



# Full wwPDB NMR Structure Validation Report ⓘ

Nov 12, 2024 – 07:13 AM JST

PDB ID : 8XE8  
BMRB ID : 36622  
Title : Solution structure of ubiquitin-like domain (UBL) of human ZFAND1  
Authors : Lai, C.H.; Ko, K.T.; Fan, P.J.; Yu, T.A.; Chang, C.F.; Hsu, S.T.D.  
Deposited on : 2023-12-11

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/NMRValidationReportHelp>

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>.

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

MolProbity : 4.02b-467  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
wwPDB-RCI : v\_1n\_11\_5\_13\_A (Berjanski et al., 2005)  
PANAV : Wang et al. (2010)  
wwPDB-ShiftChecker : v1.2  
BMRB Restraints Analysis : v1.2  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

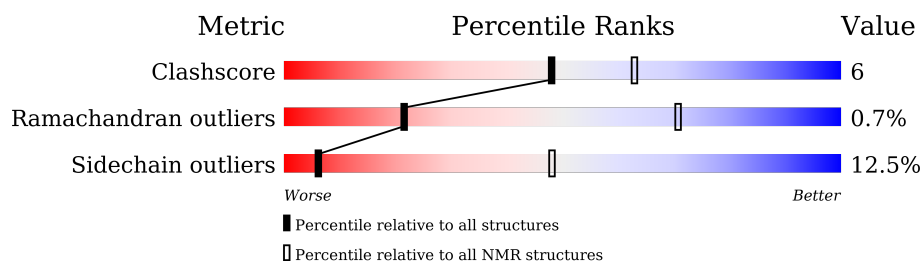
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*SOLUTION NMR*

The overall completeness of chemical shifts assignment is 87%.

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)	NMR archive (#Entries)
Clashscore	210492	14027
Ramachandran outliers	207382	12486
Sidechain outliers	206894	12463

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and 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  $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	139	 83% 11% 6%

## 2 Ensemble composition and analysis ⓘ

This entry contains 20 models. Model 5 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *lowest energy*.

The following residues are included in the computation of the global validation metrics.

Well-defined (core) protein residues			
Well-defined core	Residue range (total)	Backbone RMSD (Å)	Medoid model
1	A:138-A:268 (131)	1.23	5

Ill-defined regions of proteins are excluded from the global statistics.

Ligands and non-protein polymers are included in the analysis.

The models can be grouped into 2 clusters. No single-model clusters were found.

Cluster number	Models
1	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 19, 20
2	10, 18

### 3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 2197 atoms, of which 1098 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called AN1-type zinc finger protein 1.

Mol	Chain	Residues	Atoms						Trace
1	A	139	Total	C	H	N	O	S	0
			2197	699	1098	188	205	7	

There are 3 discrepancies between the modelled and reference sequences:

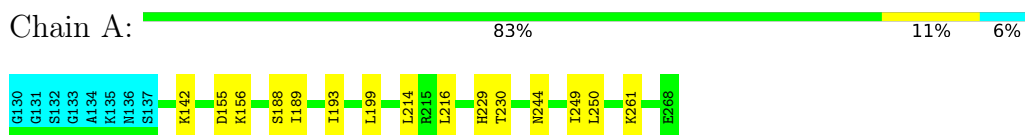
Chain	Residue	Modelled	Actual	Comment	Reference
A	130	GLY	-	expression tag	UNP Q8TCF1
A	131	GLY	-	expression tag	UNP Q8TCF1
A	132	SER	-	expression tag	UNP Q8TCF1

## 4 Residue-property plots

### 4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-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 outliers are shown as green connectors. Residues which are classified as ill-defined in the NMR ensemble, are shown in cyan with an underline colour-coded according to the previous scheme. Residues which were present in the experimental sample, but not modelled in the final structure are shown in grey.

- Molecule 1: AN1-type zinc finger protein 1

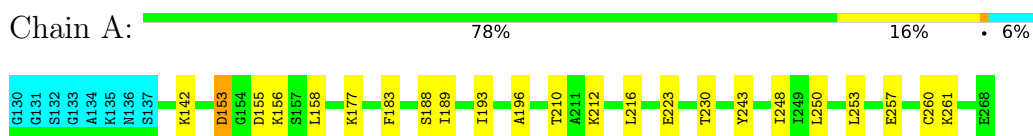


### 4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

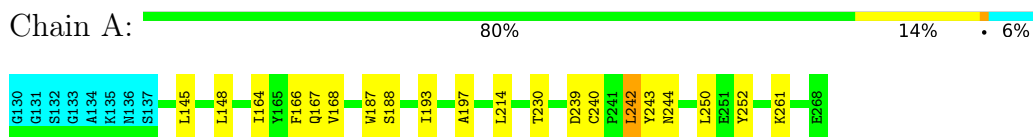
#### 4.2.1 Score per residue for model 1

- Molecule 1: AN1-type zinc finger protein 1



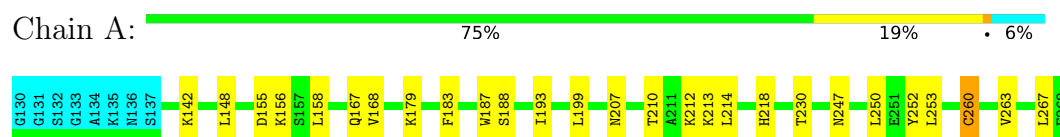
#### 4.2.2 Score per residue for model 2

- Molecule 1: AN1-type zinc finger protein 1



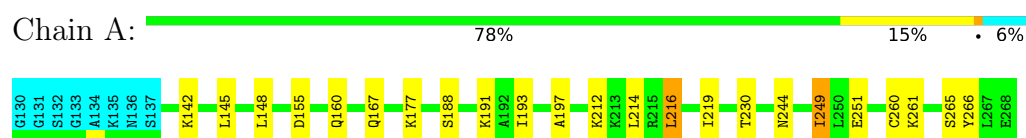
### 4.2.3 Score per residue for model 3

- Molecule 1: AN1-type zinc finger protein 1



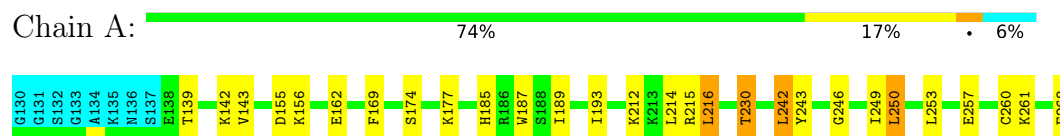
### 4.2.4 Score per residue for model 4

- Molecule 1: AN1-type zinc finger protein 1



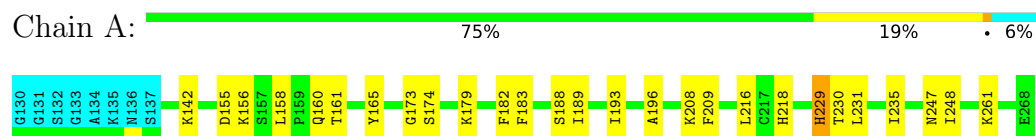
### 4.2.5 Score per residue for model 5 (medoid)

- Molecule 1: AN1-type zinc finger protein 1



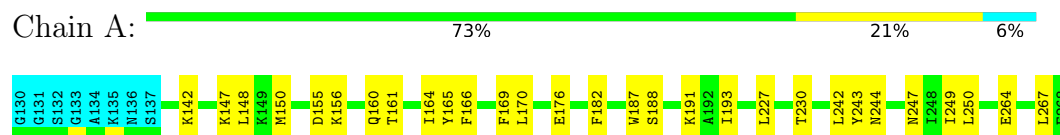
### 4.2.6 Score per residue for model 6

- Molecule 1: AN1-type zinc finger protein 1



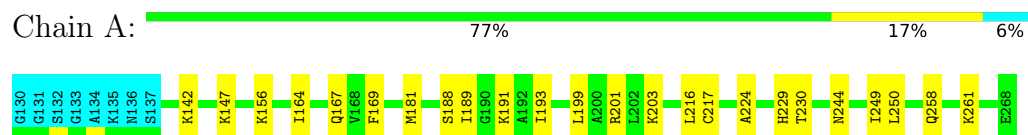
### 4.2.7 Score per residue for model 7

- Molecule 1: AN1-type zinc finger protein 1



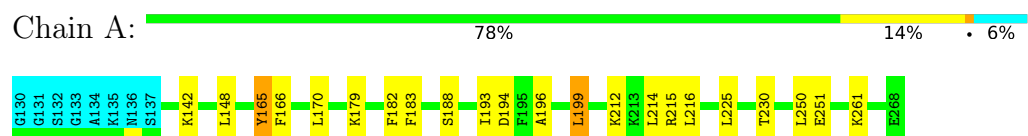
### 4.2.8 Score per residue for model 8

- Molecule 1: AN1-type zinc finger protein 1



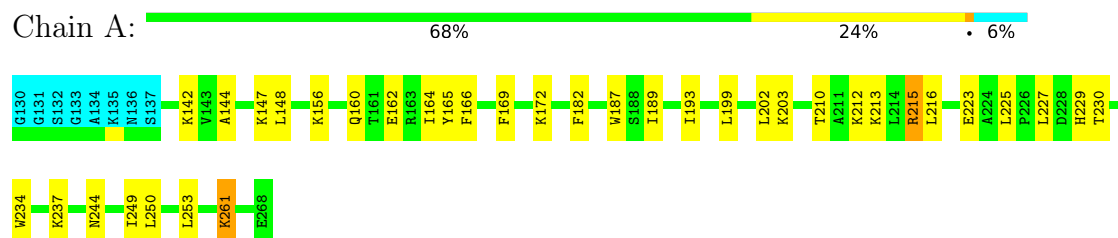
### 4.2.9 Score per residue for model 9

- Molecule 1: AN1-type zinc finger protein 1



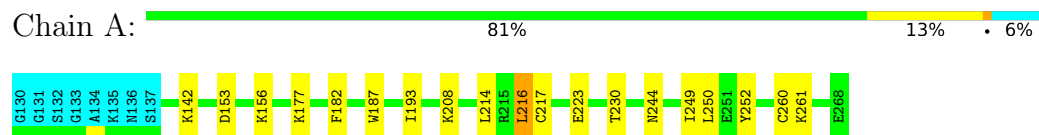
### 4.2.10 Score per residue for model 10

- Molecule 1: AN1-type zinc finger protein 1



### 4.2.11 Score per residue for model 11

- Molecule 1: AN1-type zinc finger protein 1



### 4.2.12 Score per residue for model 12

- Molecule 1: AN1-type zinc finger protein 1

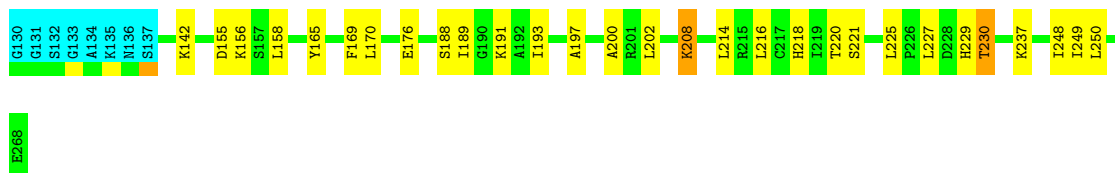




#### 4.2.13 Score per residue for model 13

- Molecule 1: AN1-type zinc finger protein 1

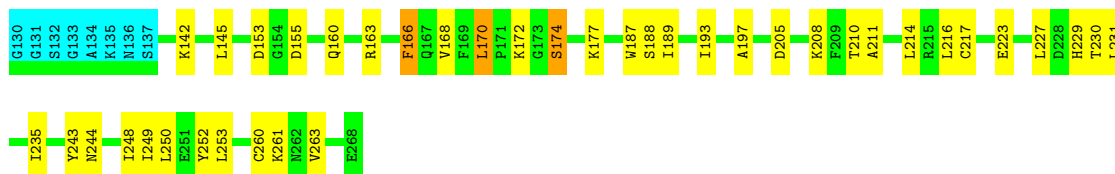
Chain A: 73% 19% • 6%



#### 4.2.14 Score per residue for model 14

- Molecule 1: AN1-type zinc finger protein 1

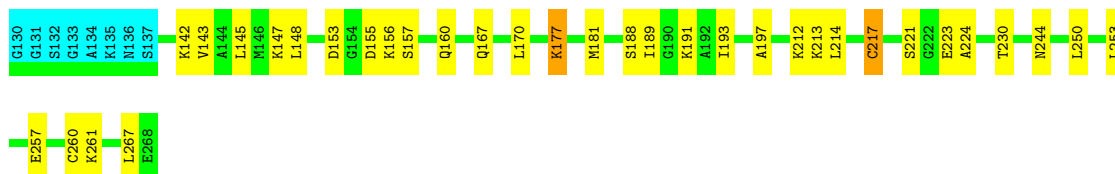
Chain A: 65% 27% • 6%



#### 4.2.15 Score per residue for model 15

- Molecule 1: AN1-type zinc finger protein 1

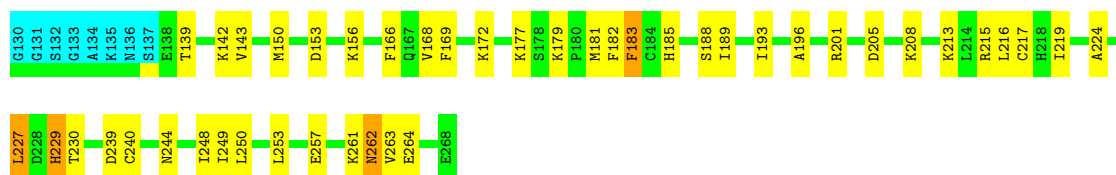
Chain A: 70% 23% • 6%



#### 4.2.16 Score per residue for model 16

- Molecule 1: AN1-type zinc finger protein 1

Chain A: 63% 29% • 6%



#### 4.2.17 Score per residue for model 17

- Molecule 1: AN1-type zinc finger protein 1

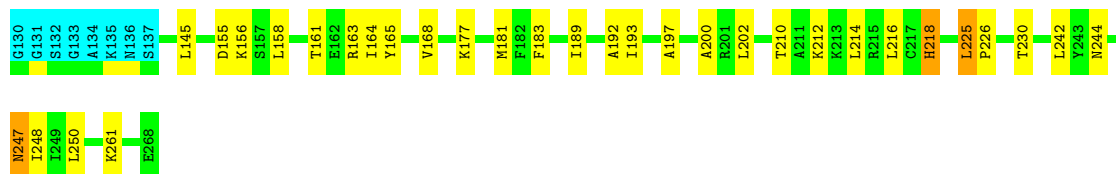
Chain A: 77% 16% • 6%



#### 4.2.18 Score per residue for model 18

- Molecule 1: AN1-type zinc finger protein 1

Chain A: 71% 21% • 6%



#### 4.2.19 Score per residue for model 19

- Molecule 1: AN1-type zinc finger protein 1

Chain A: 78% 14% • 6%



#### 4.2.20 Score per residue for model 20

- Molecule 1: AN1-type zinc finger protein 1

Chain A: 73% 19% • 6%



## 5 Refinement protocol and experimental data overview

The models were refined using the following method: *na*.

Of the 100 calculated structures, 20 were deposited, based on the following criterion: *structures with the least restraint violations*.

The following table shows the software used for structure solution, optimisation and refinement.

Software name	Classification	Version
CYANA	structure calculation	3.98.13

The following table shows chemical shift validation statistics as aggregates over all chemical shift files. Detailed validation can be found in section 7 of this report.

Chemical shift file(s)	working_cs.cif
Number of chemical shift lists	1
Total number of shifts	1634
Number of shifts mapped to atoms	1634
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	87%

## 6 Model quality

### 6.1 Standard geometry

There are no covalent bond-length or bond-angle outliers.

There are no bond-length outliers.

There are no bond-angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 6.2 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 each 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 averaged over the ensemble.

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	A	1053	1055	1055	12±4
All	All	21060	21100	21100	239

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 6.

All unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:193:ILE:HD12	1:A:250:LEU:HD11	1.03	1.31	3	2
1:A:197:ALA:HB2	1:A:214:LEU:HD22	0.94	1.38	4	4
1:A:193:ILE:HD11	1:A:216:LEU:HD23	0.91	1.40	18	4
1:A:219:ILE:HG23	1:A:263:VAL:HG21	0.80	1.54	16	1
1:A:193:ILE:HG23	1:A:250:LEU:HD21	0.79	1.52	11	3
1:A:216:LEU:C	1:A:216:LEU:HD22	0.74	2.02	11	1
1:A:193:ILE:HG23	1:A:250:LEU:HD22	0.71	1.63	17	4
1:A:197:ALA:HB2	1:A:214:LEU:HD23	0.70	1.63	19	3
1:A:193:ILE:HG23	1:A:250:LEU:HD13	0.69	1.65	9	2
1:A:214:LEU:HD13	1:A:252:TYR:CZ	0.65	2.27	2	4
1:A:249:ILE:HD13	1:A:263:VAL:HG13	0.65	1.68	20	1
1:A:193:ILE:HD12	1:A:250:LEU:CD2	0.64	2.23	17	2
1:A:193:ILE:HD12	1:A:250:LEU:HD21	0.64	1.70	17	2
1:A:189:ILE:CG2	1:A:216:LEU:HD21	0.64	2.23	8	6

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:168:VAL:HG11	1:A:250:LEU:HD12	0.63	1.69	18	1
1:A:218:HIS:CD2	1:A:242:LEU:HD23	0.63	2.29	18	1
1:A:214:LEU:HD21	1:A:250:LEU:HD13	0.62	1.71	12	1
1:A:145:LEU:HD21	1:A:244:ASN:OD1	0.61	1.94	18	1
1:A:216:LEU:HD22	1:A:248:ILE:CG2	0.61	2.26	12	1
1:A:164:ILE:HD11	1:A:244:ASN:OD1	0.60	1.96	8	4
1:A:197:ALA:HB2	1:A:214:LEU:CD2	0.60	2.26	18	9
1:A:225:LEU:HD13	1:A:234:TRP:CE2	0.60	2.31	10	1
1:A:225:LEU:HD13	1:A:226:PRO:HD2	0.60	1.71	18	1
1:A:193:ILE:HD12	1:A:250:LEU:CD1	0.60	2.26	14	1
1:A:166:PHE:CE2	1:A:168:VAL:HG22	0.59	2.33	2	2
1:A:249:ILE:HD13	1:A:263:VAL:CG1	0.59	2.26	14	2
1:A:193:ILE:CG1	1:A:250:LEU:HD11	0.58	2.28	1	2
1:A:169:PHE:HB3	1:A:249:ILE:HD12	0.58	1.74	20	4
1:A:170:LEU:HD11	1:A:179:LYS:HB2	0.58	1.76	9	1
1:A:231:LEU:O	1:A:235:ILE:HD12	0.57	1.99	14	2
1:A:215:ARG:NH2	1:A:253:LEU:HD13	0.57	2.15	10	1
1:A:166:PHE:CD2	1:A:248:ILE:HD12	0.56	2.34	14	1
1:A:193:ILE:HD11	1:A:216:LEU:HD22	0.56	1.76	20	3
1:A:155:ASP:HB3	1:A:158:LEU:HD23	0.56	1.78	13	2
1:A:189:ILE:HD12	1:A:229:HIS:O	0.55	2.01	14	3
1:A:253:LEU:HD11	1:A:257:GLU:CB	0.55	2.32	16	1
1:A:193:ILE:HG23	1:A:250:LEU:HD11	0.55	1.78	19	3
1:A:169:PHE:CB	1:A:249:ILE:HD12	0.55	2.32	8	2
1:A:183:PHE:CE2	1:A:192:ALA:HB1	0.55	2.36	18	1
1:A:170:LEU:HD12	1:A:176:GLU:O	0.54	2.01	13	1
1:A:193:ILE:HG23	1:A:250:LEU:CD2	0.54	2.29	11	6
1:A:139:THR:O	1:A:143:VAL:HG23	0.54	2.02	20	4
1:A:155:ASP:HB2	1:A:158:LEU:HD12	0.54	1.79	19	1
1:A:193:ILE:HG12	1:A:250:LEU:HD11	0.54	1.79	11	3
1:A:170:LEU:HD12	1:A:176:GLU:HB3	0.54	1.80	7	1
1:A:247:ASN:O	1:A:248:ILE:HD13	0.53	2.03	6	2
1:A:216:LEU:HD13	1:A:248:ILE:HG21	0.53	1.79	19	2
1:A:193:ILE:HD12	1:A:250:LEU:HB3	0.53	1.79	5	1
1:A:253:LEU:HD11	1:A:257:GLU:HB3	0.53	1.80	5	3
1:A:214:LEU:HG	1:A:250:LEU:HD12	0.53	1.80	5	1
1:A:193:ILE:HG12	1:A:250:LEU:HD22	0.53	1.80	9	1
1:A:197:ALA:HB1	1:A:204:ASN:OD1	0.53	2.04	17	1
1:A:267:LEU:HD23	1:A:267:LEU:O	0.53	2.04	17	1
1:A:214:LEU:HD21	1:A:250:LEU:HD21	0.53	1.81	14	1
1:A:217:CYS:O	1:A:249:ILE:HG22	0.52	2.05	20	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:145:LEU:HD21	1:A:244:ASN:ND2	0.52	2.20	20	2
1:A:189:ILE:HG22	1:A:216:LEU:HD21	0.52	1.82	6	2
1:A:193:ILE:CG2	1:A:214:LEU:HD23	0.52	2.35	4	2
1:A:189:ILE:HG22	1:A:216:LEU:HD22	0.52	1.82	5	1
1:A:189:ILE:HD12	1:A:229:HIS:HB3	0.51	1.82	20	2
1:A:193:ILE:CG1	1:A:216:LEU:HD23	0.51	2.34	6	1
1:A:216:LEU:C	1:A:216:LEU:CD2	0.51	2.76	11	1
1:A:188:SER:HA	1:A:230:THR:HG23	0.51	1.81	13	1
1:A:166:PHE:CZ	1:A:168:VAL:HG22	0.51	2.40	2	2
1:A:183:PHE:CE1	1:A:196:ALA:HB2	0.51	2.41	16	1
1:A:168:VAL:HG22	1:A:179:LYS:O	0.51	2.06	3	2
1:A:166:PHE:CE2	1:A:168:VAL:HG12	0.51	2.40	20	1
1:A:216:LEU:HD13	1:A:248:ILE:CD1	0.51	2.36	16	1
1:A:250:LEU:O	1:A:250:LEU:HD12	0.51	2.05	12	1
1:A:193:ILE:HG13	1:A:216:LEU:HD23	0.50	1.83	6	1
1:A:225:LEU:HD22	1:A:234:TRP:CZ2	0.50	2.41	10	1
1:A:155:ASP:CB	1:A:158:LEU:HD23	0.50	2.35	13	2
1:A:227:LEU:O	1:A:227:LEU:HD12	0.50	2.07	14	4
1:A:189:ILE:HG21	1:A:225:LEU:HG	0.50	1.81	18	1
1:A:216:LEU:HD22	1:A:248:ILE:HG21	0.50	1.84	12	1
1:A:189:ILE:HG23	1:A:216:LEU:HD21	0.50	1.83	1	1
1:A:214:LEU:CD2	1:A:250:LEU:HD13	0.50	2.37	12	1
1:A:217:CYS:SG	1:A:224:ALA:HB2	0.49	2.47	20	4
1:A:193:ILE:CD1	1:A:216:LEU:HD23	0.49	2.31	1	1
1:A:145:LEU:HD21	1:A:244:ASN:HD21	0.49	1.68	15	4
1:A:144:ALA:O	1:A:148:LEU:HD23	0.49	2.08	20	1
1:A:169:PHE:HB2	1:A:249:ILE:HD12	0.49	1.85	8	3
1:A:155:ASP:HB3	1:A:158:LEU:HD13	0.48	1.84	1	1
1:A:214:LEU:HD13	1:A:252:TYR:CE2	0.48	2.43	2	2
1:A:189:ILE:CG2	1:A:216:LEU:HD13	0.48	2.38	5	2
1:A:200:ALA:CB	1:A:202:LEU:HD23	0.48	2.38	18	3
1:A:164:ILE:HD13	1:A:165:TYR:N	0.48	2.23	17	1
1:A:143:VAL:HG12	1:A:147:LYS:HD2	0.48	1.85	15	1
1:A:239:ASP:O	1:A:240:CYS:C	0.48	2.51	2	2
1:A:183:PHE:CE2	1:A:196:ALA:HB2	0.48	2.44	9	3
1:A:164:ILE:HD11	1:A:244:ASN:CG	0.47	2.30	10	3
1:A:164:ILE:HD11	1:A:244:ASN:ND2	0.47	2.24	12	2
1:A:253:LEU:HD13	1:A:260:CYS:SG	0.47	2.49	3	2
1:A:225:LEU:HD12	1:A:229:HIS:CG	0.47	2.44	13	1
1:A:218:HIS:NE2	1:A:242:LEU:HD23	0.47	2.25	18	1
1:A:155:ASP:CB	1:A:158:LEU:HD13	0.46	2.40	1	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:199:LEU:O	1:A:199:LEU:HD13	0.46	2.10	20	4
1:A:193:ILE:HG22	1:A:214:LEU:HD23	0.46	1.86	4	1
1:A:205:ASP:O	1:A:211:ALA:HB3	0.46	2.11	14	1
1:A:215:ARG:HH21	1:A:253:LEU:HD13	0.46	1.71	10	1
1:A:219:ILE:CD1	1:A:249:ILE:HD12	0.45	2.40	4	1
1:A:148:LEU:HD21	1:A:167:GLN:OE1	0.45	2.11	4	1
1:A:189:ILE:O	1:A:193:ILE:HD12	0.45	2.11	15	2
1:A:185:HIS:O	1:A:230:THR:HG22	0.45	2.12	5	1
1:A:249:ILE:HD12	1:A:267:LEU:HD11	0.45	1.89	7	1
1:A:193:ILE:CG2	1:A:250:LEU:HD13	0.44	2.39	5	1
1:A:242:LEU:HD13	1:A:243:TYR:N	0.44	2.27	2	2
1:A:155:ASP:CB	1:A:158:LEU:HD12	0.44	2.43	6	1
1:A:252:TYR:O	1:A:252:TYR:CG	0.44	2.70	14	1
1:A:225:LEU:HD13	1:A:234:TRP:NE1	0.44	2.26	10	1
1:A:216:LEU:HD11	1:A:225:LEU:HD12	0.44	1.89	9	1
1:A:200:ALA:HB1	1:A:202:LEU:HD23	0.44	1.89	13	1
1:A:170:LEU:O	1:A:170:LEU:HD12	0.43	2.14	14	1
1:A:148:LEU:HD23	1:A:165:TYR:OH	0.43	2.13	9	1
1:A:158:LEU:HD13	1:A:163:ARG:HH11	0.43	1.73	18	1
1:A:183:PHE:CD2	1:A:192:ALA:HB1	0.43	2.49	18	1
1:A:189:ILE:CG2	1:A:216:LEU:HD12	0.43	2.44	12	1
1:A:193:ILE:HG21	1:A:214:LEU:C	0.43	2.34	12	2
1:A:215:ARG:HE	1:A:253:LEU:HD22	0.43	1.74	10	1
1:A:166:PHE:CE1	1:A:242:LEU:HD21	0.42	2.48	19	1
1:A:166:PHE:CZ	1:A:242:LEU:HD21	0.42	2.50	7	1
1:A:199:LEU:HD23	1:A:199:LEU:O	0.42	2.13	10	1
1:A:216:LEU:HA	1:A:250:LEU:HD12	0.42	1.91	11	1
1:A:193:ILE:HD12	1:A:250:LEU:CB	0.42	2.45	12	1
1:A:193:ILE:HG13	1:A:250:LEU:HD11	0.41	1.92	1	1
1:A:217:CYS:SG	1:A:249:ILE:HG23	0.41	2.55	11	1
1:A:253:LEU:HD13	1:A:260:CYS:HB3	0.41	1.92	1	1
1:A:242:LEU:HD11	1:A:246:GLY:HA3	0.41	1.92	5	1
1:A:193:ILE:HD11	1:A:216:LEU:CD2	0.41	2.30	18	1
1:A:263:VAL:HG22	1:A:267:LEU:HD12	0.41	1.92	3	1
1:A:193:ILE:CG2	1:A:250:LEU:HD22	0.41	2.46	10	1
1:A:216:LEU:HD12	1:A:248:ILE:HD13	0.41	1.93	13	1
1:A:193:ILE:HD11	1:A:216:LEU:HB3	0.41	1.93	14	1
1:A:144:ALA:O	1:A:148:LEU:HD13	0.41	2.16	10	1
1:A:249:ILE:HG13	1:A:263:VAL:HG22	0.41	1.93	19	1
1:A:216:LEU:HD22	1:A:217:CYS:N	0.40	2.30	11	1
1:A:177:LYS:HG2	1:A:267:LEU:HD21	0.40	1.91	15	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:253:LEU:HD13	1:A:260:CYS:CB	0.40	2.46	1	1

## 6.3 Torsion angles [i](#)

### 6.3.1 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 NMR 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	A	130/139 (94%)	119±2 (91±2%)	11±2 (8±1%)	1±1 (1±1%)	21	71
All	All	2600/2780 (94%)	2371 (91%)	212 (8%)	17 (1%)	21	71

All 10 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	174	SER	4
1	A	153	ASP	3
1	A	261	LYS	3
1	A	207	ASN	1
1	A	173	GLY	1
1	A	208	LYS	1
1	A	172	LYS	1
1	A	210	THR	1
1	A	262	ASN	1
1	A	171	PRO	1

### 6.3.2 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 NMR 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	A	114/118 (97%)	100±4 (88±3%)	14±4 (12±3%)	6	48

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	2280/2360 (97%)	1995 (88%)	285 (12%)	6 48

All 72 unique residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	230	THR	20
1	A	188	SER	15
1	A	142	LYS	14
1	A	156	LYS	14
1	A	261	LYS	12
1	A	177	LYS	9
1	A	212	LYS	9
1	A	187	TRP	8
1	A	155	ASP	8
1	A	191	LYS	8
1	A	182	PHE	7
1	A	210	THR	6
1	A	199	LEU	6
1	A	218	HIS	6
1	A	160	GLN	6
1	A	165	TYR	6
1	A	223	GLU	5
1	A	148	LEU	5
1	A	260	CYS	5
1	A	215	ARG	5
1	A	208	LYS	5
1	A	229	HIS	5
1	A	167	GLN	4
1	A	213	LYS	4
1	A	181	MET	4
1	A	201	ARG	4
1	A	172	LYS	4
1	A	227	LEU	4
1	A	153	ASP	3
1	A	243	TYR	3
1	A	247	ASN	3
1	A	216	LEU	3
1	A	249	ILE	3
1	A	161	THR	3
1	A	179	LYS	3
1	A	147	LYS	3

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Mol	Chain	Res	Type	Models (Total)
1	A	203	LYS	3
1	A	166	PHE	3
1	A	221	SER	3
1	A	170	LEU	3
1	A	242	LEU	2
1	A	183	PHE	2
1	A	251	GLU	2
1	A	162	GLU	2
1	A	150	MET	2
1	A	264	GLU	2
1	A	237	LYS	2
1	A	244	ASN	2
1	A	178	SER	2
1	A	265	SER	1
1	A	266	TYR	1
1	A	250	LEU	1
1	A	268	GLU	1
1	A	209	PHE	1
1	A	258	GLN	1
1	A	194	ASP	1
1	A	202	LEU	1
1	A	253	LEU	1
1	A	220	THR	1
1	A	163	ARG	1
1	A	174	SER	1
1	A	157	SER	1
1	A	217	CYS	1
1	A	185	HIS	1
1	A	205	ASP	1
1	A	262	ASN	1
1	A	158	LEU	1
1	A	164	ILE	1
1	A	186	ARG	1
1	A	257	GLU	1
1	A	225	LEU	1
1	A	234	TRP	1

### 6.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 6.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 6.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 6.7 Other polymers [i](#)

There are no such molecules in this entry.

## 6.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 7 Chemical shift validation

The completeness of assignment taking into account all chemical shift lists is 87% for the well-defined parts and 87% for the entire structure.

### 7.1 Chemical shift list 1

File name: working\_cs.cif

Chemical shift list name: *assigned\_chemical\_shifts\_1*

#### 7.1.1 Bookkeeping

The following table shows the results of parsing the chemical shift list and reports the number of nuclei with statistically unusual chemical shifts.

Total number of shifts	1634
Number of shifts mapped to atoms	1634
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	0

#### 7.1.2 Chemical shift referencing

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction $\pm$ precision, ppm	Suggested action
$^{13}\text{C}_\alpha$	139	$-0.11 \pm 0.09$	None needed ( $< 0.5$ ppm)
$^{13}\text{C}_\beta$	130	$-0.21 \pm 0.17$	None needed ( $< 0.5$ ppm)
$^{13}\text{C}'$	100	$0.16 \pm 0.14$	None needed ( $< 0.5$ ppm)
$^{15}\text{N}$	134	$0.20 \pm 0.19$	None needed ( $< 0.5$ ppm)

#### 7.1.3 Completeness of resonance assignments

The following table shows the completeness of the chemical shift assignments for the well-defined regions of the structure. The overall completeness is 87%, i.e. 1572 atoms were assigned a chemical shift out of a possible 1815. 0 out of 18 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	$^1\text{H}$	$^{13}\text{C}$	$^{15}\text{N}$
Backbone	615/651 (94%)	258/263 (98%)	231/262 (88%)	126/126 (100%)
Sidechain	898/1006 (89%)	606/651 (93%)	283/318 (89%)	9/37 (24%)

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	<b>Total</b>	<b><sup>1</sup>H</b>	<b><sup>13</sup>C</b>	<b><sup>15</sup>N</b>
Aromatic	59/158 (37%)	40/79 (51%)	19/73 (26%)	0/6 (0%)
Overall	1572/1815 (87%)	904/993 (91%)	533/653 (82%)	135/169 (80%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 87%, i.e. 1634 atoms were assigned a chemical shift out of a possible 1888. 0 out of 18 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	<b>Total</b>	<b><sup>1</sup>H</b>	<b><sup>13</sup>C</b>	<b><sup>15</sup>N</b>
Backbone	649/694 (94%)	276/282 (98%)	239/278 (86%)	134/134 (100%)
Sidechain	926/1036 (89%)	625/670 (93%)	291/327 (89%)	10/39 (26%)
Aromatic	59/158 (37%)	40/79 (51%)	19/73 (26%)	0/6 (0%)
Overall	1634/1888 (87%)	941/1031 (91%)	549/678 (81%)	144/179 (80%)

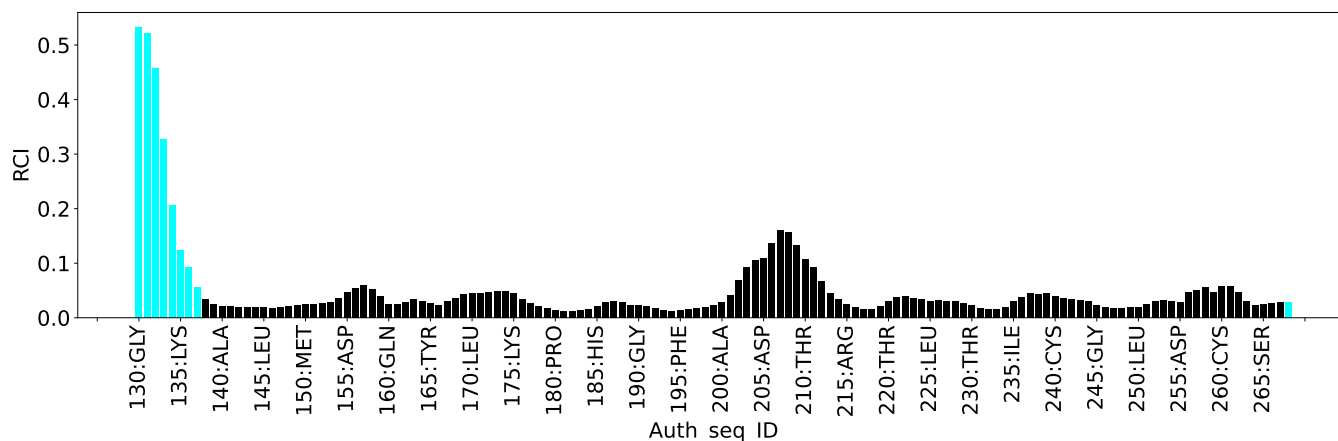
#### 7.1.4 Statistically unusual chemical shifts [i](#)

There are no statistically unusual chemical shifts.

#### 7.1.5 Random Coil Index (RCI) plots [i](#)

The image below reports *random coil index* values for the protein chains in the structure. The height of each bar gives a probability of a given residue to be disordered, as predicted from the available chemical shifts and the amino acid sequence. A value above 0.2 is an indication of significant predicted disorder. The colour of the bar shows whether the residue is in the well-defined core (black) or in the ill-defined residue ranges (cyan), as described in section 2 on ensemble composition. If well-defined core and ill-defined regions are not identified then it is shown as gray bars.

Random coil index (RCI) for chain A:



## 8 NMR restraints analysis

### 8.1 Conformationally restricting restraints

The following table provides the summary of experimentally observed NMR restraints in different categories. Restraints are classified into different categories based on the sequence separation of the atoms involved.

Description	Value
Total distance restraints	1062
Intra-residue ( $ i-j =0$ )	260
Sequential ( $ i-j =1$ )	366
Medium range ( $ i-j >1$ and $ i-j <5$ )	145
Long range ( $ i-j \geq 5$ )	227
Inter-chain	0
Hydrogen bond restraints	64
Disulfide bond restraints	0
Total dihedral-angle restraints	0
Number of unmapped restraints	0
Number of restraints per residue	7.6
Number of long range restraints per residue <sup>1</sup>	1.8

<sup>1</sup>Long range hydrogen bonds and disulfide bonds are counted as long range restraints while calculating the number of long range restraints per residue

### 8.2 Residual restraint violations

This section provides the overview of the restraint violations analysis. The violations are binned as small, medium and large violations based on its absolute value. Average number of violations per model is calculated by dividing the total number of violations in each bin by the size of the ensemble.

#### 8.2.1 Average number of distance violations per model

Distance violations less than 0.1 Å are not included in the calculation.

Bins (Å)	Average number of violations per model	Max (Å)
0.1-0.2 (Small)	1.3	0.19
0.2-0.5 (Medium)	1.8	0.5
>0.5 (Large)	3.5	3.61

### 8.2.2 Average number of dihedral-angle violations per model [i](#)

Dihedral-angle violations less than  $1^\circ$  are not included in the calculation. There are no dihedral-angle violations

## 9 Distance violation analysis ⓘ

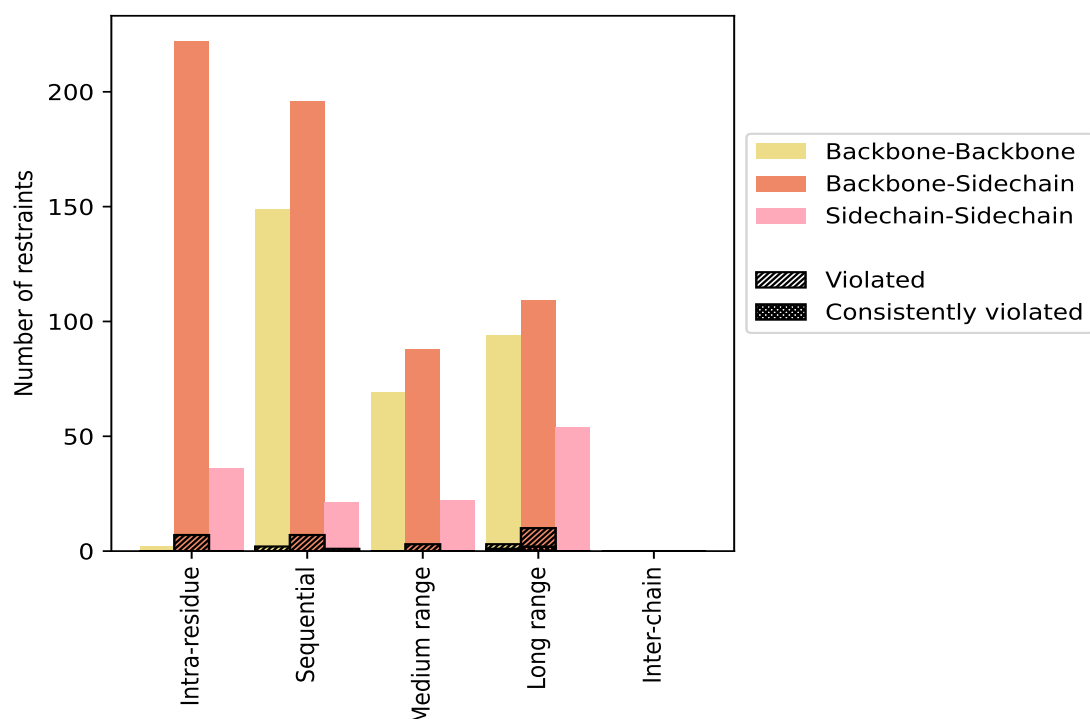
### 9.1 Summary of distance violations ⓘ

The following table shows the summary of distance violations in different restraint categories based on the sequence separation of the atoms involved. Each category is further sub-divided into three sub-categories based on the atoms involved. Violations less than 0.1 Å are not included in the statistics.

Restrains type	Count	% <sup>1</sup>	Violated <sup>3</sup>			Consistently Violated <sup>4</sup>		
			Count	% <sup>2</sup>	% <sup>1</sup>	Count	% <sup>2</sup>	% <sup>1</sup>
<b>Intra-residue (<math> i-j =0</math>)</b>	<b>260</b>	<b>24.5</b>	<b>7</b>	<b>2.7</b>	<b>0.7</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>
Backbone-Backbone	2	0.2	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	222	20.9	7	3.2	0.7	0	0.0	0.0
Sidechain-Sidechain	36	3.4	0	0.0	0.0	0	0.0	0.0
<b>Sequential (<math> i-j =1</math>)</b>	<b>366</b>	<b>34.5</b>	<b>10</b>	<b>2.7</b>	<b>0.9</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>
Backbone-Backbone	149	14.0	2	1.3	0.2	0	0.0	0.0
Backbone-Sidechain	196	18.5	7	3.6	0.7	0	0.0	0.0
Sidechain-Sidechain	21	2.0	1	4.8	0.1	0	0.0	0.0
<b>Medium range (<math> i-j &gt;1</math> &amp; <math> i-j &lt;5</math>)</b>	<b>145</b>	<b>13.7</b>	<b>1</b>	<b>0.7</b>	<b>0.1</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>
Backbone-Backbone	69	6.5	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	54	5.1	1	1.9	0.1	0	0.0	0.0
Sidechain-Sidechain	22	2.1	0	0.0	0.0	0	0.0	0.0
<b>Long range (<math> i-j \geq 5</math>)</b>	<b>227</b>	<b>21.4</b>	<b>6</b>	<b>2.6</b>	<b>0.6</b>	<b>1</b>	<b>0.4</b>	<b>0.1</b>
Backbone-Backbone	94	8.9	3	3.2	0.3	1	1.1	0.1
Backbone-Sidechain	79	7.4	3	3.8	0.3	0	0.0	0.0
Sidechain-Sidechain	54	5.1	0	0.0	0.0	0	0.0	0.0
<b>Inter-chain</b>	<b>0</b>	<b>0.0</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>
Backbone-Backbone	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Sidechain-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
<b>Hydrogen bond</b>	<b>64</b>	<b>6.0</b>	<b>9</b>	<b>14.1</b>	<b>0.8</b>	<b>2</b>	<b>3.1</b>	<b>0.2</b>
<b>Disulfide bond</b>	<b>0</b>	<b>0.0</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>
<b>Total</b>	<b>1062</b>	<b>100.0</b>	<b>33</b>	<b>3.1</b>	<b>3.1</b>	<b>3</b>	<b>0.3</b>	<b>0.3</b>
Backbone-Backbone	314	29.6	5	1.6	0.5	1	0.3	0.1
Backbone-Sidechain	615	57.9	27	4.4	2.5	2	0.3	0.2
Sidechain-Sidechain	133	12.5	1	0.8	0.1	0	0.0	0.0

<sup>1</sup> percentage calculated with respect to the total number of distance restraints, <sup>2</sup> percentage calculated with respect to the number of restraints in a particular restraint category, <sup>3</sup> violated in at least one model, <sup>4</sup> violated in all the models

### 9.1.1 Bar chart : Distribution of distance restraints and violations [i](#)



Violated and consistently violated restraints are shown using different hatch patterns in their respective categories. The hydrogen bonds and disulfied bonds are counted in their appropriate category on the x-axis

## 9.2 Distance violation statistics for each model [i](#)

The following table provides the distance violation statistics for each model in the ensemble. Violations less than 0.1 Å are not included in the statistics.

Model ID	Number of violations						Mean (Å)	Max (Å)	SD <sup>6</sup> (Å)	Median (Å)
	IR <sup>1</sup>	SQ <sup>2</sup>	MR <sup>3</sup>	LR <sup>4</sup>	IC <sup>5</sup>	Total				
1	0	1	0	5	0	6	0.66	1.01	0.31	0.68
2	0	0	0	3	0	3	0.85	0.99	0.14	0.9
3	1	0	0	5	0	6	0.63	0.87	0.24	0.7
4	1	0	0	7	0	8	0.48	1.04	0.36	0.4
5	0	1	1	5	0	7	0.56	1.02	0.32	0.44
6	1	0	1	5	0	7	0.51	1.0	0.3	0.43
7	1	0	0	5	0	6	0.62	1.02	0.29	0.58
8	2	1	0	5	0	8	0.58	1.03	0.33	0.6
9	1	1	0	5	0	7	0.52	0.9	0.23	0.55
10	1	0	0	5	0	6	0.66	1.03	0.28	0.57

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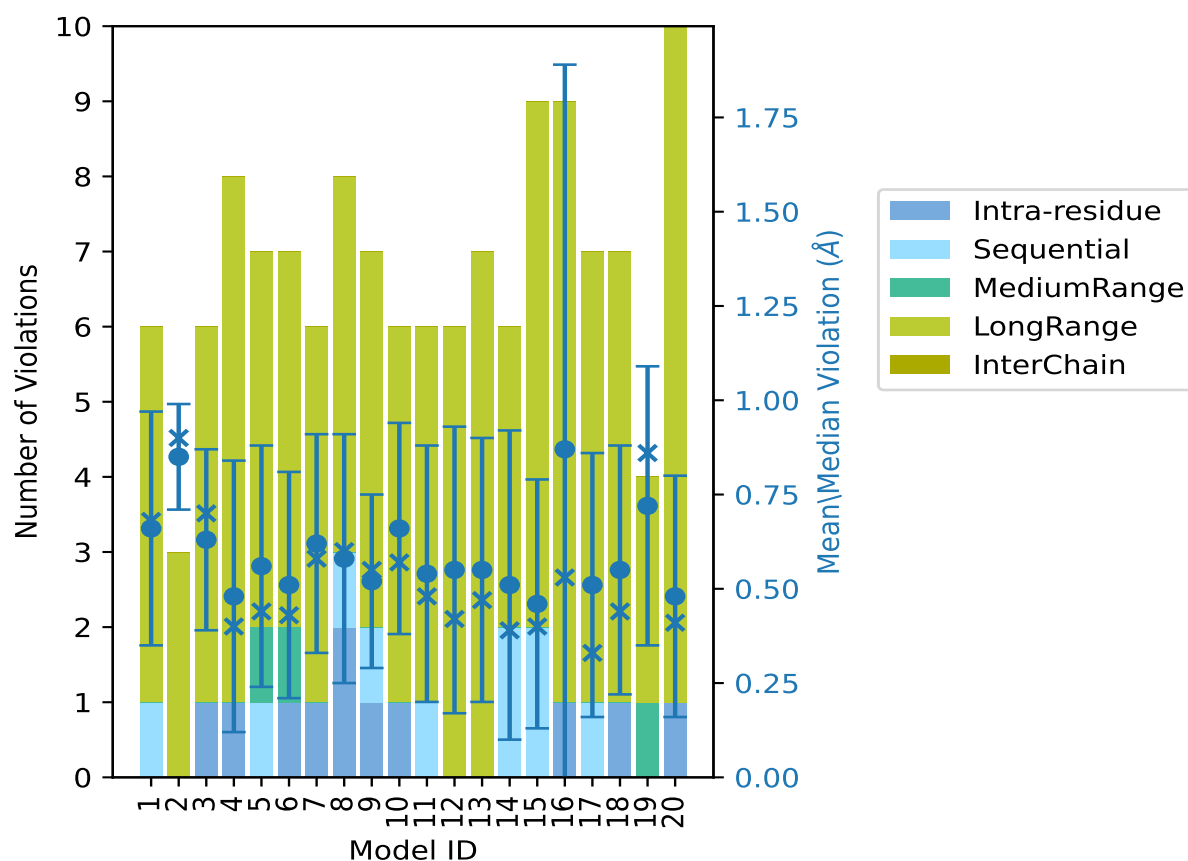
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Model ID	Number of violations						Mean (Å)	Max (Å)	SD <sup>6</sup> (Å)	Median (Å)
	IR <sup>1</sup>	SQ <sup>2</sup>	MR <sup>3</sup>	LR <sup>4</sup>	IC <sup>5</sup>	Total				
11	0	1	0	5	0	6	0.54	0.99	0.34	0.48
12	0	0	0	6	0	6	0.55	1.08	0.38	0.42
13	0	0	0	7	0	7	0.55	1.04	0.35	0.47
14	0	2	0	4	0	6	0.51	1.03	0.41	0.39
15	0	2	0	7	0	9	0.46	1.01	0.33	0.4
16	1	0	0	8	0	9	0.87	3.61	1.02	0.53
17	0	1	0	6	0	7	0.51	1.03	0.35	0.33
18	1	0	0	6	0	7	0.55	1.03	0.33	0.44
19	0	0	1	3	0	4	0.72	1.05	0.37	0.86
20	1	0	0	9	0	10	0.48	1.06	0.32	0.41

<sup>1</sup>Intra-residue restraints, <sup>2</sup>Sequential restraints, <sup>3</sup>Medium range restraints, <sup>4</sup>Long range restraints,

<sup>5</sup>Inter-chain restraints, <sup>6</sup>Standard deviation

### 9.2.1 Bar graph : Distance Violation statistics for each model ⓘ



The mean(dot),median(x) and the standard deviation are shown in blue with respect to the y axis on the right

### 9.3 Distance violation statistics for the ensemble

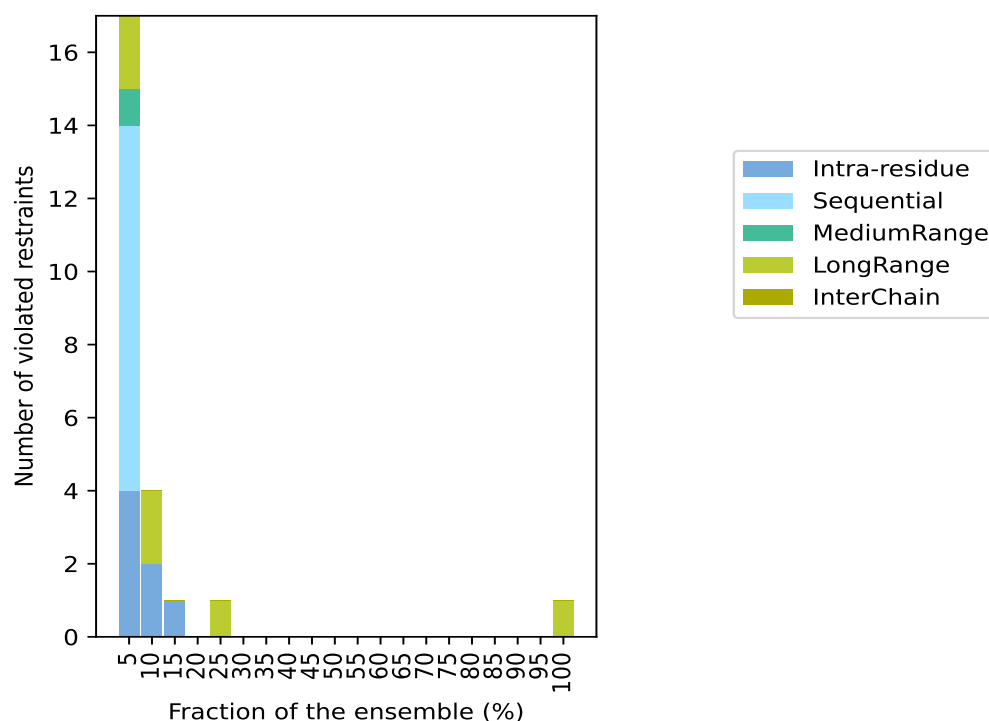
Violation analysis may find that some restraints are violated in few models and some are violated in most of models. The following table provides this information as number of violated restraints for a given fraction of the ensemble. In total, 974(IR:253, SQ:356, MR:144, LR:221, IC:0) restraints are not violated in the ensemble.

Number of violated restraints						Fraction of the ensemble	
IR <sup>1</sup>	SQ <sup>2</sup>	MR <sup>3</sup>	LR <sup>4</sup>	IC <sup>5</sup>	Total	Count <sup>6</sup>	%
4	10	1	2	0	17	1	5.0
2	0	0	2	0	4	2	10.0
1	0	0	0	0	1	3	15.0
0	0	0	0	0	0	4	20.0
0	0	0	1	0	1	5	25.0
0	0	0	0	0	0	6	30.0
0	0	0	0	0	0	7	35.0
0	0	0	0	0	0	8	40.0
0	0	0	0	0	0	9	45.0
0	0	0	0	0	0	10	50.0
0	0	0	0	0	0	11	55.0
0	0	0	0	0	0	12	60.0
0	0	0	0	0	0	13	65.0
0	0	0	0	0	0	14	70.0
0	0	0	0	0	0	15	75.0
0	0	0	0	0	0	16	80.0
0	0	0	0	0	0	17	85.0
0	0	0	0	0	0	18	90.0
0	0	0	0	0	0	19	95.0
0	0	0	1	0	1	20	100.0

<sup>1</sup>Intra-residue restraints, <sup>2</sup>Sequential restraints, <sup>3</sup>Medium range restraints, <sup>4</sup>Long range restraints,

<sup>5</sup>Inter-chain restraints, <sup>6</sup> Number of models with violations

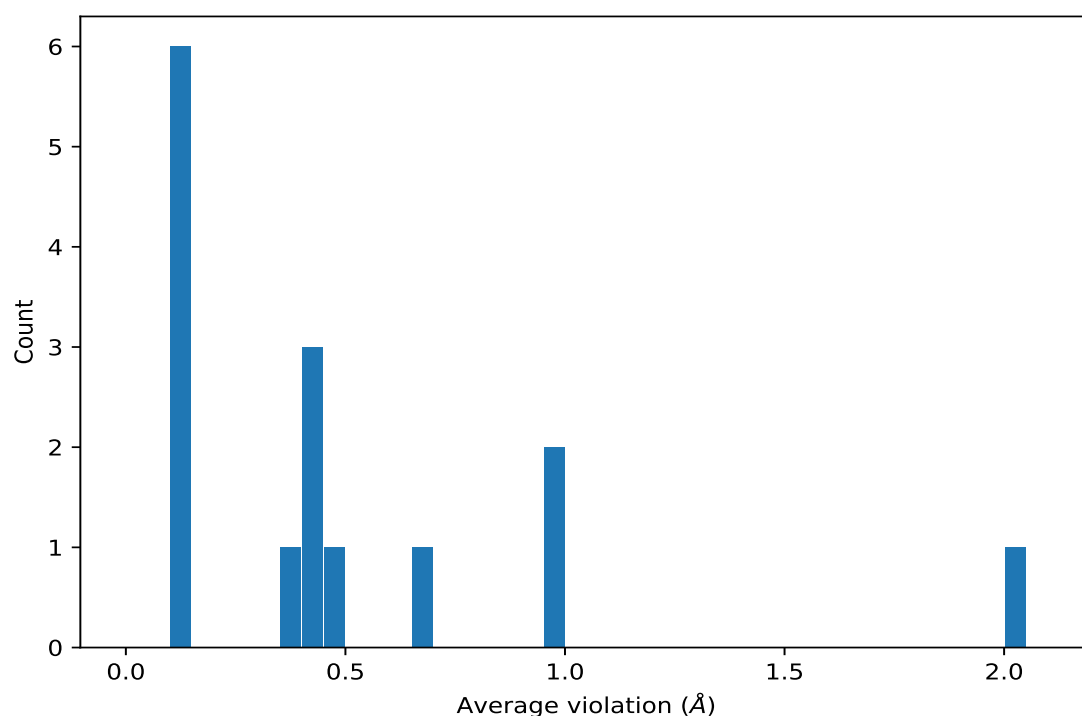
### 9.3.1 Bar graph : Distance violation statistics for the ensemble [i](#)



## 9.4 Most violated distance restraints in the ensemble [i](#)

### 9.4.1 Histogram : Distribution of mean distance violations [i](#)

The following histogram shows the distribution of the average value of the violation. The average is calculated for each restraint that is violated in more than one model over all the violated models in the ensemble



#### 9.4.2 Table: Most violated distance restraints [i](#)

The following table provides the mean and the standard deviation of the violation for each restraint sorted by number of violated models and the mean value. The Key (restraint list ID, restraint ID) is the unique identifier for a given restraint. Rows with same key represent combinatorial or ambiguous restraints and are counted as a single restraint.

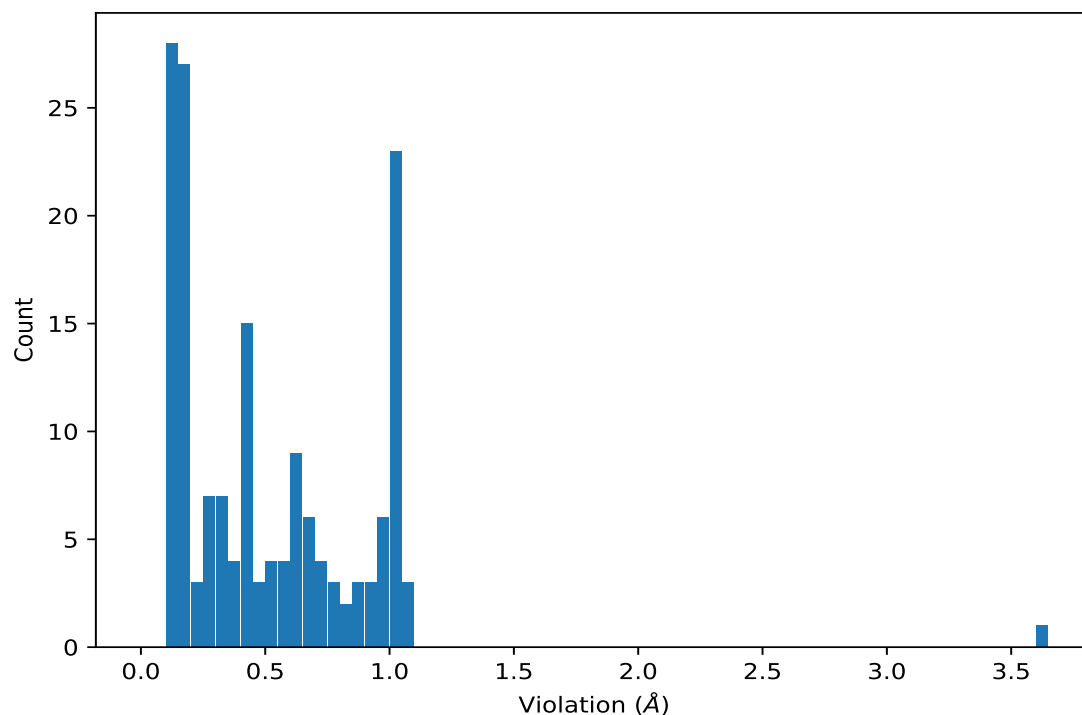
Key	Atom-1	Atom-2	Models <sup>1</sup>	Mean (Å)	SD <sup>1</sup> (Å)	Median (Å)
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	20	0.99	0.07	1.0
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	20	0.97	0.11	1.01
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	20	0.65	0.1	0.64
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	17	0.45	0.19	0.41
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	17	0.37	0.14	0.34
(2,627)	1:214:A:LEU:H	1:252:A:TYR:HD1	5	0.11	0.01	0.11
(2,627)	1:214:A:LEU:H	1:252:A:TYR:HD2	5	0.11	0.01	0.11
(1,19)	1:213:A:LYS:O	1:253:A:LEU:H	4	0.12	0.01	0.11
(2,685)	1:136:A:ASN:HA	1:136:A:ASN:HD21	3	0.43	0.0	0.43
(2,685)	1:136:A:ASN:HA	1:136:A:ASN:HD22	3	0.43	0.0	0.43
(2,56)	1:172:A:LYS:H	1:266:A:TYR:HE1	2	2.03	1.58	2.03
(2,286)	1:187:A:TRP:HA	1:187:A:TRP:HD1	2	0.42	0.01	0.42
(2,992)	1:258:A:GLN:H	1:258:A:GLN:HG2	2	0.15	0.02	0.15
(2,992)	1:258:A:GLN:H	1:258:A:GLN:HG3	2	0.15	0.02	0.15
(2,11)	1:187:A:TRP:H	1:231:A:LEU:H	2	0.12	0.02	0.12

<sup>1</sup>Number of violated models, <sup>2</sup>Standard deviation

## 9.5 All violated distance restraints [i](#)

### 9.5.1 Histogram : Distribution of distance violations [i](#)

The following histogram shows the distribution of the absolute value of the violation for all violated restraints in the ensemble.



### 9.5.2 Table : All distance violations [i](#)

The following table lists the absolute value of the violation for each restraint in the ensemble sorted by its value. The Key (restraint list ID, restraint ID) is the unique identifier for a given restraint. Rows with same key represent combinatorial or ambiguous restraints and are counted as a single restraint.

Key	Atom-1	Atom-2	Model ID	Violation (Å)
(2,56)	1:172:A:LYS:H	1:266:A:TYR:HE1	16	3.61
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	12	1.08
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	20	1.06
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	19	1.05
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	4	1.04
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	13	1.04
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	10	1.03

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Key	Atom-1	Atom-2	Model ID	Violation (Å)
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	14	1.03
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	8	1.03
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	14	1.03
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	17	1.03
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	18	1.03
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	7	1.02
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	5	1.02
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	12	1.02
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	13	1.02
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	20	1.02
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	5	1.01
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	15	1.01
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	18	1.01
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	1	1.01
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	4	1.01
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	15	1.01
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	1	1.0
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	6	1.0
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	16	1.0
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	10	1.0
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	2	0.99
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	11	0.99
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	16	0.99
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	8	0.98
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	19	0.96
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	17	0.95
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	7	0.92
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	9	0.9
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	2	0.9
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	11	0.89
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	3	0.87
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	6	0.85
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	8	0.83
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	16	0.81
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	3	0.77
(2,45)	1:193:A:ILE:HA	1:216:A:LEU:H	3	0.76
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	19	0.76
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	7	0.74
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	10	0.74
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	9	0.74
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	11	0.72
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	1	0.69

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Key	Atom-1	Atom-2	Model ID	Violation (Å)
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	17	0.68
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	1	0.68
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	4	0.66
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	18	0.66
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	2	0.65
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	5	0.64
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	13	0.64
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	14	0.64
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	3	0.64
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	6	0.63
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	20	0.63
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	8	0.62
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	3	0.61
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	12	0.6
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	8	0.59
(1,23)	1:153:A:ASP:O	1:182:A:PHE:H	9	0.57
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	15	0.55
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	9	0.55
(1,3)	1:166:A:PHE:H	1:181:A:MET:O	20	0.54
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	16	0.53
(2,431)	1:220:A:THR:HB	1:221:A:SER:H	15	0.5
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	1	0.5
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	16	0.49
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	13	0.47
(2,56)	1:172:A:LYS:H	1:266:A:TYR:HE1	20	0.45
(2,685)	1:136:A:ASN:HA	1:136:A:ASN:HD21	18	0.44
(2,685)	1:136:A:ASN:HA	1:136:A:ASN:HD22	18	0.44
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	13	0.44
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	5	0.44
(2,685)	1:136:A:ASN:HA	1:136:A:ASN:HD21	6	0.43
(2,685)	1:136:A:ASN:HA	1:136:A:ASN:HD22	6	0.43
(2,685)	1:136:A:ASN:HA	1:136:A:ASN:HD21	9	0.43
(2,685)	1:136:A:ASN:HA	1:136:A:ASN:HD22	9	0.43
(2,286)	1:187:A:TRP:HA	1:187:A:TRP:HD1	7	0.43
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	4	0.42
(2,286)	1:187:A:TRP:HA	1:187:A:TRP:HD1	10	0.41
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	10	0.41
(2,715)	1:146:A:MET:HG2	1:147:A:LYS:H	5	0.4
(2,715)	1:146:A:MET:HG3	1:147:A:LYS:H	5	0.4
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	15	0.4
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	4	0.39
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	15	0.38

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Key	Atom-1	Atom-2	Model ID	Violation (Å)
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	7	0.37
(1,4)	1:166:A:PHE:N	1:181:A:MET:O	20	0.37
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	10	0.34
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	17	0.33
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	18	0.32
(1,24)	1:153:A:ASP:O	1:182:A:PHE:N	9	0.31
(2,854)	1:201:A:ARG:H	1:201:A:ARG:HD2	8	0.3
(2,854)	1:201:A:ARG:H	1:201:A:ARG:HD3	8	0.3
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	17	0.3
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	6	0.28
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	5	0.27
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	18	0.26
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	6	0.25
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	7	0.25
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	12	0.25
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	20	0.25
(1,13)	1:213:A:LYS:H	1:253:A:LEU:O	11	0.24
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	20	0.23
(2,412)	1:216:A:LEU:HG	1:217:A:CYS:H	11	0.21
(2,638)	1:215:A:ARG:HA	1:253:A:LEU:H	12	0.19
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	11	0.19
(2,880)	1:208:A:LYS:HB2	1:209:A:PHE:H	8	0.17
(2,880)	1:208:A:LYS:HB3	1:209:A:PHE:H	8	0.17
(2,992)	1:258:A:GLN:H	1:258:A:GLN:HG2	8	0.16
(2,992)	1:258:A:GLN:H	1:258:A:GLN:HG3	8	0.16
(2,881)	1:208:A:LYS:HB2	1:210:A:THR:H	6	0.16
(2,881)	1:208:A:LYS:HB3	1:210:A:THR:H	6	0.16
(2,779)	1:167:A:GLN:H	1:168:A:VAL:HG11	9	0.16
(2,779)	1:167:A:GLN:H	1:168:A:VAL:HG12	9	0.16
(2,779)	1:167:A:GLN:H	1:168:A:VAL:HG13	9	0.16
(2,779)	1:167:A:GLN:H	1:168:A:VAL:HG21	9	0.16
(2,779)	1:167:A:GLN:H	1:168:A:VAL:HG22	9	0.16
(2,779)	1:167:A:GLN:H	1:168:A:VAL:HG23	9	0.16
(2,737)	1:150:A:MET:H	1:150:A:MET:HG2	16	0.16
(2,737)	1:150:A:MET:H	1:150:A:MET:HG3	16	0.16
(1,14)	1:213:A:LYS:N	1:253:A:LEU:O	12	0.16
(2,614)	1:249:A:ILE:H	1:249:A:ILE:HG21	4	0.15
(2,614)	1:249:A:ILE:H	1:249:A:ILE:HG22	4	0.15
(2,614)	1:249:A:ILE:H	1:249:A:ILE:HG23	4	0.15
(2,186)	1:164:A:ILE:HD11	1:165:A:TYR:HD1	17	0.15
(2,186)	1:164:A:ILE:HD11	1:165:A:TYR:HD2	17	0.15
(2,186)	1:164:A:ILE:HD12	1:165:A:TYR:HD1	17	0.15

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Key	Atom-1	Atom-2	Model ID	Violation (Å)
(2,186)	1:164:A:ILE:HD12	1:165:A:TYR:HD2	17	0.15
(2,186)	1:164:A:ILE:HD13	1:165:A:TYR:HD1	17	0.15
(2,186)	1:164:A:ILE:HD13	1:165:A:TYR:HD2	17	0.15
(2,11)	1:187:A:TRP:H	1:231:A:LEU:H	18	0.15
(2,803)	1:174:A:SER:H	1:175:A:LYS:HB2	14	0.14
(2,803)	1:174:A:SER:H	1:175:A:LYS:HB3	14	0.14
(1,19)	1:213:A:LYS:O	1:253:A:LEU:H	16	0.14
(2,992)	1:258:A:GLN:H	1:258:A:GLN:HG2	20	0.13
(2,992)	1:258:A:GLN:H	1:258:A:GLN:HG3	20	0.13
(1,35)	1:142:A:LYS:O	1:146:A:MET:H	5	0.13
(2,627)	1:214:A:LEU:H	1:252:A:TYR:HD1	17	0.12
(2,627)	1:214:A:LEU:H	1:252:A:TYR:HD2	17	0.12
(2,285)	1:186:A:ARG:H	1:187:A:TRP:H	15	0.12
(2,276)	1:183:A:PHE:H	1:183:A:PHE:HD1	3	0.12
(2,276)	1:183:A:PHE:H	1:183:A:PHE:HD2	3	0.12
(2,627)	1:214:A:LEU:H	1:252:A:TYR:HD1	13	0.11
(2,627)	1:214:A:LEU:H	1:252:A:TYR:HD2	13	0.11
(2,627)	1:214:A:LEU:H	1:252:A:TYR:HD1	14	0.11
(2,627)	1:214:A:LEU:H	1:252:A:TYR:HD2	14	0.11
(2,627)	1:214:A:LEU:H	1:252:A:TYR:HD1	16	0.11
(2,627)	1:214:A:LEU:H	1:252:A:TYR:HD2	16	0.11
(2,560)	1:238:A:GLU:HB2	1:239:A:ASP:H	1	0.11
(2,560)	1:238:A:GLU:HB3	1:239:A:ASP:H	1	0.11
(1,41)	1:148:A:LEU:O	1:151:A:HIS:H	19	0.11
(1,19)	1:213:A:LYS:O	1:253:A:LEU:H	4	0.11
(1,19)	1:213:A:LYS:O	1:253:A:LEU:H	13	0.11
(1,19)	1:213:A:LYS:O	1:253:A:LEU:H	15	0.11
(2,627)	1:214:A:LEU:H	1:252:A:TYR:HD1	4	0.1
(2,627)	1:214:A:LEU:H	1:252:A:TYR:HD2	4	0.1
(2,223)	1:176:A:GLU:H	1:177:A:LYS:H	14	0.1
(2,32)	1:153:A:ASP:H	1:180:A:PRO:HB3	15	0.1
(2,11)	1:187:A:TRP:H	1:231:A:LEU:H	20	0.1

## 10 Dihedral-angle violation analysis ⓘ

No dihedral-angle restraints found