Full wwPDB EM Validation Report (i)

Feb 8, 2026 – 12:50 AM JST

PDB ID	:	9KHT / pdb_00009kht
EMDB ID	:	EMD-62354
Title	:	cryo-EM structure of Ufd2/Ubc4-Ub in complex with K29-linked triUb (dimeric conformation)
Authors	:	Ai, H.S.; Tong, Z.B.; Liu, L.
Deposited on	:	2024-11-11
Resolution	:	4.85 Å(reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the (i) 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 (i)) were used in the production of this report:

EMDB validation analysis	:	FAILED
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	NOT EXECUTED
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.47

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 4.85 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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%

Mol	Chain	Length	Quality of chain
1	D	76	79% 21%
1	d	76	76% 24%
2	C	76	83% 17%
2	E	76	66% 34%
2	F	76	68% 32%
2	c	76	86% 14%
2	e	76	61% 39%
2	f	76	59% 41%
3	A	955	75% 21% •

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Mol	Chain	Length	Quality of chain
3	a	955	73% 24% •
4	B	148	73% 24% •
4	b	148	71% 28% •

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 19960 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 Polyubiquitin-C.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	D	76	539	336	97	105	1	0	0
1	d	76	552	344	101	106	1	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	48	CYS	LYS	engineered mutation	UNP P0CG48
d	48	CYS	LYS	engineered mutation	UNP P0CG48

- Molecule 2 is a protein called Ubiquitin.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	E	76	556	343	100	113		0	0
2	F	76	575	362	98	114	1	0	0
2	e	76	556	343	100	113		0	0
2	f	76	568	355	98	114	1	0	0
2	C	76	528	326	98	104		0	0
2	c	76	528	326	98	104		0	0

- Molecule 3 is a protein called E4 ubiquitin-protein ligase UFD2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	A	917	6722	4287	1123	1291	21	7	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	a	922	6793	4325	1141	1305	22	7	0

- Molecule 4 is a protein called Ubiquitin-conjugating enzyme E2 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	B	144	1013	645	171	195	2	0	0
4	b	146	1030	658	174	196	2	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	22	SER	CYS	engineered mutation	UNP P15731
B	108	SER	CYS	engineered mutation	UNP P15731
b	22	SER	CYS	engineered mutation	UNP P15731
b	108	SER	CYS	engineered mutation	UNP P15731

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. 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. 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: Polyubiquitin-C

Chain D:

- Molecule 1: Polyubiquitin-C

Chain d:

- Molecule 2: Ubiquitin

Chain E:

- Molecule 2: Ubiquitin

Chain F:

- Molecule 2: Ubiquitin

Chain e:

- Molecule 2: Ubiquitin

Chain f:

• Molecule 2: Ubiquitin

Chain C:

• Molecule 2: Ubiquitin

Chain c:

• Molecule 3: E4 ubiquitin-protein ligase UFD2

Chain A:

• Molecule 3: E4 ubiquitin-protein ligase UFD2

Chain a:

L131 I134 V151 PHE P153 THR L155 L156 E157 Y158 H162 VAL SER H165 F166 D167 L168 N169 E170 S171 V172 I173 Y174 N175 N176 V177 V185 F200 Y204 S205 C206 K207 P208 Q209 D210 T215 E227 A228 A229 V230 A231 N234 T246 A247 H250 Q254 H257

I261 F265 F266 I267 V268 L271 S275 S278 I283 A290 N291 K292 N293 H294 L295 R296 R297 P301 P302 E305 L306 M312 I315 T316 R321 Q324 P325 F326 L327 D328 I329 S330 Y331 K332 D335 K336 I337 D350 L351 S352 A366 D369 K370

N371 R372 K373 THR ALA ASP S377 N380 F381 I382 Y392 L393 H394 Y395 G396 L397 G398 G399 T400 L401 E405 K406 M407 G408 L414 E417 D429 V430 A437 S440 S451 F454 G458 H462 R463 S464 E468 V469 F470 I473 S477 L480 I481 R482

V483 V484 D485 H488 E489 I500 PRO ASP GLN ILE GLY VAL GLU ASN VAL ASP ASN ALA ASP PHE L515 A519 F523 K524 Y525 Y526 E532 N536 K543 Y544 V559 T562 V565 L566 ARG C568 P569 L585 G588 P591 LEU T593 F599 D602

H606 L615 L619 Y622 R641 F672 F673 V677 M680 D683 L684 L687 E690 N694 L695 H699 A709 ARG GLY ALA PRO PRO THR ARG GLU GLU E719 D720 Q724 E763 I764 R767 M771 L772 N773 K800 K804 T807 T808 V809

Y810 I811 N812 E818 F819 I820 S821 A822 V823 A824 K825 F830 V839 D840 I841 L842 K845 L848 A849 S850 F853 I854 F860 E865 R868 Y878 L889 M890 Y891 M894 P897 V898 I899 L900 P901 A902 S903 K904 I907 D908 R909 H915 D919 S920

T921 N925 T935 K952 A955

- Molecule 4: Ubiquitin-conjugating enzyme E2 4

Chain B: 73% 24%

M1 S2 R6 L11 L14 P19 A24 G25 P26 D30 H33 W34 Q35 ALA SER ILE M39 P45 Y46 V50 I55 D60 K64 I68 H76 P77 N78 I79 N80 N84 I85 C86 L87 L90 P96 L110 LEU T112 D118 P119 L120

I127 D131 Y135 A139 R140 T143 V148

- Molecule 4: Ubiquitin-conjugating enzyme E2 4

Chain b: 71% 28%

M1 S2 R6 K9 L14 P19 T20 S21 S22 S23 A24 G25 P26 VAL G28 D29 D30 H33 W34 S37 P45 Y46 I55 P58 P66 K67 I68 S69 F70 H76 P77 N78 I79 N80 N84 I85 C86 L87 L90 L110 LEU T112 D118 I127

D131 Y135 E136 A137 T138 A139 R140 E141 V148

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	48544	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

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	D	0.21	0/545	0.35	0/739
1	d	0.21	0/558	0.36	0/755
2	C	0.17	0/533	0.36	0/722
2	E	0.17	0/561	0.40	0/758
2	F	0.12	0/581	0.31	0/783
2	c	0.14	0/533	0.35	0/722
2	e	0.17	0/561	0.38	0/758
2	f	0.13	0/574	0.30	0/774
3	A	0.19	0/6879	0.39	0/9363
3	a	0.20	0/6953	0.40	1/9461 (0.0%)
4	B	0.23	0/1042	0.43	0/1432
4	b	0.20	0/1061	0.42	0/1459
All	All	0.19	0/20381	0.39	1/27726 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	a	405	GLU	N-CA-C	-5.27	105.54	111.28

There are no chirality outliers.

There are no planarity outliers.

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	D	539	0	491	10	0
1	d	552	0	529	13	0
2	C	528	0	481	9	0
2	E	556	0	531	21	0
2	F	575	0	576	18	0
2	c	528	0	481	8	0
2	e	556	0	531	22	0
2	f	568	0	556	21	0
3	A	6722	0	6044	138	0
3	a	6793	0	6119	152	0
4	B	1013	0	887	27	0
4	b	1030	0	910	29	0
All	All	19960	0	18136	447	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.

All (447) 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)
1:D:22:THR:HA	1:D:55:THR:HA	1.54	0.89
1:d:22:THR:HA	1:d:55:THR:HA	1.63	0.81
4:B:86:CYS:SG	4:B:118:ASP:HB3	2.21	0.80
4:B:127:ILE:HG23	4:B:131:ASP:HB3	1.69	0.74
2:C:22:THR:HA	2:C:55:THR:HA	1.70	0.73
3:A:99:VAL:HG22	3:A:134:ILE:HG23	1.70	0.73
4:B:6:ARG:NH2	4:B:96:PRO:O	2.20	0.72
3:a:720:ASP:O	3:a:724:GLN:NE2	2.22	0.72
2:f:1:MET:HB2	2:f:63:LYS:HB3	1.72	0.72
3:a:99:VAL:HG22	3:a:134:ILE:HG23	1.73	0.71
4:B:110:LEU:O	4:B:112:THR:N	2.24	0.71
3:A:10:ILE:HD12	3:A:46:GLN:HE21	1.54	0.71
2:E:42:ARG:HH11	2:E:49:GLN:HG2	1.57	0.70
4:b:110:LEU:O	4:b:112:THR:N	2.24	0.70
2:f:27:LYS:NZ	2:f:41:GLN:O	2.24	0.70
2:c:22:THR:HA	2:c:55:THR:HA	1.73	0.69
1:d:19:PRO:HA	1:d:56:LEU:HD22	1.73	0.69
3:a:10:ILE:HD11	3:a:23:LEU:HG	1.73	0.69
2:F:27:LYS:NZ	2:F:41:GLN:O	2.26	0.68
1:D:19:PRO:HA	1:D:56:LEU:HD22	1.74	0.68
3:A:800:LYS:HE3	3:A:841:ILE:HG23	1.75	0.68
3:a:153:PRO:HA	3:a:156:LEU:HB3	1.75	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:14:PRO:HG3	3:A:22:LEU:HA	1.76	0.67
2:C:44:ILE:HB	2:C:68:HIS:HB2	1.76	0.67
3:A:500:ILE:HD11	3:A:569:PRO:HD2	1.77	0.67
2:F:23:ILE:HB	2:F:52:ASP:HA	1.78	0.66
3:a:14:PRO:HG3	3:a:22:LEU:HA	1.75	0.66
3:a:10:ILE:HD12	3:a:46:GLN:HE21	1.61	0.66
3:A:250:HIS:HE1	3:A:455:ALA:HA	1.61	0.66
3:a:800:LYS:HE3	3:a:841:ILE:HG23	1.76	0.66
3:A:615:LEU:O	3:A:619:LEU:HB2	1.96	0.65
4:b:26:PRO:O	4:b:28:GLY:N	2.28	0.65
3:A:297:ARG:HH11	3:A:399:GLY:HA2	1.61	0.65
3:a:302:PRO:HB2	3:a:305:GLU:HB2	1.76	0.65
3:a:316:THR:HG21	3:a:397:LEU:HD22	1.78	0.65
3:A:171:SER:O	3:A:175:ASN:ND2	2.30	0.65
3:a:207:LYS:HB2	3:a:210:ASP:HB2	1.79	0.65
1:d:29:LYS:NZ	2:e:76:GLY:O	2.30	0.65
3:a:171:SER:O	3:a:175:ASN:ND2	2.30	0.65
3:A:901:PRO:O	3:A:904:LYS:NZ	2.29	0.64
2:c:44:ILE:HB	2:c:68:HIS:HB2	1.80	0.64
2:F:1:MET:HB2	2:F:63:LYS:HB3	1.79	0.64
4:B:46:TYR:OH	4:B:76:HIS:ND1	2.30	0.64
3:A:720:ASP:O	3:A:724:GLN:NE2	2.31	0.64
3:a:808:THR:HG22	3:a:812:ASN:HD21	1.63	0.64
2:f:24:GLU:HB2	2:f:52:ASP:HB3	1.79	0.63
4:B:11:LEU:HD11	4:B:26:PRO:HD3	1.80	0.63
2:f:23:ILE:HB	2:f:52:ASP:HA	1.79	0.63
3:A:89:GLU:OE2	3:A:92:ARG:NH1	2.29	0.63
3:a:67:ASN:ND2	3:a:91:ASP:OD1	2.32	0.63
3:A:207:LYS:HB2	3:A:210:ASP:HB2	1.81	0.62
3:A:808:THR:HG22	3:A:812:ASN:HD21	1.64	0.62
3:A:206:CYS:O	3:A:292:LYS:NZ	2.30	0.62
3:A:167:ASP:OD2	3:A:169:ASN:ND2	2.33	0.62
2:C:42:ARG:HD3	2:C:72:ARG:HE	1.65	0.61
3:a:55:LYS:HB3	3:a:58:GLU:HB3	1.83	0.61
3:a:462:HIS:HD2	3:a:464:SER:H	1.47	0.61
2:E:28:ALA:O	2:E:31:GLN:NE2	2.34	0.61
2:e:28:ALA:O	2:e:31:GLN:NE2	2.32	0.61
3:a:167:ASP:OD2	3:a:169:ASN:ND2	2.34	0.61
2:F:22:THR:HG22	2:F:55:THR:HG22	1.83	0.61
3:a:690:GLU:OE2	3:a:694:ASN:ND2	2.34	0.61
2:F:24:GLU:HB2	2:F:52:ASP:HB3	1.82	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:67:ASN:ND2	3:A:91:ASP:OD1	2.34	0.60
3:A:117:ILE:HD13	3:A:120:ILE:HD12	1.83	0.60
3:a:808:THR:O	3:a:812:ASN:ND2	2.34	0.60
3:a:485:ASP:OD2	3:a:489:GLU:N	2.33	0.60
3:a:117:ILE:HD13	3:a:120:ILE:HD12	1.82	0.59
4:B:14:LEU:HD21	4:B:24:ALA:HB3	1.84	0.59
2:f:6:LYS:NZ	4:B:19:PRO:O	2.35	0.59
3:a:206:CYS:O	3:a:292:LYS:NZ	2.31	0.59
3:A:549:ILE:HG22	3:A:555:LEU:HG	1.85	0.59
3:a:328:ASP:OD2	3:a:330:SER:OG	2.20	0.59
3:a:393:LEU:HD12	3:a:397:LEU:HD21	1.83	0.59
4:b:46:TYR:OH	4:b:76:HIS:ND1	2.36	0.59
3:A:808:THR:O	3:A:812:ASN:ND2	2.35	0.58
3:A:335:ASP:N	3:A:335:ASP:OD1	2.36	0.58
3:a:773:ASN:HD21	3:a:823:VAL:HG13	1.69	0.58
3:a:89:GLU:OE2	3:a:92:ARG:NH1	2.29	0.58
3:A:230:VAL:HG12	3:A:234:ASN:HD21	1.69	0.58
3:a:894:MET:HG2	3:a:908:ASP:HB2	1.85	0.58
4:b:70:PHE:HE2	4:b:79:ILE:HD13	1.69	0.58
2:e:27:LYS:HZ3	2:e:38:PRO:HA	1.69	0.58
3:A:393:LEU:HD12	3:A:397:LEU:HD21	1.86	0.58
2:c:42:ARG:HD3	2:c:72:ARG:HE	1.69	0.58
2:E:41:GLN:HA	2:E:71:LEU:HD23	1.86	0.57
2:F:6:LYS:NZ	4:b:20:THR:O	2.36	0.57
3:A:588:GLY:HA2	3:A:599:PHE:CE2	2.40	0.57
2:E:18:GLU:N	2:E:21:ASP:OD2	2.36	0.57
3:a:915:HIS:NE2	3:a:921:THR:O	2.34	0.57
2:f:42:ARG:HB2	2:f:70:VAL:HB	1.86	0.57
3:a:763:GLU:HG2	3:a:764:ILE:HG12	1.87	0.57
3:a:889:LEU:O	4:b:6:ARG:NH1	2.38	0.57
2:f:22:THR:HG22	2:f:55:THR:HG22	1.87	0.56
3:A:286:PHE:O	3:A:392:TYR:OH	2.21	0.56
3:A:100:VAL:HA	3:A:103:GLN:HB2	1.86	0.56
3:a:185:VAL:HG21	3:a:267:ILE:HA	1.87	0.56
3:a:335:ASP:OD1	3:a:335:ASP:N	2.35	0.56
2:F:8:LEU:HD21	2:F:70:VAL:HA	1.88	0.56
3:A:404:GLU:OE2	3:A:540:TYR:OH	2.20	0.56
3:a:821:SER:OG	3:a:825:LYS:NZ	2.32	0.56
1:d:11:LYS:NZ	3:a:297:ARG:O	2.38	0.56
3:A:485:ASP:OD2	3:A:489:GLU:N	2.34	0.56
2:c:22:THR:HG22	2:c:55:THR:HG22	1.88	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:b:86:CYS:SG	4:b:118:ASP:HB3	2.46	0.56
3:A:131:LEU:HD23	3:A:134:ILE:HD12	1.87	0.56
3:a:470:PHE:HA	3:a:473:ILE:HD12	1.87	0.56
4:b:14:LEU:HD21	4:b:24:ALA:HB3	1.88	0.56
3:a:321:ARG:NH2	3:a:468:GLU:OE2	2.38	0.55
2:C:22:THR:HG22	2:C:55:THR:HG22	1.88	0.55
2:F:8:LEU:HD11	2:F:71:LEU:H	1.71	0.55
2:e:18:GLU:N	2:e:21:ASP:OD2	2.38	0.55
3:a:131:LEU:HD23	3:a:134:ILE:HD12	1.89	0.55
3:a:588:GLY:HA2	3:a:599:PHE:CE2	2.41	0.55
4:B:86:CYS:SG	4:B:118:ASP:CB	2.92	0.55
4:B:127:ILE:O	4:B:131:ASP:N	2.39	0.54
2:E:23:ILE:HB	2:E:52:ASP:HA	1.89	0.54
2:e:15:LEU:HA	2:f:76:GLY:HA3	1.89	0.54
3:A:350:ASP:OD1	3:A:351:LEU:N	2.40	0.54
1:D:51:GLU:N	1:D:59:TYR:OH	2.40	0.54
2:E:56:LEU:HD11	2:E:61:ILE:HG21	1.90	0.54
3:A:850[A]:SER:OG	3:A:853:PHE:N	2.32	0.54
3:a:684:LEU:HD23	3:a:687:LEU:HD12	1.90	0.54
3:A:447:LYS:O	3:A:451:SER:OG	2.23	0.54
3:A:641:ARG:NH1	3:A:683:ASP:OD2	2.41	0.54
3:A:850[B]:SER:OG	3:A:853:PHE:N	2.32	0.54
2:e:23:ILE:HB	2:e:52:ASP:HA	1.89	0.54
3:a:267:ILE:O	3:a:271:LEU:HG	2.08	0.54
4:b:80:ASN:HD21	4:b:84:ASN:ND2	2.05	0.54
2:c:40:GLN:HA	2:c:72:ARG:HB2	1.89	0.53
3:A:47:LEU:HD13	3:A:107:PHE:HE2	1.72	0.53
2:e:42:ARG:HH11	2:e:49:GLN:HG2	1.73	0.53
3:A:470:PHE:HA	3:A:473:ILE:HD12	1.89	0.53
3:a:500:ILE:HD11	3:a:569:PRO:HD2	1.89	0.53
3:a:275:SER:H	3:a:278:SER:HB2	1.73	0.53
3:A:275:SER:H	3:A:278:SER:HB2	1.73	0.53
3:a:429:ASP:OD1	3:a:430:VAL:N	2.40	0.53
2:e:49:GLN:HB2	3:a:372:ARG:HH12	1.74	0.53
2:f:21:ASP:HB3	2:f:25:ASN:HD22	1.74	0.53
3:a:100:VAL:HA	3:a:103:GLN:HB2	1.91	0.53
2:C:19:PRO:HA	2:C:56:LEU:HD22	1.91	0.53
3:A:11:THR:O	3:A:14:PRO:HB3	2.09	0.53
3:a:437:ALA:O	3:a:440:SER:OG	2.26	0.53
4:b:45:PRO:HB3	4:b:136:GLU:HG3	1.90	0.53
2:f:8:LEU:HD21	2:f:70:VAL:HG13	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:810:TYR:HD1	3:A:819:PHE:HZ	1.58	0.52
1:d:31:GLN:HA	1:d:36:ILE:H	1.74	0.52
3:A:230:VAL:O	3:A:234:ASN:ND2	2.42	0.52
3:a:462:HIS:CD2	3:a:464:SER:HB3	2.45	0.52
4:b:76:HIS:CD2	4:b:78:ASN:H	2.28	0.52
2:F:6:LYS:N	2:F:67:LEU:O	2.35	0.52
3:A:519:ALA:HB3	3:A:524:LYS:HD2	1.91	0.52
3:a:850[A]:SER:OG	3:a:853:PHE:N	2.34	0.52
3:a:850[B]:SER:OG	3:a:853:PHE:N	2.34	0.52
4:b:127:ILE:O	4:b:131:ASP:N	2.36	0.52
4:B:55:ILE:HG12	4:B:68:ILE:HG23	1.91	0.52
3:a:11:THR:O	3:a:14:PRO:HB3	2.10	0.52
3:a:414:LEU:HA	3:a:417:GLU:HG3	1.92	0.52
3:A:267:ILE:O	3:A:271:LEU:HG	2.10	0.52
3:a:396:GLY:O	3:a:399:GLY:N	2.43	0.52
3:A:290:ALA:HB2	3:A:392:TYR:CZ	2.45	0.51
3:A:894:MET:HG2	3:A:908:ASP:HB2	1.92	0.51
4:B:80:ASN:HD21	4:B:84:ASN:ND2	2.07	0.51
4:B:76:HIS:CD2	4:B:78:ASN:H	2.28	0.51
3:A:250:HIS:CE1	3:A:458:GLY:HA3	2.44	0.51
3:A:316:THR:HG21	3:A:397:LEU:HD22	1.91	0.51
3:A:328:ASP:OD2	3:A:330:SER:OG	2.29	0.51
1:d:51:GLU:OE1	1:d:54:ARG:N	2.43	0.51
3:A:200:PHE:O	3:A:215:THR:OG1	2.28	0.51
4:B:26:PRO:HA	4:B:34:TRP:HA	1.93	0.51
1:D:51:GLU:OE1	1:D:54:ARG:N	2.44	0.51
3:A:250:HIS:CE1	3:A:455:ALA:HA	2.43	0.51
3:a:615:LEU:O	3:a:619:LEU:HB2	2.11	0.51
2:F:44:ILE:N	2:F:68:HIS:O	2.40	0.51
3:a:602:ASP:O	3:a:606:HIS:ND1	2.37	0.51
4:b:23:SER:N	4:b:37:SER:OG	2.44	0.51
3:A:312:MET:HA	3:A:315:ILE:HD11	1.92	0.51
4:B:55:ILE:HG12	4:B:68:ILE:HD12	1.93	0.51
3:A:690:GLU:OE2	3:A:694:ASN:ND2	2.44	0.51
3:A:34:LEU:HA	3:A:38:PHE:HD2	1.75	0.50
3:A:185:VAL:HG21	3:A:267:ILE:HA	1.93	0.50
3:A:265:PHE:HA	3:A:268:VAL:HG22	1.94	0.50
3:A:908:ASP:OD1	3:A:909:ARG:N	2.44	0.50
3:a:38:PHE:O	3:a:42:LEU:HG	2.11	0.50
3:a:250:HIS:HE1	3:a:454:PHE:O	1.94	0.50
3:A:28:VAL:HB	3:A:29:PRO:HD3	1.94	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:380:ASN:HD21	3:A:382:ILE:HB	1.76	0.50
3:a:350:ASP:OD1	3:a:351:LEU:N	2.45	0.50
3:A:684:LEU:HD23	3:A:687:LEU:HD12	1.92	0.50
3:a:810:TYR:HD1	3:a:819:PHE:HZ	1.60	0.50
4:B:84:ASN:HB2	4:B:120:LEU:HD21	1.94	0.50
2:E:49:GLN:HB2	3:A:372:ARG:HH12	1.77	0.50
3:a:619:LEU:HB3	3:a:672:PHE:HE2	1.77	0.50
2:E:42:ARG:NH2	3:A:369:ASP:OD1	2.34	0.50
3:a:265:PHE:HA	3:a:268:VAL:HG22	1.92	0.50
1:D:31:GLN:HA	1:D:36:ILE:H	1.76	0.50
2:E:71:LEU:O	2:E:72:ARG:C	2.54	0.50
3:A:477:SER:HA	3:A:480:LEU:HG	1.93	0.49
2:e:49:GLN:HB2	3:a:372:ARG:HH22	1.78	0.49
3:a:559:VAL:O	3:a:562:THR:OG1	2.23	0.49
3:a:406:LYS:O	3:a:408:GLY:N	2.45	0.49
3:a:683:ASP:O	3:a:687:LEU:HG	2.12	0.49
3:A:763:GLU:HG2	3:A:764:ILE:HG12	1.93	0.49
2:F:21:ASP:HB3	2:F:25:ASN:HD22	1.76	0.49
4:B:45:PRO:O	4:B:140:ARG:HG2	2.11	0.49
2:C:40:GLN:HA	2:C:72:ARG:HB2	1.94	0.49
3:a:47:LEU:HD13	3:a:107:PHE:HE2	1.78	0.49
2:c:42:ARG:HB2	2:c:72:ARG:HG3	1.94	0.49
1:D:21:ASP:O	1:D:56:LEU:N	2.46	0.49
3:A:227:GLU:HB3	3:A:230:VAL:HG23	1.94	0.49
3:a:231:ALA:HB1	3:a:451:SER:HB3	1.95	0.49
3:a:398:GLY:O	3:a:401:LEU:HG	2.13	0.49
3:a:532:GLU:O	3:a:536:ASN:ND2	2.26	0.49
2:E:49:GLN:HB2	3:A:372:ARG:HH22	1.77	0.49
1:d:42:ARG:NH2	1:d:49:GLN:HE22	2.11	0.49
2:e:41:GLN:HA	2:e:71:LEU:HD23	1.95	0.49
4:B:30:ASP:HB3	4:B:33:HIS:HB3	1.95	0.49
3:a:24:LYS:HE3	3:a:25:SER:HB3	1.95	0.48
3:a:28:VAL:HB	3:a:29:PRO:HD3	1.95	0.48
3:a:469:VAL:O	3:a:473:ILE:HG13	2.13	0.48
3:A:47:LEU:HD13	3:A:107:PHE:CE2	2.48	0.48
3:A:462:HIS:NE2	3:A:464:SER:HB3	2.27	0.48
3:a:477:SER:HA	3:a:480:LEU:HG	1.95	0.48
2:E:2:GLN:HA	2:E:16:GLU:HA	1.95	0.48
3:A:38:PHE:O	3:A:42:LEU:HG	2.13	0.48
3:a:283:ILE:HD11	3:a:381:PHE:CE1	2.49	0.48
3:a:290:ALA:HB2	3:a:392:TYR:CZ	2.49	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:a:899:ILE:N	3:a:935:THR:O	2.36	0.48
3:a:821:SER:HG	3:a:825:LYS:HZ3	1.55	0.48
3:a:519:ALA:HB3	3:a:524:LYS:HD2	1.96	0.48
3:A:283:ILE:HD11	3:A:381:PHE:CE1	2.49	0.48
3:A:34:LEU:HA	3:A:38:PHE:CD2	2.48	0.48
4:B:30:ASP:OD2	4:B:33:HIS:N	2.47	0.48
2:e:56:LEU:HD11	2:e:61:ILE:HG21	1.95	0.48
3:A:84:HIS:O	3:A:88:GLN:HG2	2.13	0.48
4:B:127:ILE:HG22	4:B:135:TYR:HB2	1.96	0.48
3:a:865:GLU:OE2	3:a:868:ARG:NH1	2.42	0.47
4:b:127:ILE:HG22	4:b:135:TYR:HB2	1.95	0.47
1:d:51:GLU:OE1	1:d:53:GLY:N	2.48	0.47
2:c:19:PRO:HA	2:c:56:LEU:HD22	1.95	0.47
2:C:42:ARG:HB2	2:C:72:ARG:HG3	1.95	0.47
3:A:351:LEU:HD13	3:A:356:ARG:NH2	2.29	0.47
3:A:469:VAL:O	3:A:473:ILE:HG13	2.14	0.47
3:a:673:PHE:O	3:a:677:VAL:HG23	2.15	0.47
3:a:695:LEU:O	3:a:699:HIS:ND1	2.34	0.47
3:a:131:LEU:HA	3:a:134:ILE:HD12	1.96	0.47
1:d:51:GLU:N	1:d:59:TYR:OH	2.46	0.47
3:A:673:PHE:O	3:A:677:VAL:HG23	2.15	0.47
3:A:811:ILE:O	3:A:814:SER:OG	2.25	0.47
3:a:283:ILE:HD11	3:a:381:PHE:HE1	1.80	0.47
2:e:32:ASP:OD1	2:e:33:LYS:N	2.48	0.47
2:f:4:PHE:HB2	2:f:66:THR:HA	1.97	0.47
2:f:19:PRO:HA	2:f:56:LEU:HB2	1.96	0.47
4:b:76:HIS:CG	4:b:77:PRO:HD2	2.49	0.47
2:e:11:LYS:HB2	3:a:204:TYR:CZ	2.50	0.47
3:A:890:MET:SD	4:B:2:SER:HB3	2.55	0.47
3:a:482:ARG:O	3:a:488:HIS:ND1	2.48	0.47
2:F:6:LYS:O	2:F:69:LEU:N	2.26	0.46
3:A:401:LEU:O	3:A:404:GLU:HG3	2.16	0.46
3:a:84:HIS:O	3:a:88:GLN:HG2	2.14	0.46
2:e:2:GLN:HA	2:e:16:GLU:HA	1.96	0.46
3:A:250:HIS:NE2	3:A:454:PHE:O	2.48	0.46
3:a:326:PHE:HB3	3:a:337:ILE:HD11	1.98	0.46
3:a:804:LYS:O	3:a:807:THR:OG1	2.30	0.46
3:A:131:LEU:HA	3:A:134:ILE:HD12	1.97	0.46
3:a:823:VAL:HG12	3:a:830:PHE:HE1	1.81	0.46
3:a:406:LYS:C	3:a:408:GLY:H	2.24	0.46
2:f:62:GLN:HG2	2:f:63:LYS:N	2.30	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:183:LEU:O	3:A:186:THR:OG1	2.34	0.46
2:F:38:PRO:HA	2:F:41:GLN:CD	2.41	0.46
4:B:76:HIS:CG	4:B:77:PRO:HD2	2.50	0.46
3:a:34:LEU:HA	3:a:38:PHE:HD2	1.80	0.46
3:a:366:ALA:O	3:a:370:LYS:N	2.46	0.45
3:A:171:SER:HA	3:A:174:TYR:CZ	2.51	0.45
3:A:230:VAL:HG12	3:A:234:ASN:ND2	2.31	0.45
3:a:34:LEU:HA	3:a:38:PHE:CD2	2.50	0.45
4:b:55:ILE:HG12	4:b:68:ILE:HG23	1.98	0.45
3:A:173:ILE:O	3:A:177:VAL:HG23	2.17	0.45
3:A:330:SER:HB2	3:A:332:LYS:NZ	2.32	0.45
2:E:22:THR:O	2:E:26:VAL:HG23	2.16	0.45
3:A:283:ILE:HD11	3:A:381:PHE:HE1	1.82	0.45
3:A:366:ALA:O	3:A:370:LYS:N	2.49	0.45
3:a:173:ILE:O	3:a:177:VAL:HG23	2.17	0.45
3:a:330:SER:HB2	3:a:332:LYS:NZ	2.32	0.45
3:a:902:ALA:C	3:a:925:ASN:HD21	2.24	0.45
4:b:86:CYS:SG	4:b:118:ASP:CB	3.04	0.45
2:f:37:PRO:HA	2:f:38:PRO:HD3	1.87	0.45
3:a:47:LEU:HD13	3:a:107:PHE:CE2	2.52	0.45
3:a:919:ASP:OD1	3:a:920:SER:N	2.50	0.45
3:A:820:ILE:HG22	3:A:860:PHE:HE1	1.80	0.45
3:A:209:GLN:OE1	3:A:209:GLN:N	2.35	0.45
3:A:294:HIS:HA	3:A:395:TYR:CE1	2.52	0.45
3:a:773:ASN:OD1	3:a:810:TYR:OH	2.24	0.45
2:E:72:ARG:O	2:E:73:LEU:C	2.60	0.44
3:A:24:LYS:HE3	3:A:25:SER:HB3	1.99	0.44
3:A:815:GLU:O	3:A:816:GLN:NE2	2.50	0.44
3:a:24:LYS:HB3	3:a:25:SER:HB3	2.00	0.44
3:a:247:ALA:HA	3:a:250:HIS:CD2	2.52	0.44
2:E:49:GLN:OE1	3:A:372:ARG:NH2	2.50	0.44
2:F:25:ASN:O	2:F:29:LYS:HG3	2.17	0.44
2:e:8:LEU:HD23	2:e:8:LEU:HA	1.86	0.44
2:C:1:MET:N	2:C:17:VAL:O	2.36	0.44
3:a:171:SER:HA	3:a:174:TYR:CZ	2.52	0.44
3:a:898:VAL:N	3:a:907:ILE:O	2.30	0.44
1:d:21:ASP:O	1:d:56:LEU:N	2.49	0.44
3:A:153:PRO:HA	3:A:156:LEU:HB3	1.99	0.44
3:a:227:GLU:OE1	3:a:229:ALA:N	2.49	0.44
4:b:45:PRO:HB2	4:b:139:ALA:HB3	1.99	0.44
2:f:6:LYS:N	2:f:67:LEU:O	2.39	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:c:6:LYS:HD2	2:c:10:GLY:HA2	2.00	0.44
3:A:532:GLU:O	3:A:536:ASN:ND2	2.25	0.44
3:a:890:MET:SD	4:b:2:SER:HB3	2.58	0.44
3:a:901:PRO:O	3:a:904:LYS:NZ	2.51	0.44
3:A:295:LEU:HB2	3:A:306:LEU:HD11	2.00	0.44
3:A:820:ILE:HG22	3:A:860:PHE:CE1	2.53	0.44
4:B:139:ALA:O	4:B:143:THR:OG1	2.24	0.44
3:a:112:ALA:H	3:a:115:ASN:ND2	2.16	0.44
3:a:246:THR:HG22	3:a:250:HIS:CE1	2.53	0.44
3:a:523:PHE:HA	3:a:526:TYR:CE2	2.53	0.44
1:d:21:ASP:OD1	1:d:25:ASN:ND2	2.50	0.43
3:a:677:VAL:O	3:a:680:MET:HG2	2.18	0.43
4:b:55:ILE:HG12	4:b:68:ILE:HD12	2.00	0.43
3:A:602:ASP:O	3:A:606:HIS:ND1	2.39	0.43
3:a:380:ASN:HD21	3:a:382:ILE:HB	1.82	0.43
3:A:13:ASP:HB2	3:A:14:PRO:HA	2.00	0.43
3:A:24:LYS:HB3	3:A:25:SER:HB3	1.99	0.43
3:A:618:LEU:HA	3:A:621:PHE:HB3	2.00	0.43
3:a:265:PHE:CZ	3:a:321:ARG:HG2	2.53	0.43
3:A:683:ASP:O	3:A:687:LEU:HG	2.18	0.43
3:A:804:LYS:O	3:A:807:THR:OG1	2.30	0.43
3:a:11:THR:O	3:a:23:LEU:HB2	2.18	0.43
3:a:294:HIS:HA	3:a:395:TYR:CE1	2.53	0.43
3:a:823:VAL:HG12	3:a:830:PHE:CE1	2.53	0.43
4:b:26:PRO:HA	4:b:34:TRP:HA	2.01	0.43
2:e:22:THR:O	2:e:26:VAL:HG23	2.18	0.43
3:a:13:ASP:HB2	3:a:14:PRO:HA	2.00	0.43
2:F:37:PRO:HA	2:F:38:PRO:HD3	1.90	0.43
1:d:39:ASP:OD1	1:d:40:GLN:HG3	2.18	0.43
2:f:70:VAL:HG21	4:B:50:VAL:HG21	2.00	0.43
2:C:6:LYS:HD2	2:C:10:GLY:HA2	2.00	0.43
3:a:622:TYR:CZ	3:a:641:ARG:HD3	2.54	0.43
3:a:406:LYS:C	3:a:408:GLY:N	2.76	0.43
3:a:641:ARG:NH1	3:a:683:ASP:OD2	2.52	0.43
4:b:58:PRO:HD3	4:b:66:PRO:HA	2.01	0.43
2:e:42:ARG:NH2	3:a:369:ASP:OD1	2.48	0.43
3:A:47:LEU:HD21	3:A:60:LEU:HD11	2.01	0.43
3:A:301:PRO:HD2	3:A:303:PHE:CE1	2.54	0.43
3:A:346:SER:OG	3:A:349:ILE:O	2.21	0.43
3:A:257:HIS:O	3:A:261:ILE:HG12	2.19	0.43
3:a:117:ILE:HA	3:a:120:ILE:HB	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:a:771:MET:HE3	3:a:771:MET:HB3	1.97	0.43
4:b:19:PRO:HG2	4:b:22:SER:O	2.19	0.43
3:A:227:GLU:OE1	3:A:229:ALA:N	2.51	0.43
2:E:62:GLN:N	2:E:65:SER:OG	2.47	0.42
3:a:254:GLN:NE2	3:a:458:GLY:O	2.52	0.42
3:a:481:ILE:O	3:a:484:VAL:HG12	2.19	0.42
3:a:767:ARG:H	3:a:767:ARG:HG2	1.70	0.42
2:E:42:ARG:NH1	2:E:49:GLN:HG2	2.32	0.42
3:A:152:PHE:HB2	3:A:153:PRO:HD3	2.01	0.42
3:A:330:SER:HB2	3:A:332:LYS:HZ3	1.84	0.42
3:A:523:PHE:HA	3:A:526:TYR:CE2	2.53	0.42
3:A:889:LEU:HD23	3:A:907:ILE:HD12	2.00	0.42
3:a:330:SER:HB2	3:a:332:LYS:HZ3	1.83	0.42
3:a:891:TYR:CE2	4:b:6:ARG:HD2	2.53	0.42
3:a:102:LEU:HD23	3:a:102:LEU:HA	1.91	0.42
3:a:295:LEU:O	3:a:301:PRO:HB3	2.19	0.42
3:a:543:LYS:HE2	3:a:544:TYR:CZ	2.55	0.42
3:A:585:LEU:HD23	3:A:585:LEU:HA	1.82	0.42
3:a:200:PHE:O	3:a:215:THR:OG1	2.37	0.42
3:a:324:GLN:CD	3:a:325:PRO:HD3	2.45	0.42
2:E:27:LYS:NZ	2:E:38:PRO:HA	2.34	0.42
1:d:11:LYS:HB3	1:d:11:LYS:HE2	1.86	0.42
3:A:549:ILE:H	3:A:549:ILE:HG13	1.62	0.42
3:A:845:LYS:O	3:A:848:LEU:HG	2.20	0.42
3:A:878:TYR:CE1	3:A:952:LYS:HA	2.54	0.42
3:a:565:VAL:HG12	3:a:566:LEU:HD23	2.01	0.42
3:a:619:LEU:HA	3:a:619:LEU:HD23	1.90	0.42
2:f:44:ILE:N	2:f:68:HIS:O	2.44	0.42
3:A:465:LEU:O	3:A:469:VAL:HG23	2.20	0.42
4:B:45:PRO:HB2	4:B:139:ALA:HB3	2.01	0.42
3:a:295:LEU:HB2	3:a:306:LEU:HD11	2.00	0.42
3:a:312:MET:HA	3:a:315:ILE:HD11	2.01	0.42
2:E:8:LEU:HD23	2:E:8:LEU:HA	1.91	0.42
3:A:175:ASN:OD1	3:A:175:ASN:N	2.53	0.42
3:A:483:VAL:HA	3:A:488:HIS:HD1	1.85	0.42
3:a:878:TYR:CE1	3:a:952:LYS:HA	2.55	0.42
1:D:37:PRO:HA	1:D:38:PRO:HD3	1.96	0.42
1:D:62:GLN:O	1:D:65:SER:OG	2.37	0.42
2:f:25:ASN:O	2:f:29:LYS:HG3	2.20	0.42
3:A:763:GLU:OE1	3:A:763:GLU:N	2.36	0.42
3:A:823:VAL:HG12	3:A:830:PHE:CE1	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:898:VAL:N	3:A:907:ILE:O	2.27	0.41
2:e:43:LEU:HD12	2:e:43:LEU:HA	1.85	0.41
2:e:67:LEU:HD13	2:e:67:LEU:HA	1.82	0.41
3:A:481:ILE:O	3:A:484:VAL:HG12	2.20	0.41
3:a:209:GLN:OE1	3:a:209:GLN:N	2.34	0.41
3:a:230:VAL:HG12	3:a:234:ASN:HD21	1.85	0.41
1:D:32:ASP:OD1	1:D:33:LYS:N	2.53	0.41
2:E:27:LYS:HZ3	2:E:38:PRO:HA	1.85	0.41
3:A:326:PHE:HA	3:A:333:LYS:HD2	2.02	0.41
3:A:750:ILE:HG13	3:A:751:TYR:CD1	2.55	0.41
3:A:792:PRO:HB2	3:A:797:PHE:O	2.20	0.41
2:E:32:ASP:OD1	2:E:33:LYS:N	2.53	0.41
2:f:4:PHE:O	2:f:67:LEU:N	2.43	0.41
3:A:823:VAL:HG12	3:A:830:PHE:HE1	1.85	0.41
4:B:87:LEU:O	4:B:90:LEU:HG	2.20	0.41
3:a:891:TYR:CD2	4:b:9:LYS:HD3	2.55	0.41
2:f:30:ILE:HA	2:f:33:LYS:HG2	2.03	0.41
3:a:820:ILE:HG22	3:a:860:PHE:HE1	1.86	0.41
3:a:845:LYS:O	3:a:848:LEU:HG	2.21	0.41
3:A:615:LEU:HD23	3:A:616:TYR:H	1.85	0.41
3:A:887:ASP:HB3	3:A:890:MET:HB3	2.02	0.41
1:D:31:GLN:HB3	1:D:36:ILE:O	2.21	0.41
2:F:22:THR:HA	2:F:55:THR:HA	2.03	0.41
2:e:72:ARG:NH1	3:a:352:SER:HA	2.36	0.41
3:A:695:LEU:O	3:A:699:HIS:ND1	2.36	0.41
3:a:158:TYR:HA	3:a:162:HIS:HD2	1.86	0.41
3:a:257:HIS:O	3:a:261:ILE:HG12	2.21	0.41
3:a:839:VAL:O	3:a:842:LEU:HG	2.21	0.41
2:E:43:LEU:HD12	2:E:43:LEU:HA	1.88	0.41
2:F:6:LYS:NZ	4:b:19:PRO:O	2.54	0.41
3:A:66:ARG:O	3:A:70:GLN:HG2	2.21	0.41
3:A:462:HIS:CD2	3:A:462:HIS:C	2.99	0.41
2:e:45:PHE:HB2	2:e:67:LEU:HD11	2.03	0.40
2:f:15:LEU:HG	2:f:17:VAL:HG13	2.02	0.40
3:A:117:ILE:HA	3:A:120:ILE:HB	2.02	0.40
3:a:45:TYR:HA	3:a:49:GLU:HG2	2.03	0.40
3:a:908:ASP:OD1	3:a:909:ARG:N	2.51	0.40
4:b:87:LEU:O	4:b:90:LEU:HG	2.21	0.40
2:F:4:PHE:HB2	2:F:66:THR:HA	2.04	0.40
3:A:324:GLN:CD	3:A:325:PRO:HD3	2.46	0.40
3:a:230:VAL:HG12	3:a:234:ASN:ND2	2.36	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:a:585:LEU:HD23	3:a:585:LEU:HA	1.82	0.40
3:a:818:GLU:OE1	3:a:818:GLU:N	2.52	0.40
3:a:894:MET:O	3:a:897:PRO:HD3	2.21	0.40
3:A:465:LEU:HA	3:A:468:GLU:OE1	2.21	0.40
3:A:810:TYR:CD1	3:A:819:PHE:HZ	2.37	0.40
3:a:462:HIS:NE2	3:a:464:SER:HB3	2.37	0.40
4:b:137:ALA:O	4:b:141:GLU:HG3	2.21	0.40
2:e:1:MET:O	2:e:17:VAL:N	2.43	0.40
3:A:55:LYS:HB3	3:A:58:GLU:HB3	2.04	0.40
3:A:242:SER:H	3:A:245:GLN:NE2	2.19	0.40
3:A:264:LEU:HA	3:A:267:ILE:HG13	2.04	0.40
3:A:312:MET:O	3:A:316:THR:OG1	2.39	0.40
4:B:60:ASP:O	4:B:64:LYS:N	2.54	0.40
4:b:30:ASP:OD2	4:b:33:HIS:N	2.55	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	74/76 (97%)	67 (90%)	7 (10%)	0	100	100
1	d	74/76 (97%)	68 (92%)	6 (8%)	0	100	100
2	C	74/76 (97%)	71 (96%)	3 (4%)	0	100	100
2	E	74/76 (97%)	69 (93%)	5 (7%)	0	100	100
2	F	74/76 (97%)	72 (97%)	2 (3%)	0	100	100
2	c	74/76 (97%)	70 (95%)	4 (5%)	0	100	100
2	e	74/76 (97%)	68 (92%)	6 (8%)	0	100	100
2	f	74/76 (97%)	70 (95%)	4 (5%)	0	100	100
3	A	905/955 (95%)	872 (96%)	33 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	a	910/955 (95%)	864 (95%)	45 (5%)	1 (0%)	48	83
4	B	138/148 (93%)	134 (97%)	4 (3%)	0	100	100
4	b	140/148 (95%)	130 (93%)	10 (7%)	0	100	100
All	All	2685/2814 (95%)	2555 (95%)	129 (5%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	a	407	MET

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	D	49/68 (72%)	49 (100%)	0	100	100
1	d	54/68 (79%)	54 (100%)	0	100	100
2	C	47/68 (69%)	47 (100%)	0	100	100
2	E	56/68 (82%)	56 (100%)	0	100	100
2	F	61/68 (90%)	61 (100%)	0	100	100
2	c	47/68 (69%)	47 (100%)	0	100	100
2	e	56/68 (82%)	56 (100%)	0	100	100
2	f	59/68 (87%)	59 (100%)	0	100	100
3	A	645/862 (75%)	645 (100%)	0	100	100
3	a	656/862 (76%)	656 (100%)	0	100	100
4	B	95/130 (73%)	95 (100%)	0	100	100
4	b	97/130 (75%)	97 (100%)	0	100	100
All	All	1922/2528 (76%)	1922 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (46)

such sidechains are listed below:

Mol	Chain	Res	Type
2	E	62	GLN
2	F	41	GLN
2	F	49	GLN
1	d	49	GLN
2	f	25	ASN
2	f	41	GLN
3	A	46	GLN
3	A	68	GLN
3	A	69	GLN
3	A	70	GLN
3	A	88	GLN
3	A	162	HIS
3	A	169	ASN
3	A	234	ASN
3	A	244	GLN
3	A	245	GLN
3	A	254	GLN
3	A	371	ASN
3	A	394	HIS
3	A	462	HIS
3	A	665	GLN
3	A	703	ASN
3	A	812	ASN
3	A	816	GLN
3	A	950	GLN
4	B	78	ASN
4	B	84	ASN
3	a	46	GLN
3	a	68	GLN
3	a	69	GLN
3	a	88	GLN
3	a	162	HIS
3	a	234	ASN
3	a	244	GLN
3	a	245	GLN
3	a	250	HIS
3	a	254	GLN
3	a	371	ASN
3	a	462	HIS
3	a	665	GLN
3	a	703	ASN
3	a	812	ASN

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Mol	Chain	Res	Type
3	a	816	GLN
3	a	950	GLN
4	b	78	ASN
4	b	84	ASN

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)

There are no ligands in this entry.

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.