MagNet Challenge 2025 Pretest Evaluation Results by Team Siegen and Paderborn, Germany

Hendrik Vater[*], Oliver Josef Schweins[*], Till Piepenbrock[*], Marvin Meyer[*],
Lukas Hölsch[†], Oliver Wallscheid[†], and Wilhelm Kirchgässner[‡]

[*]Department of Power Electronics and Electrical Drives, Paderborn University, Paderborn, Germany
[†]Chair of Interconnected Automation Systems, University of Siegen, Siegen, Germany
[‡]Beckhoff Automation, Verl, Germany

[*]{vater, piepenbrock, meyer}@lea.uni-paderborn.de, oliverjs@mail.uni-paderborn.de,
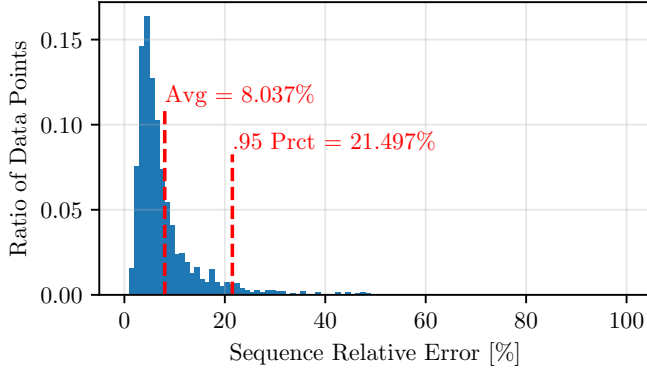[†]{lukas.hoelsch, oliver.wallscheid}@uni-siegen.de,
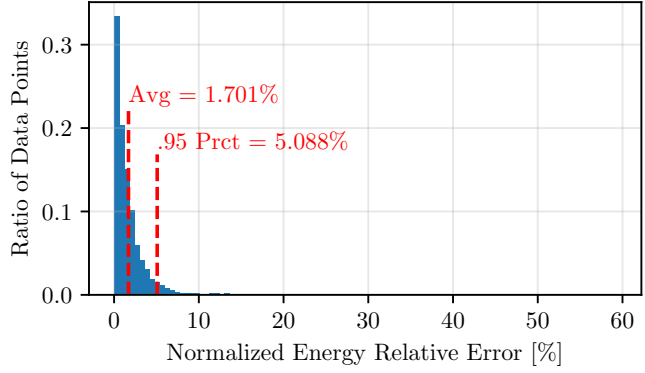[‡] W.Kirchgaessner@beckhoff.com

Material: 3C90

Sequence Relative Error for 3C90
10% known, 90% unknown
Avg=8.037%,
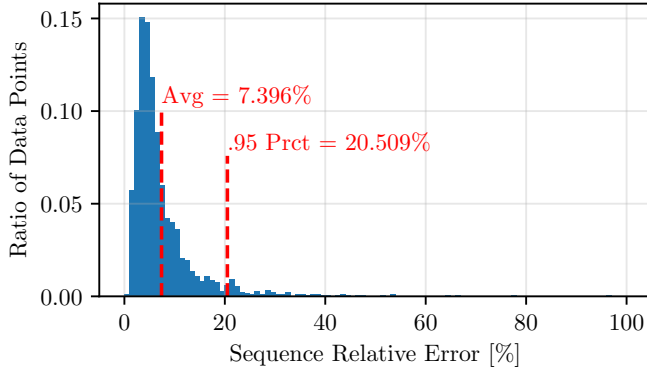.95 Prct=21.497%,
Max=87.564%

Normalized Energy Relative Error for 3C90
10% known, 90% unknown
Avg=1.701%,
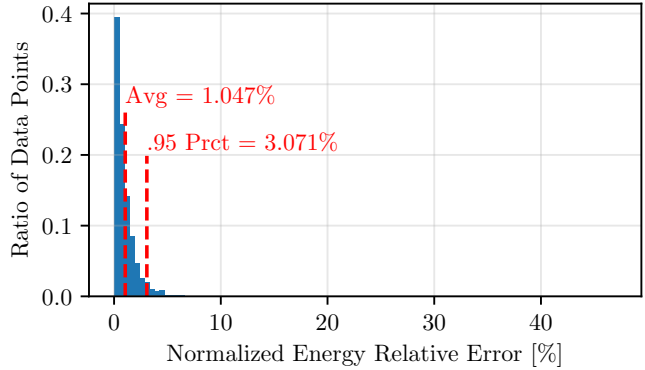.95 Prct=5.088%,
Max=59.266%

Sequence Relative Error for 3C90
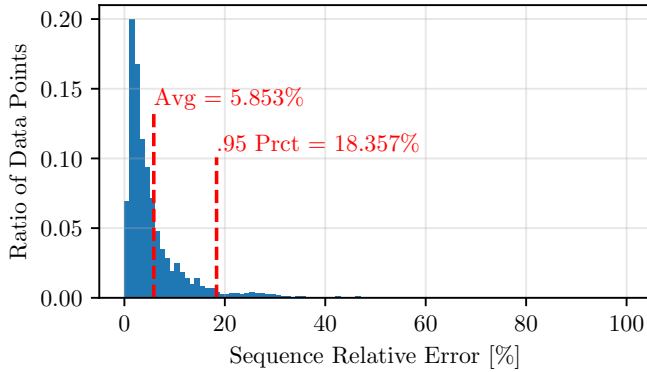**50% known, 50% unknown**
Avg=7.396%,
.95 Prct=20.509%,
Max=96.496%

Normalized Energy Relative Error for 3C90
50% known, 50% unknown
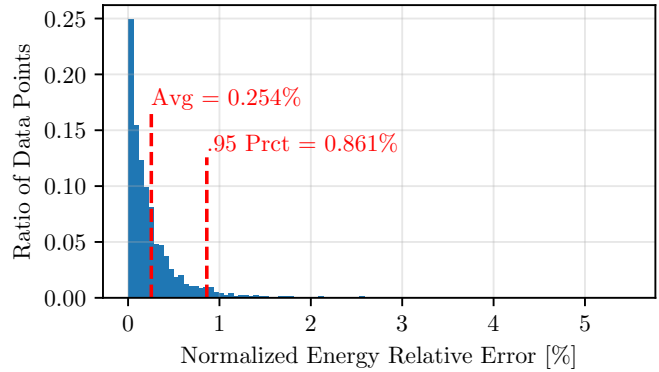Avg=1.047%,
.95 Prct=3.071%,
Max=47.057%

Sequence Relative Error for 3C90
90% known, 10% unknown
Avg=5.853%,
.95 Prct=18.357%,
Max=186.579%

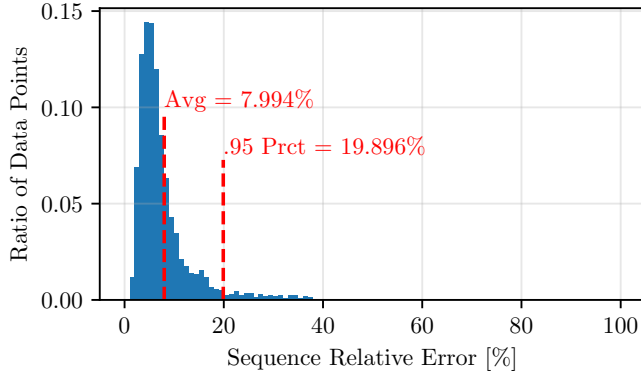**Normalized Energy Relative Error for** 3C90
90% known, 10% unknown
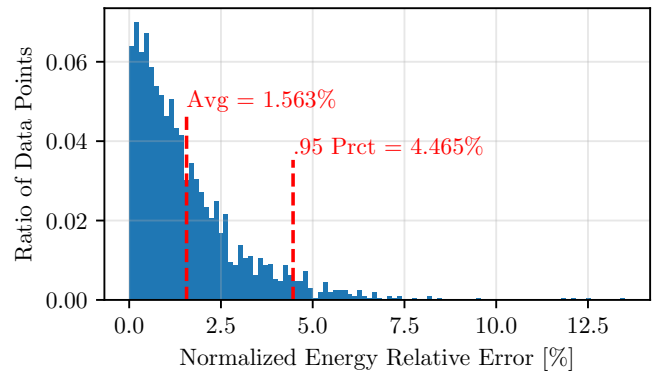Avg=0.254%,
.95 Prct=0.861%,
Max=5.496%

Material: 3C94

Sequence Relative Error for 3C94
10% known, 90% unknown
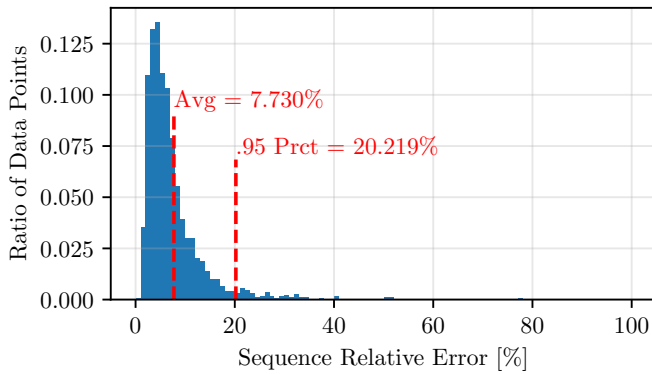Avg=7.994%,
.95 Prct=19.896%,
Max=89.100%

Normalized Energy Relative Error for 3C94
10% known, 90% unknown
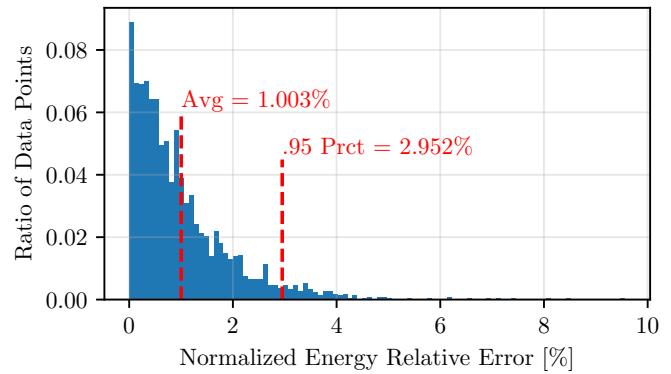Avg=1.563%,
.95 Prct=4.465%,
Max=13.518%

Sequence Relative Error for 3C94
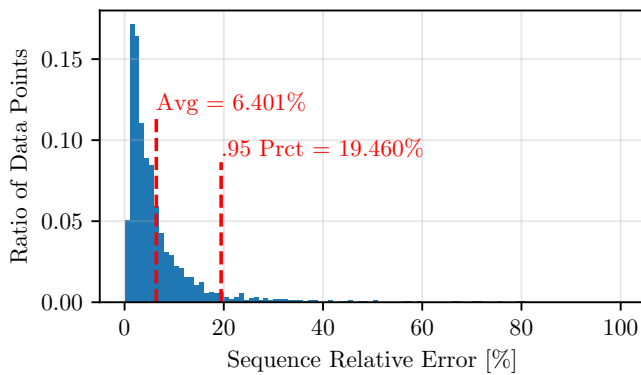**50% known, 50% unknown**
Avg=7.730%,
.95 Prct=20.219%,
Max=91.404%

Normalized Energy Relative Error for 3C94
50% known, 50% unknown
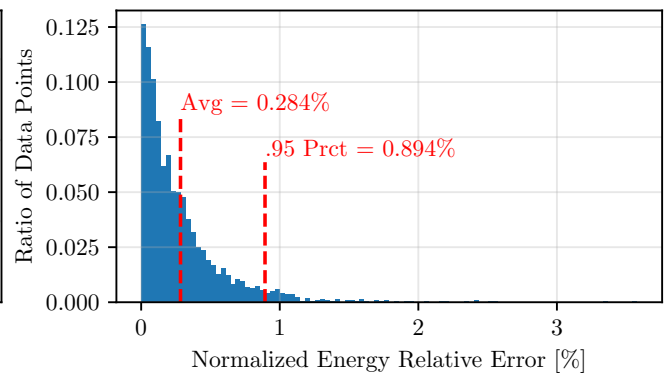Avg=1.003%,
.95 Prct=2.952%,
Max=9.569%

Sequence Relative Error for 3C94
90% known, 10% unknown
Avg=6.401%,
.95 Prct=19.460%,
Max=80.218%

Normalized Energy Relative Error for 3C94
90% known, 10% unknown
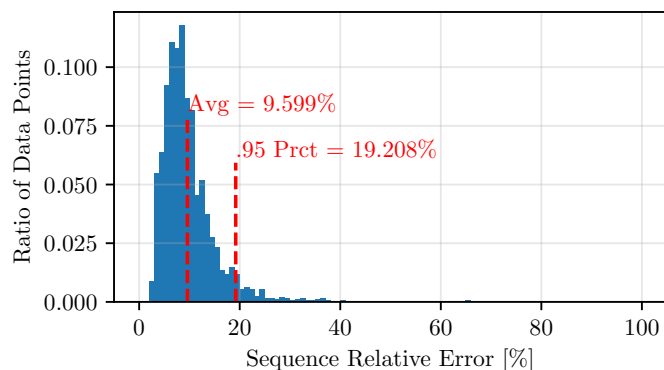Avg=0.284%,
.95 Prct=0.894%,
Max=3.580%

Material: 3E6

Sequence Relative Error for 3E6
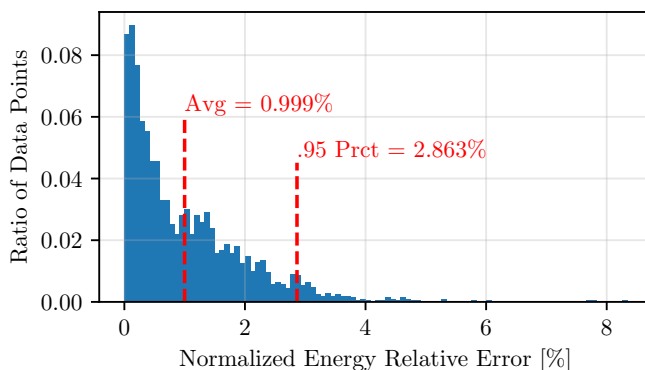**10% known, 90% unknown**
Avg=9.599%,
.95 Prct=19.208%,
Max=65.739%

Normalized Energy Relative Error for 3E6
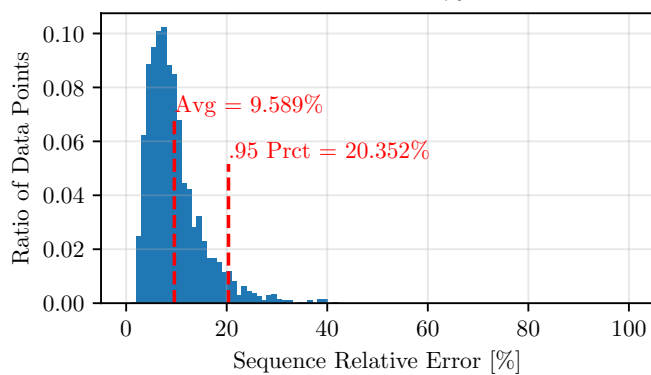**10% known, 90% unknown**
Avg=0.999%,
.95 Prct=2.863%,
Max=8.338%

Sequence Relative Error for 3E6
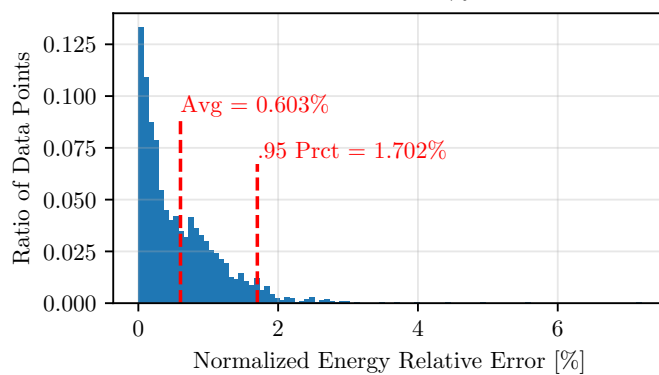**50% known, 50% unknown**
Avg=9.589%,
.95 Prct=20.352%,
Max=41.862%

Normalized Energy Relative Error for 3E6
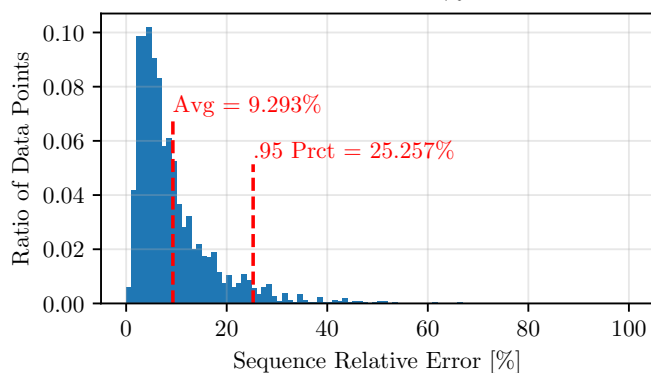**50% known, 50% unknown**
Avg=0.603%,
.95 Prct=1.702%,
Max=7.193%

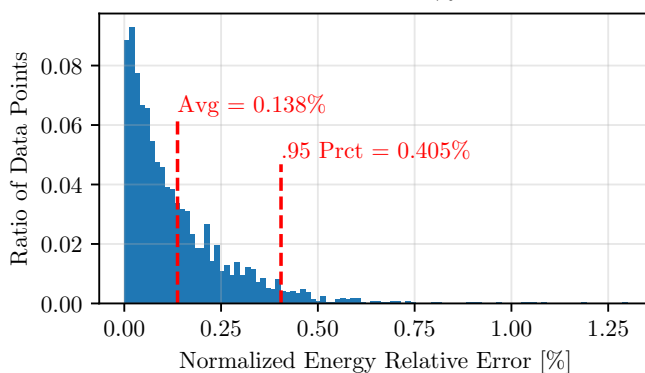**Sequence Relative Error for** 3E6
90% known, 10% unknown
Avg=9.293%,
.95 Prct=25.257%,
Max=66.311%

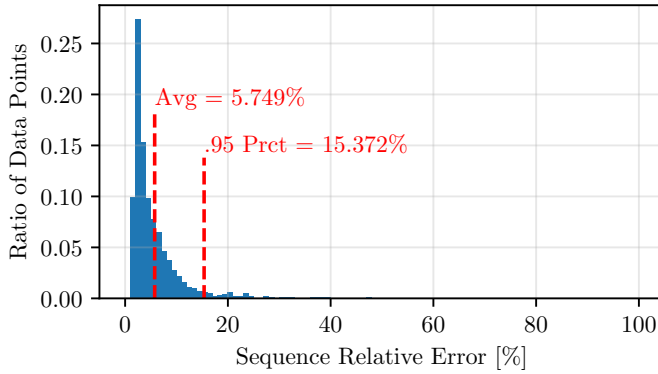**Normalized Energy Relative Error for** 3E6
90% known, 10% unknown
Avg=0.138%,
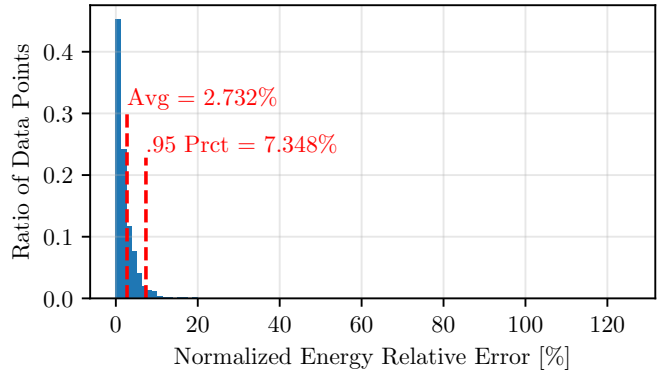.95 Prct=0.405%,
Max=1.299%

Material: 3F4

Sequence Relative Error for 3F4
10% known, 90% unknown
Avg=5.749%,
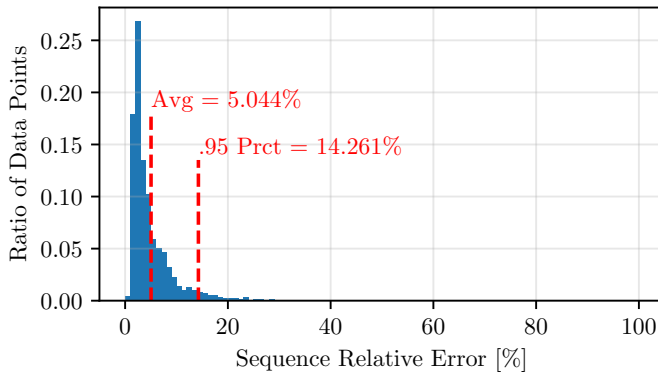.95 Prct=15.372%,
Max=83.190%

Normalized Energy Relative Error for 3F4
10% known, 90% unknown
Avg=2.732%,
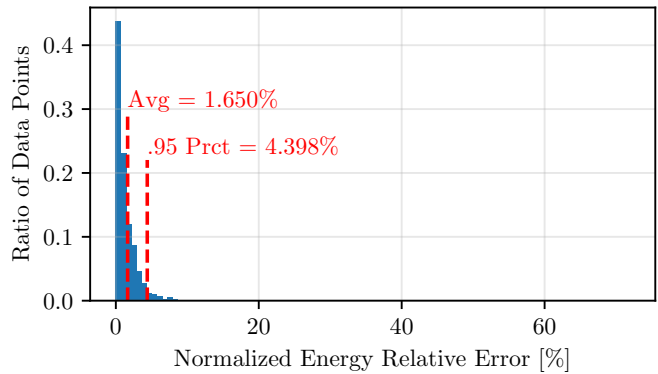.95 Prct=7.348%,
Max=125.426%

Sequence Relative Error for 3F4
50% known, 50% unknown
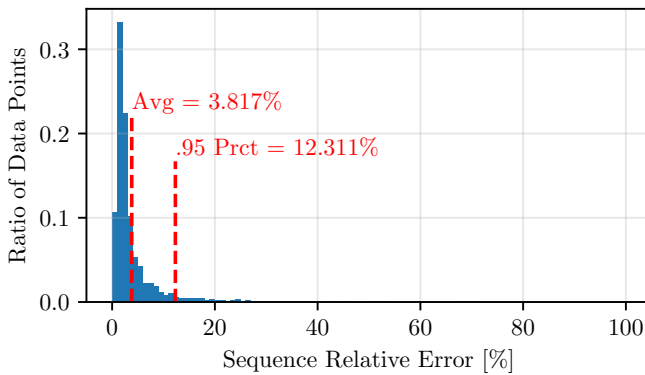Avg=5.044%,
.95 Prct=14.261%,
Max=56.249%

Normalized Energy Relative Error for 3F4
50% known, 50% unknown
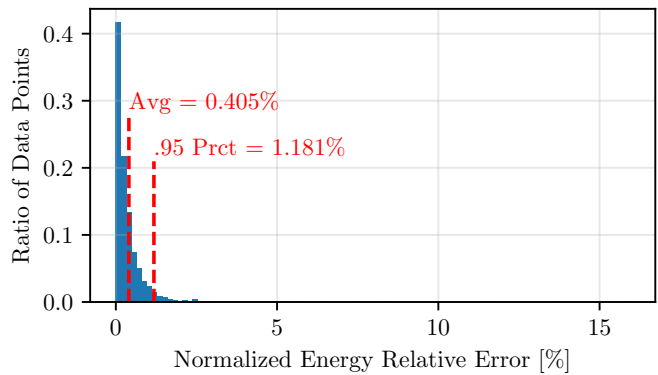Avg=1.650%,
.95 Prct=4.398%,
Max=71.895%

Sequence Relative Error for 3F4
90% known, 10% unknown
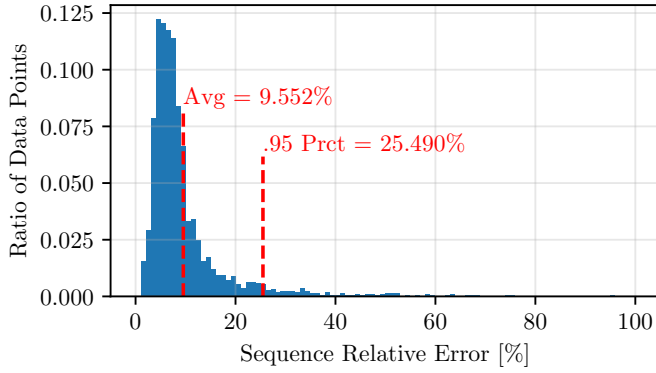Avg=3.817%,
.95 Prct=12.311%,
Max=70.712%

Normalized Energy Relative Error for 3F4
90% known, 10% unknown
Avg=0.405%,
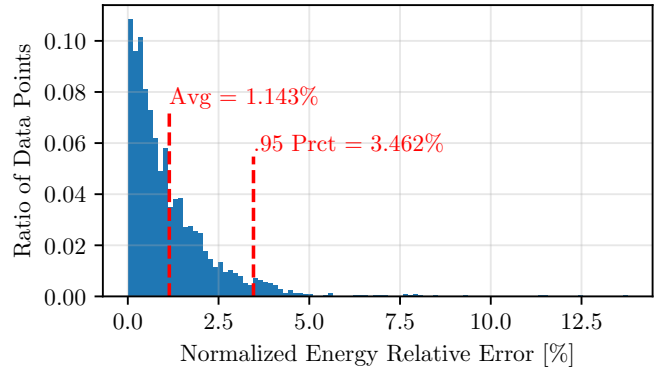.95 Prct=1.181%,
Max=15.931%

Material: 77

Sequence Relative Error for 77
10% known, 90% unknown
Avg=9.552%,
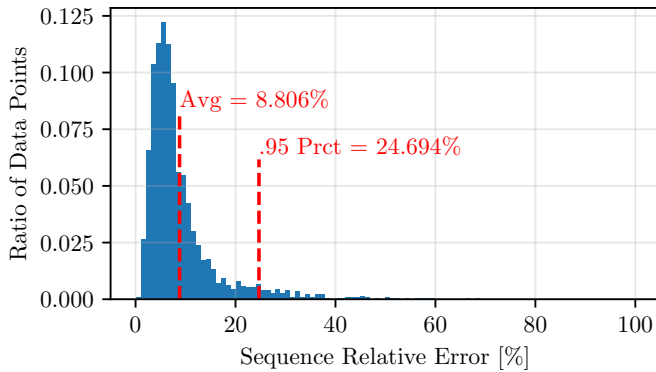.95 Prct=25.490%,
Max=95.361%

Normalized Energy Relative Error for 77
10% known, 90% unknown
Avg=1.143%,
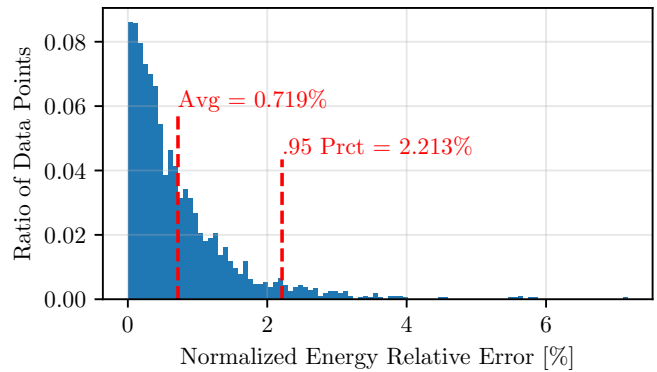.95 Prct=3.462%,
Max=13.770%

Sequence Relative Error for 77
50% known, 50% unknown
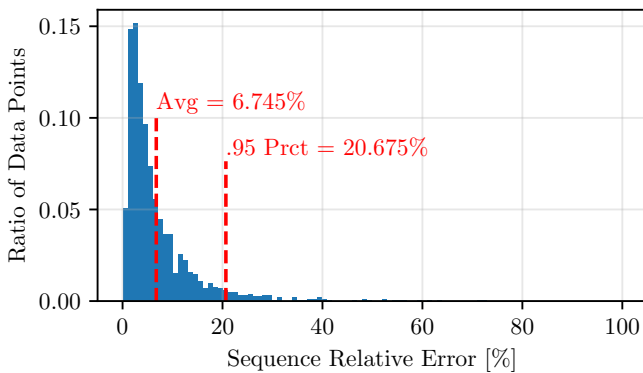Avg=8.806%,
.95 Prct=24.694%,
Max=68.054%

Normalized Energy Relative Error for 77
50% known, 50% unknown
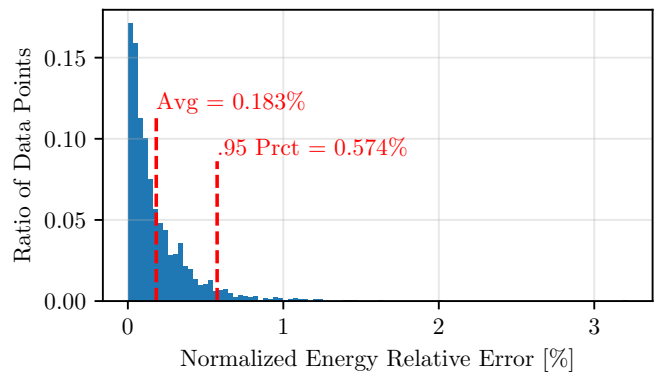Avg=0.719%,
.95 Prct=2.213%,
Max=7.170%

Sequence Relative Error for 77
90% known, 10% unknown
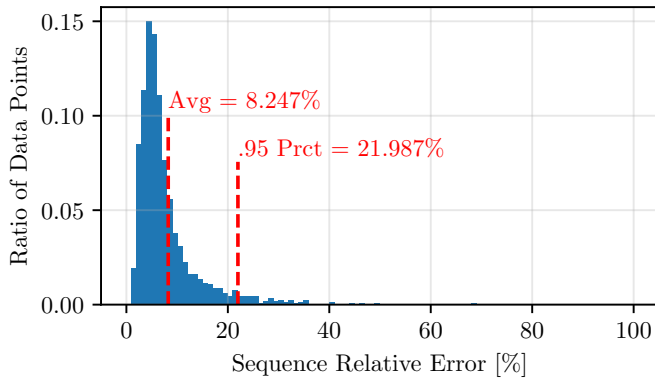Avg=6.745%,
.95 Prct=20.675%,
Max=72.044%

Normalized Energy Relative Error for 77
90% known, 10% unknown
Avg=0.183%,
.95 Prct=0.574%,
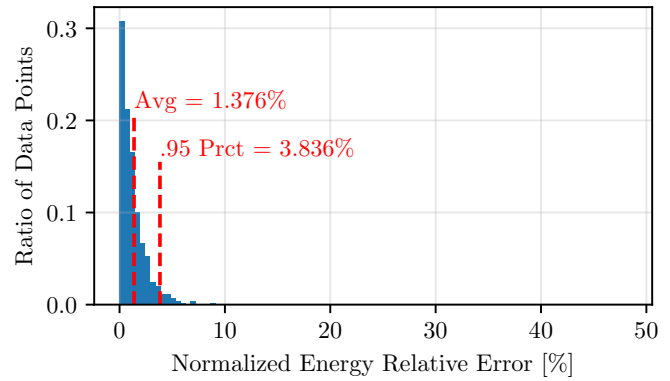Max=3.214%

Material: 78

Sequence Relative Error for 78
10% known, 90% unknown
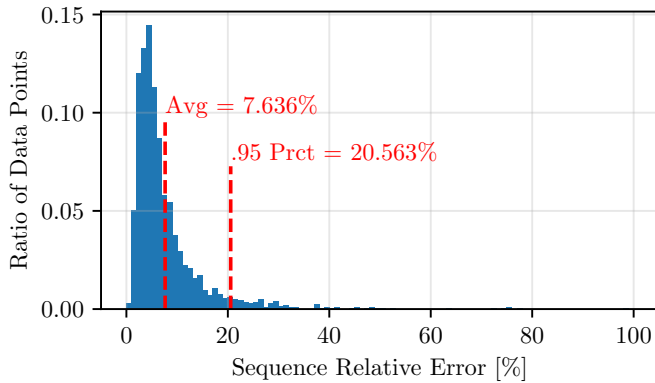Avg=8.247%,
.95 Prct=21.987%,
Max=101.908%

Normalized Energy Relative Error for 78
10% known, 90% unknown
Avg=1.376%,
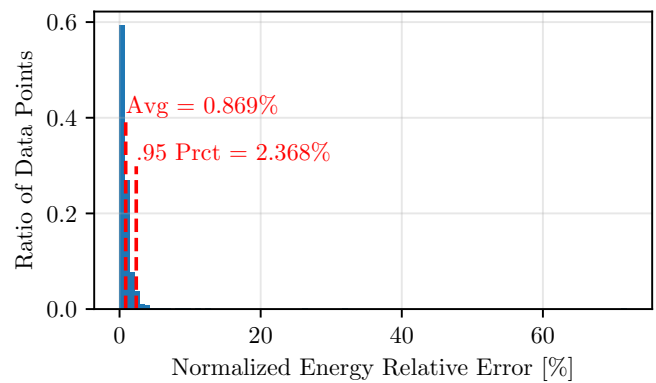.95 Prct=3.836%,
Max=48.144%

Sequence Relative Error for 78
50% known, 50% unknown
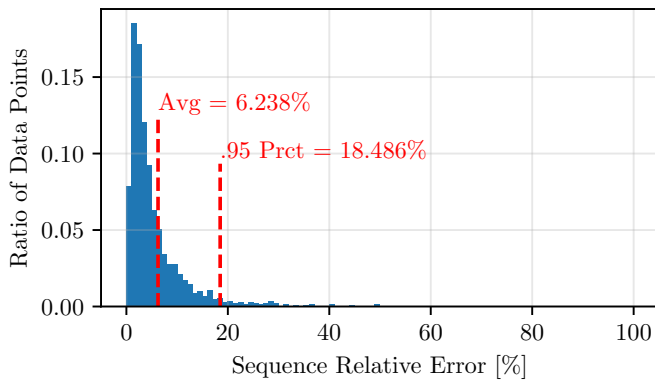Avg=7.636%,
.95 Prct=20.563%,
Max=98.317%

Normalized Energy Relative Error for 78
50% known, 50% unknown
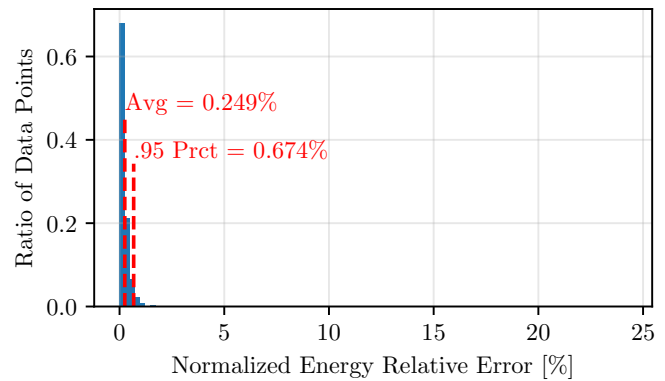Avg=0.869%,
.95 Prct=2.368%,
Max=71.893%

Sequence Relative Error for 78
90% known, 10% unknown
Avg=6.238%,
.95 Prct=18.486%,
Max=566.488%

Normalized Energy Relative Error for 78
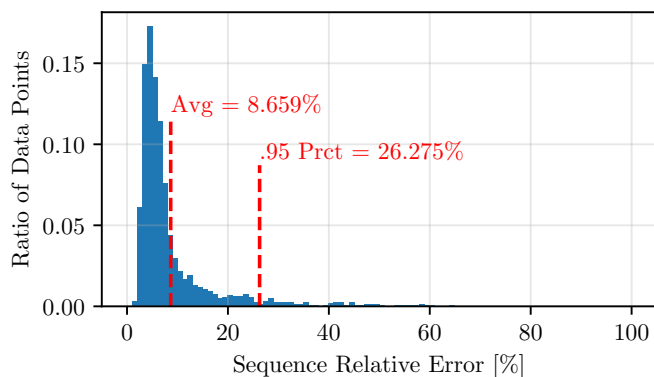**90% known, 10% unknown**
Avg=0.249%,
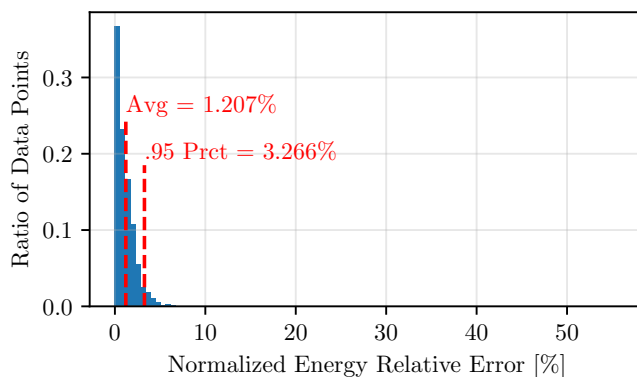.95 Prct=0.674%,
Max=24.224%

Material: N27

Sequence Relative Error for N27
10% known, 90% unknown
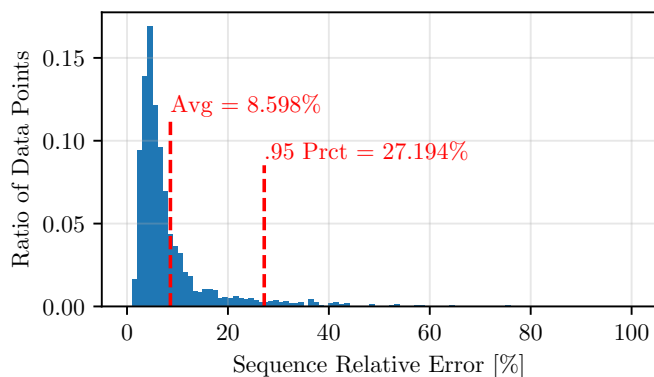Avg=8.659%,
.95 Prct=26.275%,
Max=64.812%

Normalized Energy Relative Error for N27
10% known, 90% unknown
Avg=1.207%,
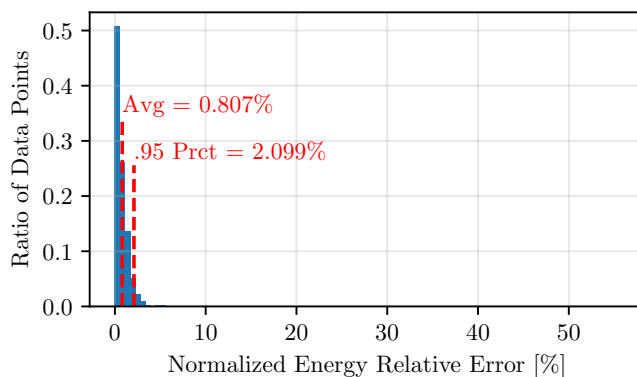.95 Prct=3.266%,
Max=55.801%

Sequence Relative Error for N27
50% known, 50% unknown
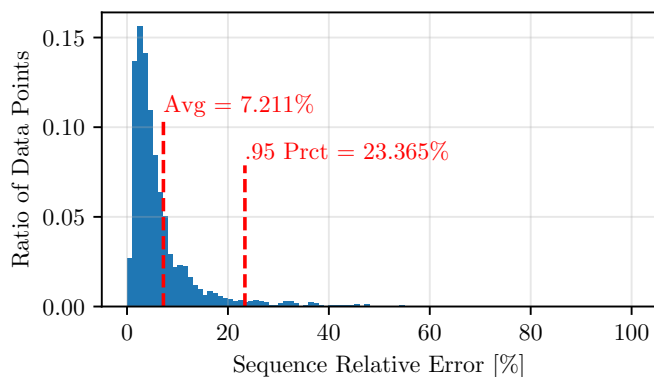Avg=8.598%,
.95 Prct=27.194%,
Max=94.779%

Normalized Energy Relative Error for N27
50% known, 50% unknown
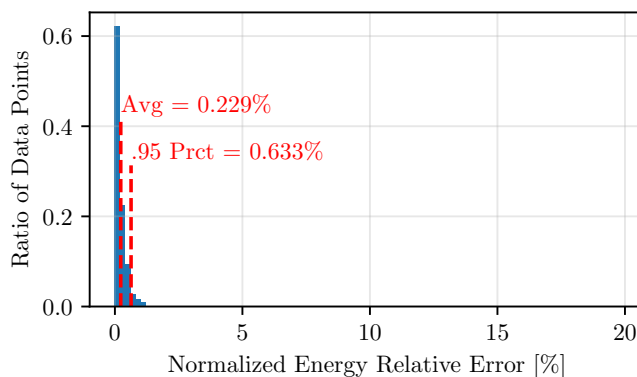Avg=0.807%,
.95 Prct=2.099%,
Max=55.585%

Sequence Relative Error for N27
90% known, 10% unknown
Avg=7.211%,
.95 Prct=23.365%,
Max=136.513%

Normalized Energy Relative Error for N27
90% known, 10% unknown
Avg=0.229%,
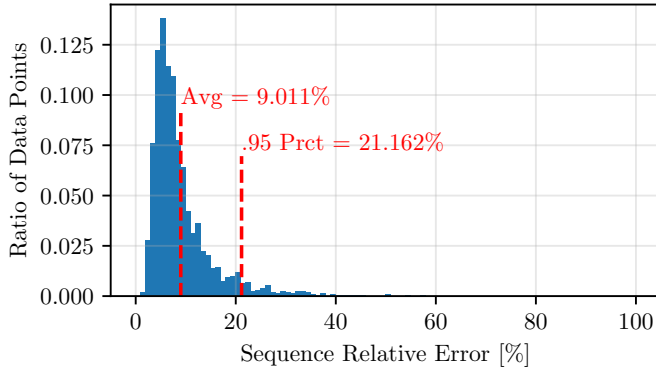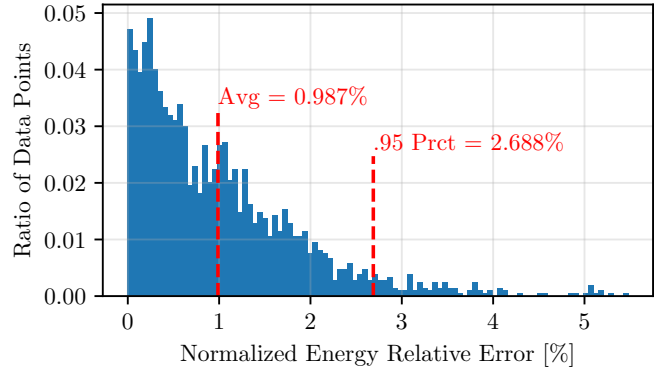.95 Prct=0.633%,
Max=19.786%

Material: N30

Sequence Relative Error for N30
10% known, 90% unknown
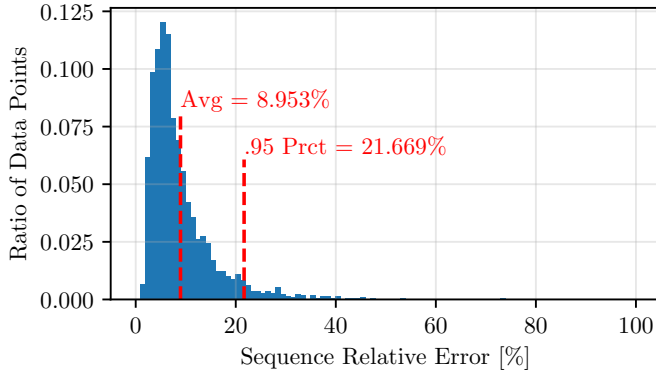Avg=9.011%,
.95 Prct=21.162%,
Max=57.377%

Normalized Energy Relative Error for N30
10% known, 90% unknown
Avg=0.987%,
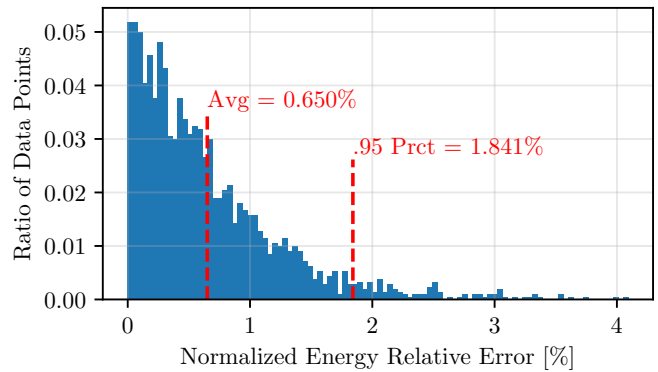.95 Prct=2.688%,
Max=5.477%

Sequence Relative Error for N30
50% known, 50% unknown
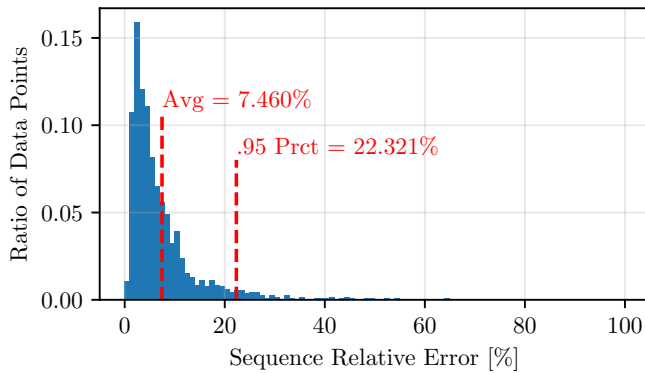Avg=8.953%,
.95 Prct=21.669%,
Max=73.418%

Normalized Energy Relative Error for N30
50% known, 50% unknown
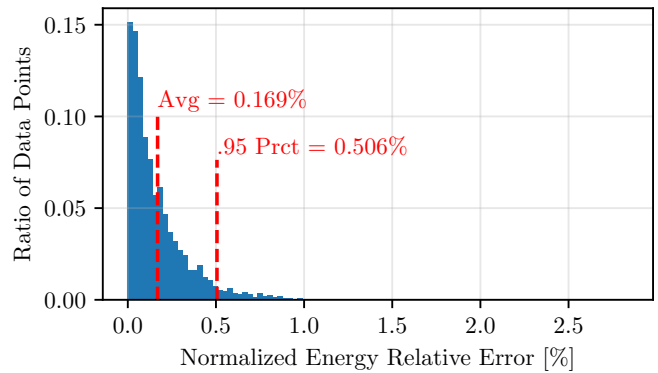Avg=0.650%,
.95 Prct=1.841%,
Max=4.091%

Sequence Relative Error for N30
90% known, 10% unknown
Avg=7.460%,
.95 Prct=22.321%,
Max=104.185%

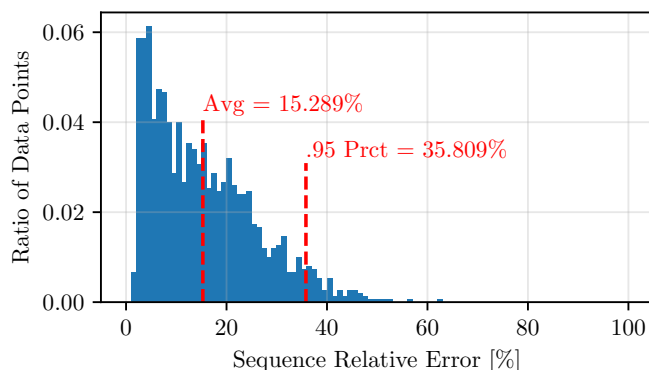**Normalized Energy Relative Error for N30**
90% known, 10% unknown
Avg=0.169%,
.95 Prct=0.506%,
Max=2.837%

Material: N49

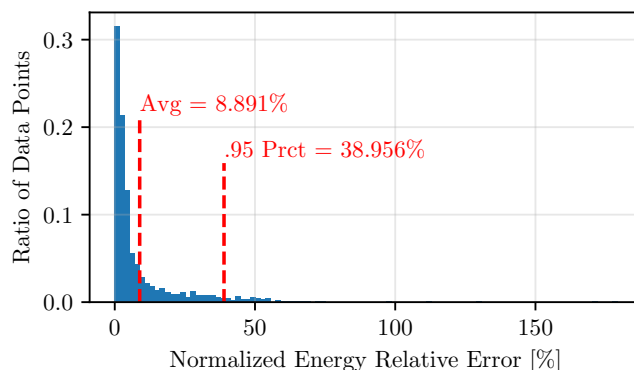**Sequence Relative Error for** N49
10% known, 90% unknown
Avg=15.289%,
.95 Prct=35.809%,
Max=62.284%

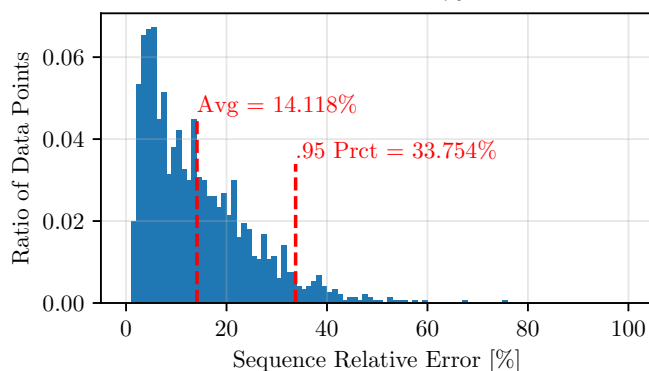**Normalized Energy Relative Error for** N49
10% known, 90% unknown
Avg=8.891%,
.95 Prct=38.956%,
Max=179.113%

Sequence Relative Error for N49
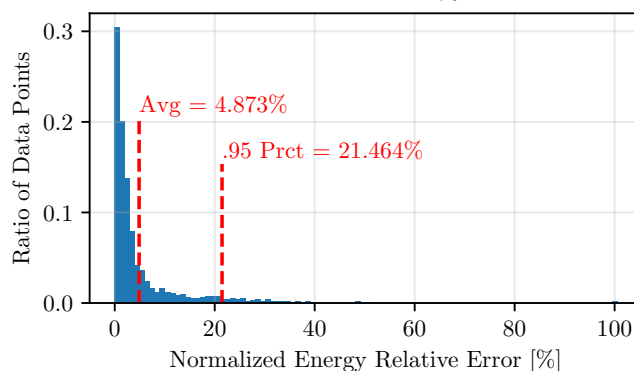**50% known, 50% unknown**
Avg=14.118%,
.95 Prct=33.754%,
Max=75.671%

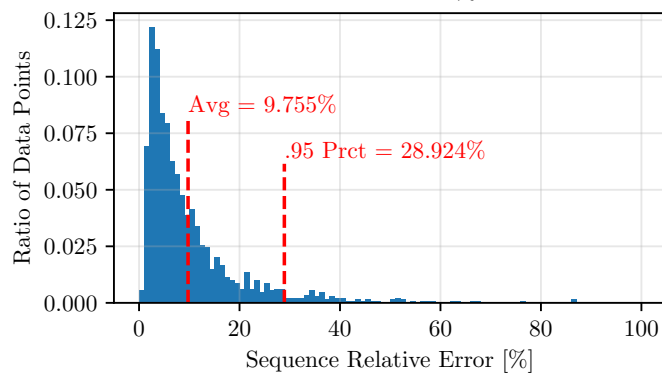**Normalized Energy Relative Error for** N49
50% known, 50% unknown
Avg=4.873%,
.95 Prct=21.464%,
Max=100.502%

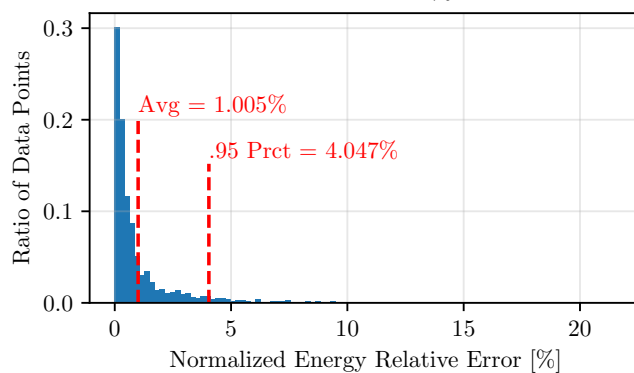**Sequence Relative Error for** N49
90% known, 10% unknown
Avg=9.755%,
.95 Prct=28.924%,
Max=86.498%

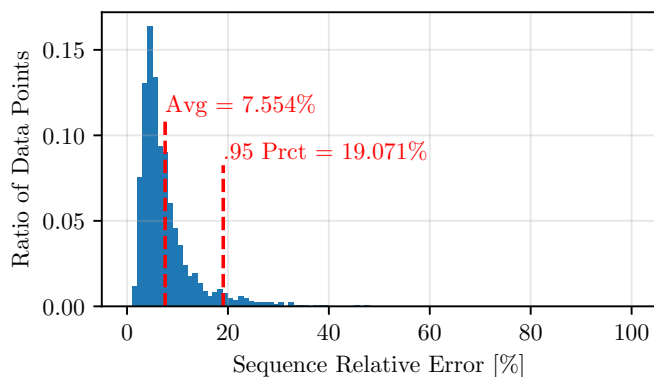**Normalized Energy Relative Error for** N49
90% known, 10% unknown
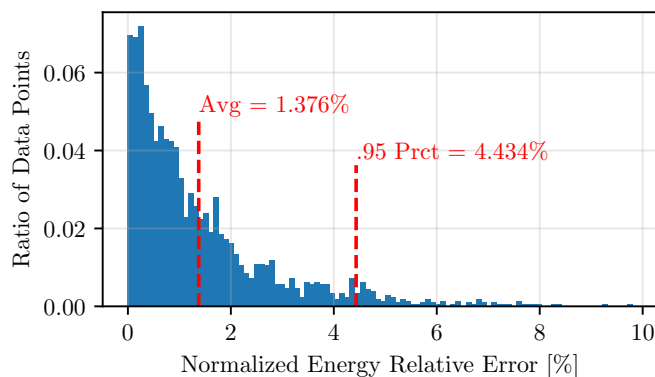Avg=1.005%,
.95 Prct=4.047%,
Max=21.596%

Material: N87

Sequence Relative Error for N87
10% known, 90% unknown
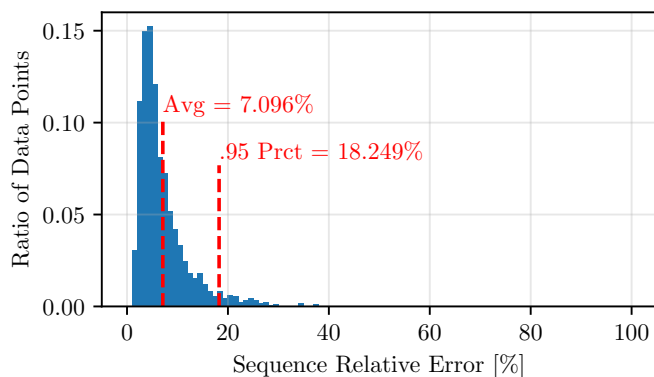Avg=7.554%,
.95 Prct=19.071%,
Max=47.024%

Normalized Energy Relative Error for N87
10% known, 90% unknown
Avg=1.376%,
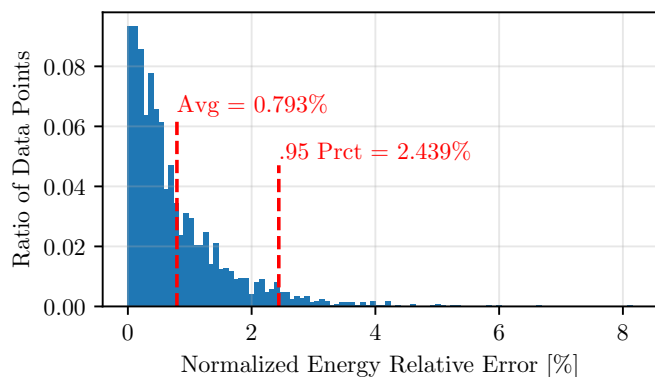.95 Prct=4.434%,
Max=9.802%

Sequence Relative Error for N87
50% known, 50% unknown
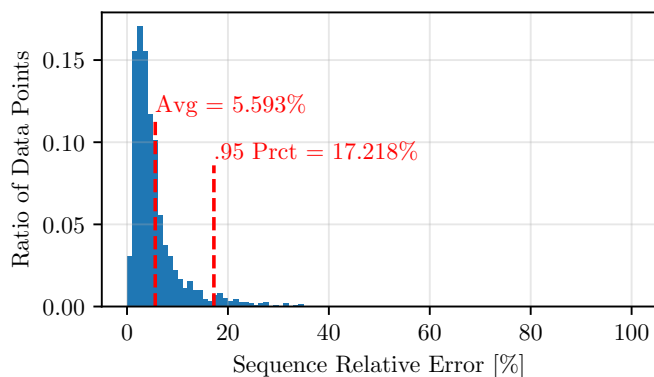Avg=7.096%,
.95 Prct=18.249%,
Max=42.242%

Normalized Energy Relative Error for N87
50% known, 50% unknown
Avg=0.793%,
.95 Prct=2.439%,
Max=8.155%

Sequence Relative Error for N87
90% known, 10% unknown
Avg=5.593%,
.95 Prct=17.218%,
Max=72.564%

Normalized Energy Relative Error for N87
90% known, 10% unknown
Avg=0.189%,
.95 Prct=0.625%,
Max=2.203%