拓扑与并行矩阵乘法的节点适配性实验结果

实验环境：本地模拟器（基于python 3.6）
实验拓扑：16k2ring, 16k3, 16k3wheel, 16k3grid, 16k4, 16k4torus
实验算法：Cannon (16,1,1), BMR (4,4,1), SUMMA(1,1,16)

每个拓扑与每个算法进行配对模拟，模拟分为：

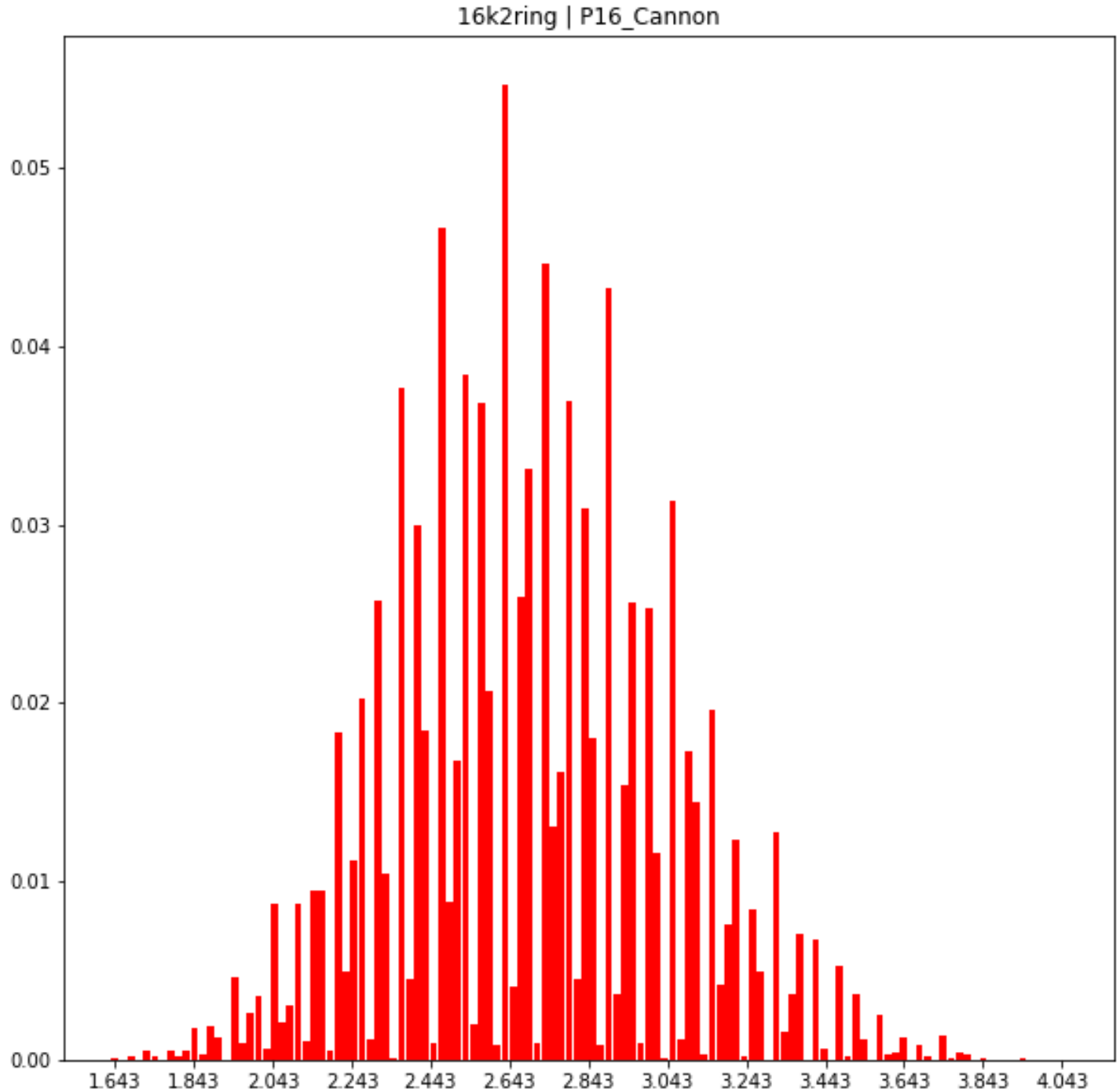
- 完全随机映射模拟（全部进程随机映射到各个节点），每组进行10,000次
- 浅层模拟退火模拟（进行短时间的模拟退火优化），每组进行1,000次

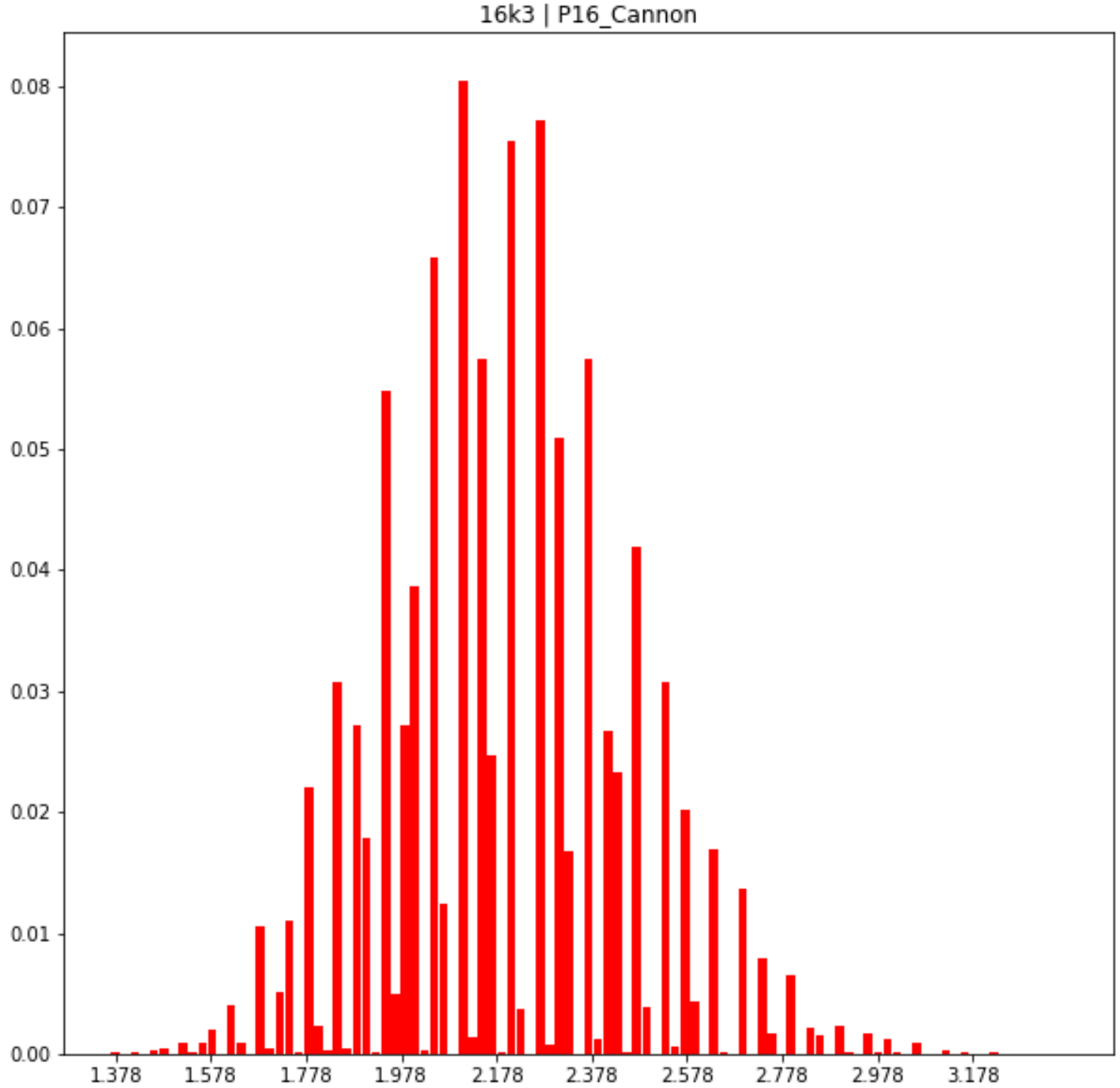
结果按频率统计结果呈现为条状图：

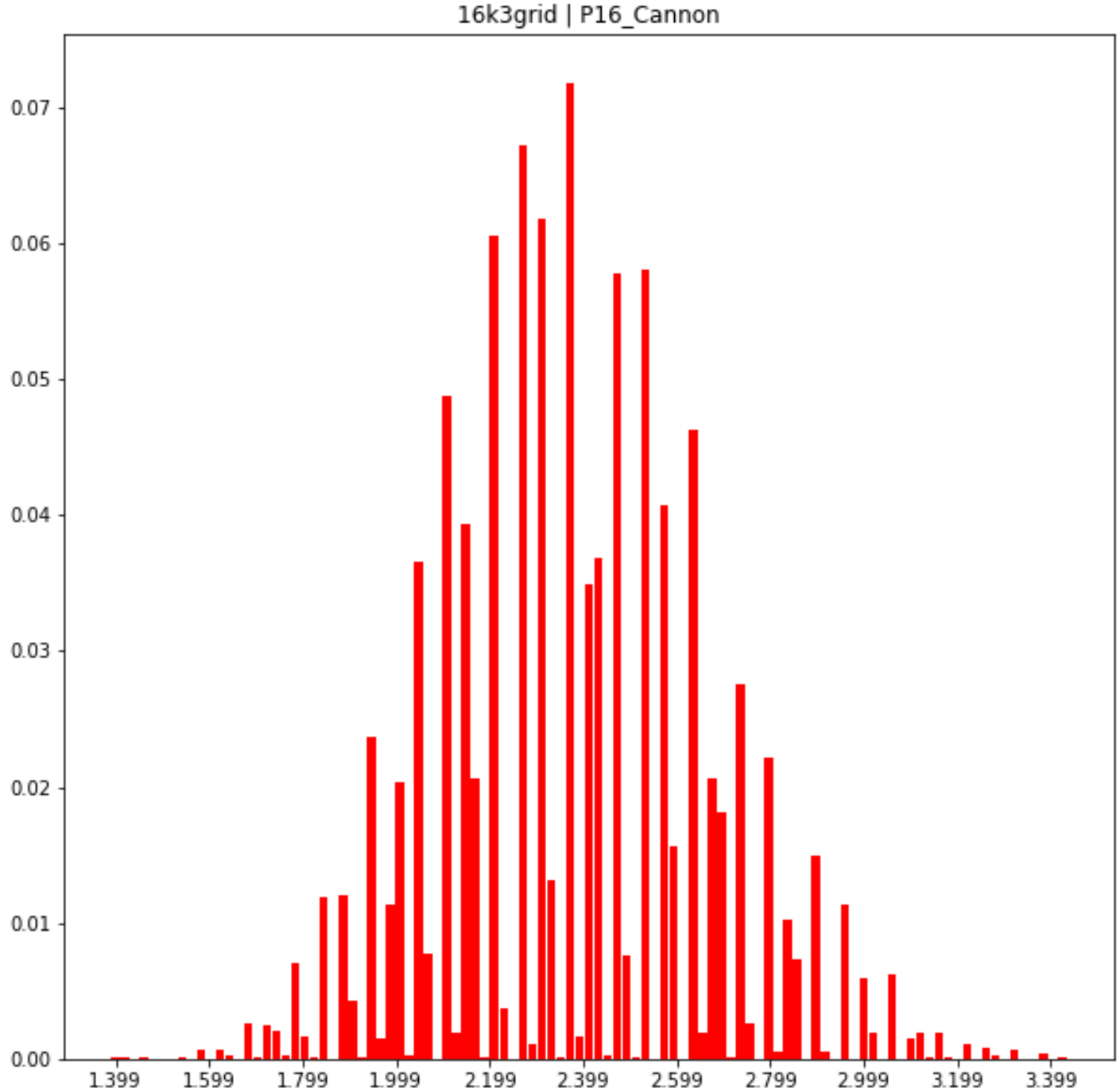
- 横轴为模拟耗时与理想耗时（fully-connected）的比值；
- 纵轴为拥有该耗时时段的方案的出现频率

P = 16, Cannon Method

Random Plan




16k3 | P16_Cannon
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1.378
1.578
1.778
1.978
2.178
2.378
2.578
2.778
2.978
3.178


16k3grid | P16_Cannon
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1.399
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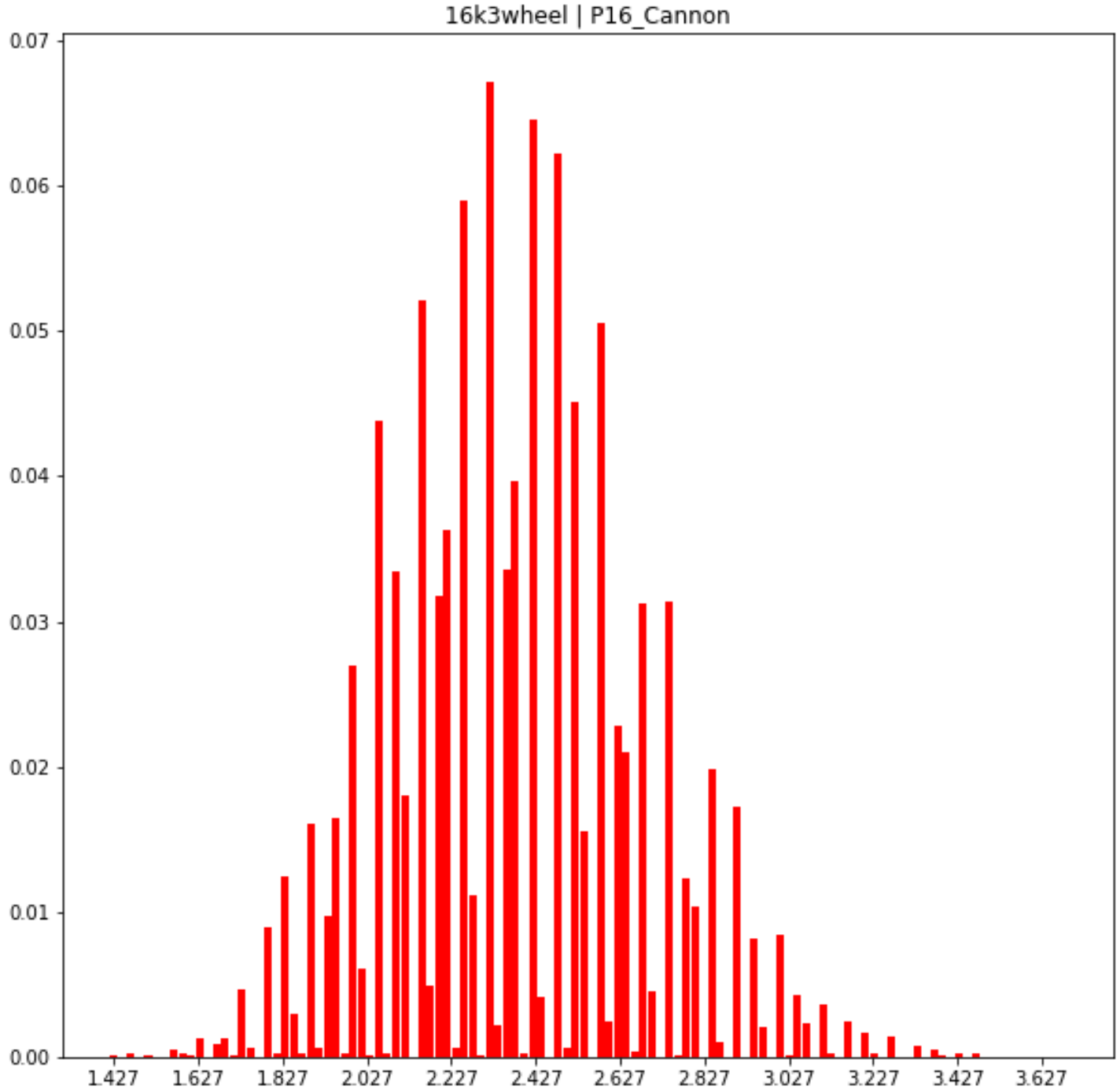
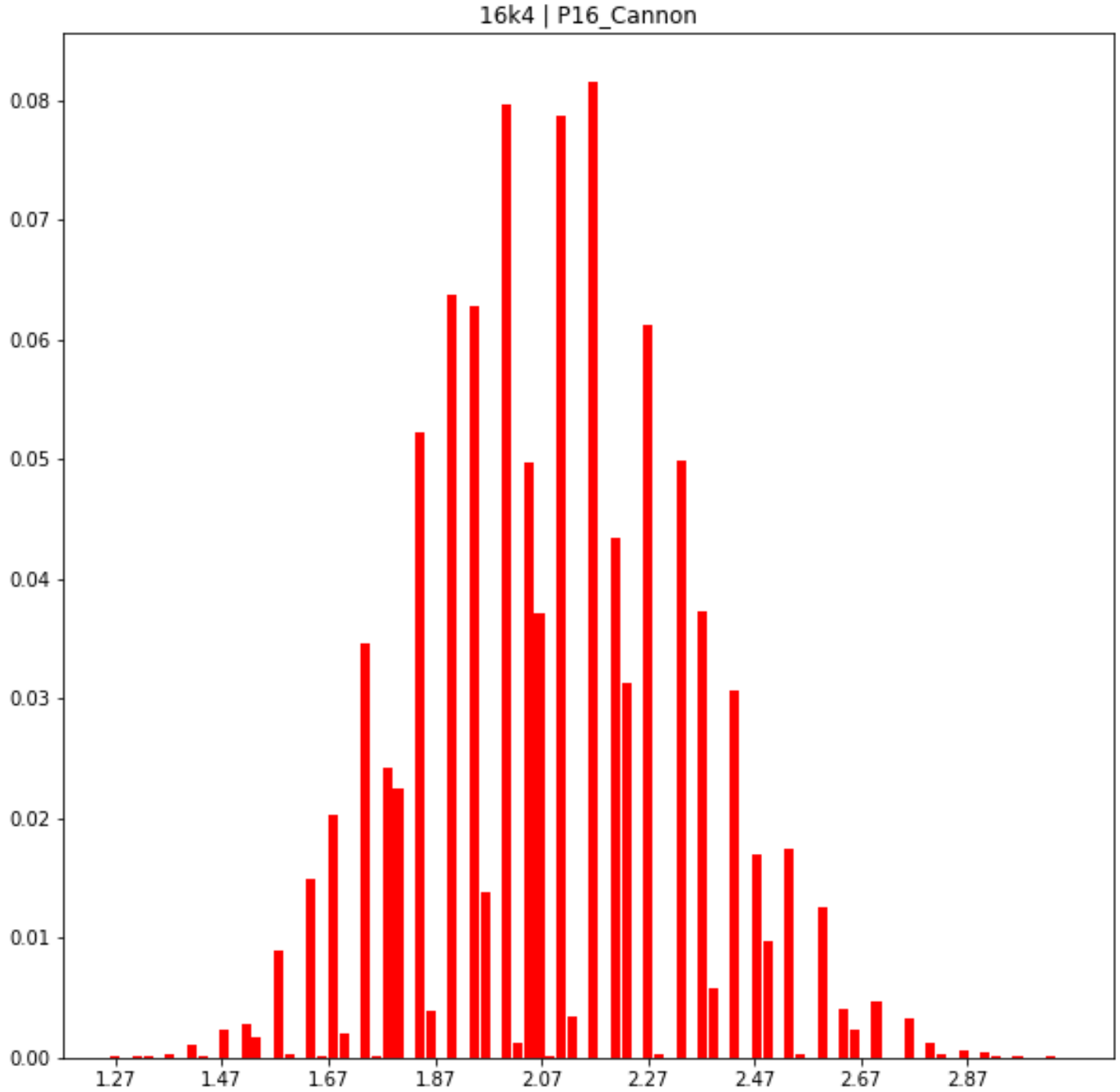
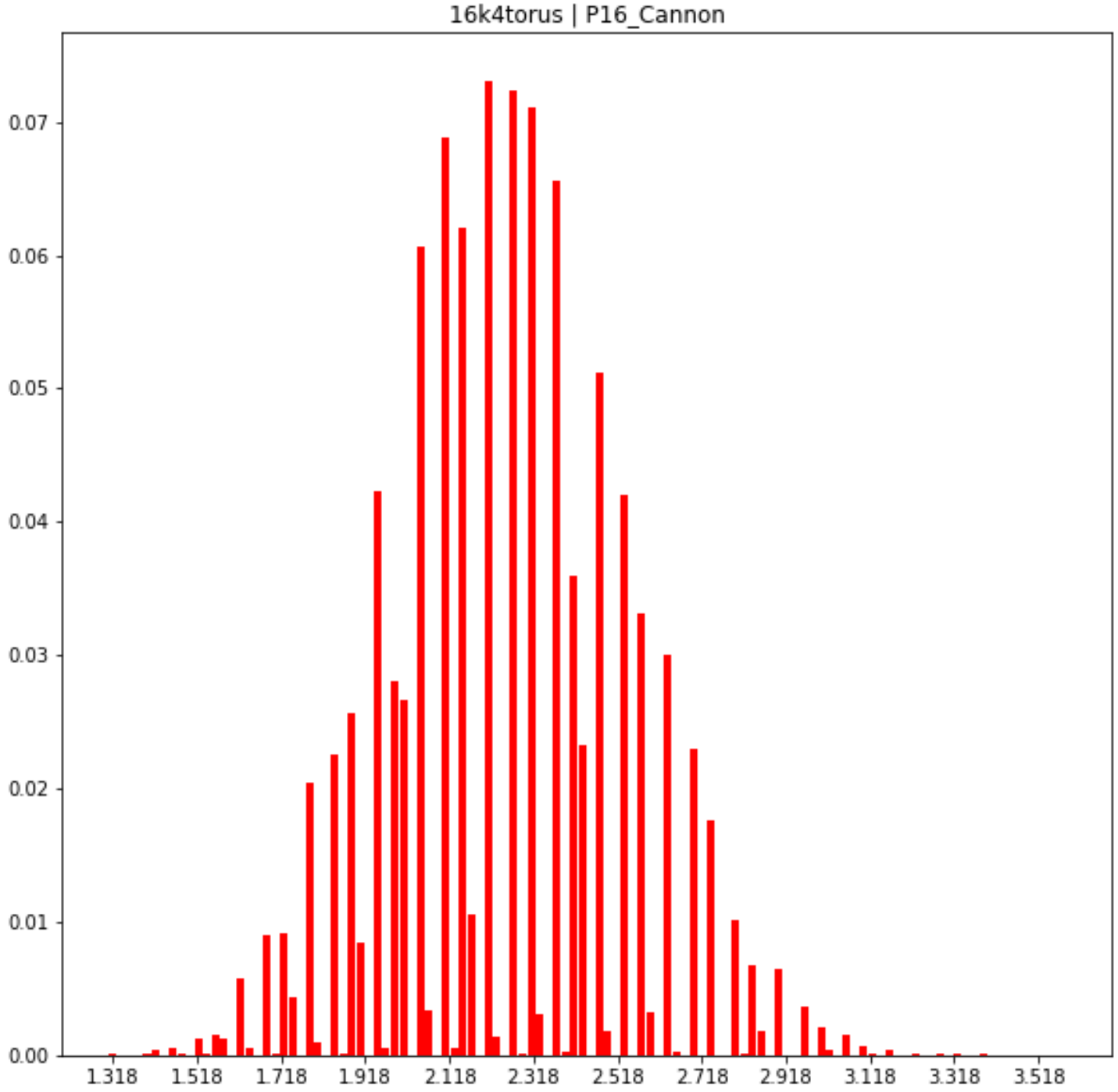
1.999
2.199
2.399
2.599
2.799
2.999
3.199
3.399

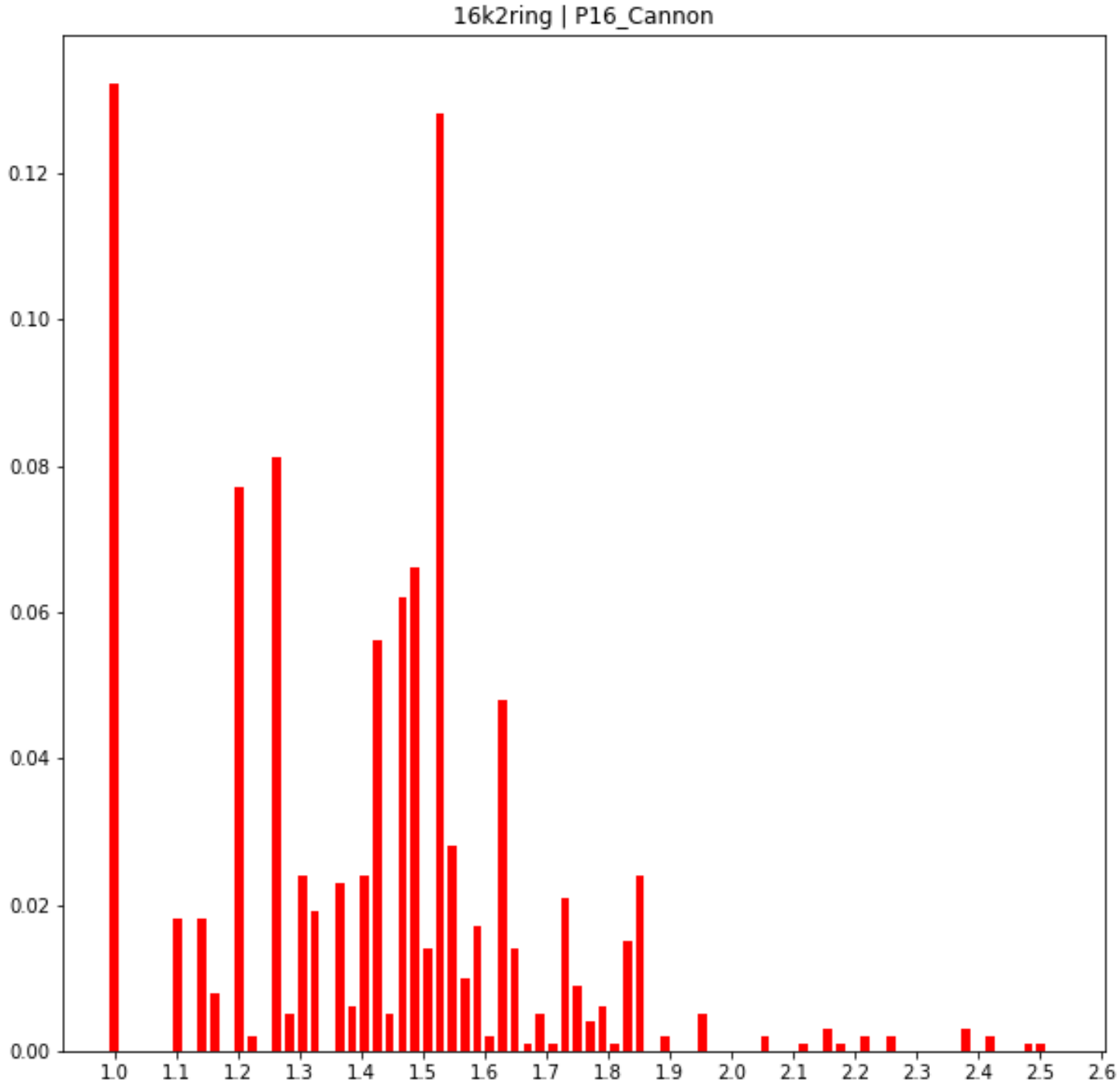

16k3wheel | P16_Cannon
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1.427
1.627
1.827
2.027
2.227
2.427
2.627
2.827
3.027
3.227
3.427
3.627

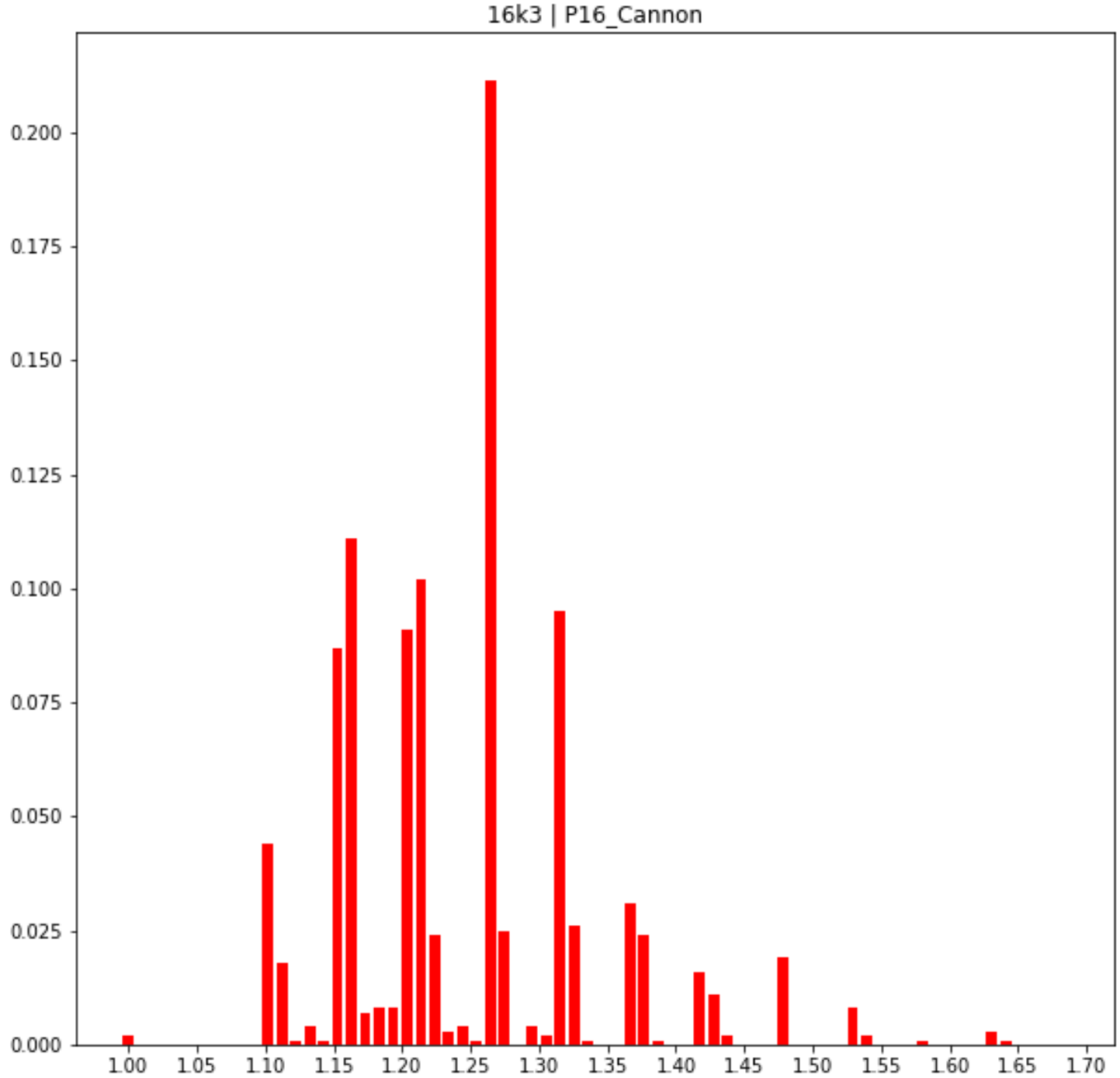

16k4 | P16_Cannon
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1.27
1.47
1.67
1.87
2.07
2.27
2.47
2.67
2.87

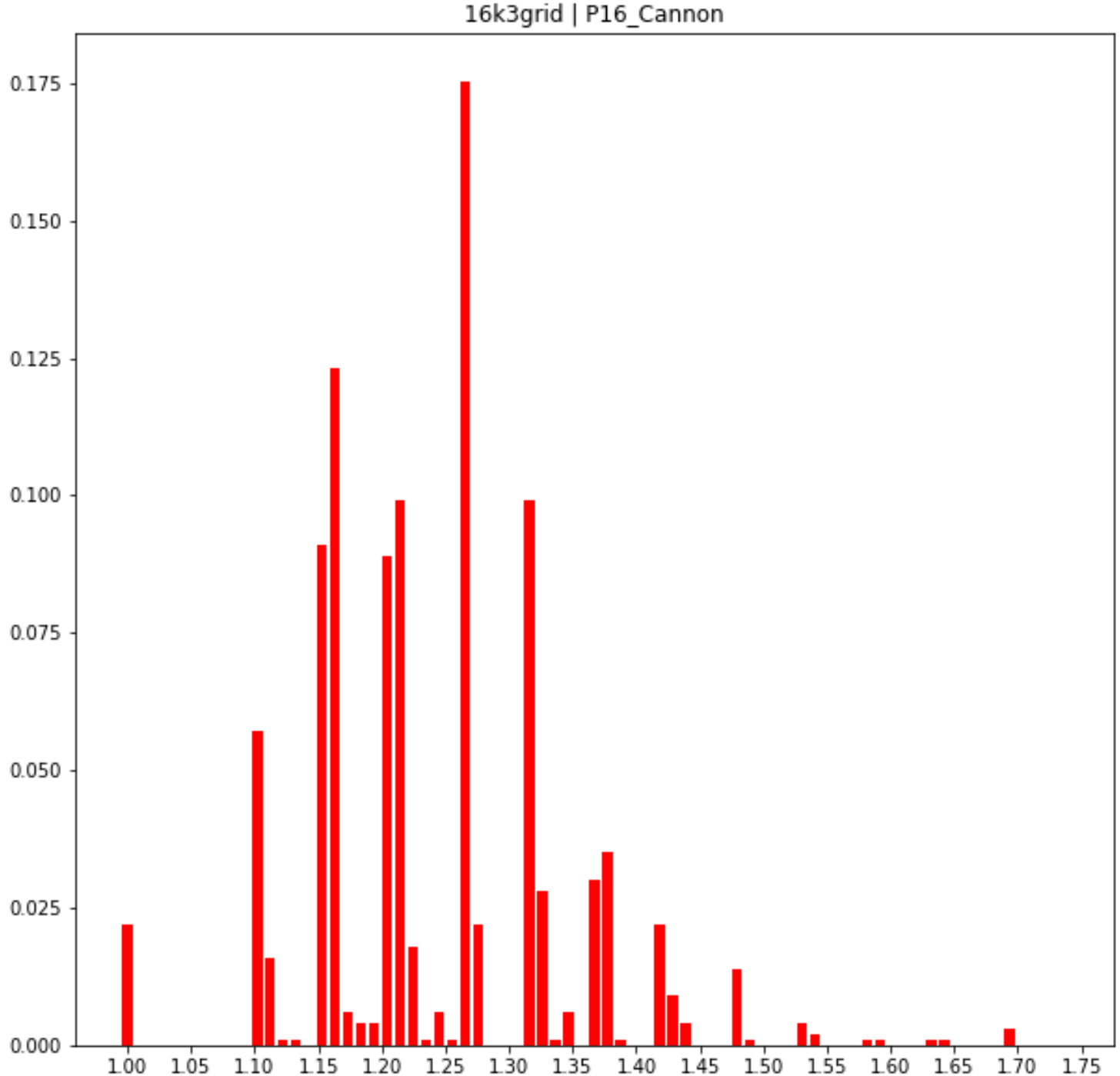

16k4torus | P16_Cannon
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1.318
1.518
1.718
1.918
2.118
2.318
2.518
2.718
2.918
3.118
3.318
3.518

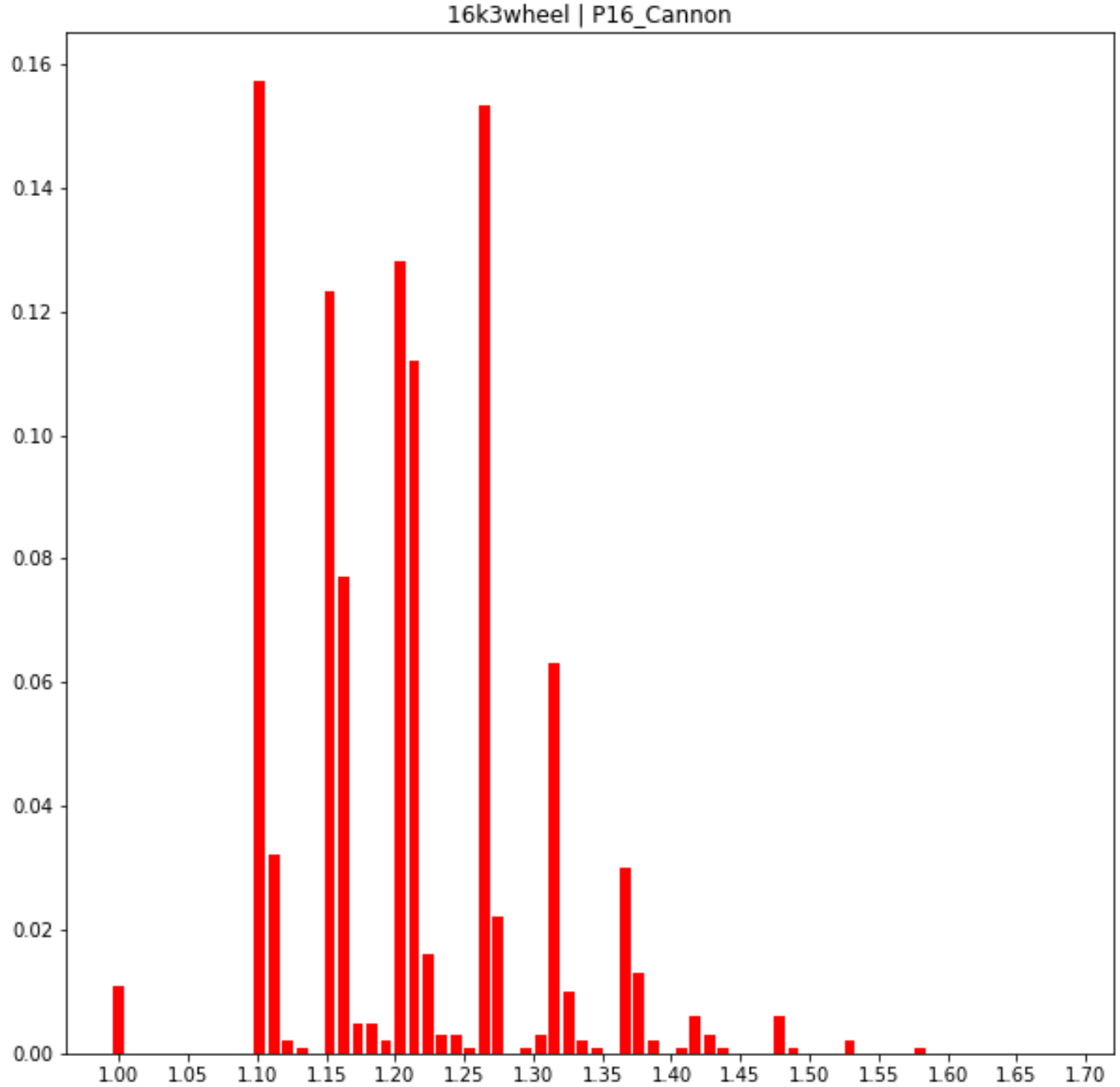
P = 16, Cannon Method

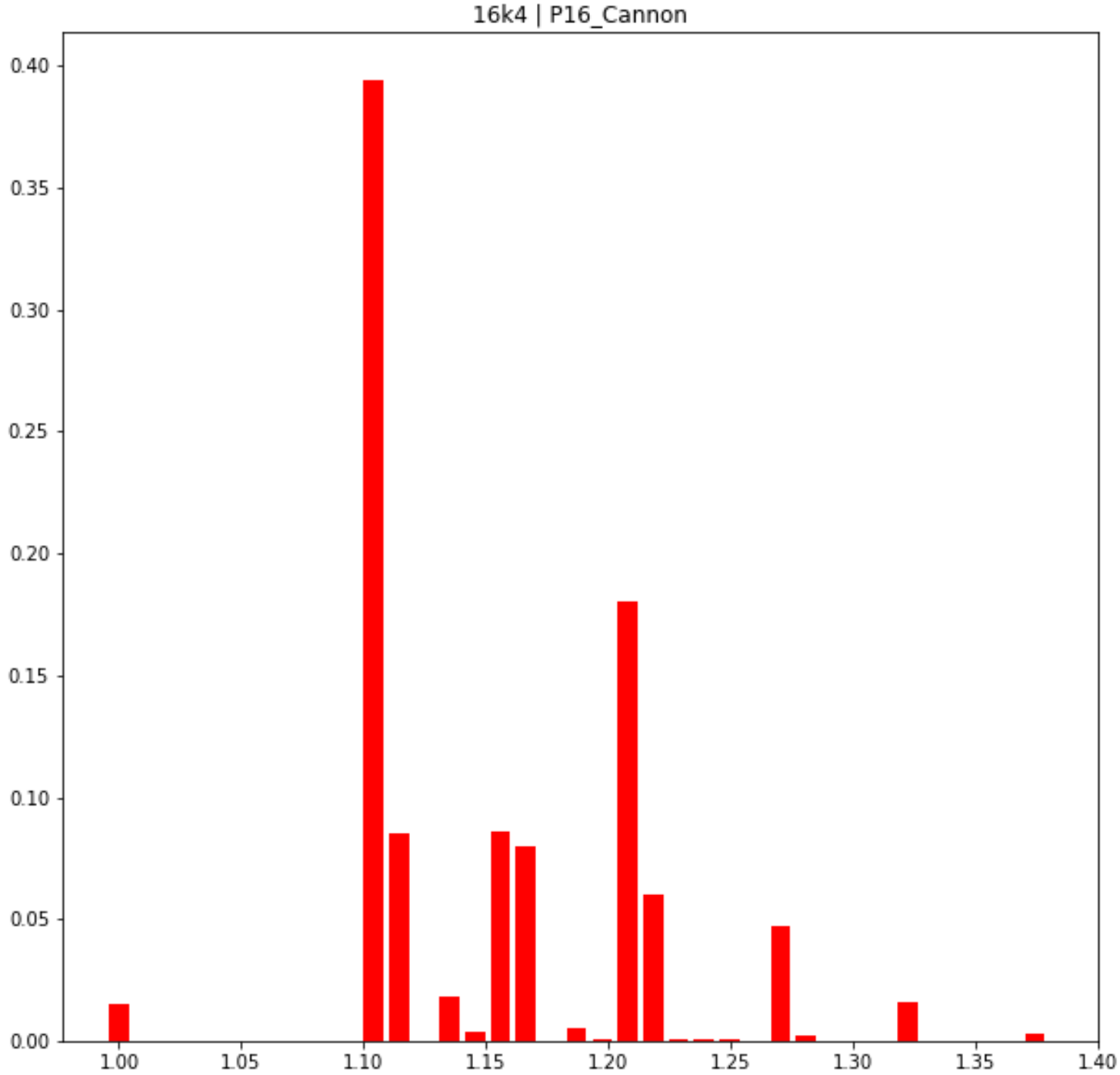
Annealing Plan

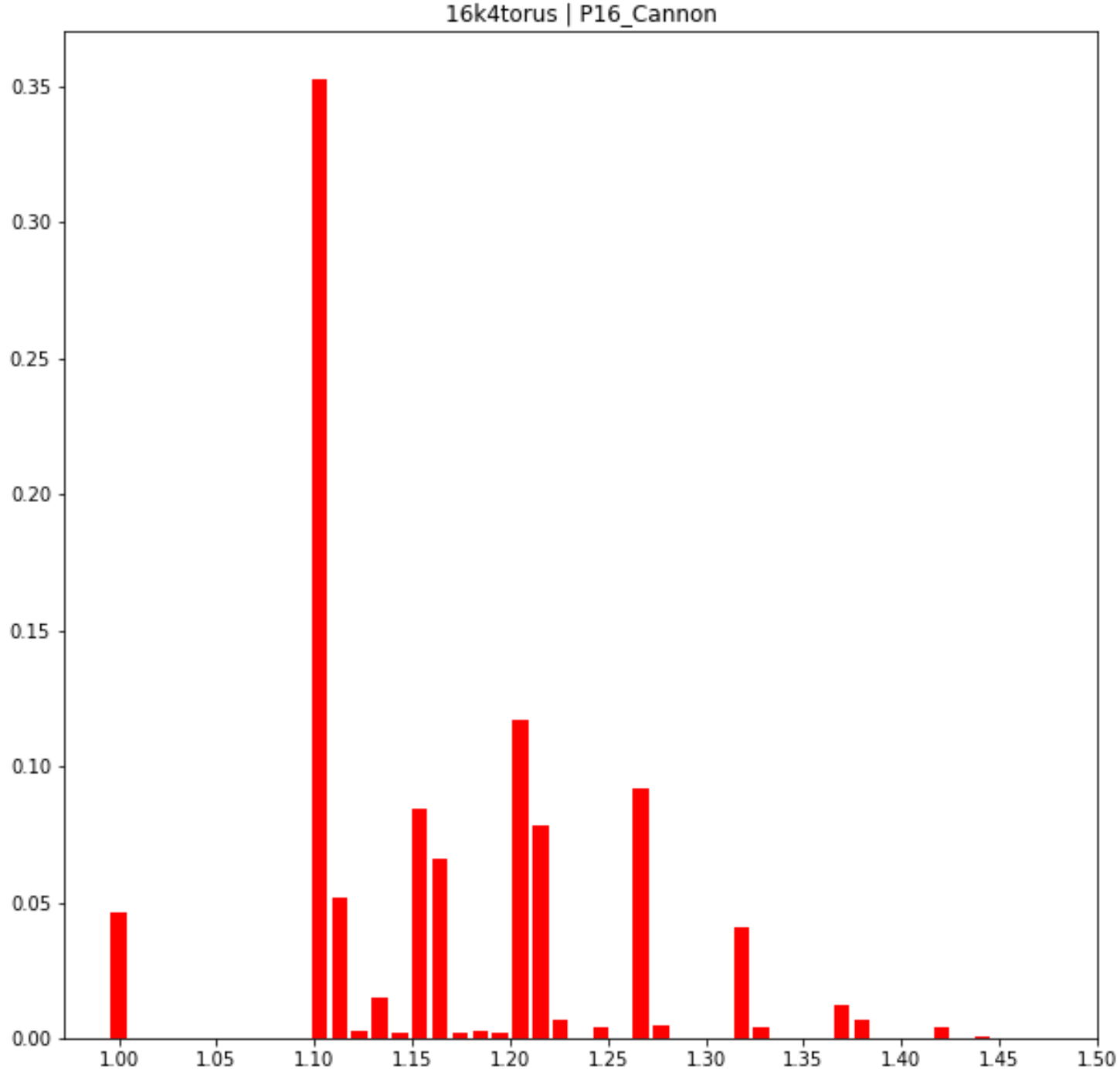



16k3 | P16_Cannon
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
1.00
1.05
1.10
1.15
1.20
1.25
1.30
1.35
1.40
1.45
1.50
1.55
1.60
1.65
1.70


16k3grid | P16_Cannon
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
1.00
1.05
1.10
1.15
1.20
1.25
1.30
1.35
1.40
1.45
1.50
1.55
1.60
1.65
1.70
1.75

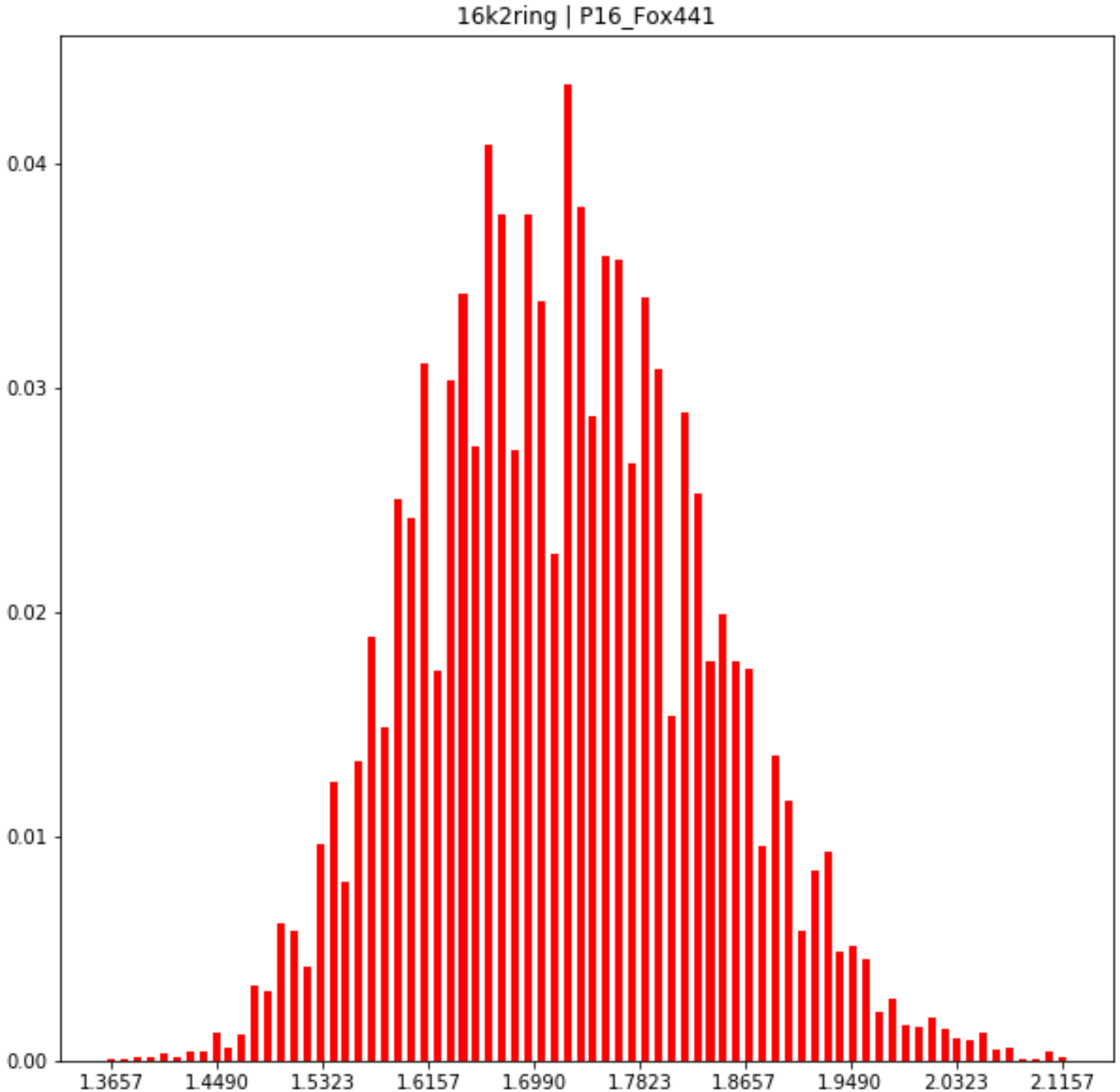

16k3wheel | P16_Cannon
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1.00
1.05
1.10
1.15
1.20
1.25
1.30
1.35
1.40
1.45
1.50
1.55
1.60
1.65
1.70

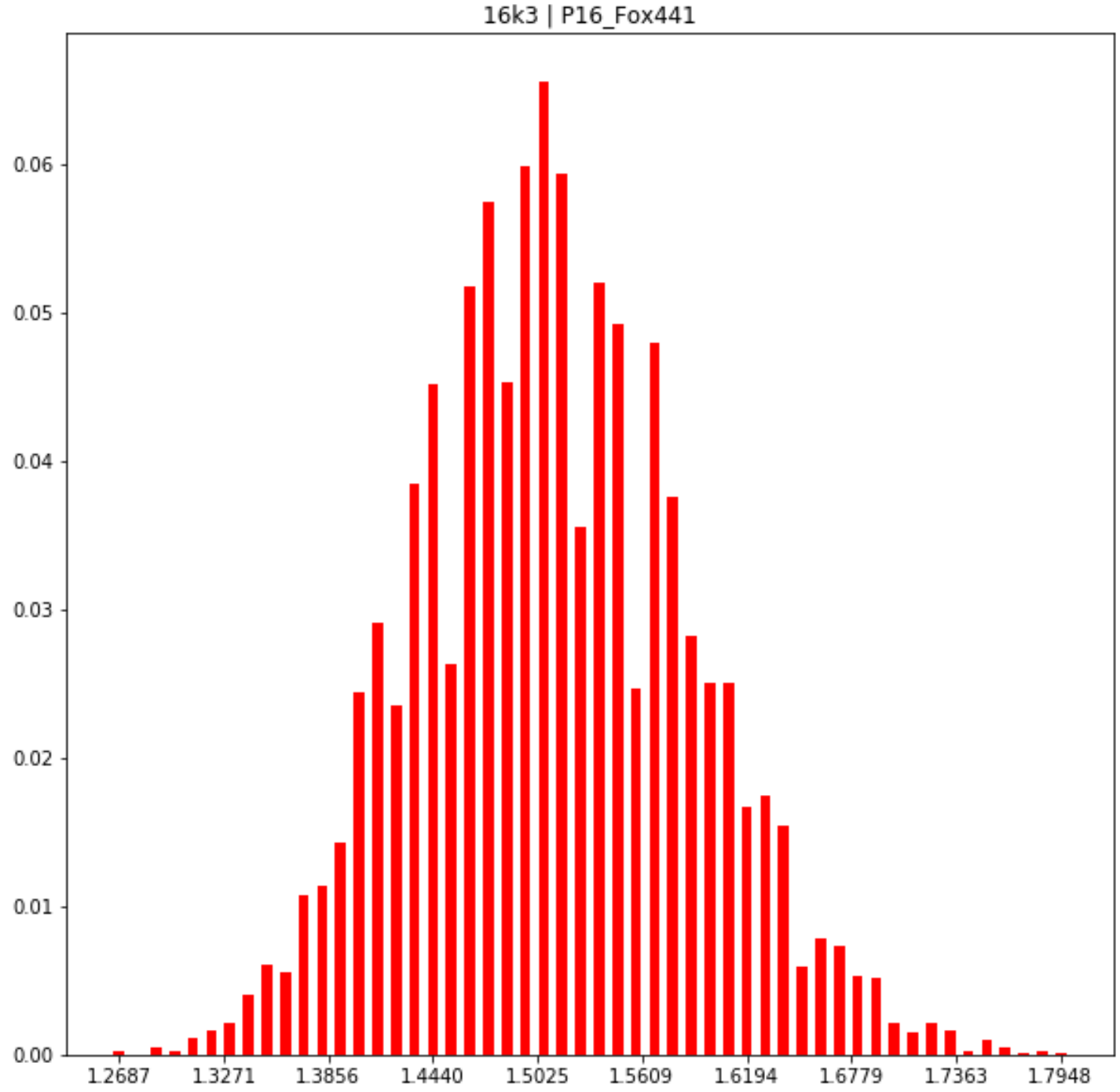

16k4 | P16_Cannon
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1.00
1.05
1.10
1.15
1.20
1.25
1.30
1.35
1.40

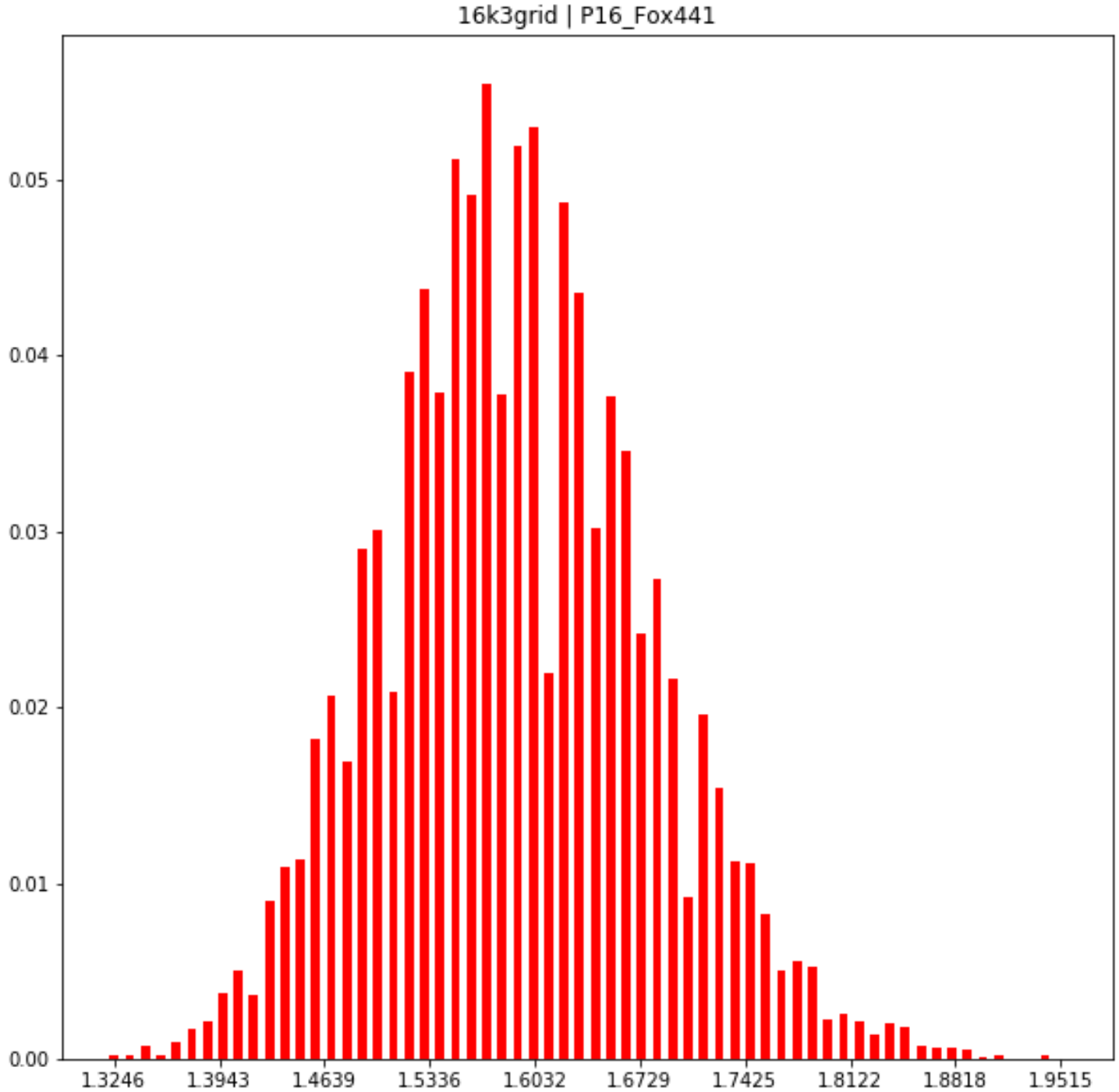

16k4torus | P16_Cannon
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1.00
1.05
1.10
1.15
1.20
1.25
1.30
1.35
1.40
1.45
1.50

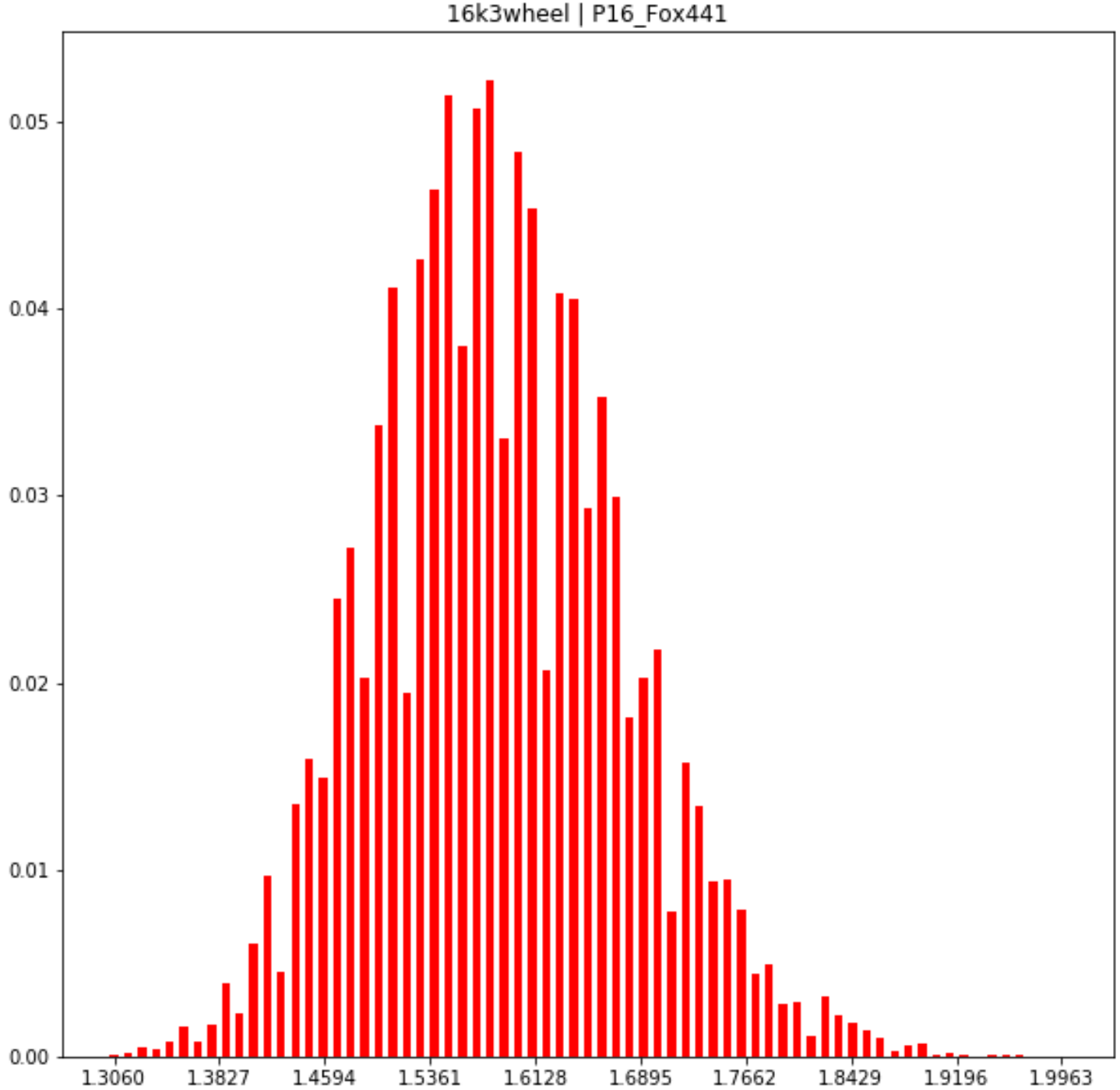
P = 16, BMR Method (4,4,1 型)

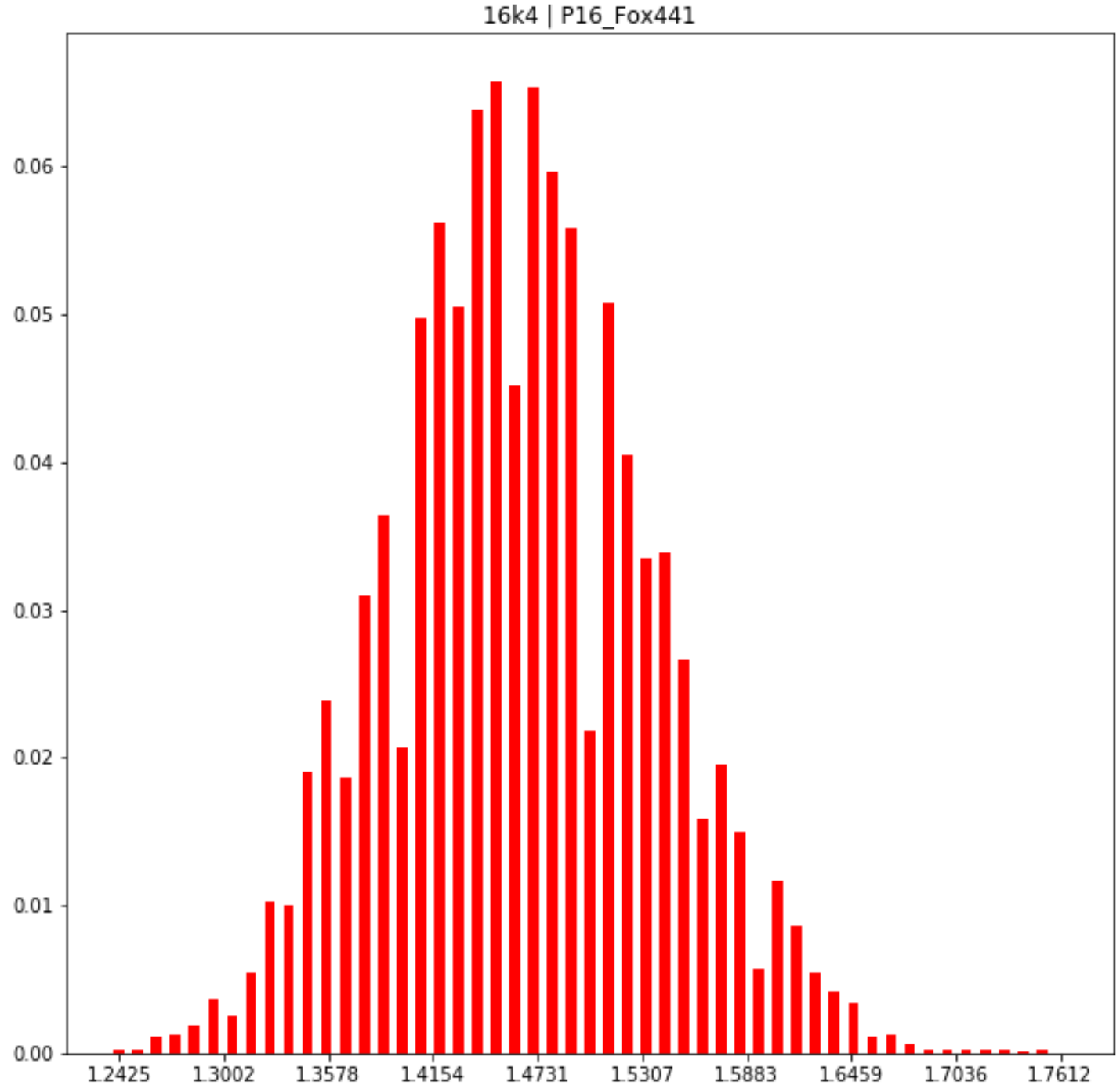
Random Plan

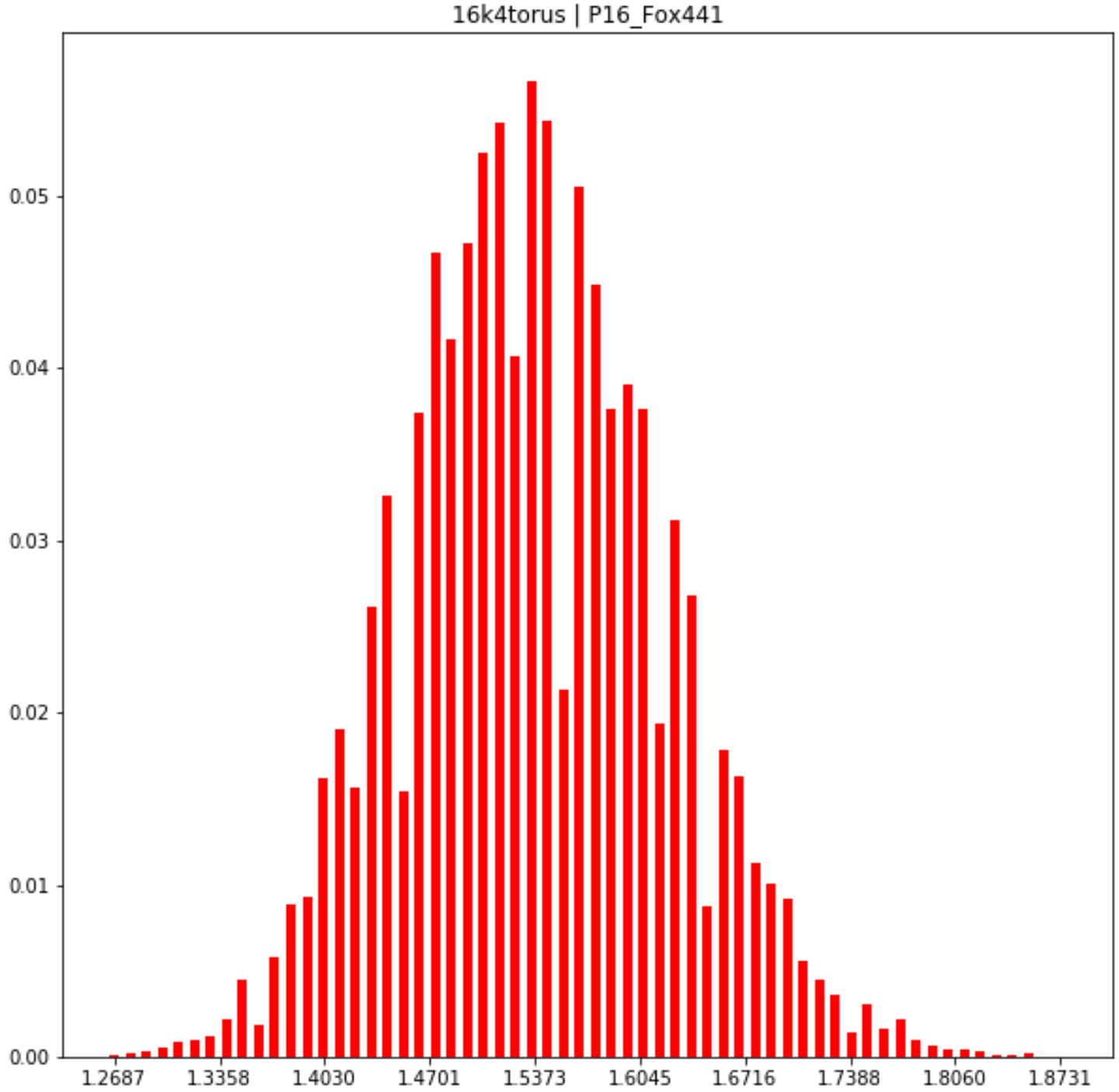



16k3 | P16_Fox441
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1.2687
1.3271
1.3856
1.4440
1.5025
1.5609
1.6194
1.6779
1.7363
1.7948


16k3grid | P16_Fox441
0.05
0.04
0.03
0.02
0.01
0.00
1.3246
1.3943
1.4639
1.5336
1.6032
1.6729
1.7425
1.8122
1.8818
1.9515

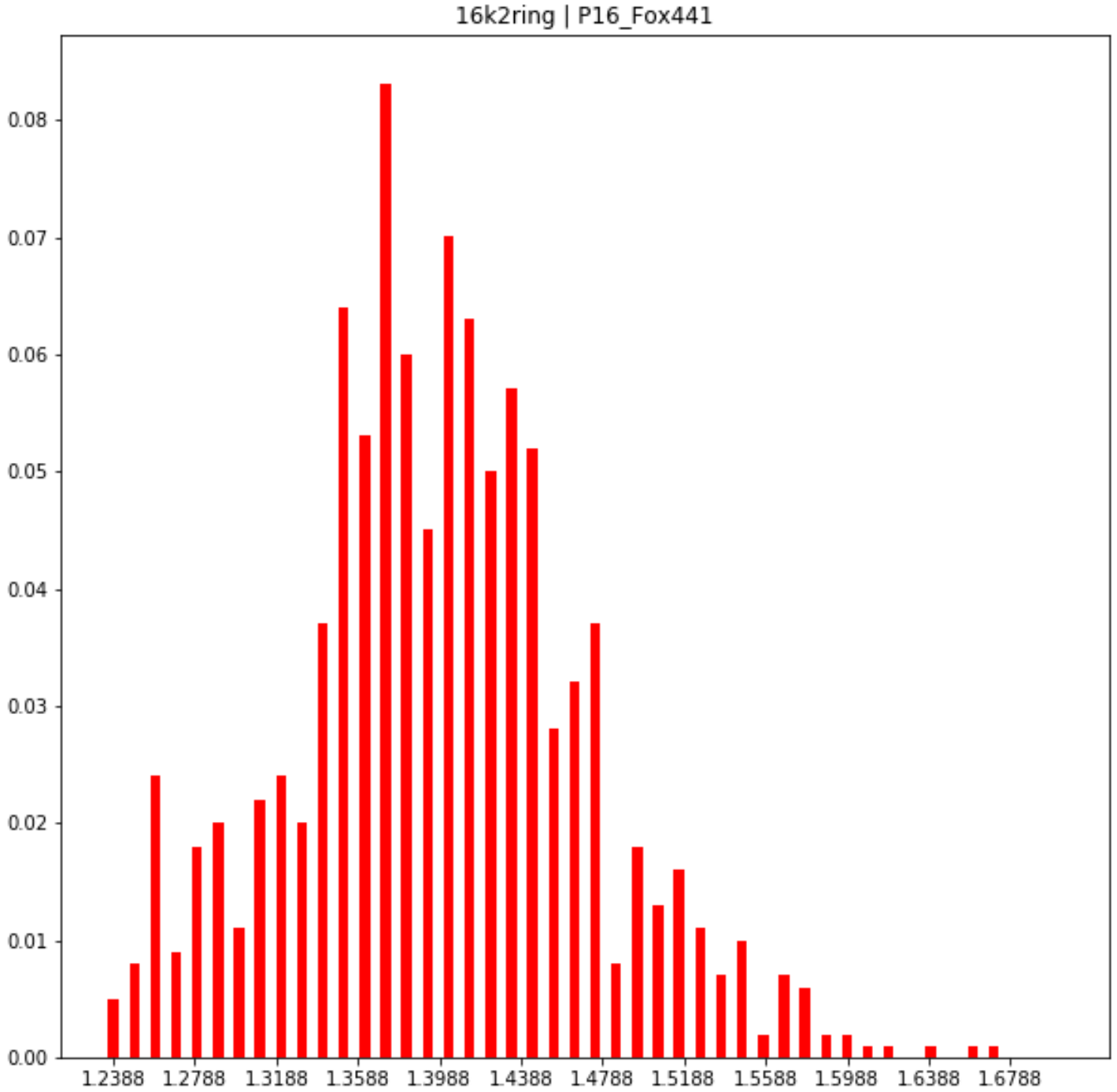

16k3wheel | P16_Fox441
0.05
0.04
0.03
0.02
0.01
0.00
1.3060
1.3827
1.4594
1.5361
1.6128
1.6895
1.7662
1.8429
1.9196
1.9963

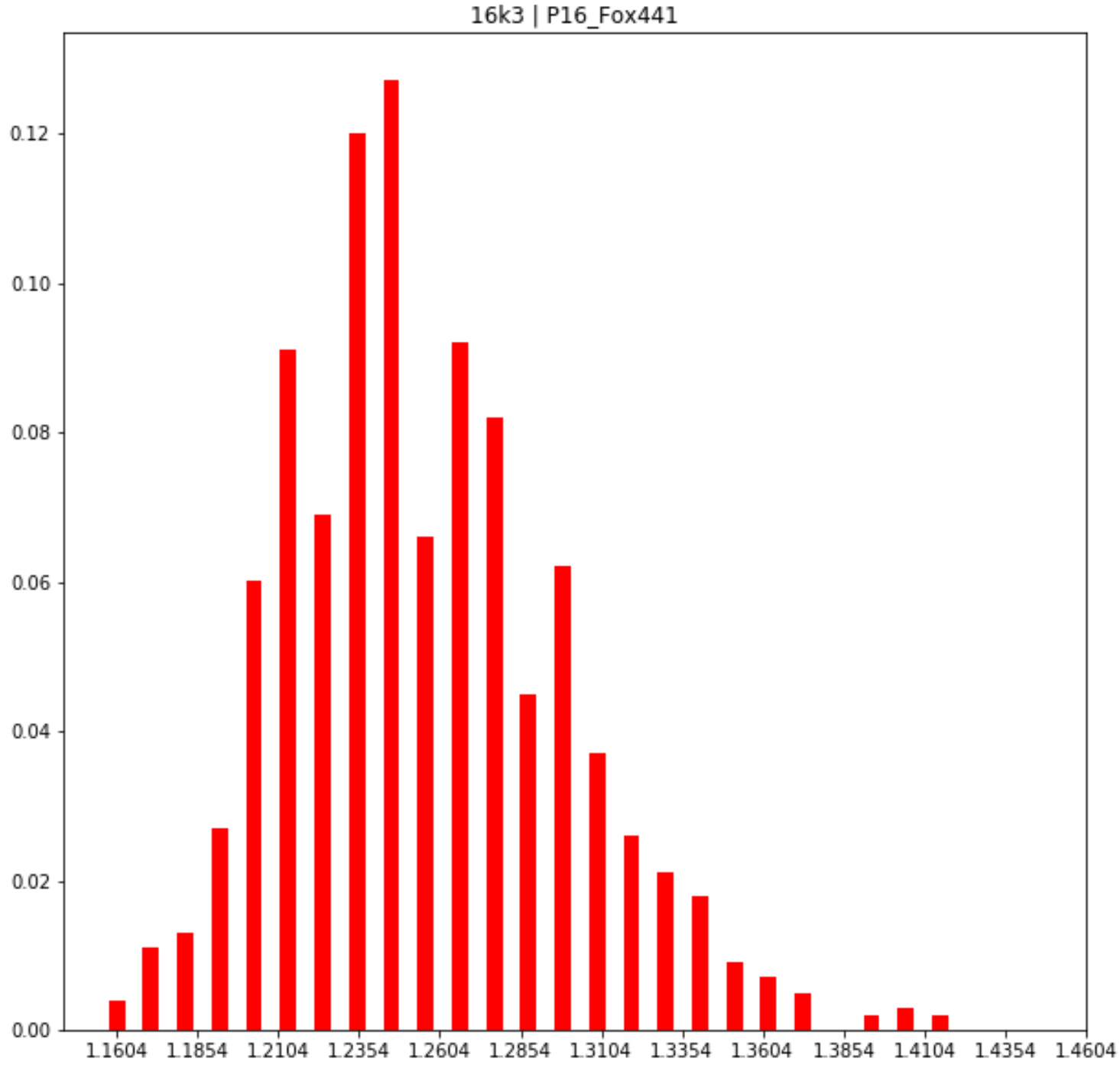

16k4 | P16_Fox441
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1.2425
1.3002
1.3578
1.4154
1.4731
1.5307
1.5883
1.6459
1.7036
1.7612

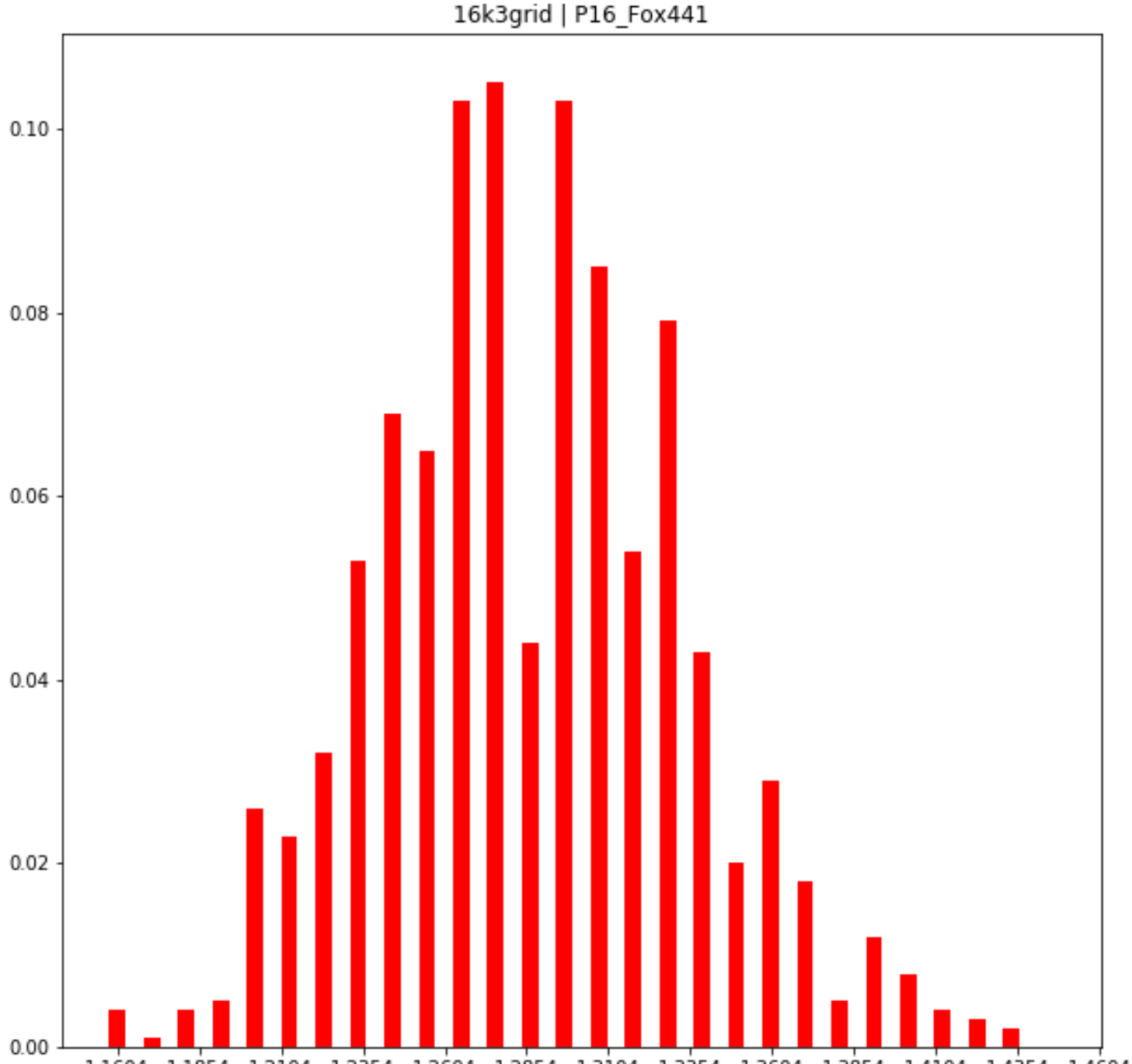

16k4torus | P16_Fox441
0.05
0.04
0.03
0.02
0.01
0.00
1.2687
1.3358
1.4030
1.4701
1.5373
1.6045
1.6716
1.7388
1.8060
1.8731

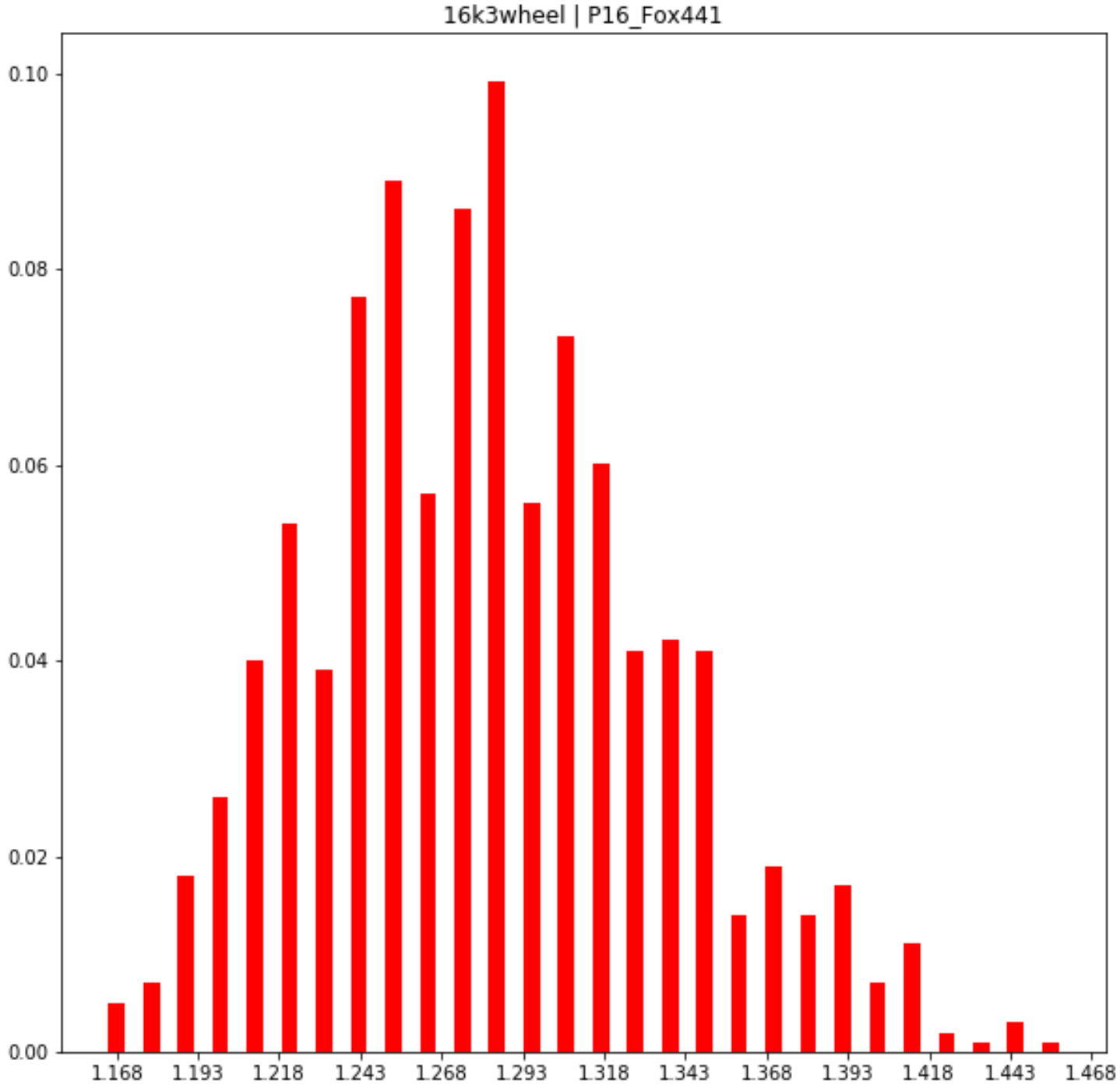
P = 16, BMR Method (4,4,1 型)

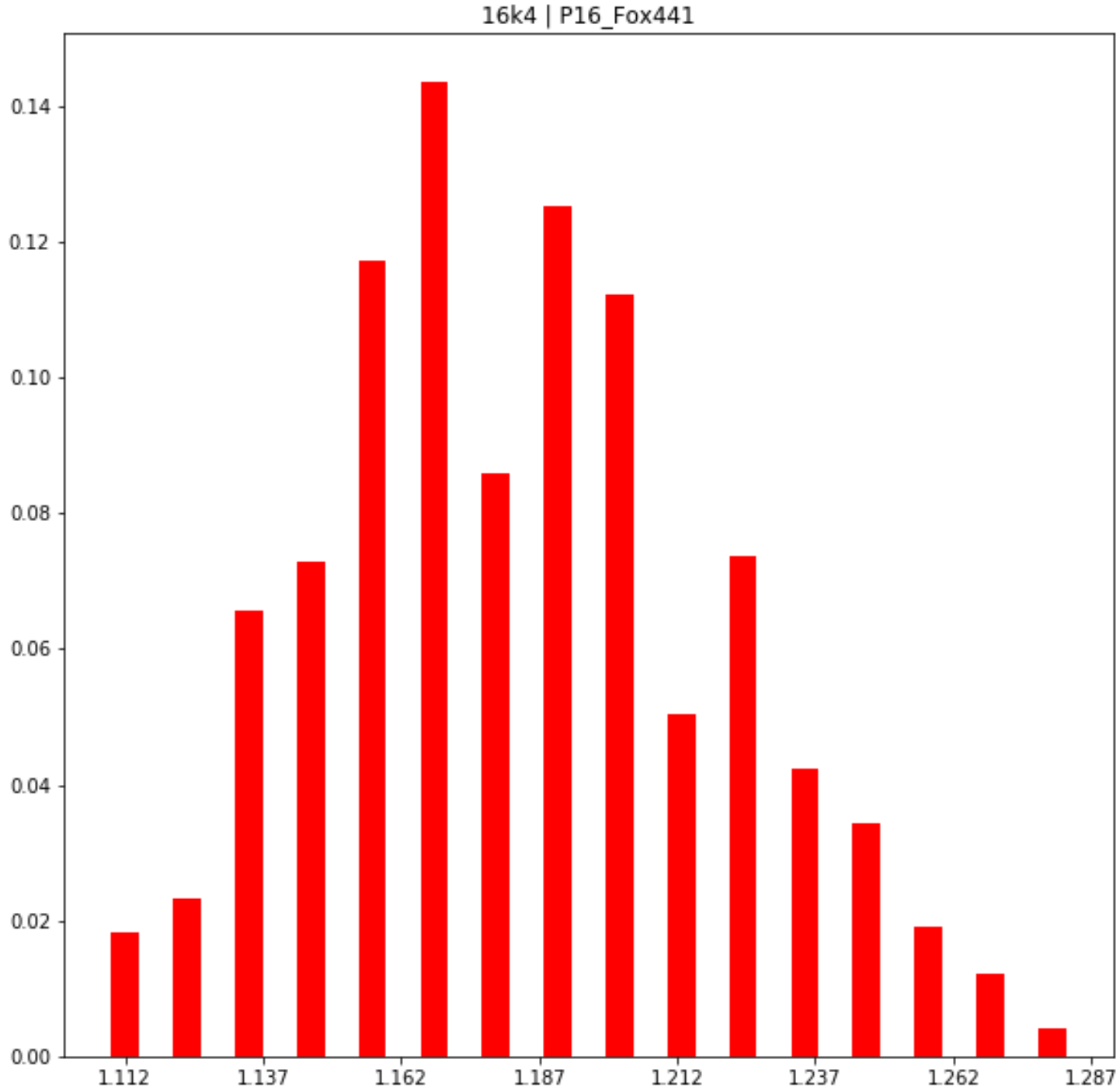
Annealing Plan

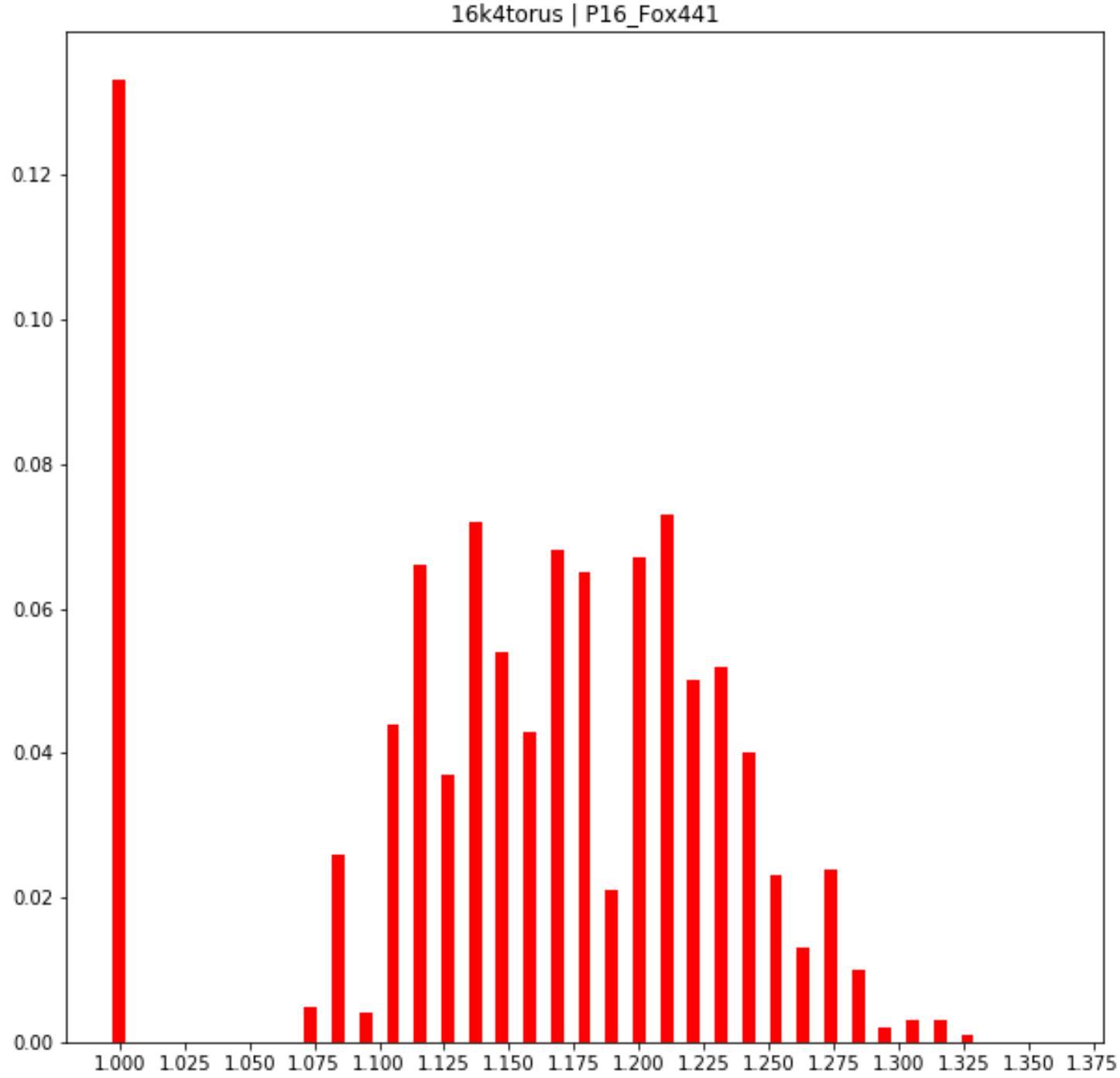



16k3 | P16_Fox441
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1.1604
1.1854
1.2104
1.2354
1.2604
1.2854
1.3104
1.3354
1.3604
1.3854
1.4104
1.4354
1.4604


16k3grid | P16_Fox441
0.10
0.08
0.06
0.04
0.02
0.00
1.1604
1.1854
1.2104
1.2354
1.2604
1.2854
1.3104
1.3354
1.3604
1.3854
1.4104
1.4354
1.4604

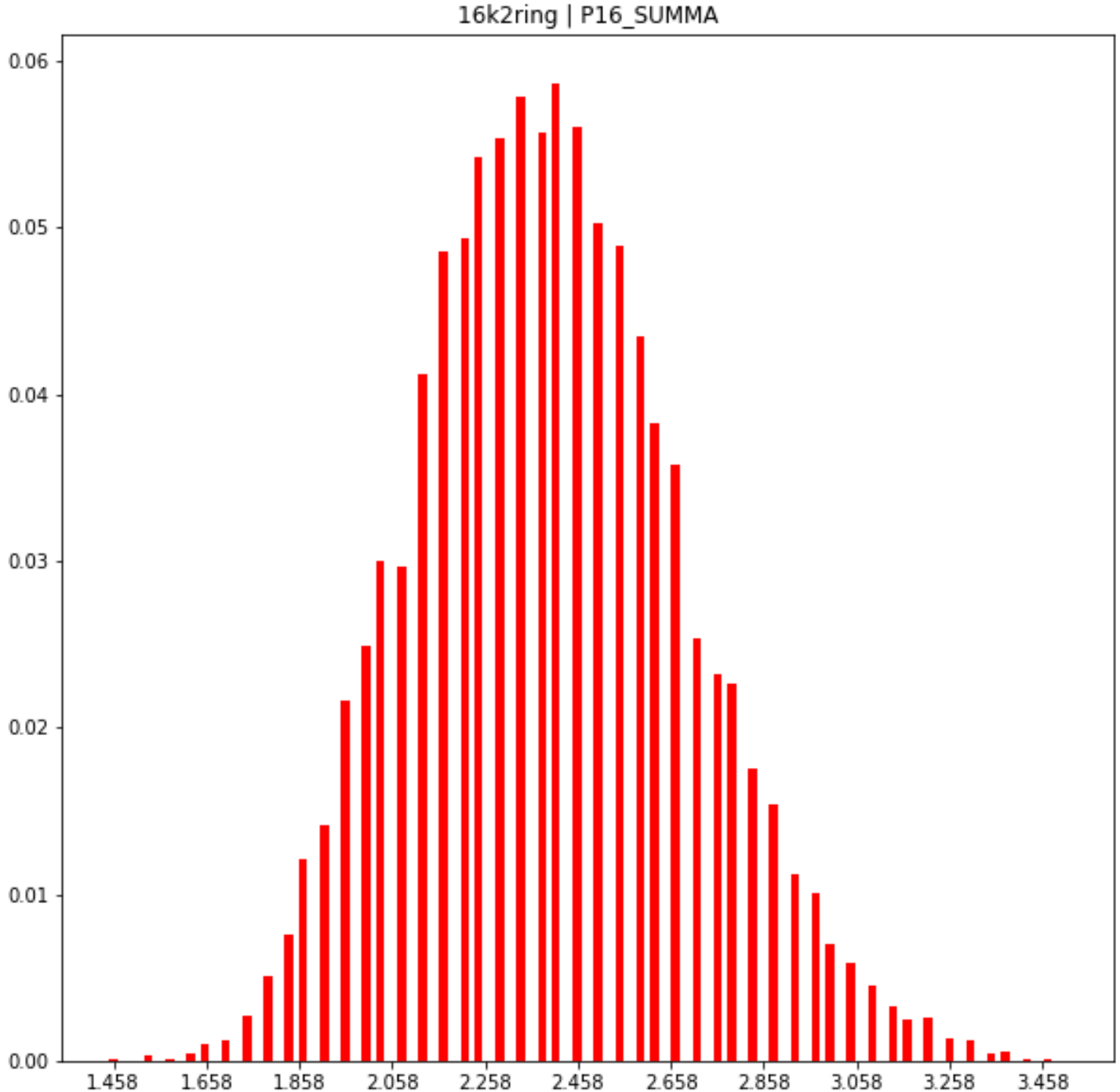

16k3wheel | P16_Fox441
0.10
0.08
0.06
0.04
0.02
0.00
1.168
1.193
1.218
1.243
1.268
1.293
1.318
1.343
1.368
1.393
1.418
1.443
1.468

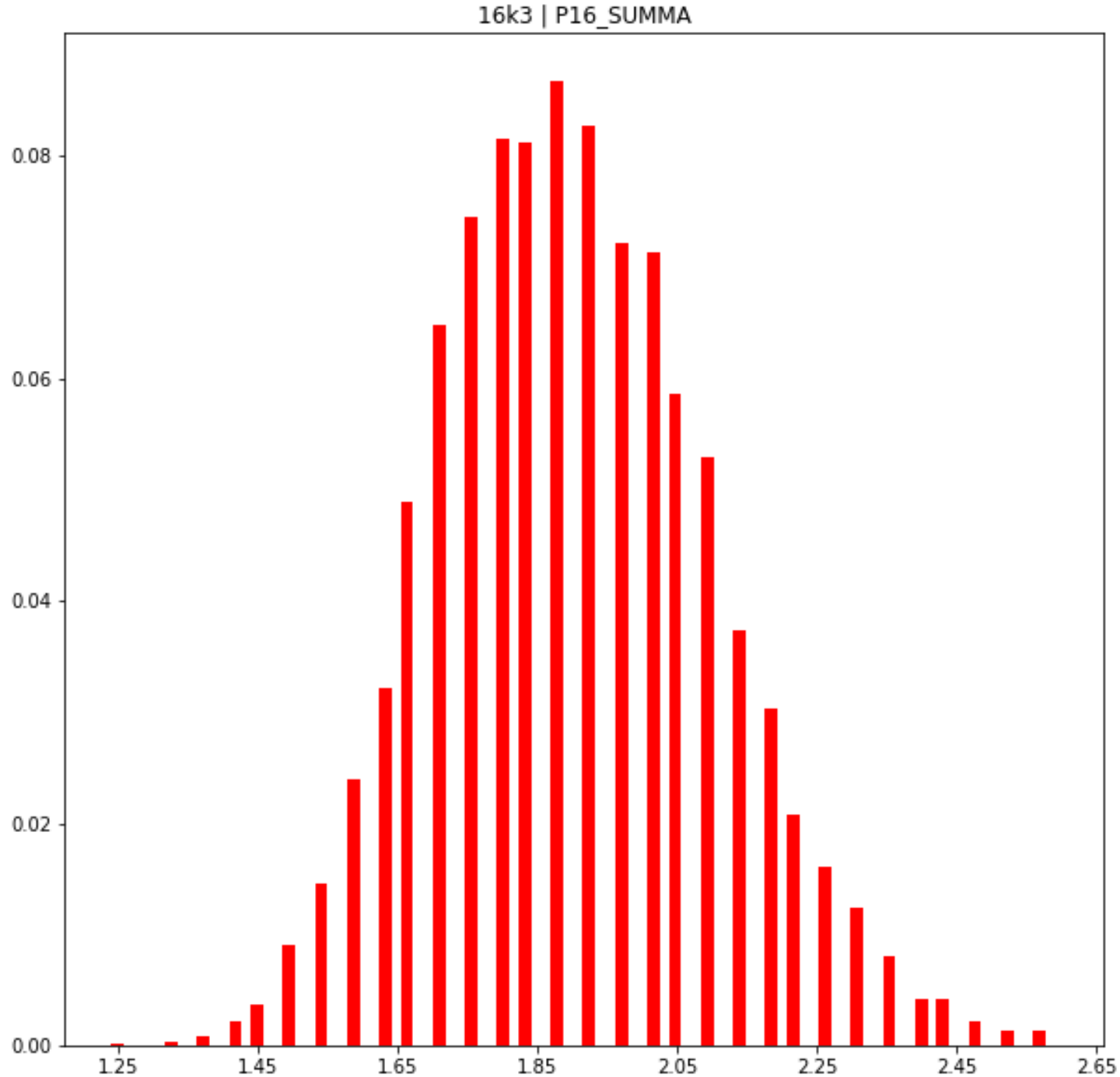

16k4 | P16_Fox441
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1.112
1.137
1.162
1.187
1.212
1.237
1.262
1.287

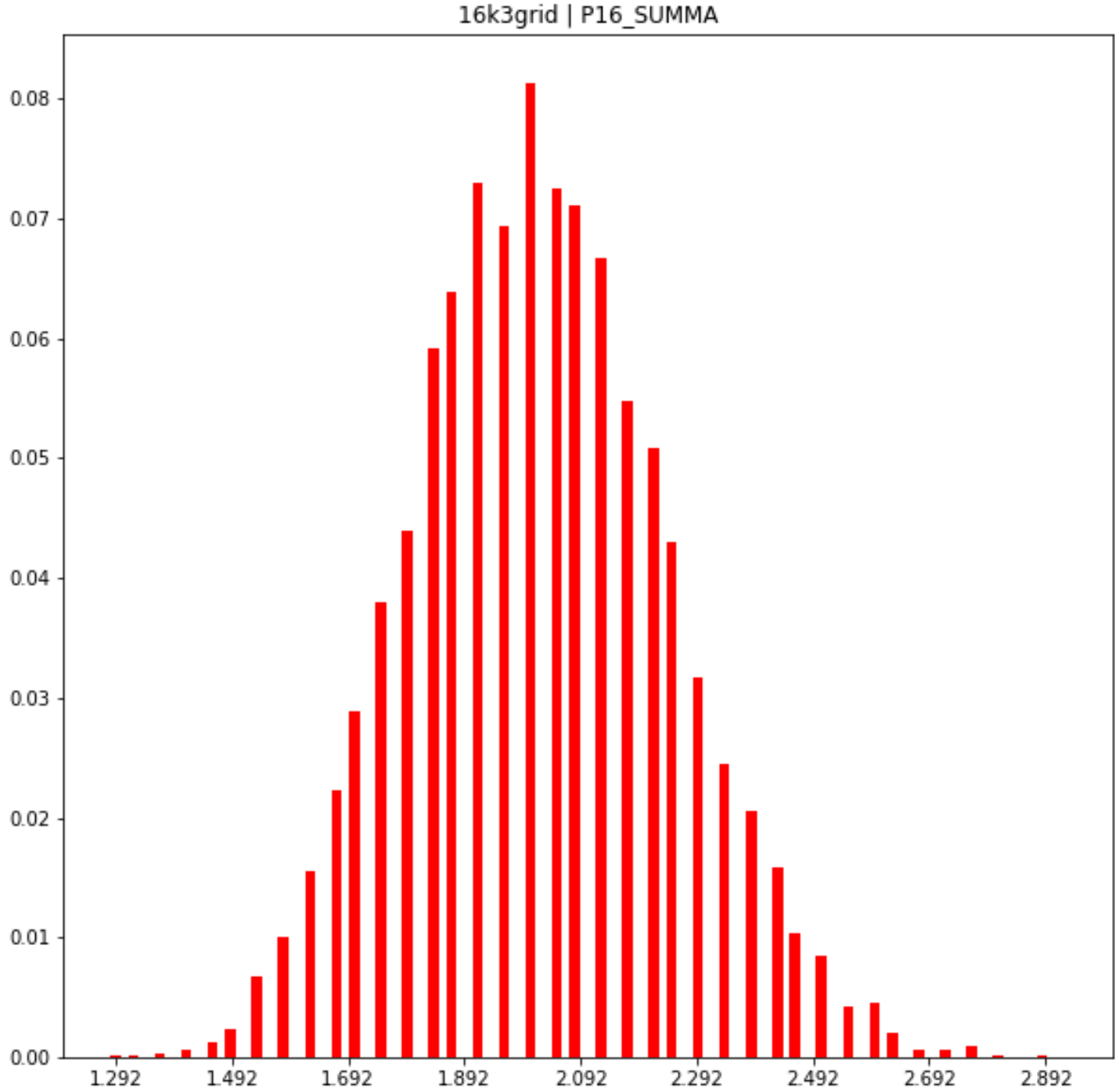

16k4torus | P16_Fox441
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1.000
1.025
1.050
1.075
1.100
1.125
1.150
1.175
1.200
1.225
1.250
1.275
1.300
1.325
1.350
1.375

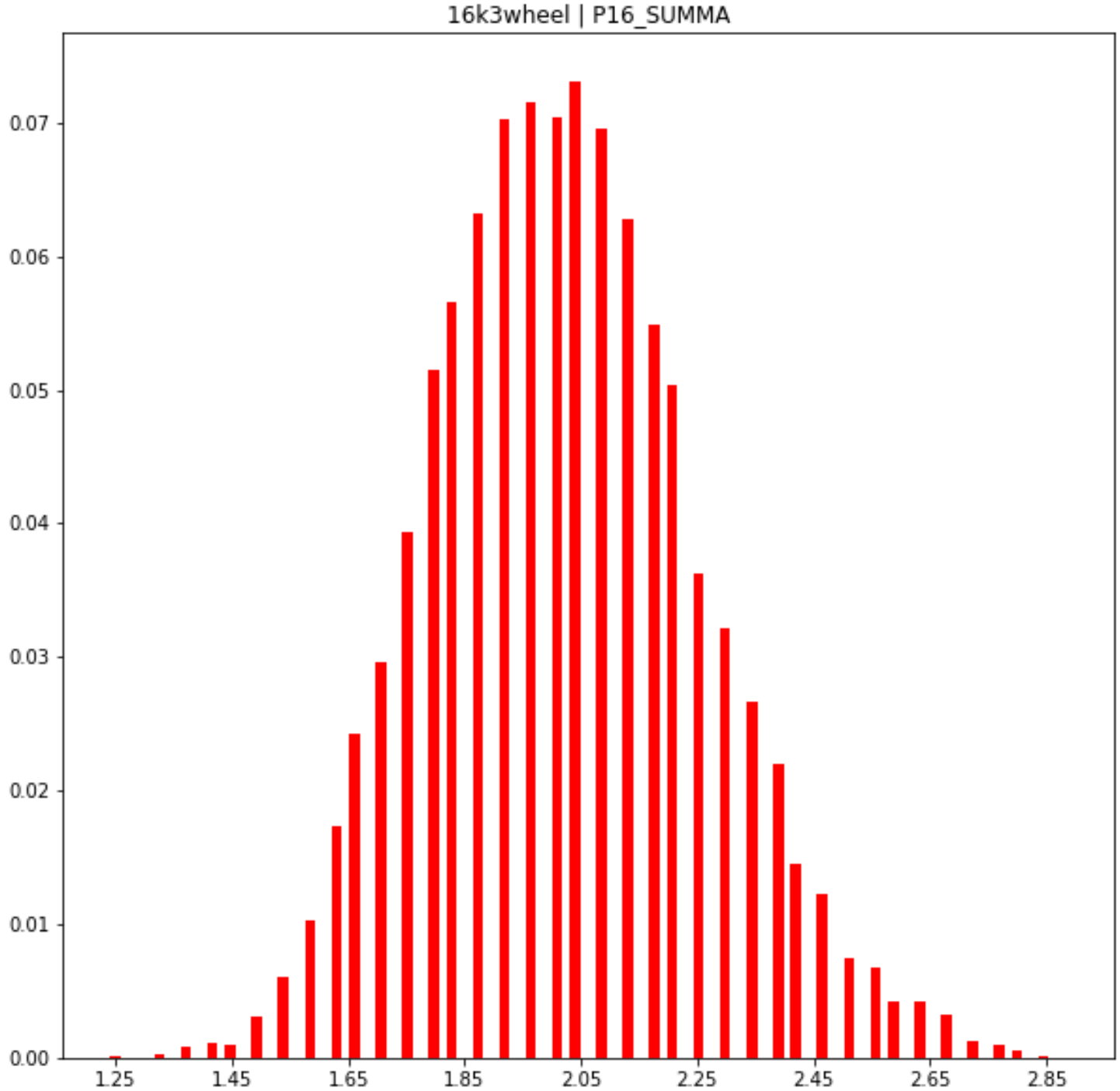
P = 16, SUMMA

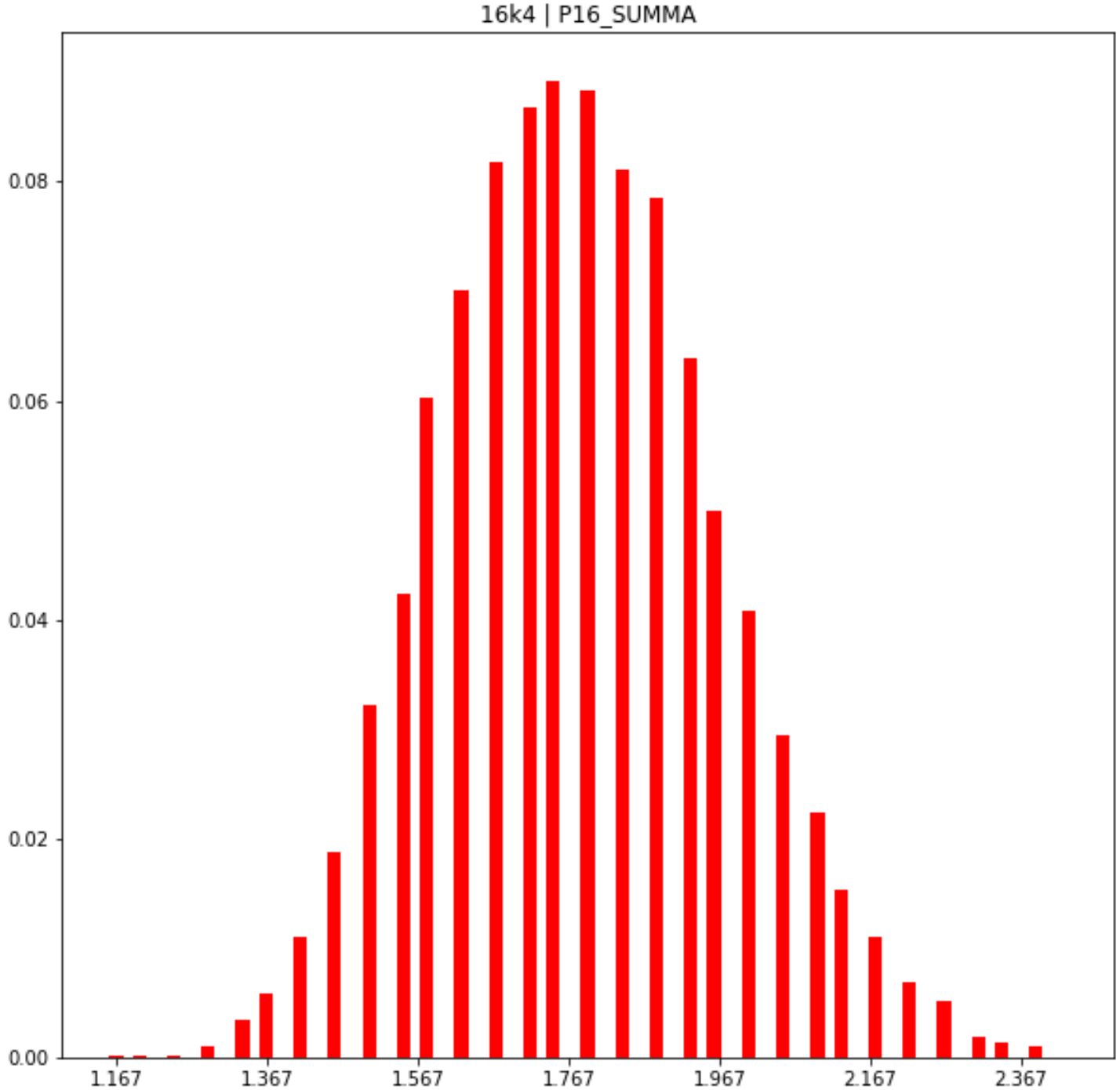
Random Plan

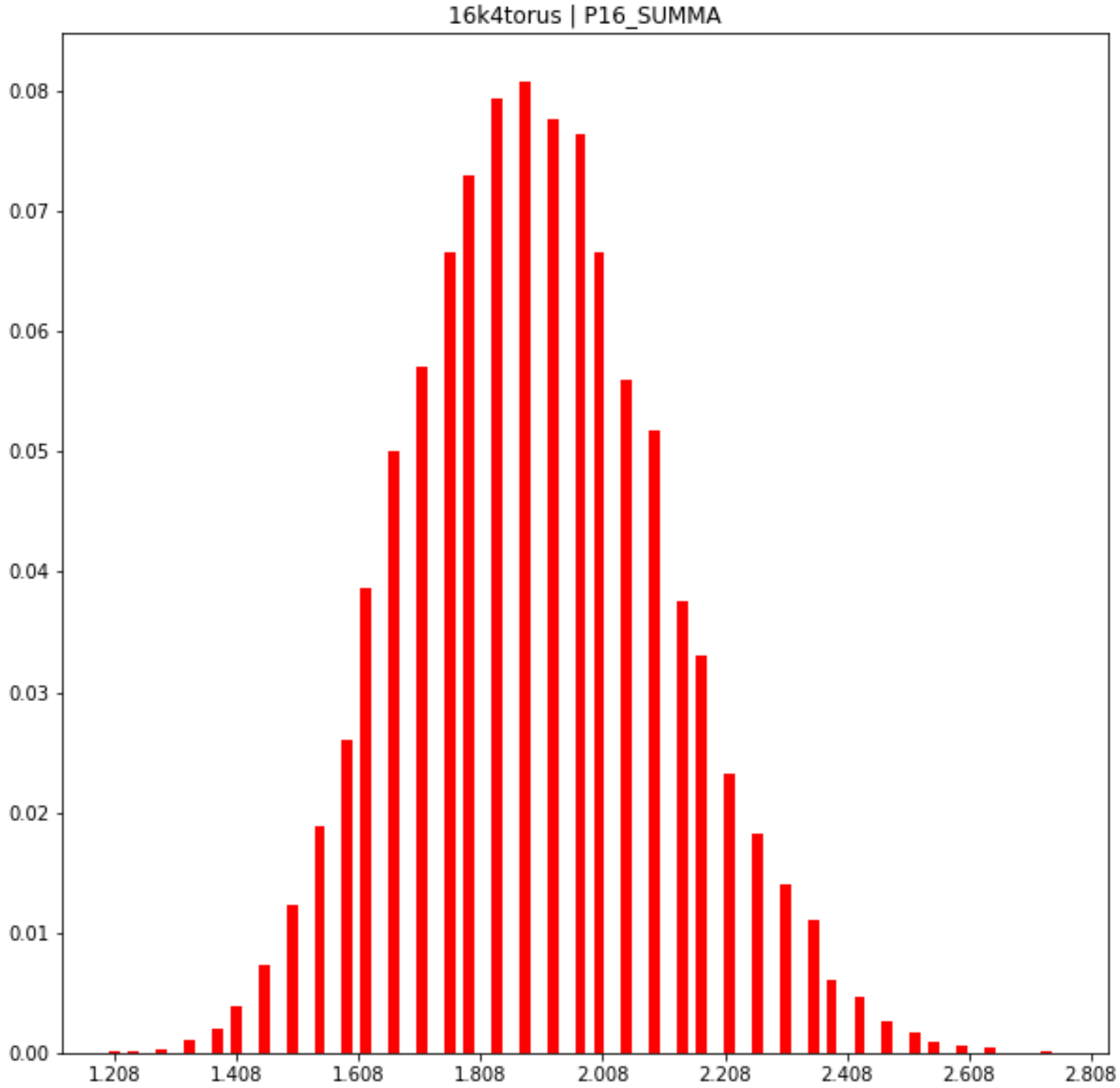



16k3 | P16_SUMMA
0.08
0.06
0.04
0.02
0.00
1.25
1.45
1.65
1.85
2.05
2.25
2.45
2.65


16k3grid | P16_SUMMA
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1.292
1.492
1.692
1.892
2.092
2.292
2.492
2.692
2.892

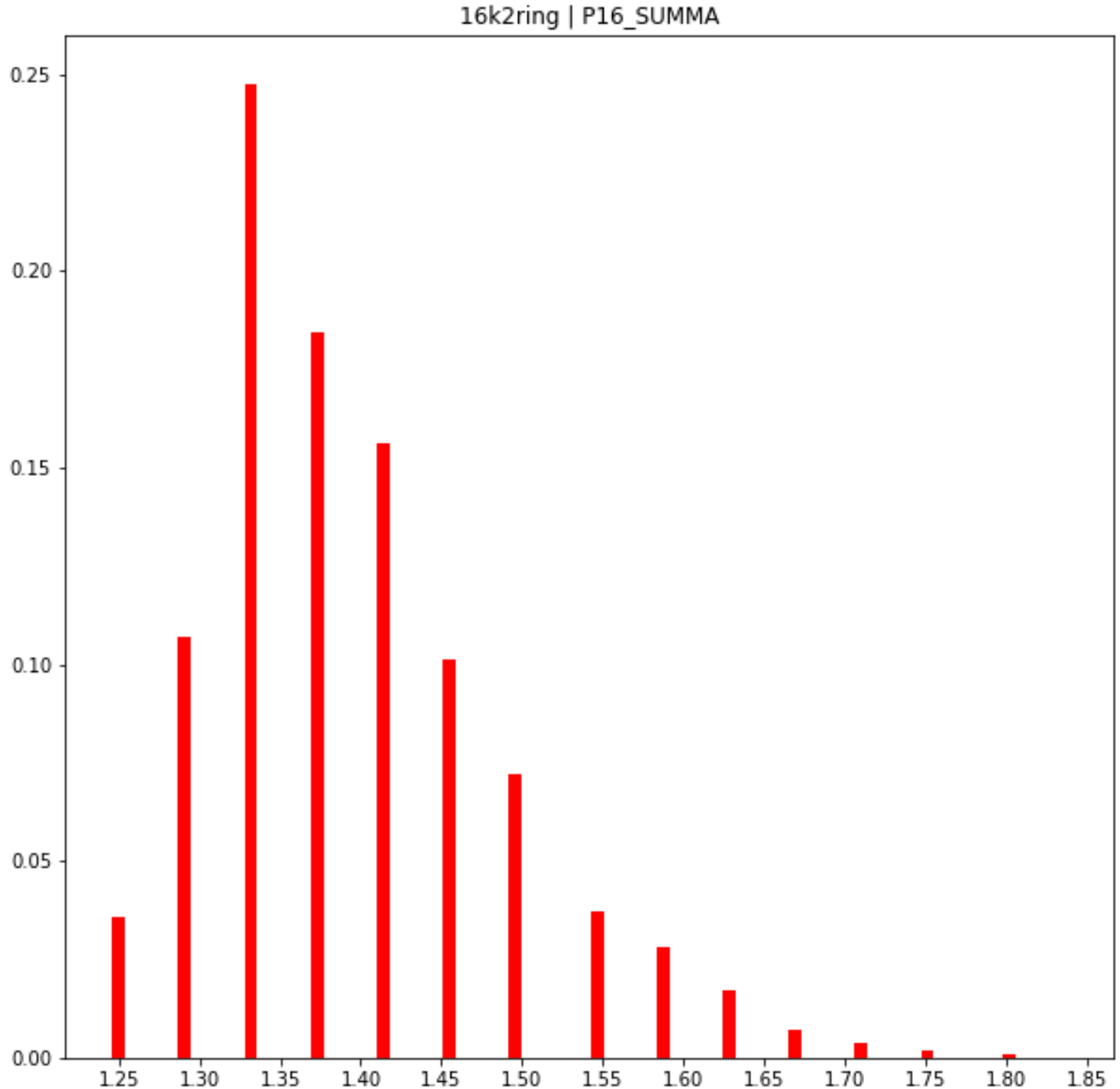

16k3wheel | P16_SUMMA
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1.25
1.45
1.65
1.85
2.05
2.25
2.45
2.65
2.85

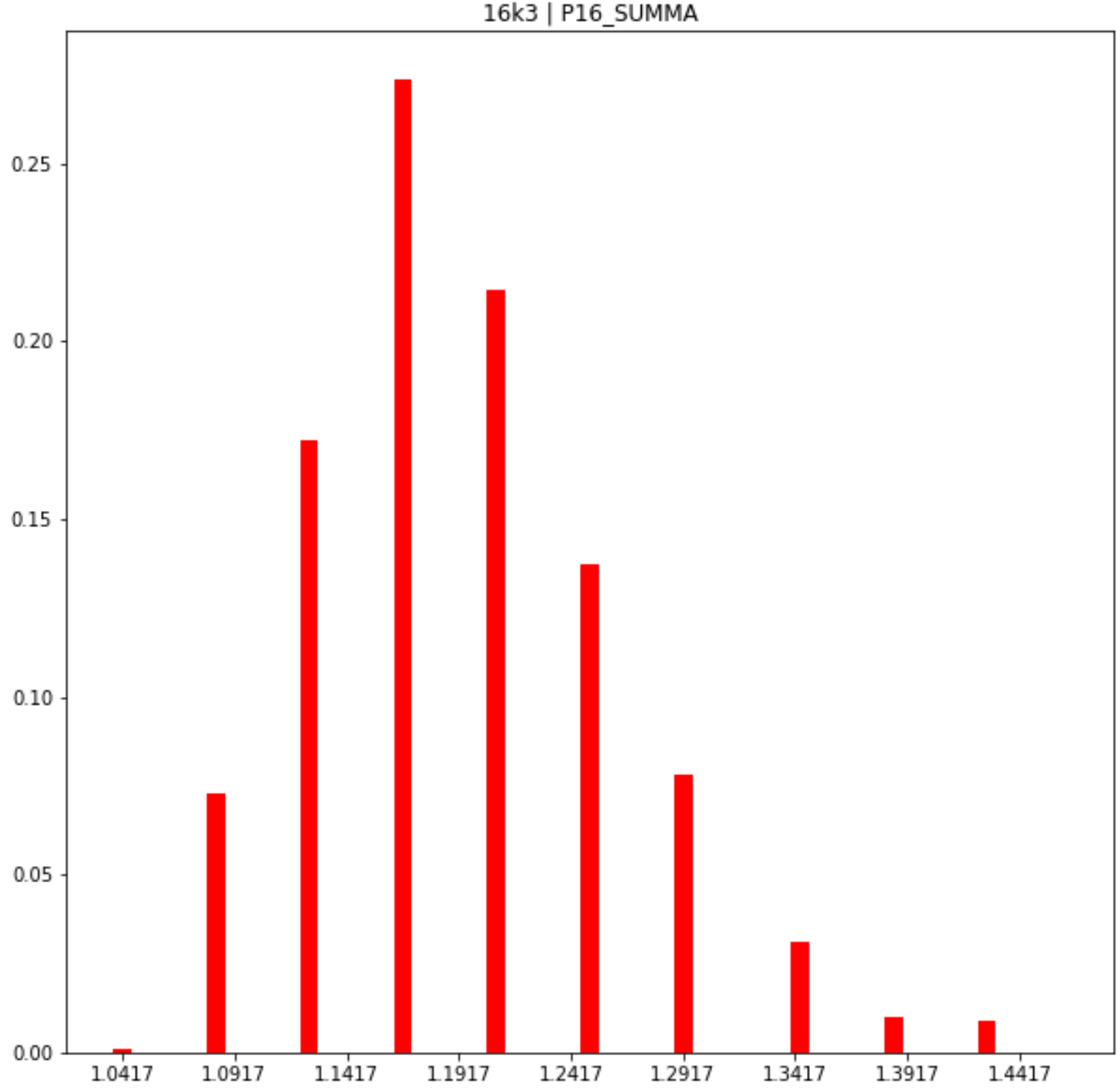

16k4 | P16_SUMMA
0.08
0.06
0.04
0.02
0.00
1.167
1.367
1.567
1.767
1.967
2.167
2.367

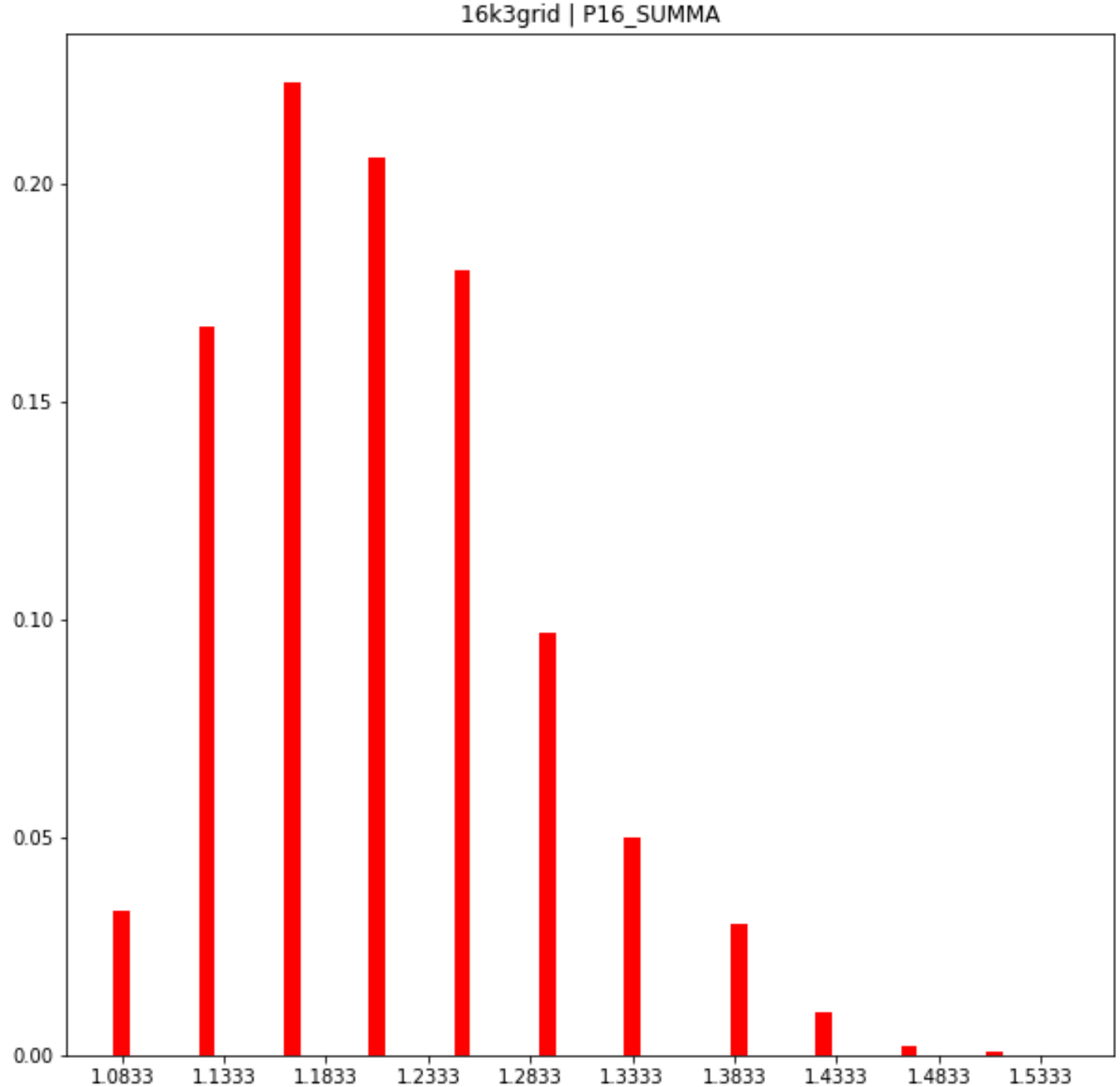

16k4torus | P16_SUMMA
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1.208
1.408
1.608
1.808
2.008
2.208
2.408
2.608
2.808

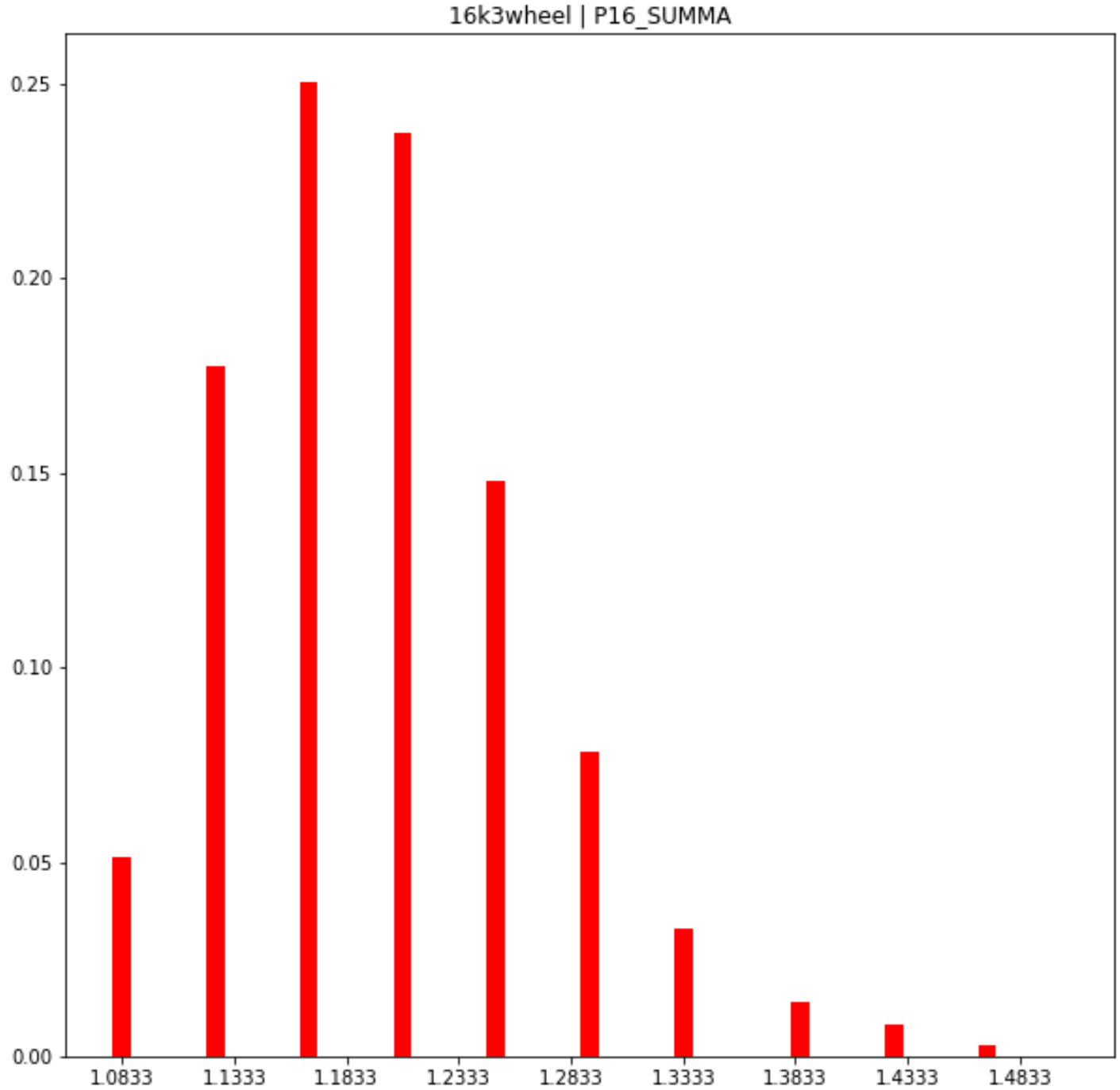
P = 16, SUMMA

Annealing Plan




16k3 | P16_SUMMA
0.25
0.20
0.15
0.10
0.05
0.00
1.0417
1.0917
1.1417
1.1917
1.2417
1.2917
1.3417
1.3917
1.4417


16k3grid | P16_SUMMA
0.20
0.15
0.10
0.05
0.00
1.0833
1.1333
1.1833
1.2333
1.2833
1.3333
1.3833
1.4333
1.4833
1.5333


16k3wheel | P16_SUMMA
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0.20
0.15
0.10
0.05
0.00
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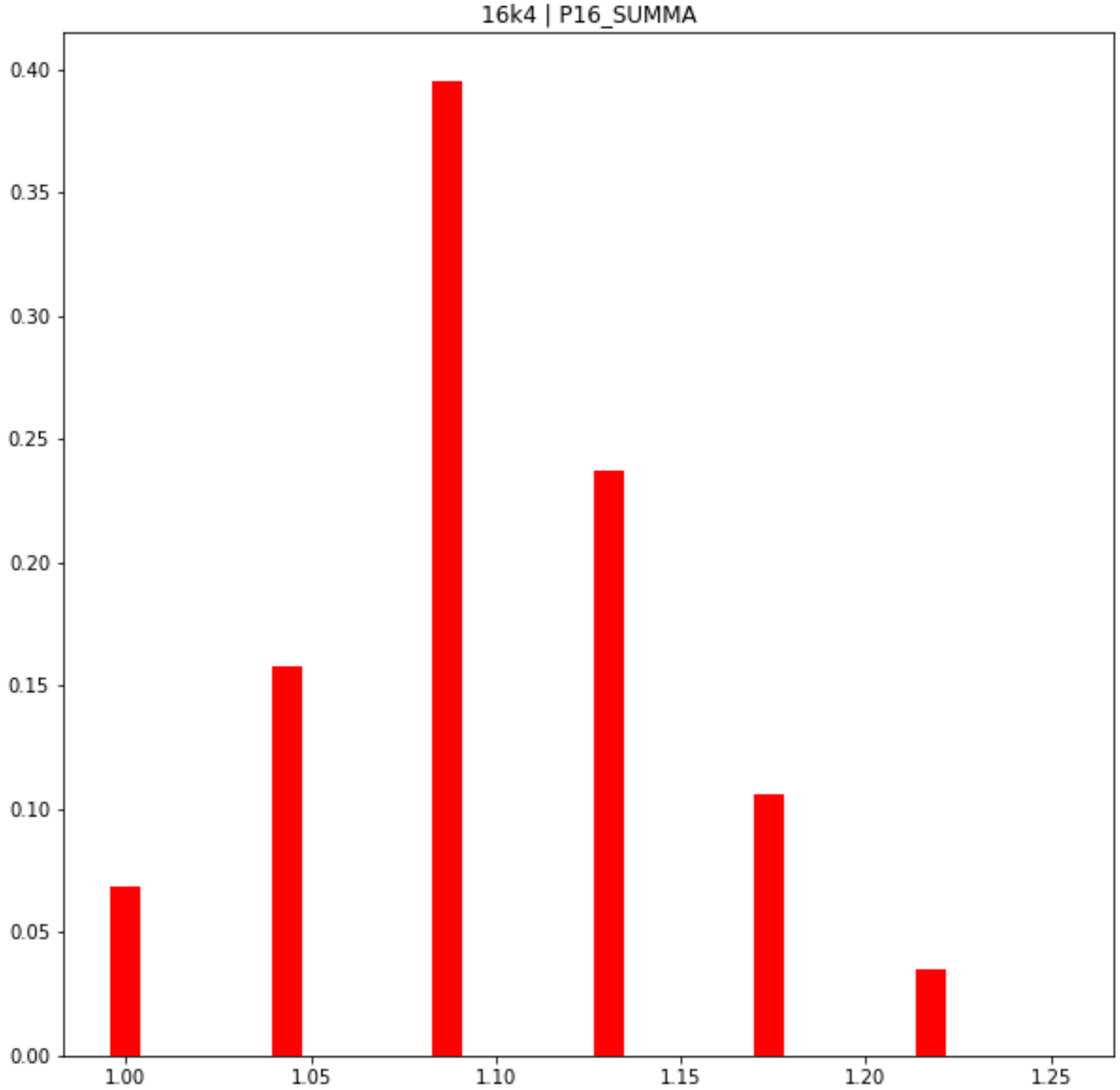
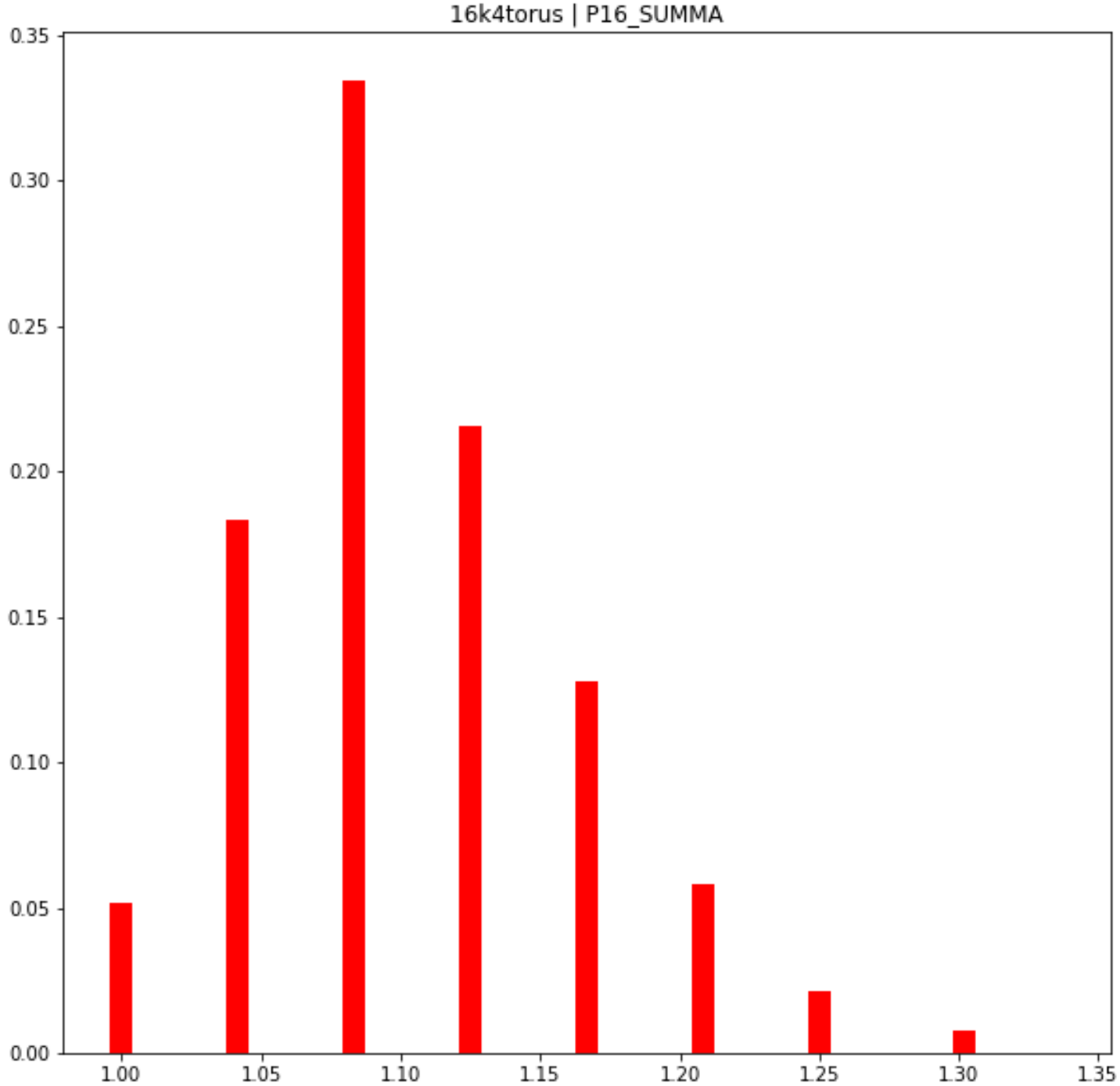
1.1333
1.1833
1.2333
1.2833
1.3333
1.3833
1.4333
1.4833


16k4 | P16_SUMMA
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1.00
1.05
1.10
1.15
1.20
1.25


16k4torus | P16_SUMMA
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1.00
1.05
1.10
1.15
1.20
1.25
1.30
1.35