2	F	63	GLU	N-CA	-5.50	1.38	1.45
2	F	172	ARG	CA-C	-5.47	1.46	1.52
2	G	22	GLU	CA-CB	-5.45	1.45	1.53
2	F	122	LYS	N-CA	-5.41	1.40	1.46
1	A	152	HIS	CG-ND1	-5.39	1.32	1.38
1	D	165	HIS	CG-CD2	5.36	1.41	1.35
2	G	286	HIS	CG-CD2	5.32	1.41	1.35
2	E	228	ARG	N-CA	-5.25	1.39	1.46
1	A	165	HIS	CG-CD2	5.13	1.41	1.35
2	G	154	HIS	CG-CD2	5.09	1.41	1.35
1	C	199	LEU	CA-C	-5.07	1.46	1.52

All (86) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	62	ASN	N-CA-C	14.26	127.59	110.91
2	G	268	ARG	N-CA-C	-13.48	96.69	112.87
2	G	253	ASP	N-CA-C	-12.57	97.93	113.01
2	F	61	ASN	CB-CA-C	-11.89	89.31	109.99
2	F	121	GLU	N-CA-C	-11.09	96.93	112.13
2	F	175	ASP	N-CA-C	10.27	123.86	111.02
2	H	19	ARG	CB-CA-C	9.95	125.18	109.55
2	G	123	GLN	N-CA-C	-9.25	101.07	111.71
2	H	19	ARG	N-CA-C	-9.21	93.31	108.23
2	H	175	ASP	N-CA-C	8.74	121.95	111.02
2	G	175	ASP	N-CA-C	8.74	121.94	111.02
2	E	252	GLU	CB-CA-C	-8.64	97.19	110.92
2	H	266	ASP	CA-C-N	8.43	130.38	119.84
2	H	266	ASP	C-N-CA	8.43	130.38	119.84
2	E	124	LEU	N-CA-C	8.01	123.82	111.56
2	E	253	ASP	N-CA-C	-7.83	102.82	112.38
2	F	127	THR	CA-C-N	-7.77	109.67	120.71
2	F	127	THR	C-N-CA	-7.77	109.67	120.71
2	E	228	ARG	N-CA-C	-7.70	101.90	110.91
2	H	252	GLU	CB-CA-C	-7.64	95.21	110.42
2	G	251	THR	CA-C-N	-7.53	110.20	120.44
2	G	251	THR	C-N-CA	-7.53	110.20	120.44
2	E	127	THR	N-CA-C	7.49	121.26	112.72
2	H	123	GLN	N-CA-C	-7.46	99.06	111.37
2	G	125	TYR	N-CA-C	-7.37	103.75	112.89
2	F	127	THR	N-CA-CB	-7.32	97.04	111.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	47	ARG	NE-CZ-NH2	7.22	125.70	119.20
2	F	120	ASP	CB-CA-C	7.08	119.90	110.06
2	G	121	GLU	CB-CA-C	-7.02	96.44	110.42
2	G	252	GLU	N-CA-C	6.99	118.69	111.14
2	G	270	ASN	N-CA-C	6.92	125.54	110.80
2	G	124	LEU	N-CA-C	6.91	121.75	111.04
2	H	127	THR	CA-C-N	-6.83	110.05	121.39
2	H	127	THR	C-N-CA	-6.83	110.05	121.39
2	E	252	GLU	N-CA-C	6.70	119.19	111.02
2	G	21	ARG	CB-CA-C	-6.70	99.29	110.68
2	G	122	LYS	N-CA-C	-6.69	102.52	111.96
2	E	193	ALA	N-CA-C	6.64	117.83	108.00
1	C	47	ARG	NE-CZ-NH2	6.47	125.02	119.20
2	F	193	ALA	N-CA-C	6.42	117.50	108.00
1	B	173	GLU	CA-CB-CG	6.29	126.68	114.10
2	F	120	ASP	N-CA-C	-6.27	100.89	110.30
2	F	58	ASN	CA-C-N	-6.23	110.42	120.64
2	F	58	ASN	C-N-CA	-6.23	110.42	120.64
2	H	126	GLN	CA-C-N	-6.22	112.74	123.25
2	H	126	GLN	C-N-CA	-6.22	112.74	123.25
2	E	332	ALA	N-CA-C	6.13	121.51	113.30
2	H	163	MET	CG-SD-CE	6.11	114.34	100.90
2	H	268	ARG	CB-CA-C	-6.03	100.26	110.64
2	H	229	LYS	N-CA-C	-6.02	98.03	108.69
2	H	163	MET	CB-CG-SD	6.01	130.75	112.70
1	A	199	LEU	CA-CB-CG	-5.98	95.37	116.30
1	C	47	ARG	NE-CZ-NH1	-5.91	115.59	121.50
1	D	173	GLU	CA-CB-CG	5.83	125.75	114.10
2	G	43	ARG	CB-CG-CD	-5.78	98.00	111.30
2	F	3	GLY	CA-C-N	5.77	125.68	119.85
2	F	3	GLY	C-N-CA	5.77	125.68	119.85
2	F	172	ARG	CG-CD-NE	5.74	124.63	112.00
2	F	172	ARG	CB-CG-CD	-5.72	98.15	111.30
1	C	65	ASN	CA-C-N	5.71	125.83	119.32
1	C	65	ASN	C-N-CA	5.71	125.83	119.32
2	F	62	ASN	N-CA-CB	-5.65	102.16	111.53
2	G	118	ASN	N-CA-C	5.61	119.85	112.89
2	F	275	ARG	CG-CD-NE	5.57	124.25	112.00
2	E	21	ARG	CB-CA-C	-5.53	101.97	110.81
1	C	43	VAL	N-CA-C	5.51	114.17	107.61
1	D	47	ARG	CD-NE-CZ	5.47	132.07	124.40
1	C	184	VAL	N-CA-C	5.43	113.41	107.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	127	THR	N-CA-C	-5.41	103.56	111.30
1	A	47	ARG	NE-CZ-NH1	-5.38	116.12	121.50
2	E	126	GLN	N-CA-C	-5.37	104.67	111.11
2	G	193	ALA	N-CA-C	5.34	117.11	108.08
2	F	58	ASN	O-C-N	-5.30	116.28	122.96
2	H	266	ASP	N-CA-C	-5.29	98.13	109.81
2	E	61	ASN	CA-C-O	5.28	124.63	119.08
1	B	47	ARG	CD-NE-CZ	5.28	131.78	124.40
2	F	63	GLU	N-CA-C	-5.21	101.38	109.24
2	H	49	LYS	N-CA-C	-5.20	106.20	112.54
1	D	43	VAL	N-CA-C	5.17	113.76	107.61
2	F	199	GLY	CA-C-N	5.14	125.18	119.32
2	F	199	GLY	C-N-CA	5.14	125.18	119.32
2	E	21	ARG	NE-CZ-NH1	-5.13	116.37	121.50
1	D	47	ARG	NE-CZ-NH2	-5.12	114.59	119.20
2	H	321	HIS	CA-C-N	5.07	125.35	119.47
2	H	321	HIS	C-N-CA	5.07	125.35	119.47
2	H	193	ALA	N-CA-C	5.01	116.55	108.08

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	F	120	ASP	Peptide
2	G	118	ASN	Peptide
2	H	119	THR	Peptide

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1622	0	1534	28	0
1	B	1592	0	1517	29	0
1	C	1605	0	1524	26	0
1	D	1592	0	1517	29	2
2	E	2802	0	2745	79	0
2	F	2802	0	2745	93	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	G	2802	0	2745	70	2
2	H	2796	0	2740	83	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
All	All	17617	0	17067	412	2

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.

All (412) 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)
2:F:118:ASN:HD22	2:F:163:MET:CE	1.53	1.22
2:H:121:GLU:OE1	2:H:121:GLU:HA	1.36	1.16
2:F:118:ASN:HD22	2:F:163:MET:HE3	1.00	1.15
2:E:275:ARG:HH11	2:E:275:ARG:HG3	1.13	1.11
2:F:124:LEU:HD11	2:F:128:LEU:HD21	1.30	1.09
2:F:123:GLN:HE21	2:F:123:GLN:HA	1.09	1.09
2:H:122:LYS:HG3	2:H:123:GLN:N	1.62	1.08
2:E:247:LYS:O	2:E:279:LYS:HE2	1.53	1.08
2:E:228:ARG:HH11	2:E:228:ARG:CG	1.67	1.06
2:E:228:ARG:HH11	2:E:228:ARG:HG2	1.21	1.05
2:F:126:GLN:CA	2:F:126:GLN:HE21	1.66	1.05
2:F:126:GLN:HA	2:F:126:GLN:NE2	1.60	1.05
2:F:330:ASP:O	2:F:333:ARG:HD2	1.57	1.05
2:F:118:ASN:ND2	2:F:163:MET:CE	2.23	1.01
2:F:333:ARG:HG2	2:F:333:ARG:HH11	1.18	1.00
2:E:275:ARG:HH11	2:E:275:ARG:CG	1.72	1.00
2:H:122:LYS:O	2:H:123:GLN:C	2.04	1.00
2:F:123:GLN:HE21	2:F:123:GLN:CA	1.76	0.97
2:G:269:PHE:O	2:G:270:ASN:HB2	1.62	0.96
2:F:171:LEU:O	2:F:172:ARG:HG2	1.68	0.94
2:F:333:ARG:HG2	2:F:333:ARG:NH1	1.75	0.94
1:C:186:ARG:HG2	1:C:186:ARG:HH11	1.32	0.94
2:G:122:LYS:O	2:G:126:GLN:HB2	1.67	0.93
2:F:40:GLN:NE2	2:F:59:ILE:CD1	2.32	0.92
2:F:124:LEU:HD11	2:F:128:LEU:CD2	1.99	0.92
2:F:126:GLN:CA	2:F:126:GLN:NE2	2.30	0.92
2:E:275:ARG:HG3	2:E:275:ARG:NH1	1.78	0.91

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:118:ASN:ND2	2:F:163:MET:HE3	1.84	0.91
1:D:186:ARG:HG2	1:D:186:ARG:HH11	1.36	0.90
2:H:123:GLN:O	2:H:123:GLN:NE2	2.05	0.89
2:F:322:PRO:HA	2:F:325:TYR:CD2	2.07	0.89
1:B:186:ARG:HG2	1:B:186:ARG:HH11	1.38	0.89
2:F:40:GLN:NE2	2:F:59:ILE:HD12	1.89	0.88
2:F:123:GLN:HA	2:F:123:GLN:NE2	1.89	0.87
2:F:73:VAL:HG12	2:F:74:LYS:HD3	1.55	0.87
2:E:124:LEU:O	2:E:128:LEU:HG	1.74	0.87
2:H:124:LEU:HD21	2:H:128:LEU:HD21	1.56	0.87
1:A:186:ARG:HG2	1:A:186:ARG:HH11	1.40	0.87
2:H:124:LEU:CD1	2:H:166:HIS:HB2	2.04	0.87
2:F:123:GLN:CA	2:F:123:GLN:NE2	2.37	0.86
2:G:316:ARG:HG2	2:G:316:ARG:HH21	1.41	0.86
2:F:118:ASN:ND2	2:F:163:MET:HE2	1.91	0.85
2:E:122:LYS:HD2	2:E:122:LYS:N	1.93	0.82
2:F:120:ASP:O	2:F:124:LEU:CB	2.28	0.82
1:D:193:HIS:HD2	1:D:195:MET:HB3	1.43	0.81
2:H:123:GLN:C	2:H:123:GLN:HE21	1.88	0.81
2:F:74:LYS:CD	2:F:74:LYS:H	1.94	0.79
2:H:121:GLU:OE1	2:H:125:TYR:CD1	2.36	0.79
1:A:165:HIS:CE1	1:B:185:PRO:HB3	2.18	0.79
2:F:121:GLU:HG2	2:F:122:LYS:N	1.97	0.79
2:H:123:GLN:HE21	2:H:123:GLN:CA	1.95	0.79
2:F:171:LEU:C	2:F:172:ARG:HG2	2.08	0.78
2:H:124:LEU:HD23	2:H:124:LEU:O	1.83	0.78
2:F:40:GLN:HE21	2:F:59:ILE:CD1	1.96	0.77
1:C:206:ASN:O	1:C:207:PHE:C	2.28	0.76
2:H:122:LYS:HG3	2:H:123:GLN:H	1.51	0.76
2:H:123:GLN:C	2:H:123:GLN:NE2	2.44	0.75
2:E:228:ARG:HG2	2:E:228:ARG:NH1	1.94	0.75
2:F:333:ARG:HH11	2:F:333:ARG:CG	1.94	0.75
2:F:322:PRO:HA	2:F:325:TYR:CE2	2.20	0.75
1:C:165:HIS:CE1	1:D:185:PRO:HB3	2.22	0.74
2:H:124:LEU:HD11	2:H:166:HIS:CG	2.21	0.74
2:H:121:GLU:OE1	2:H:125:TYR:HD1	1.69	0.74
2:H:118:ASN:C	2:H:120:ASP:HB2	2.12	0.74
2:G:270:ASN:C	2:G:272:ILE:H	1.96	0.74
2:F:126:GLN:HE21	2:F:126:GLN:N	1.84	0.74
2:H:122:LYS:CG	2:H:123:GLN:N	2.46	0.74
2:F:73:VAL:CG1	2:F:74:LYS:HD3	2.18	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:186:ARG:HH12	1:C:191:LYS:HG3	1.53	0.73
2:G:267:PRO:C	2:G:269:PHE:N	2.36	0.73
1:A:186:ARG:HH12	1:A:191:LYS:HG3	1.53	0.73
2:G:275:ARG:HB3	2:G:275:ARG:CZ	2.13	0.72
2:H:124:LEU:HD23	2:H:124:LEU:C	2.13	0.72
2:F:120:ASP:O	2:F:124:LEU:HB3	1.90	0.72
2:H:118:ASN:ND2	2:H:120:ASP:HB3	2.05	0.71
2:E:228:ARG:HH11	2:E:228:ARG:HG3	1.53	0.71
2:F:73:VAL:HG12	2:F:74:LYS:H	1.57	0.70
2:G:267:PRO:C	2:G:269:PHE:H	1.98	0.70
1:D:186:ARG:HH12	1:D:191:LYS:HG3	1.55	0.70
2:G:265:LEU:O	2:G:266:ASP:C	2.31	0.70
2:G:270:ASN:HA	2:G:272:ILE:H	1.56	0.70
2:G:316:ARG:HG2	2:G:316:ARG:NH2	2.05	0.70
1:C:186:ARG:HH11	1:C:186:ARG:CG	2.05	0.69
2:F:195:ARG:O	2:F:195:ARG:HG2	1.91	0.69
2:F:73:VAL:HG12	2:F:74:LYS:CD	2.21	0.69
2:H:121:GLU:OE1	2:H:121:GLU:CA	2.29	0.69
2:E:124:LEU:O	2:E:124:LEU:HD12	1.93	0.69
2:H:124:LEU:CD1	2:H:166:HIS:CB	2.71	0.68
1:A:186:ARG:NH1	1:A:191:LYS:HG3	2.07	0.68
2:G:266:ASP:OD1	2:G:267:PRO:N	2.28	0.67
2:H:119:THR:N	2:H:120:ASP:HB2	2.09	0.67
1:A:200:GLN:OE1	1:B:175:ARG:NE	2.26	0.67
1:D:186:ARG:NH1	1:D:191:LYS:HG3	2.10	0.67
2:H:119:THR:O	2:H:119:THR:OG1	2.08	0.66
2:E:333:ARG:HG2	2:E:333:ARG:HH11	1.59	0.66
2:E:122:LYS:HD2	2:E:122:LYS:H	1.61	0.66
1:A:175:ARG:NE	1:B:200:GLN:OE1	2.26	0.66
2:E:333:ARG:O	2:E:333:ARG:HD3	1.97	0.65
2:G:122:LYS:O	2:G:126:GLN:CB	2.44	0.65
1:A:193:HIS:HB3	2:F:41:LEU:O	1.98	0.64
2:F:124:LEU:O	2:F:124:LEU:HD12	1.97	0.64
2:G:270:ASN:C	2:G:272:ILE:N	2.49	0.64
2:G:266:ASP:C	2:G:266:ASP:OD1	2.39	0.64
2:G:272:ILE:HG13	2:G:273:LEU:N	2.11	0.64
1:C:186:ARG:NH1	1:C:191:LYS:HG3	2.12	0.63
2:H:80:ARG:HD3	2:H:179:ALA:O	1.98	0.63
2:E:90:GLY:O	2:H:18:HIS:CG	2.52	0.63
2:F:120:ASP:O	2:F:124:LEU:N	2.31	0.63
1:B:186:ARG:NH1	1:B:191:LYS:HG3	2.14	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:191:LYS:HB2	2:H:40:GLN:HG2	1.81	0.63
2:E:118:ASN:CB	2:E:163:MET:HE2	2.29	0.62
2:E:120:ASP:OD2	2:E:120:ASP:N	2.32	0.62
2:G:265:LEU:C	2:G:266:ASP:O	2.40	0.62
2:F:126:GLN:HE21	2:F:126:GLN:HA	1.26	0.61
2:F:142:LYS:NZ	2:F:331:GLN:HE22	1.98	0.61
1:A:193:HIS:HD2	1:A:195:MET:HB3	1.66	0.61
2:G:227:PHE:O	2:G:228:ARG:HB2	1.98	0.61
2:E:269:PHE:HA	2:E:272:ILE:HG12	1.82	0.61
2:H:36:GLN:HE22	2:H:103:ASP:HA	1.65	0.61
2:E:118:ASN:CG	2:E:163:MET:HE2	2.26	0.60
1:B:186:ARG:HH11	1:B:186:ARG:CG	2.13	0.60
2:H:122:LYS:C	2:H:124:LEU:N	2.56	0.60
1:A:186:ARG:HH11	1:A:186:ARG:CG	2.11	0.60
2:H:82:ILE:O	2:H:86:GLU:HG3	2.00	0.60
2:F:142:LYS:NZ	2:F:331:GLN:NE2	2.49	0.60
2:H:120:ASP:OD1	2:H:164:ILE:HB	2.01	0.60
1:C:185:PRO:HB3	1:D:165:HIS:CE1	2.37	0.60
1:B:13:PHE:CE2	1:B:22:PHE:CE1	2.90	0.59
2:F:281:TRP:HB3	2:F:298:LEU:HD22	1.83	0.59
1:D:196:ALA:O	1:D:200:GLN:HG3	2.02	0.59
2:E:227:PHE:O	2:E:228:ARG:CB	2.48	0.59
2:E:280:ARG:O	2:E:283:ARG:HB2	2.02	0.59
1:B:186:ARG:HH12	1:B:191:LYS:HG3	1.68	0.59
2:H:36:GLN:O	2:H:38:ASP:N	2.36	0.59
1:D:186:ARG:HH11	1:D:186:ARG:CG	2.12	0.59
2:F:74:LYS:H	2:F:74:LYS:HD2	1.65	0.59
2:G:120:ASP:O	2:G:124:LEU:HB2	2.03	0.59
2:G:21:ARG:O	2:G:23:TYR:N	2.36	0.58
2:E:123:GLN:O	2:E:127:THR:HG23	2.03	0.58
2:F:40:GLN:HE21	2:F:59:ILE:HD11	1.67	0.58
2:F:118:ASN:C	2:F:118:ASN:OD1	2.47	0.58
2:H:118:ASN:ND2	2:H:120:ASP:CB	2.67	0.58
2:H:124:LEU:O	2:H:124:LEU:CD2	2.52	0.58
2:F:171:LEU:C	2:F:172:ARG:CG	2.77	0.58
2:G:252:GLU:C	2:G:254:LEU:N	2.54	0.58
2:G:252:GLU:C	2:G:254:LEU:H	2.12	0.58
2:E:333:ARG:O	2:E:333:ARG:CG	2.51	0.57
2:F:123:GLN:NE2	2:F:123:GLN:N	2.51	0.57
2:H:124:LEU:CD1	2:H:166:HIS:CG	2.87	0.57
1:A:193:HIS:CG	1:A:194:PRO:HD2	2.40	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:57:GLU:OE1	1:B:57:GLU:HA	2.04	0.57
2:G:269:PHE:O	2:G:270:ASN:CB	2.42	0.57
1:C:57:GLU:HA	1:C:57:GLU:OE1	2.05	0.57
2:G:122:LYS:C	2:G:124:LEU:N	2.60	0.57
2:F:172:ARG:HG2	2:F:172:ARG:HH11	1.69	0.56
2:E:121:GLU:OE1	2:E:125:TYR:CE2	2.58	0.56
1:B:193:HIS:CD2	1:B:195:MET:H	2.23	0.56
2:F:40:GLN:HE22	2:F:59:ILE:HD12	1.67	0.56
2:E:281:TRP:HB3	2:E:298:LEU:HD22	1.88	0.55
2:F:123:GLN:N	2:F:123:GLN:CD	2.60	0.55
1:D:57:GLU:OE1	1:D:57:GLU:HA	2.05	0.55
1:C:65:ASN:CG	1:C:68:GLN:HB2	2.32	0.55
1:C:111:ARG:NH1	1:C:114:CYS:SG	2.79	0.55
2:F:239:TYR:HA	2:F:269:PHE:CE2	2.41	0.55
2:E:118:ASN:HB3	2:E:163:MET:HE2	1.89	0.55
2:F:125:TYR:C	2:F:127:THR:H	2.13	0.55
2:F:124:LEU:CD1	2:F:128:LEU:CD2	2.80	0.55
2:F:202:LEU:HD11	2:F:213:LEU:HD11	1.87	0.55
2:E:228:ARG:CG	2:E:228:ARG:NH1	2.37	0.55
1:A:57:GLU:HA	1:A:57:GLU:OE1	2.07	0.55
1:B:13:PHE:HE2	1:B:22:PHE:CE1	2.25	0.55
2:F:73:VAL:HG12	2:F:74:LYS:N	2.21	0.54
2:H:3:GLY:O	2:H:262:ASN:HB3	2.08	0.54
2:G:124:LEU:HB3	2:G:125:TYR:HD1	1.73	0.54
2:H:121:GLU:OE1	2:H:125:TYR:CE1	2.61	0.54
2:E:239:TYR:CZ	2:E:268:ARG:HD3	2.43	0.54
2:H:265:LEU:C	2:H:266:ASP:O	2.46	0.54
1:A:169:MET:HG3	2:E:54:PHE:HE2	1.72	0.54
2:E:125:TYR:O	2:E:126:GLN:C	2.50	0.54
2:E:124:LEU:HD12	2:E:124:LEU:C	2.27	0.54
2:E:275:ARG:CG	2:E:275:ARG:NH1	2.43	0.54
2:F:227:PHE:O	2:F:228:ARG:HB2	2.05	0.54
2:G:80:ARG:HD3	2:G:179:ALA:O	2.08	0.54
2:H:265:LEU:HD22	2:H:269:PHE:CD1	2.42	0.54
2:G:270:ASN:OD1	2:G:271:ASP:N	2.40	0.54
2:H:265:LEU:O	2:H:266:ASP:C	2.50	0.54
2:H:269:PHE:O	2:H:272:ILE:HG12	2.08	0.54
1:A:193:HIS:HD2	1:A:195:MET:CB	2.21	0.53
2:H:20:PRO:O	2:H:21:ARG:C	2.51	0.53
2:F:124:LEU:HD12	2:F:124:LEU:C	2.33	0.53
2:E:124:LEU:HB3	2:E:125:TYR:HD1	1.73	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:269:PHE:CD2	2:H:272:ILE:HD11	2.43	0.53
1:B:206:ASN:O	1:B:207:PHE:HB2	2.09	0.53
1:A:185:PRO:HB3	1:B:165:HIS:CE1	2.44	0.52
1:D:13:PHE:CE2	1:D:22:PHE:CE1	2.97	0.52
2:G:252:GLU:O	2:G:253:ASP:C	2.52	0.52
1:B:111:ARG:NH1	1:B:114:CYS:SG	2.82	0.52
2:G:64:LYS:O	2:G:115:HIS:HB2	2.09	0.52
2:E:252:GLU:C	2:E:254:LEU:N	2.65	0.52
2:F:330:ASP:O	2:F:333:ARG:CD	2.46	0.52
2:H:123:GLN:HG3	2:H:124:LEU:N	2.22	0.52
2:E:36:GLN:NE2	2:E:104:PRO:HD3	2.25	0.52
2:G:270:ASN:CG	2:G:271:ASP:H	2.18	0.52
2:G:270:ASN:CA	2:G:272:ILE:H	2.21	0.52
2:G:43:ARG:NH2	2:G:55:GLU:OE1	2.43	0.52
2:G:228:ARG:HG3	2:G:228:ARG:HH11	1.74	0.52
2:F:125:TYR:O	2:F:128:LEU:N	2.35	0.51
2:F:271:ASP:N	2:F:271:ASP:OD1	2.41	0.51
1:A:127:ILE:HD11	2:E:105:VAL:HG13	1.93	0.51
1:C:207:PHE:O	1:C:207:PHE:CD2	2.63	0.51
2:E:227:PHE:O	2:E:228:ARG:HB2	2.07	0.51
2:F:125:TYR:C	2:F:127:THR:N	2.66	0.51
2:G:252:GLU:O	2:G:254:LEU:N	2.43	0.51
2:F:118:ASN:HB3	2:F:163:MET:HG3	1.93	0.51
2:G:316:ARG:HH21	2:G:316:ARG:CG	2.19	0.51
2:F:142:LYS:HZ1	2:F:331:GLN:HE22	1.58	0.51
1:A:111:ARG:NH1	1:A:114:CYS:SG	2.84	0.51
1:D:193:HIS:CD2	1:D:195:MET:HB3	2.34	0.51
2:G:20:PRO:O	2:G:21:ARG:C	2.54	0.51
1:D:186:ARG:HG2	1:D:186:ARG:NH1	2.15	0.50
2:H:124:LEU:HD13	2:H:166:HIS:HB2	1.91	0.50
1:A:65:ASN:HB3	1:A:68:GLN:HB2	1.93	0.50
2:G:228:ARG:HG3	2:G:228:ARG:NH1	2.27	0.50
2:G:281:TRP:HB3	2:G:298:LEU:HD22	1.92	0.50
2:F:322:PRO:CA	2:F:325:TYR:CE2	2.94	0.50
2:H:124:LEU:HD11	2:H:166:HIS:HB2	1.89	0.50
2:F:132:ASP:OD1	2:F:169:ARG:NH2	2.29	0.50
2:H:36:GLN:C	2:H:38:ASP:H	2.20	0.50
2:F:120:ASP:O	2:F:124:LEU:HB2	2.10	0.49
2:G:268:ARG:C	2:G:270:ASN:H	2.19	0.49
2:F:126:GLN:C	2:F:127:THR:OG1	2.52	0.49
1:B:122:ILE:HD12	1:B:164:PRO:HG2	1.95	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:118:ASN:CG	2:E:163:MET:CE	2.86	0.49
2:H:199:GLY:HA2	2:H:216:TRP:CD1	2.48	0.49
2:E:228:ARG:NH1	2:E:228:ARG:HG3	2.18	0.49
1:C:207:PHE:C	1:C:207:PHE:CD2	2.89	0.49
2:H:123:GLN:NE2	2:H:123:GLN:CA	2.67	0.49
1:A:188:TYR:CD2	2:F:69:ILE:HG21	2.47	0.49
2:F:199:GLY:HA2	2:F:216:TRP:CD1	2.48	0.49
1:B:13:PHE:HE2	1:B:22:PHE:CD1	2.31	0.49
1:B:169:MET:HG3	2:F:54:PHE:HE2	1.77	0.49
1:D:22:PHE:CE2	1:D:159:PHE:CZ	3.01	0.49
2:G:21:ARG:C	2:G:23:TYR:H	2.20	0.49
2:E:252:GLU:O	2:E:253:ASP:C	2.56	0.48
2:F:59:ILE:O	2:F:60:THR:C	2.55	0.48
1:C:207:PHE:O	1:C:207:PHE:CG	2.65	0.48
2:E:199:GLY:HA2	2:E:216:TRP:CD1	2.48	0.48
2:F:322:PRO:CA	2:F:325:TYR:CD2	2.91	0.48
2:H:123:GLN:HE21	2:H:123:GLN:HA	1.75	0.48
2:E:333:ARG:O	2:E:333:ARG:CD	2.60	0.48
2:F:189:ASN:OD1	2:F:191:ARG:HG2	2.13	0.48
2:H:223:ALA:HB2	2:H:301:LEU:HD11	1.95	0.48
1:B:166:MET:HE1	2:F:52:GLU:HG2	1.95	0.48
1:D:109:CYS:SG	1:D:111:ARG:HB2	2.53	0.48
2:E:90:GLY:O	2:H:18:HIS:HB3	2.13	0.48
2:G:199:GLY:HA2	2:G:216:TRP:CD1	2.48	0.48
2:F:142:LYS:HZ3	2:F:331:GLN:NE2	2.11	0.48
1:C:193:HIS:CD2	1:C:195:MET:H	2.32	0.47
2:G:21:ARG:C	2:G:23:TYR:N	2.71	0.47
1:B:13:PHE:CE2	1:B:22:PHE:CD1	3.02	0.47
2:E:194:SER:O	2:E:195:ARG:C	2.57	0.47
2:G:7:SER:O	2:G:8:ARG:HG3	2.14	0.47
2:G:36:GLN:NE2	2:G:104:PRO:HD3	2.29	0.47
1:D:193:HIS:CG	1:D:194:PRO:HD2	2.49	0.47
2:G:22:GLU:O	2:G:22:GLU:HG3	2.13	0.47
2:E:118:ASN:CB	2:E:163:MET:CE	2.92	0.47
1:B:22:PHE:CE2	1:B:159:PHE:CZ	3.02	0.47
2:G:265:LEU:HD13	2:G:269:PHE:CB	2.44	0.47
1:C:13:PHE:CE2	1:C:22:PHE:CE1	3.02	0.47
2:E:222:LEU:O	2:E:226:ILE:HG12	2.15	0.47
2:F:80:ARG:HD3	2:F:179:ALA:O	2.15	0.47
2:E:202:LEU:HD11	2:E:213:LEU:HD11	1.96	0.47
2:E:252:GLU:O	2:E:254:LEU:N	2.48	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:G:122:LYS:C	2:G:124:LEU:H	2.22	0.47
2:E:126:GLN:O	2:E:228:ARG:NH2	2.47	0.46
2:E:278:ARG:NH2	2:E:302:ASP:OD1	2.48	0.46
2:F:52:GLU:OE1	2:F:71:LYS:HE2	2.15	0.46
2:E:121:GLU:OE1	2:E:125:TYR:CD2	2.69	0.46
2:E:125:TYR:N	2:E:125:TYR:CD1	2.83	0.46
2:F:125:TYR:O	2:F:127:THR:N	2.48	0.46
2:E:124:LEU:HB3	2:E:125:TYR:CD1	2.51	0.46
1:C:175:ARG:NE	1:D:200:GLN:OE1	2.40	0.46
2:H:278:ARG:O	2:H:278:ARG:HG2	2.16	0.46
2:E:125:TYR:HD1	2:E:125:TYR:N	2.13	0.46
1:A:163:PHE:HB3	1:A:164:PRO:HD3	1.97	0.46
2:G:122:LYS:O	2:G:126:GLN:CG	2.63	0.46
1:A:124:LEU:HD21	1:A:143:VAL:HG11	1.98	0.46
1:D:13:PHE:HE2	1:D:22:PHE:CE1	2.34	0.46
2:F:103:ASP:O	2:F:104:PRO:C	2.59	0.45
2:G:275:ARG:CZ	2:G:275:ARG:CB	2.88	0.45
1:B:34:PHE:CZ	2:F:50:TYR:CE2	3.05	0.45
2:G:268:ARG:O	2:G:270:ASN:N	2.47	0.45
2:H:281:TRP:HB3	2:H:298:LEU:HD22	1.99	0.45
1:D:43:VAL:HG12	1:D:78:MET:SD	2.57	0.45
2:E:90:GLY:O	2:H:18:HIS:CD2	2.69	0.45
1:D:190:PHE:HB3	2:H:41:LEU:HG	1.99	0.45
2:E:124:LEU:HD13	2:E:124:LEU:HA	1.42	0.45
1:A:36:LEU:HD22	1:A:83:ILE:HG12	1.98	0.45
2:E:121:GLU:HB3	2:E:122:LYS:HD2	1.99	0.45
2:G:92:PRO:HD2	2:G:146:TYR:CG	2.52	0.45
1:A:193:HIS:CB	2:F:41:LEU:O	2.64	0.45
2:H:124:LEU:C	2:H:124:LEU:CD2	2.80	0.45
2:H:124:LEU:HD12	2:H:166:HIS:CB	2.47	0.45
1:C:22:PHE:CE2	1:C:159:PHE:CZ	3.05	0.45
2:E:230:GLU:O	2:E:230:GLU:HG2	2.14	0.45
2:E:67:VAL:HG22	2:E:112:VAL:HG22	1.99	0.44
2:F:120:ASP:O	2:F:124:LEU:CA	2.65	0.44
2:G:223:ALA:HB2	2:G:301:LEU:HD11	2.00	0.44
2:F:119:THR:O	2:F:120:ASP:C	2.61	0.44
2:G:202:LEU:HD11	2:G:213:LEU:HD11	2.00	0.44
2:E:75:LYS:HE2	2:E:79:LYS:HE3	1.99	0.44
2:E:73:VAL:HG12	2:E:74:LYS:HG3	1.98	0.44
2:H:122:LYS:O	2:H:124:LEU:N	2.45	0.44
2:G:265:LEU:HD13	2:G:269:PHE:HB2	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:252:GLU:C	2:H:254:LEU:N	2.74	0.44
1:A:193:HIS:CD2	1:A:195:MET:H	2.36	0.44
2:H:124:LEU:O	2:H:124:LEU:CG	2.64	0.44
2:G:73:VAL:HG11	2:G:77:LYS:HD2	1.99	0.44
2:H:73:VAL:HG12	2:H:74:LYS:H	1.83	0.44
2:H:137:MET:HE1	2:H:218:LEU:HG	2.00	0.44
1:C:173:GLU:HG3	1:D:207:PHE:HD2	1.83	0.43
2:H:49:LYS:HE3	2:H:49:LYS:HB3	1.60	0.43
1:A:186:ARG:NH1	1:A:186:ARG:CG	2.78	0.43
1:B:124:LEU:HD21	1:B:143:VAL:HG11	2.00	0.43
1:D:186:ARG:NH1	1:D:186:ARG:CG	2.76	0.43
2:H:124:LEU:HD11	2:H:166:HIS:CB	2.42	0.43
1:C:186:ARG:CG	1:C:186:ARG:NH1	2.70	0.43
2:E:20:PRO:O	2:E:21:ARG:C	2.60	0.43
2:G:268:ARG:C	2:G:270:ASN:N	2.77	0.43
1:D:124:LEU:HD21	1:D:143:VAL:HG11	2.01	0.43
2:G:121:GLU:HA	2:G:124:LEU:HB3	2.00	0.43
2:E:227:PHE:O	2:E:228:ARG:C	2.59	0.43
2:E:239:TYR:OH	2:E:268:ARG:HD3	2.18	0.43
2:E:14:ASP:O	2:E:18:HIS:HD2	2.01	0.43
2:E:80:ARG:HD3	2:E:179:ALA:O	2.19	0.43
2:H:226:ILE:O	2:H:289:ASN:HB2	2.19	0.43
2:G:174:ILE:HD12	2:G:175:ASP:HB2	2.00	0.43
1:C:199:LEU:HD23	1:C:199:LEU:HA	1.52	0.43
1:D:13:PHE:CE2	1:D:22:PHE:CD1	3.07	0.43
2:E:90:GLY:O	2:H:18:HIS:CB	2.67	0.43
2:E:296:GLU:CD	2:E:296:GLU:H	2.27	0.43
2:G:144:LEU:HD23	2:G:144:LEU:HA	1.91	0.43
1:C:172:PRO:HB2	1:D:203:ALA:HB3	2.01	0.42
2:F:74:LYS:CD	2:F:74:LYS:N	2.73	0.42
2:G:258:ILE:HD13	2:G:265:LEU:HG	1.99	0.42
1:B:198:GLN:O	1:B:202:GLN:HG3	2.19	0.42
2:E:120:ASP:O	2:E:121:GLU:C	2.61	0.42
2:G:74:LYS:H	2:G:74:LYS:HG3	1.39	0.42
2:G:120:ASP:C	2:G:122:LYS:H	2.26	0.42
1:C:13:PHE:HE2	1:C:22:PHE:CE1	2.37	0.42
2:G:36:GLN:HE22	2:G:103:ASP:HA	1.85	0.42
2:H:202:LEU:HD11	2:H:213:LEU:HD11	2.00	0.42
1:C:124:LEU:HD21	1:C:143:VAL:HG11	2.02	0.42
1:C:193:HIS:HD2	1:C:195:MET:HB3	1.85	0.42
2:E:91:GLY:HA3	2:E:146:TYR:CE2	2.54	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:195:MET:CG	2:F:42:VAL:HG13	2.50	0.42
2:E:223:ALA:HB2	2:E:301:LEU:HD11	2.00	0.42
2:F:125:TYR:C	2:F:128:LEU:H	2.25	0.42
2:G:125:TYR:HD1	2:G:125:TYR:N	2.17	0.42
2:G:242:LEU:HA	2:G:245:ILE:HD12	2.01	0.42
2:H:36:GLN:C	2:H:38:ASP:N	2.75	0.42
2:H:280:ARG:O	2:H:283:ARG:HB2	2.20	0.42
1:D:196:ALA:HB2	2:H:42:VAL:HA	2.00	0.42
2:E:252:GLU:C	2:E:254:LEU:H	2.27	0.42
2:H:308:ASP:HB3	2:H:311:SER:OG	2.20	0.42
1:C:139:LYS:HG2	1:C:179:PRO:HG3	2.02	0.42
2:E:36:GLN:HE22	2:E:104:PRO:HD3	1.85	0.42
2:E:275:ARG:HH11	2:E:275:ARG:HG2	1.74	0.42
2:F:67:VAL:HG22	2:F:112:VAL:HG22	2.00	0.42
1:D:13:PHE:HE2	1:D:22:PHE:CD1	2.38	0.41
2:E:49:LYS:HD3	2:E:50:TYR:CE1	2.55	0.41
2:E:74:LYS:HG3	2:E:74:LYS:H	0.97	0.41
2:G:125:TYR:N	2:G:125:TYR:CD1	2.86	0.41
2:H:67:VAL:HG12	2:H:69:ILE:HG13	2.02	0.41
2:H:103:ASP:O	2:H:104:PRO:C	2.61	0.41
2:F:92:PRO:HD2	2:F:146:TYR:CG	2.56	0.41
2:F:200:PRO:HD3	2:F:216:TRP:CE2	2.55	0.41
2:H:74:LYS:H	2:H:74:LYS:HG3	1.39	0.41
2:H:265:LEU:O	2:H:266:ASP:O	2.39	0.41
2:G:73:VAL:HG12	2:G:74:LYS:H	1.84	0.41
2:F:120:ASP:HB3	2:F:123:GLN:HG2	2.01	0.41
2:H:121:GLU:O	2:H:125:TYR:N	2.48	0.41
1:D:22:PHE:CD2	1:D:159:PHE:CZ	3.08	0.41
2:E:36:GLN:HE22	2:E:103:ASP:HA	1.84	0.41
2:H:124:LEU:O	2:H:124:LEU:HG	2.20	0.41
2:G:194:SER:O	2:G:195:ARG:C	2.61	0.41
2:G:268:ARG:HE	2:G:268:ARG:HB3	1.27	0.41
1:B:8:SER:OG	1:B:11:SER:HB3	2.20	0.41
1:B:139:LYS:HG2	1:B:179:PRO:HG3	2.03	0.41
2:F:95:ILE:HB	2:F:174:ILE:HG22	2.03	0.41
2:H:266:ASP:HA	2:H:267:PRO:HD2	1.74	0.41
1:B:22:PHE:CD2	1:B:159:PHE:CZ	3.09	0.41
1:B:195:MET:HG2	1:B:195:MET:O	2.21	0.41
2:E:92:PRO:HD2	2:E:146:TYR:CG	2.55	0.41
2:H:194:SER:O	2:H:195:ARG:C	2.62	0.41
1:D:111:ARG:NH1	1:D:114:CYS:SG	2.93	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:223:ALA:HB2	2:F:301:LEU:HD11	2.02	0.41
2:H:103:ASP:O	2:H:107:ARG:HA	2.20	0.41
2:H:174:ILE:HD12	2:H:175:ASP:HB2	2.01	0.41
1:A:166:MET:O	1:A:169:MET:HB2	2.21	0.41
2:F:14:ASP:O	2:F:18:HIS:HD2	2.03	0.41
2:H:92:PRO:HD2	2:H:146:TYR:CG	2.56	0.41
2:H:121:GLU:HB3	2:H:122:LYS:H	1.71	0.41
2:G:14:ASP:O	2:G:18:HIS:HD2	2.04	0.40
2:E:239:TYR:CE2	2:E:268:ARG:HG3	2.57	0.40
1:A:197:TYR:O	1:A:198:GLN:C	2.64	0.40
1:B:166:MET:O	1:B:169:MET:HB2	2.21	0.40
1:C:149:SER:HA	1:C:152:HIS:CE1	2.57	0.40
2:G:165:ASP:HB3	2:G:170:LYS:HB3	2.04	0.40
1:A:117:GLN:HA	1:A:118:PRO:HD2	1.97	0.40
1:B:186:ARG:NH1	1:B:186:ARG:CG	2.78	0.40
2:H:303:LYS:HA	2:H:306:ARG:HE	1.87	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:148:SER:OG	2:G:271:ASP:OD2[2_546]	2.06	0.14
1:D:17:ARG:NE	2:G:271:ASP:O[2_546]	2.08	0.12

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	195/215 (91%)	190 (97%)	5 (3%)	0	100	100
1	B	191/215 (89%)	186 (97%)	5 (3%)	0	100	100
1	C	193/215 (90%)	187 (97%)	6 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	191/215 (89%)	185 (97%)	5 (3%)	1 (0%)	24	55
2	E	330/391 (84%)	310 (94%)	20 (6%)	0	100	100
2	F	330/391 (84%)	305 (92%)	25 (8%)	0	100	100
2	G	330/391 (84%)	302 (92%)	26 (8%)	2 (1%)	21	52
2	H	329/391 (84%)	304 (92%)	24 (7%)	1 (0%)	36	65
All	All	2089/2424 (86%)	1969 (94%)	116 (6%)	4 (0%)	43	71

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	H	37	ASP
1	D	67	ASN
2	G	22	GLU
2	G	121	GLU

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	174/191 (91%)	167 (96%)	7 (4%)	28	56
1	B	171/191 (90%)	164 (96%)	7 (4%)	27	55
1	C	172/191 (90%)	165 (96%)	7 (4%)	27	55
1	D	171/191 (90%)	162 (95%)	9 (5%)	20	49
2	E	305/347 (88%)	285 (93%)	20 (7%)	15	43
2	F	305/347 (88%)	288 (94%)	17 (6%)	19	47
2	G	305/347 (88%)	280 (92%)	25 (8%)	10	35
2	H	304/347 (88%)	283 (93%)	21 (7%)	14	41
All	All	1907/2152 (89%)	1794 (94%)	113 (6%)	18	46

All (113) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	36	LEU
1	A	57	GLU
1	A	63	GLU
1	A	71	LEU
1	A	99	GLU
1	A	143	VAL
1	A	186	ARG
1	B	7	VAL
1	B	57	GLU
1	B	71	LEU
1	B	99	GLU
1	B	111	ARG
1	B	173	GLU
1	B	186	ARG
1	C	8	SER
1	C	57	GLU
1	C	71	LEU
1	C	99	GLU
1	C	143	VAL
1	C	186	ARG
1	C	202	GLN
1	D	7	VAL
1	D	57	GLU
1	D	59	ASP
1	D	71	LEU
1	D	99	GLU
1	D	114	CYS
1	D	143	VAL
1	D	173	GLU
1	D	186	ARG
2	E	8	ARG
2	E	15	VAL
2	E	47	ARG
2	E	52	GLU
2	E	73	VAL
2	E	74	LYS
2	E	80	ARG
2	E	118	ASN
2	E	120	ASP
2	E	122	LYS
2	E	123	GLN
2	E	124	LEU
2	E	127	THR

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Mol	Chain	Res	Type
2	E	163	MET
2	E	228	ARG
2	E	252	GLU
2	E	259	ASP
2	E	275	ARG
2	E	290	GLN
2	E	333	ARG
2	F	13	THR
2	F	15	VAL
2	F	21	ARG
2	F	52	GLU
2	F	59	ILE
2	F	74	LYS
2	F	121	GLU
2	F	123	GLN
2	F	124	LEU
2	F	126	GLN
2	F	127	THR
2	F	163	MET
2	F	172	ARG
2	F	271	ASP
2	F	275	ARG
2	F	290	GLN
2	F	333	ARG
2	G	13	THR
2	G	15	VAL
2	G	21	ARG
2	G	22	GLU
2	G	27	GLU
2	G	43	ARG
2	G	52	GLU
2	G	73	VAL
2	G	74	LYS
2	G	118	ASN
2	G	121	GLU
2	G	124	LEU
2	G	125	TYR
2	G	126	GLN
2	G	163	MET
2	G	230	GLU
2	G	259	ASP
2	G	265	LEU

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Mol	Chain	Res	Type
2	G	266	ASP
2	G	272	ILE
2	G	275	ARG
2	G	287	SER
2	G	290	GLN
2	G	316	ARG
2	G	333	ARG
2	H	13	THR
2	H	15	VAL
2	H	19	ARG
2	H	21	ARG
2	H	47	ARG
2	H	49	LYS
2	H	52	GLU
2	H	73	VAL
2	H	74	LYS
2	H	118	ASN
2	H	119	THR
2	H	120	ASP
2	H	121	GLU
2	H	122	LYS
2	H	123	GLN
2	H	259	ASP
2	H	268	ARG
2	H	270	ASN
2	H	275	ARG
2	H	278	ARG
2	H	290	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (60) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	65	ASN
1	A	151	HIS
1	A	165	HIS
1	A	171	HIS
1	A	182	GLN
1	A	193	HIS
1	B	96	GLN
1	B	165	HIS
1	B	171	HIS
1	B	182	GLN

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Mol	Chain	Res	Type
1	B	193	HIS
1	B	206	ASN
1	C	48	GLN
1	C	96	GLN
1	C	165	HIS
1	C	171	HIS
1	C	193	HIS
1	C	198	GLN
1	D	151	HIS
1	D	165	HIS
1	D	171	HIS
1	D	193	HIS
2	E	18	HIS
2	E	36	GLN
2	E	118	ASN
2	E	290	GLN
2	E	291	HIS
2	E	310	GLN
2	E	331	GLN
2	F	18	HIS
2	F	29	HIS
2	F	35	ASN
2	F	36	GLN
2	F	40	GLN
2	F	118	ASN
2	F	123	GLN
2	F	126	GLN
2	F	270	ASN
2	F	290	GLN
2	F	291	HIS
2	F	310	GLN
2	F	331	GLN
2	G	18	HIS
2	G	35	ASN
2	G	36	GLN
2	G	118	ASN
2	G	234	HIS
2	G	291	HIS
2	G	310	GLN
2	H	35	ASN
2	H	36	GLN
2	H	93	ASN

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Mol	Chain	Res	Type
2	H	115	HIS
2	H	117	ASN
2	H	118	ASN
2	H	123	GLN
2	H	234	HIS
2	H	290	GLN
2	H	291	HIS
2	H	310	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 4 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 ⓘ

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	199/215 (92%)	-0.43	0 100 100	23, 40, 76, 104	0
1	B	195/215 (90%)	-0.13	2 (1%) 79 63	27, 58, 98, 140	0
1	C	197/215 (91%)	-0.16	1 (0%) 87 76	38, 59, 93, 153	0
1	D	195/215 (90%)	-0.10	2 (1%) 79 63	38, 65, 104, 152	0
2	E	332/391 (84%)	-0.23	0 100 100	29, 44, 78, 113	0
2	F	332/391 (84%)	0.19	5 (1%) 72 53	44, 69, 108, 134	0
2	G	332/391 (84%)	0.24	3 (0%) 81 65	46, 73, 104, 123	0
2	H	331/391 (84%)	0.21	5 (1%) 72 53	50, 70, 106, 138	0
All	All	2113/2424 (87%)	-0.01	18 (0%) 81 65	23, 62, 101, 153	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	66	PRO	3.1
1	B	66	PRO	3.0
2	H	126	GLN	2.8
2	G	118	ASN	2.7
1	C	66	PRO	2.5
2	G	119	THR	2.4
2	F	126	GLN	2.3
1	D	68	GLN	2.3
2	H	275	ARG	2.3
2	H	110	ALA	2.2
2	F	236	HIS	2.2
2	H	267	PRO	2.2
2	H	3	GLY	2.1
2	F	62	ASN	2.1
2	F	325	TYR	2.1
1	B	69	SER	2.0

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Mol	Chain	Res	Type	RSRZ
2	G	117	ASN	2.0
2	F	125	TYR	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
3	ZN	A	301	1/1	1.00	0.02	29,29,29,29	0
3	ZN	B	301	1/1	1.00	0.03	32,32,32,32	0
3	ZN	C	301	1/1	1.00	0.03	47,47,47,47	0
3	ZN	D	301	1/1	1.00	0.01	40,40,40,40	0

6.5 Other polymers [i](#)

There are no such residues in this entry.