KaonLT update

2026-03-20

Sameer Jain
Catholic University of America

Objective:

1. Coincidence blocking correction For kaonLT Data.
   High Q2 settings: Both Low and High epsion

   Q2=3.0 W=2.32 x=0.40 — Done
   Q2=2.115 W=2.95 x=0.21 — Done
   Q2=4.4 W=2.74 x=0.40 — Done
   Q2=3.0 W=3.14 x=0.25 — Done
   Q2=5.5 W=3.02 x=0.40 — Done

   Low Q2 settings: Both Low and High epsion

   Q=0.5 W=2.40 –Done

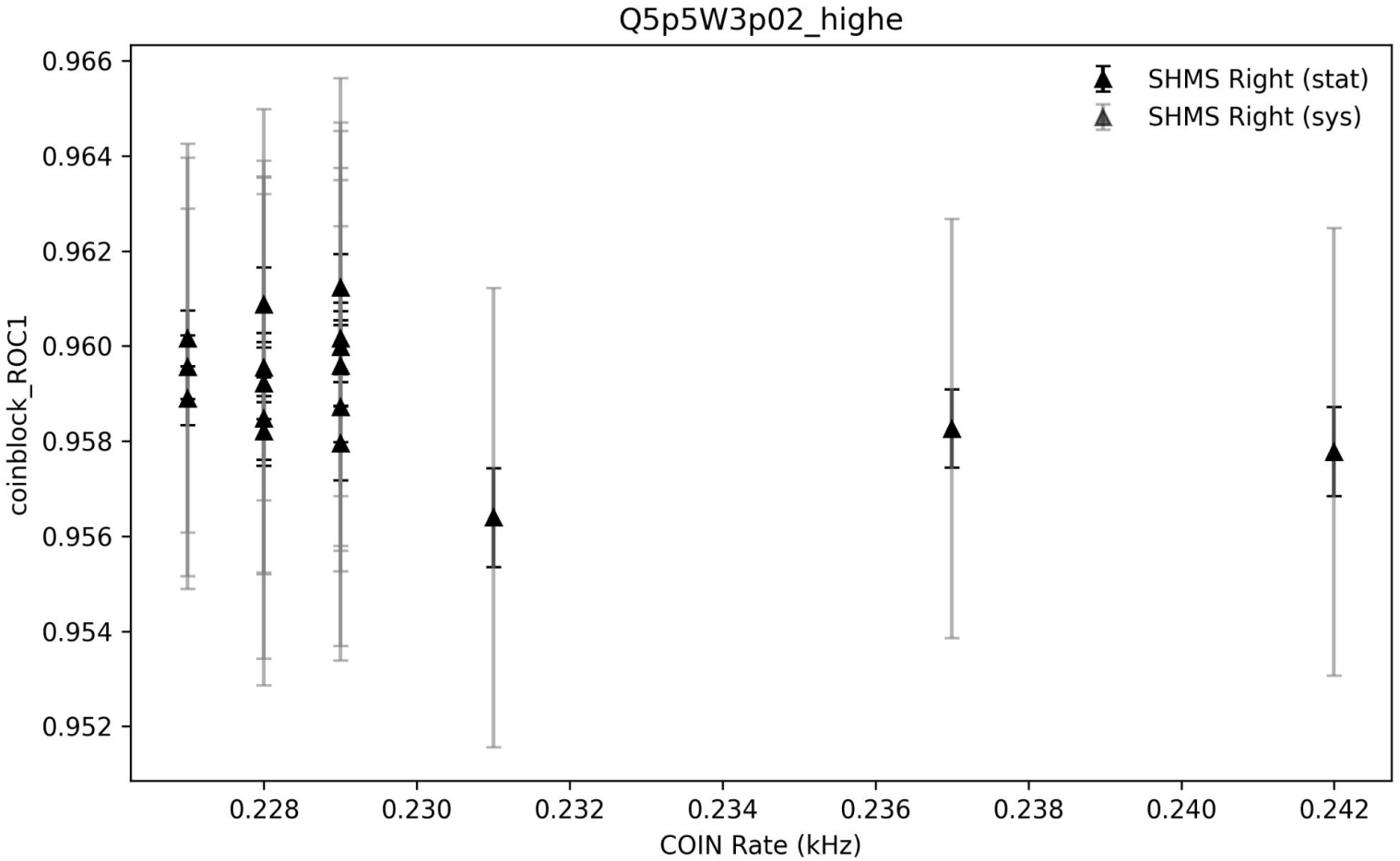
➤Fixed Windows

1. For the run period around Oct 2018 three different fixed windows were chosen.

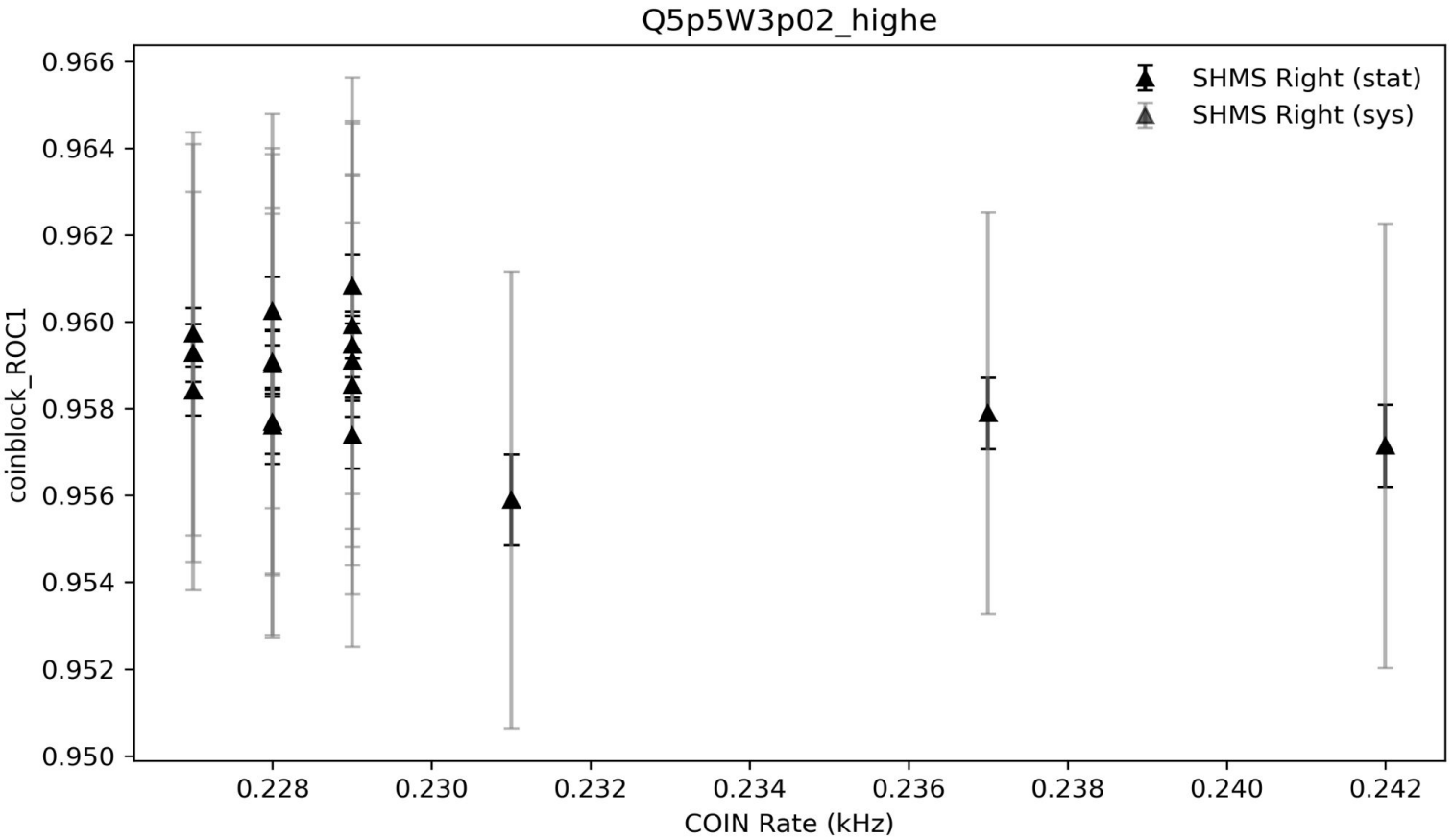
2. For the run period around Dec 2018 fixed window of -11 ns to 129 ns window was fixed.
3. For the run period around March 2019 same window as the run period of Oct 2018 was used.

```
# ------------------------------------------------
run_ranges = [
    # Format: {"min_run": X, "max_run": Y, "coin_low": Z1, "coin_high": Z2}
    {"min_run": 4865, "max_run": 4870, "coin_low": -35.0, "coin_high": 145.0},
    {"min_run": 4871, "max_run": 4874, "coin_low": -8.0, "coin_high": 172.0},
    {"min_run": 4875, "max_run": 4894, "coin_low": -35.0, "coin_high": 145.0},
    {"min_run": 4895, "max_run": 5534, "coin_low": -25.0, "coin_high": 115.0},
    {"min_run": 6638, "max_run": 7045, "coin_low": -11.0, "coin_high": 129.0},
    {"min_run": 7871, "max_run": 8356, "coin_low": -25.0, "coin_high": 115.0},
    # Add more ranges as needed
]
```

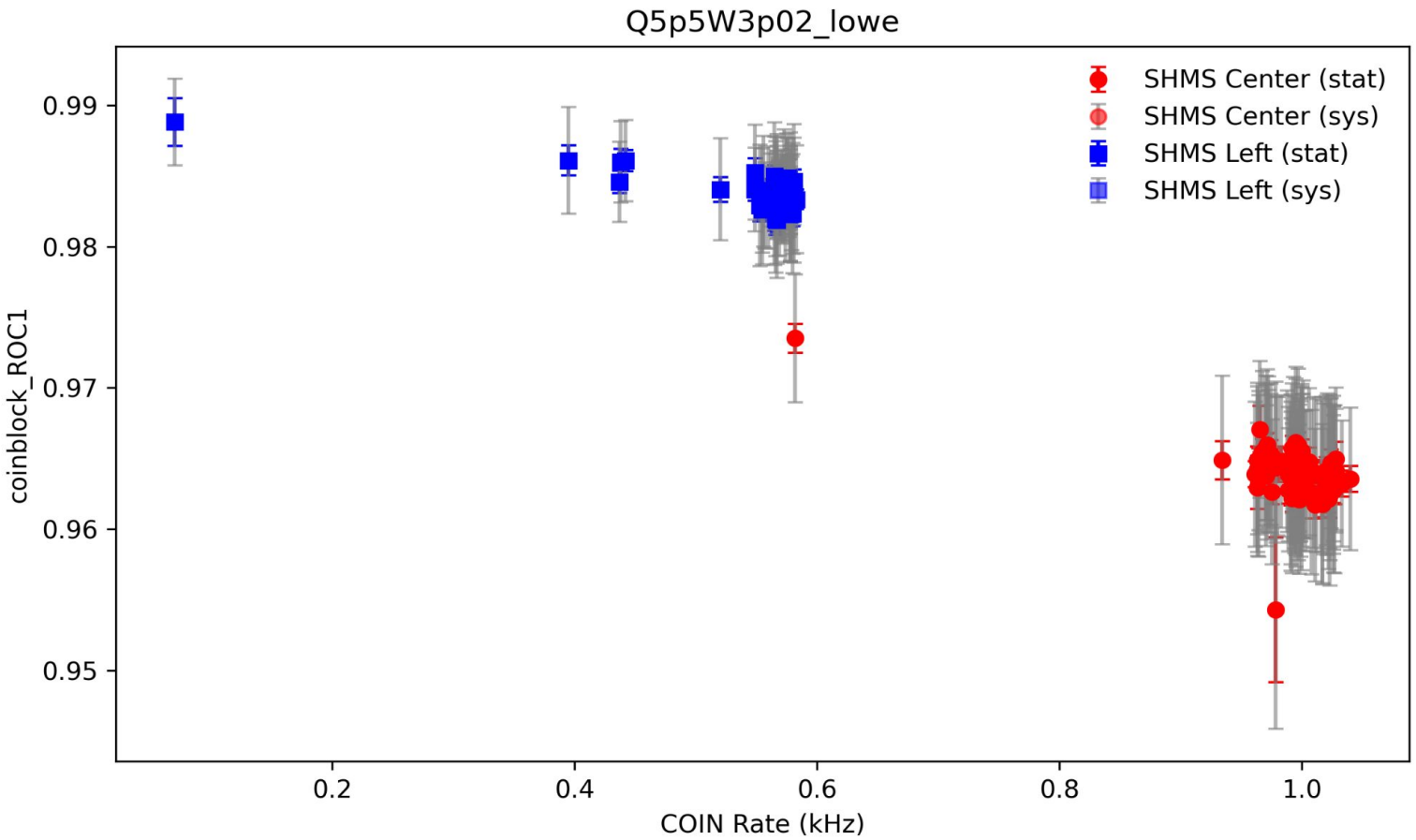
Varying cuts



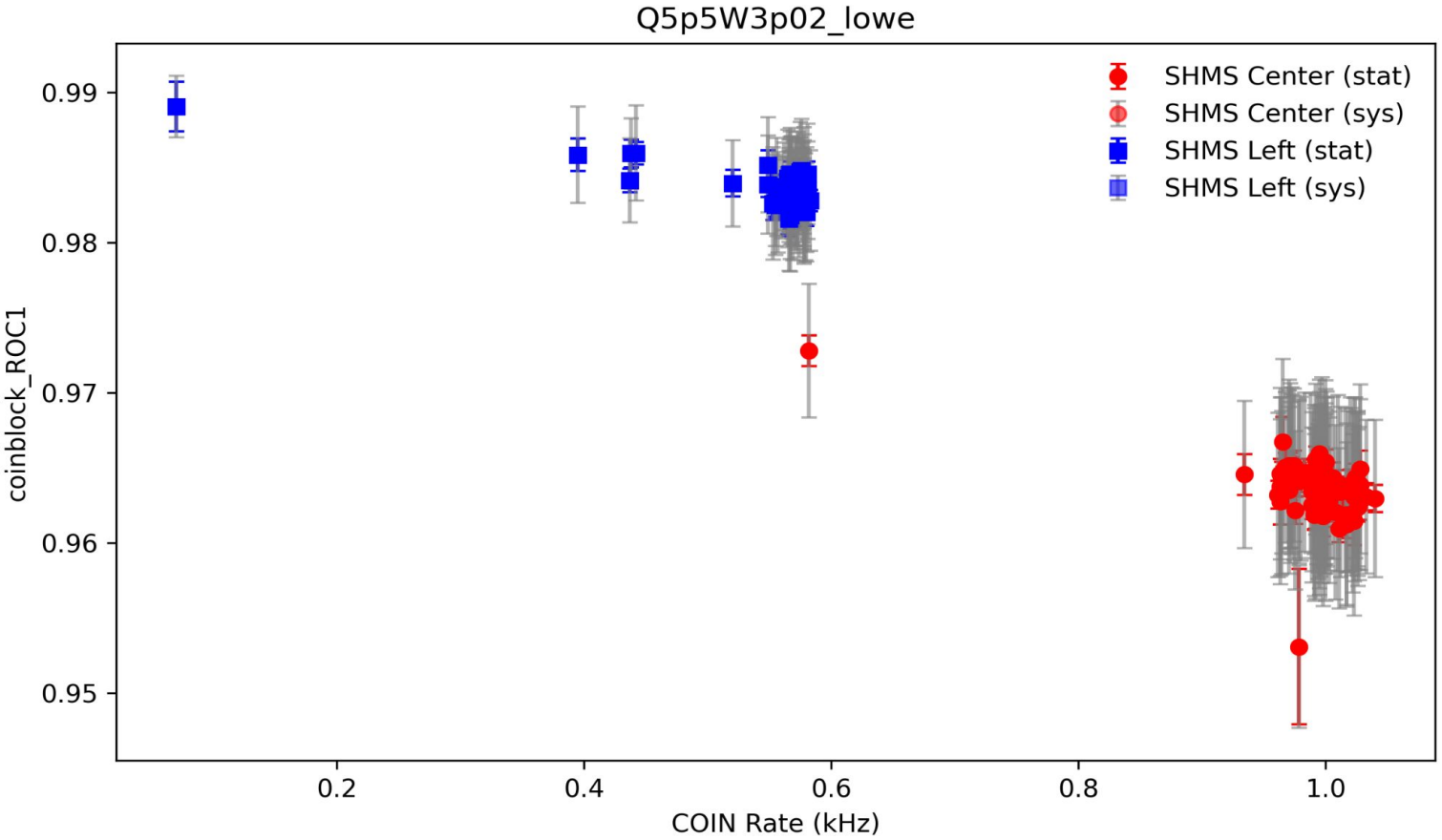
Fixed cuts


Q5p5W3p02_highe
SHMS Right (stat)
SHMS Right (sys)
coinblock_ROC1
0.966
0.964
0.962
0.960
0.958
0.956
0.954
0.952
0.950
0.228
0.230
0.232
0.234
0.236
0.238
0.240
0.242
COIN Rate (kHz)

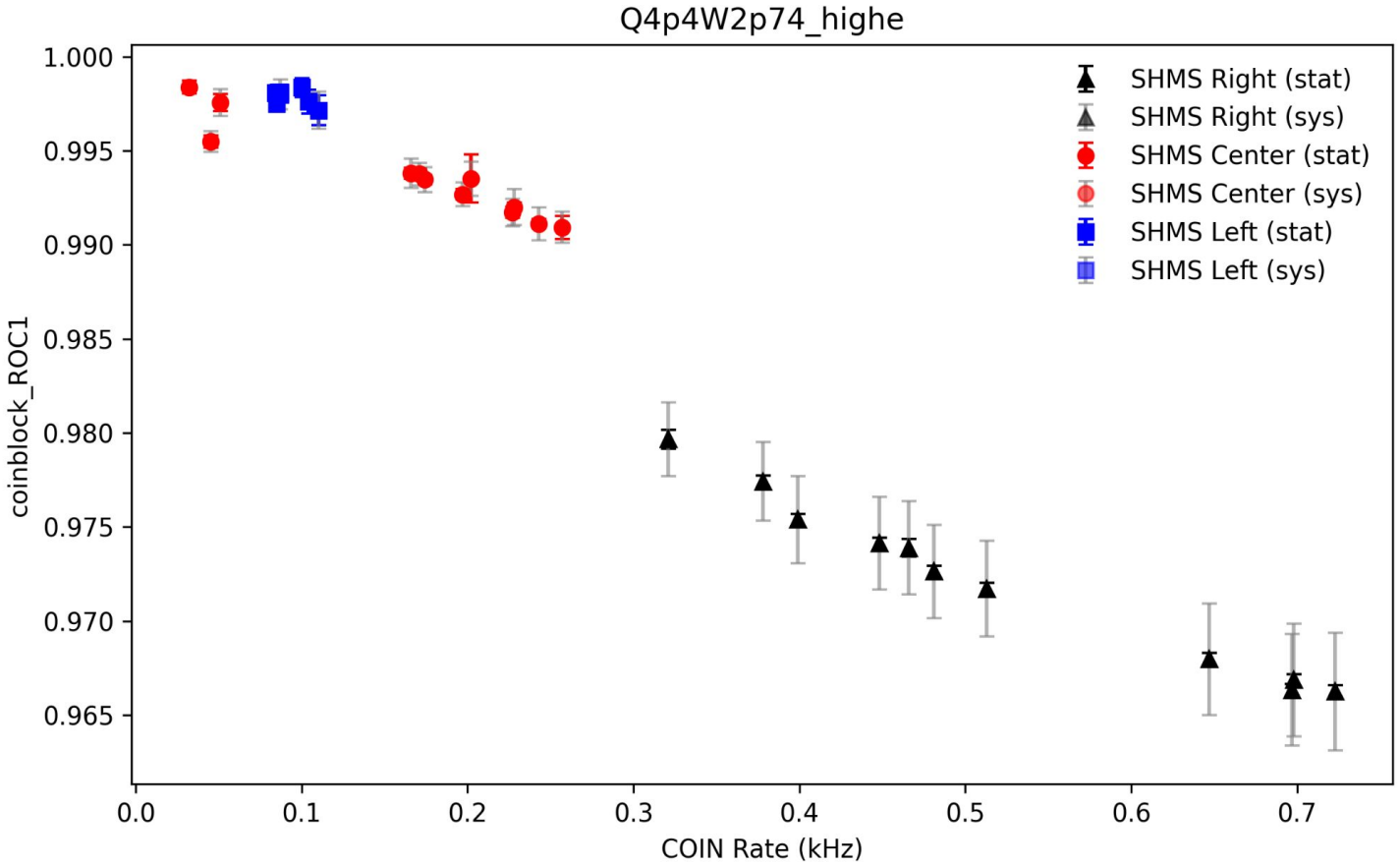
Varying cuts



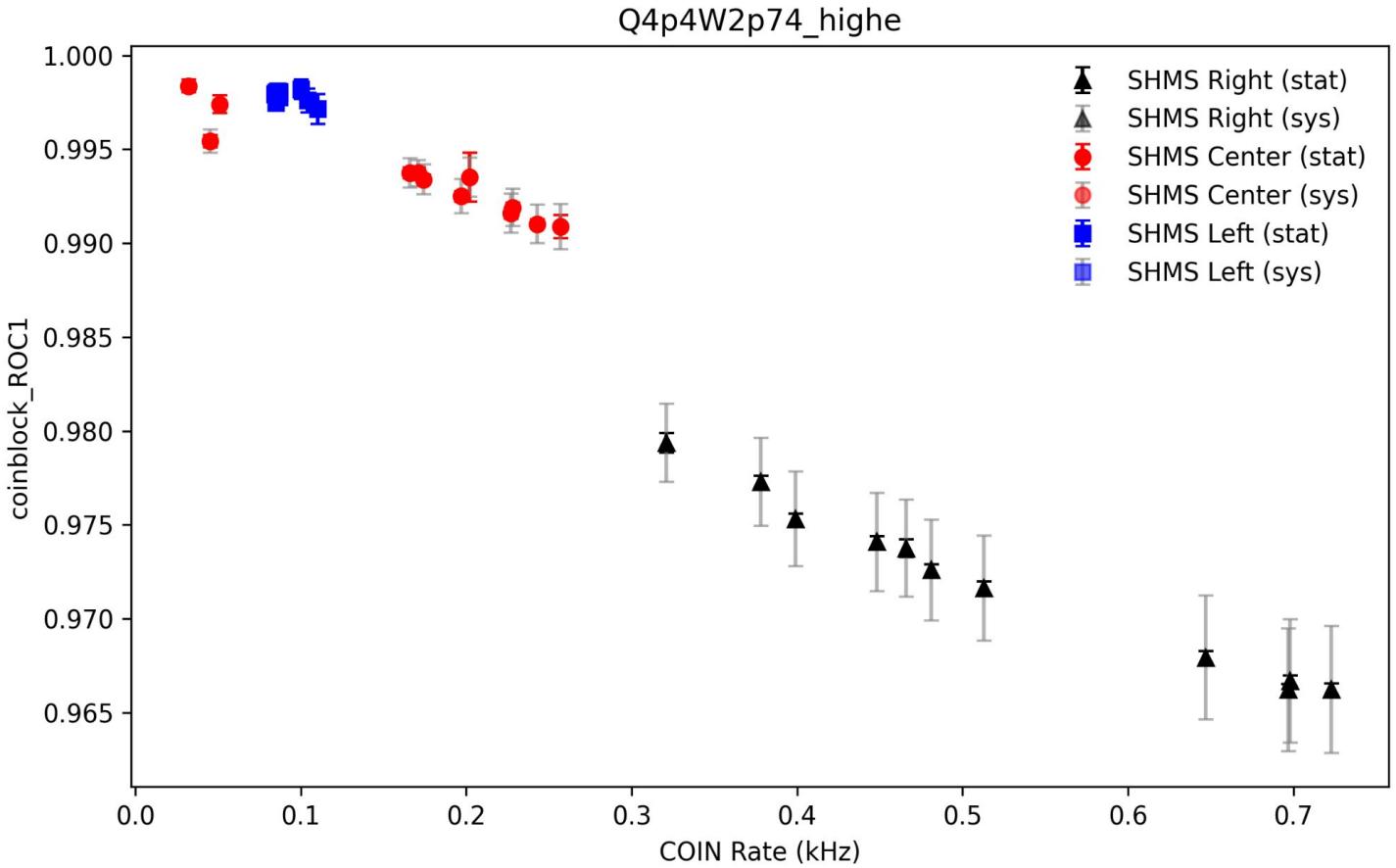
Fixed cuts


Q5p5W3p02_lowe
SHMS Center (stat)
SHMS Center (sys)
SHMS Left (stat)
SHMS Left (sys)
coinblock_ROC1
0.99
0.98
0.97
0.96
0.95
0.2
0.4
0.6
0.8
1.0
COIN Rate (kHz)

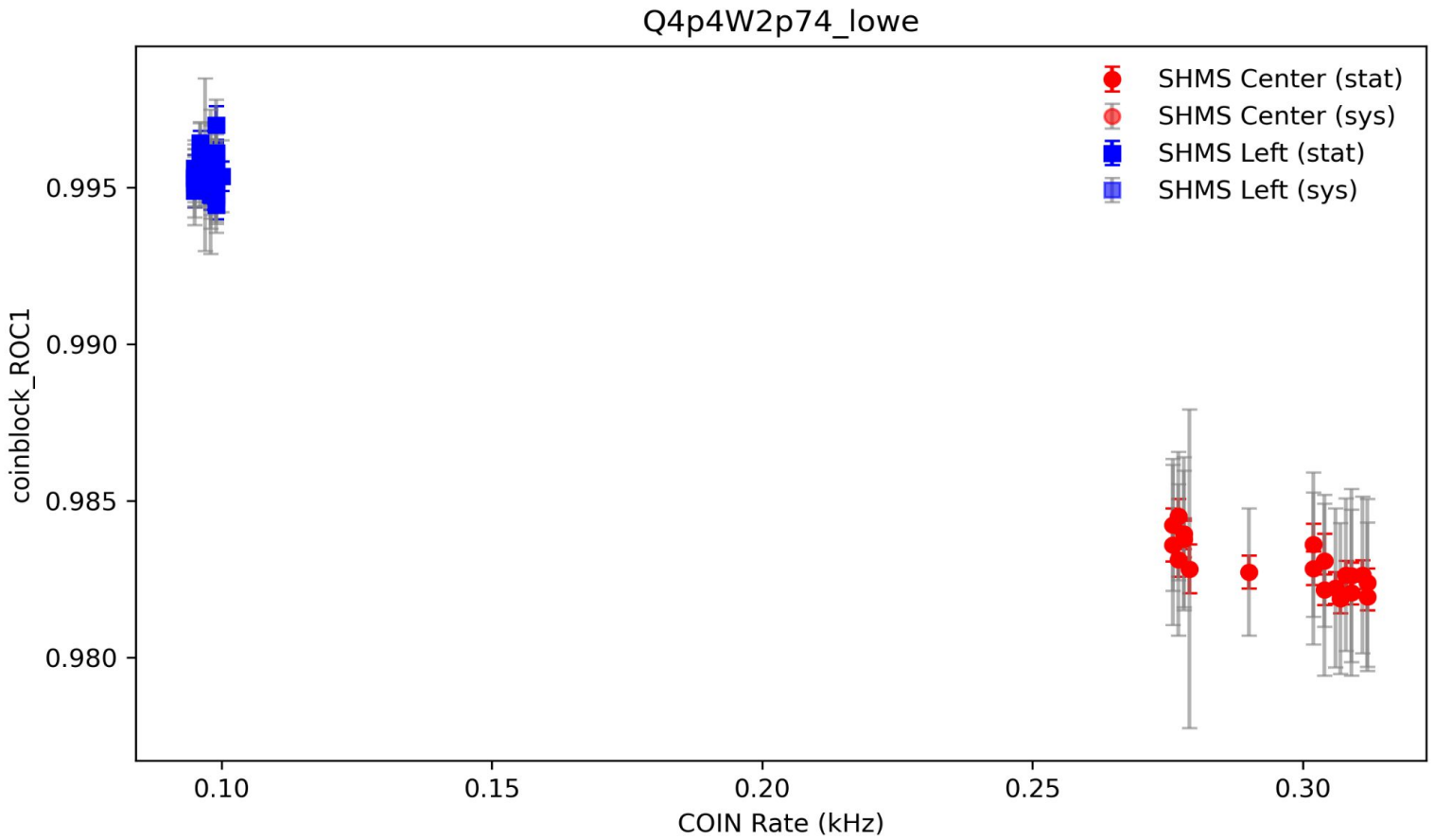
Varying cuts



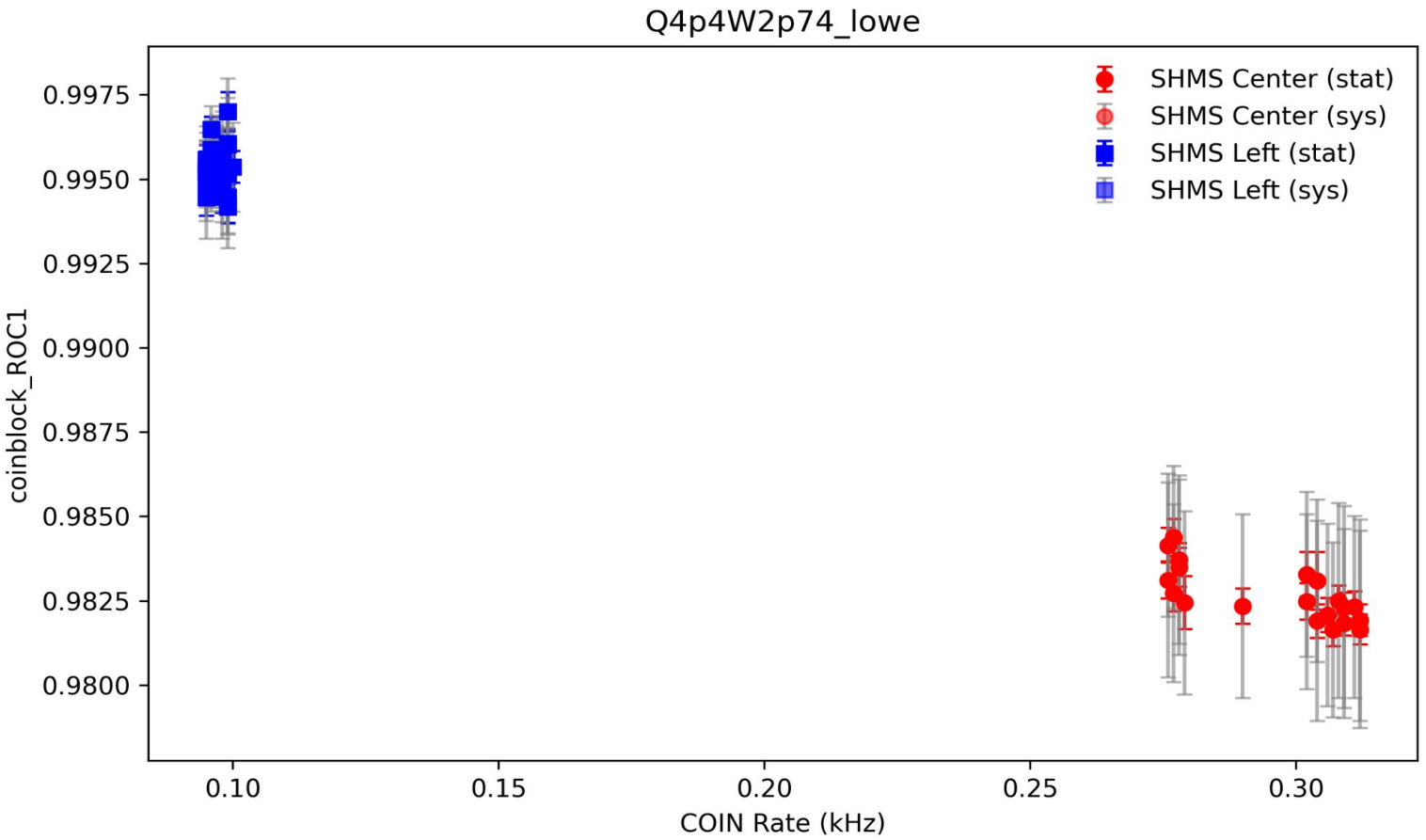
Fixed cuts


Q4p4W2p74_highe
SHMS Right (stat)
SHMS Right (sys)
SHMS Center (stat)
SHMS Center (sys)
SHMS Left (stat)
SHMS Left (sys)
coinblock_ROC1
COIN Rate (kHz)
1.000
0.995
0.990
0.985
0.980
0.975
0.970
0.965
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7

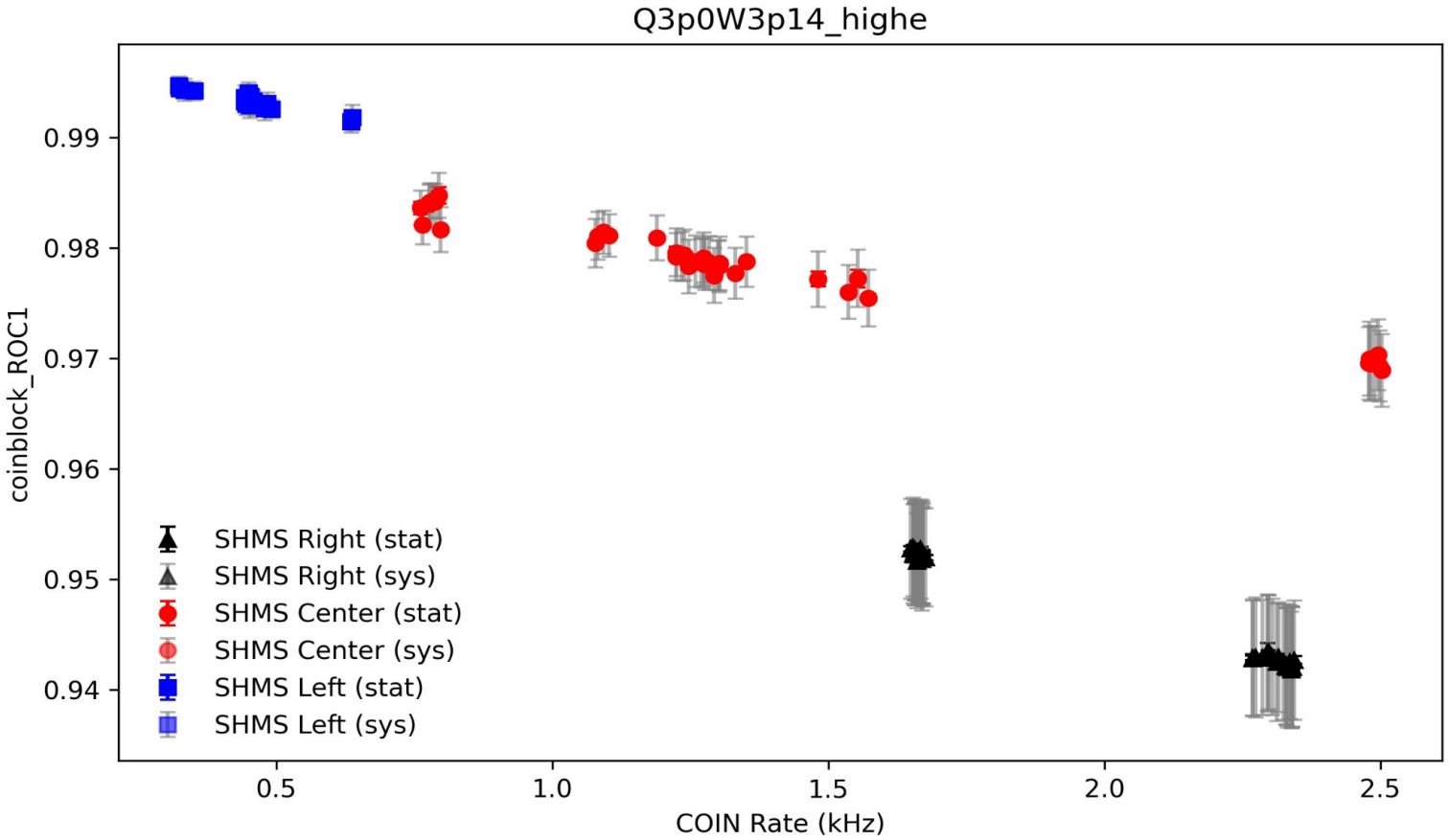
Varying cuts



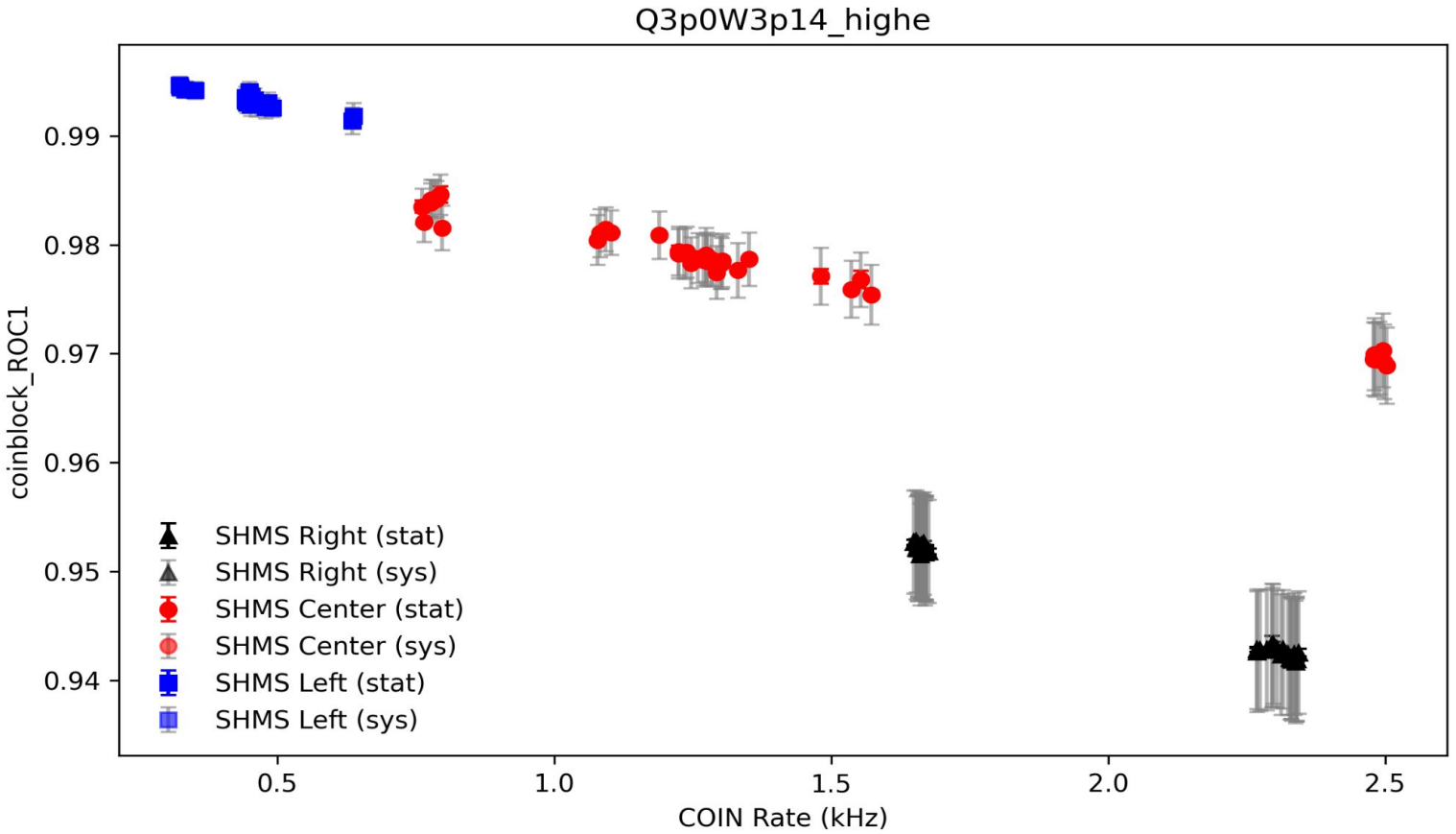
Fixed cuts


Q4p4W2p74_lowe
SHMS Center (stat)
SHMS Center (sys)
SHMS Left (stat)
SHMS Left (sys)
coinblock_ROC1
0.9975
0.9950
0.9925
0.9900
0.9875
0.9850
0.9825
0.9800
0.10
0.15
0.20
0.25
0.30
COIN Rate (kHz)

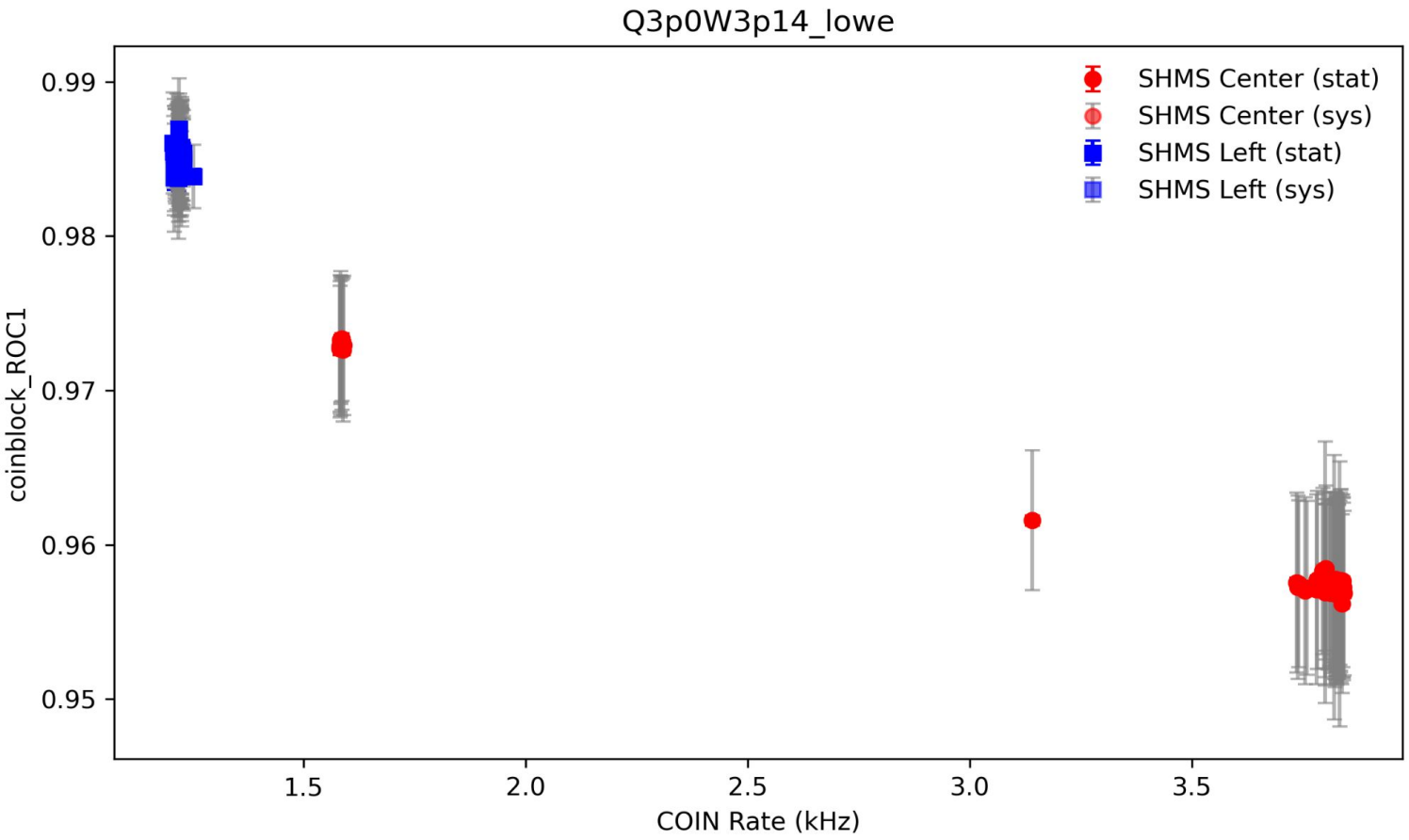
Varying cuts



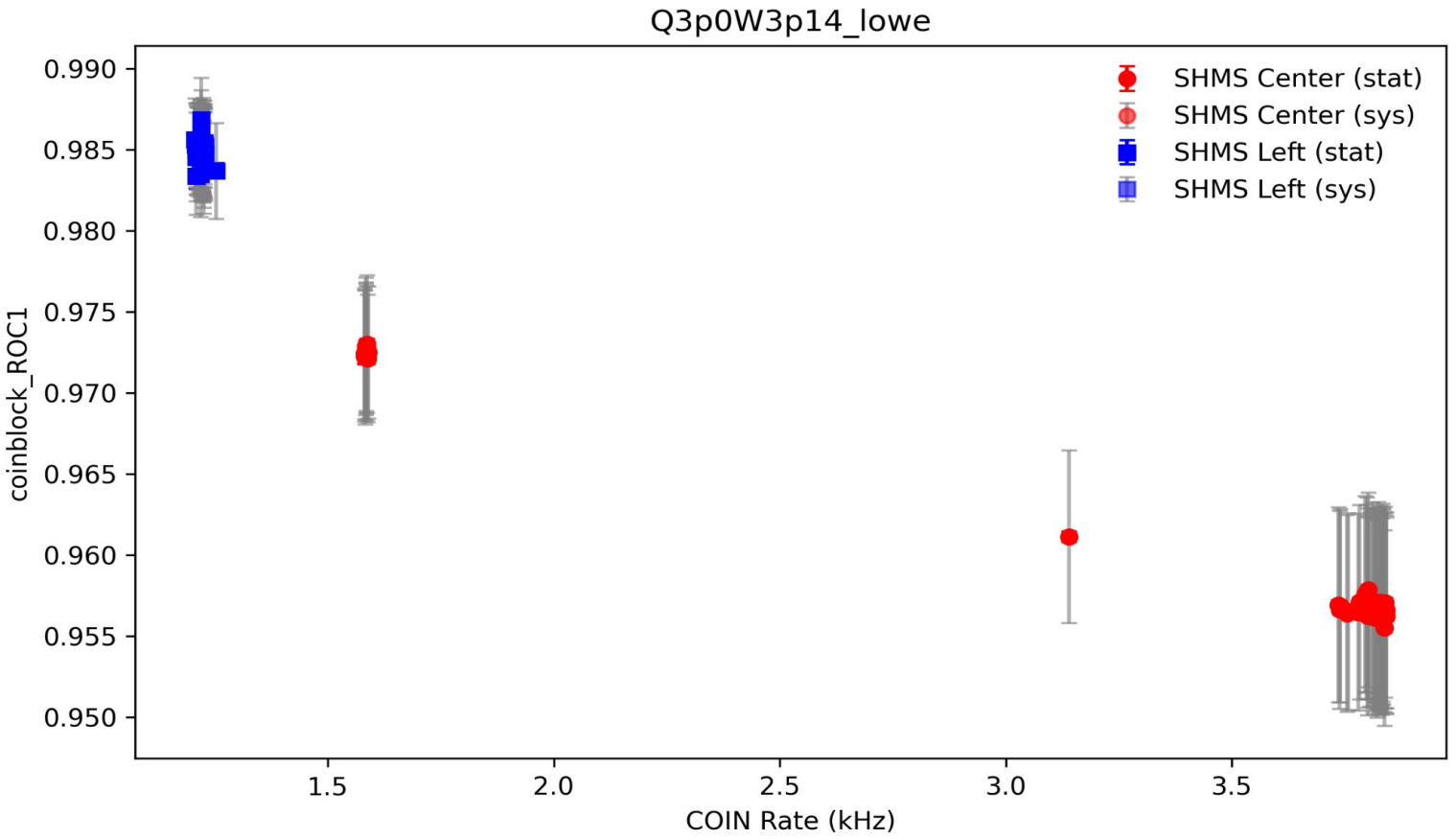
Fixed cuts


Q3p0W3p14_highe
coinblock_ROC1
0.99
0.98
0.97
0.96
0.95
0.94
0.5
1.0
1.5
2.0
2.5
COIN Rate (kHz)
SHMS Right (stat)
SHMS Right (sys)
SHMS Center (stat)
SHMS Center (sys)
SHMS Left (stat)
SHMS Left (sys)

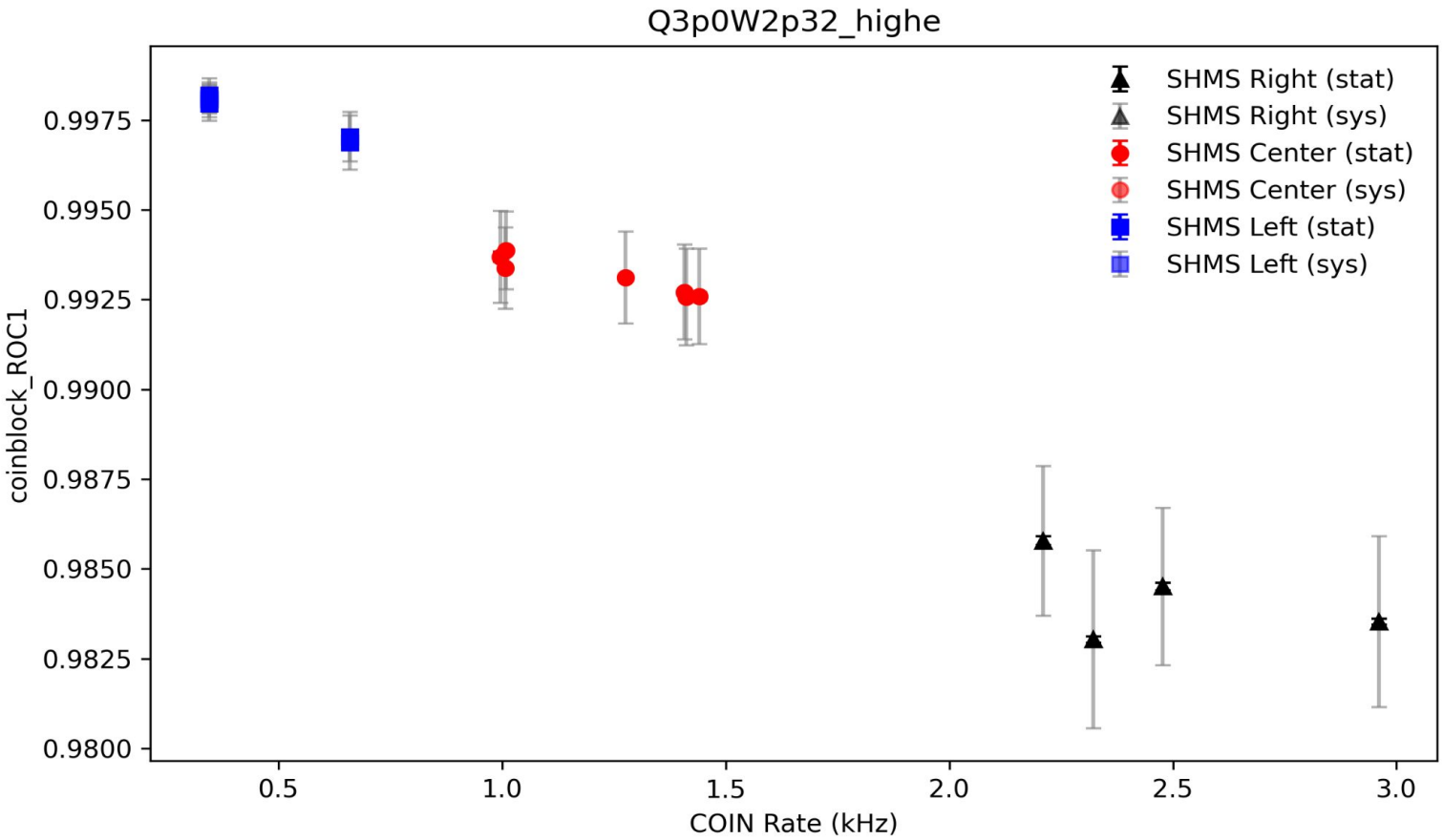
Varying cuts



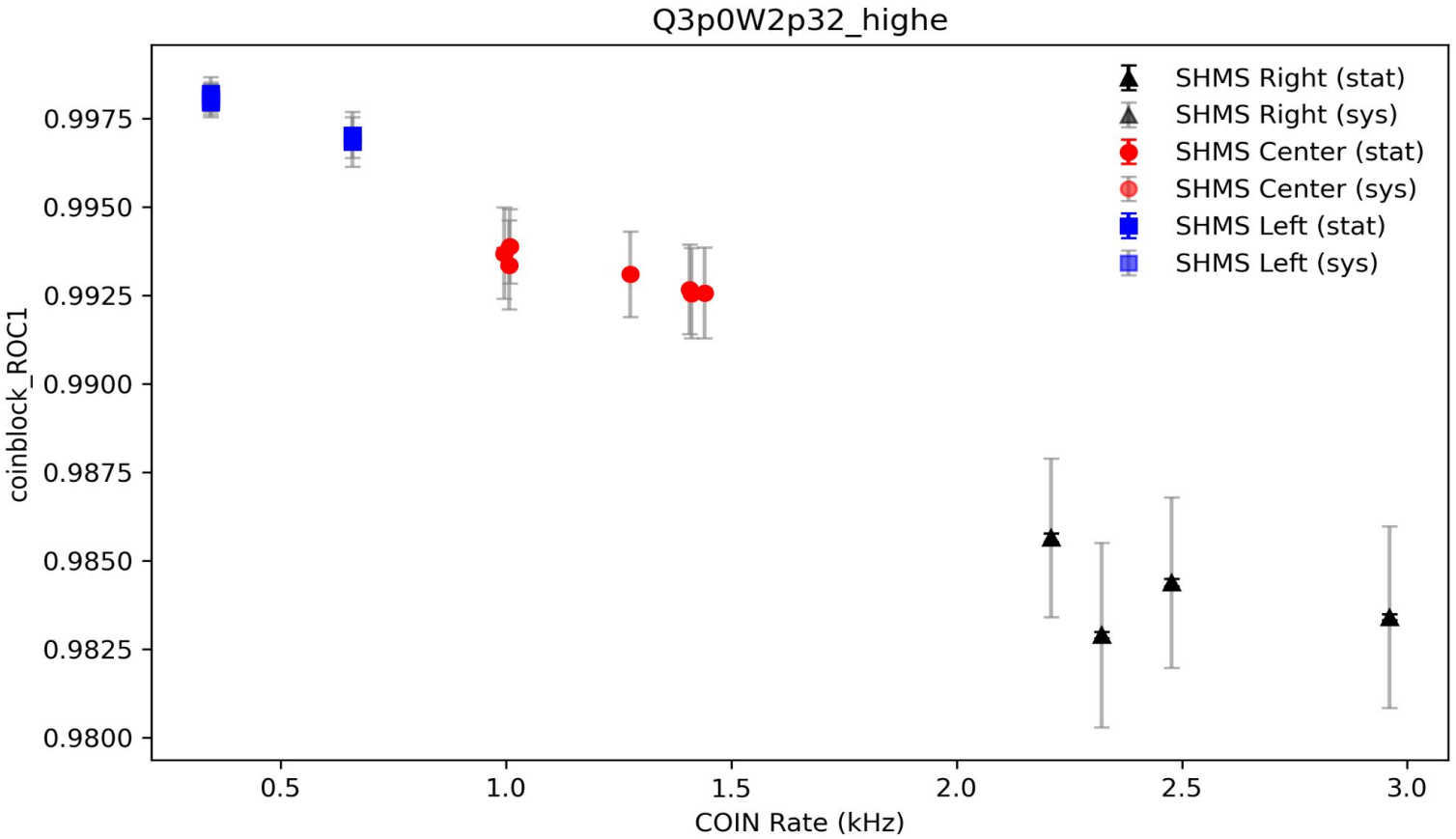
Fixed cuts


Q3p0W3p14_lowe
SHMS Center (stat)
SHMS Center (sys)
SHMS Left (stat)
SHMS Left (sys)
coinblock_ROC1
0.990
0.985
0.980
0.975
0.970
0.965
0.960
0.955
0.950
1.5
2.0
2.5
3.0
3.5
COIN Rate (kHz)

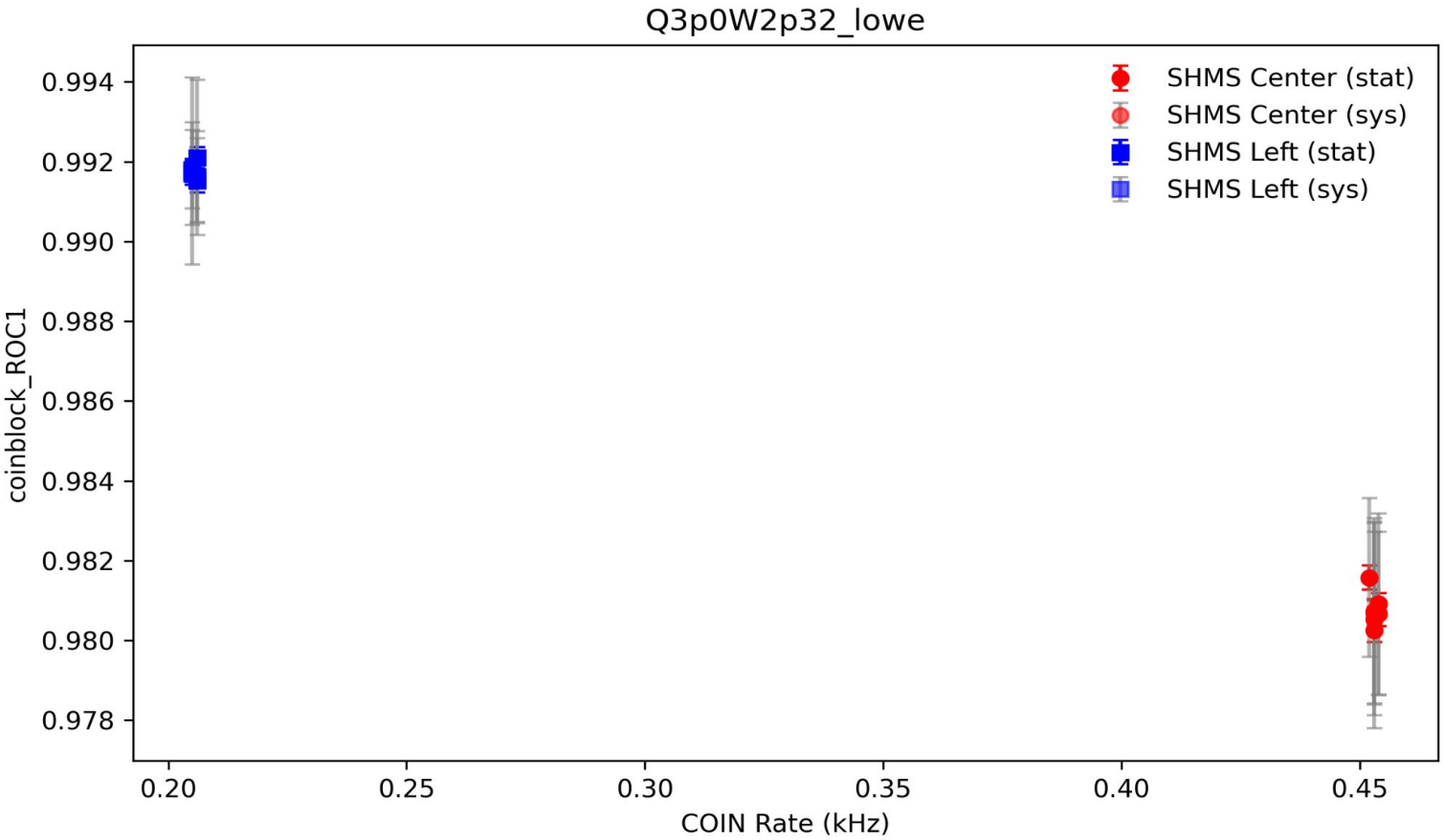
Varying cuts



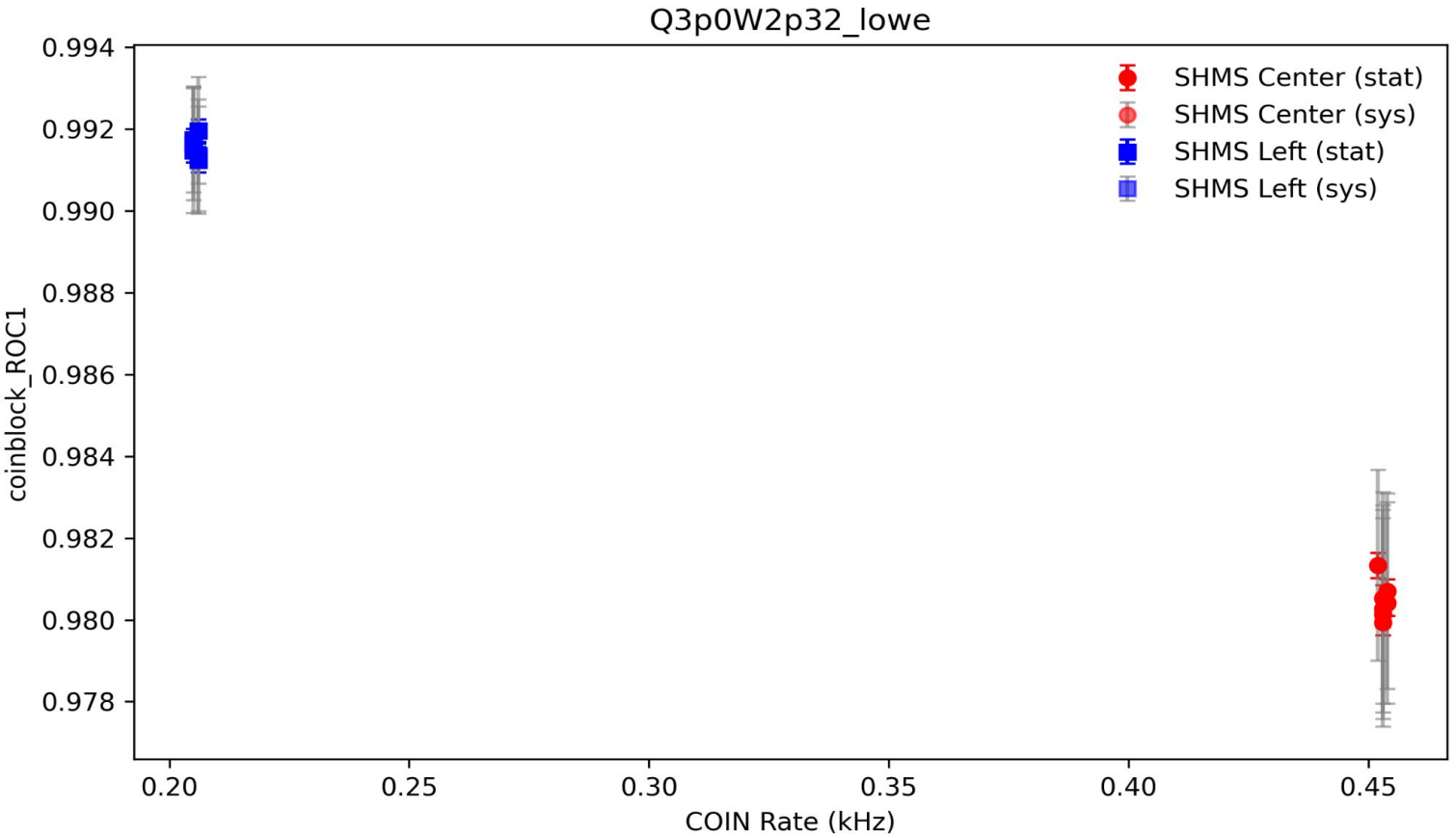
Fixed cuts


Q3p0W2p32_highe
SHMS Right (stat)
SHMS Right (sys)
SHMS Center (stat)
SHMS Center (sys)
SHMS Left (stat)
SHMS Left (sys)
coinblock_ROC1
0.9975
0.9950
0.9925
0.9900
0.9875
0.9850
0.9825
0.9800
0.5
1.0
1.5
2.0
2.5
3.0
COIN Rate (kHz)

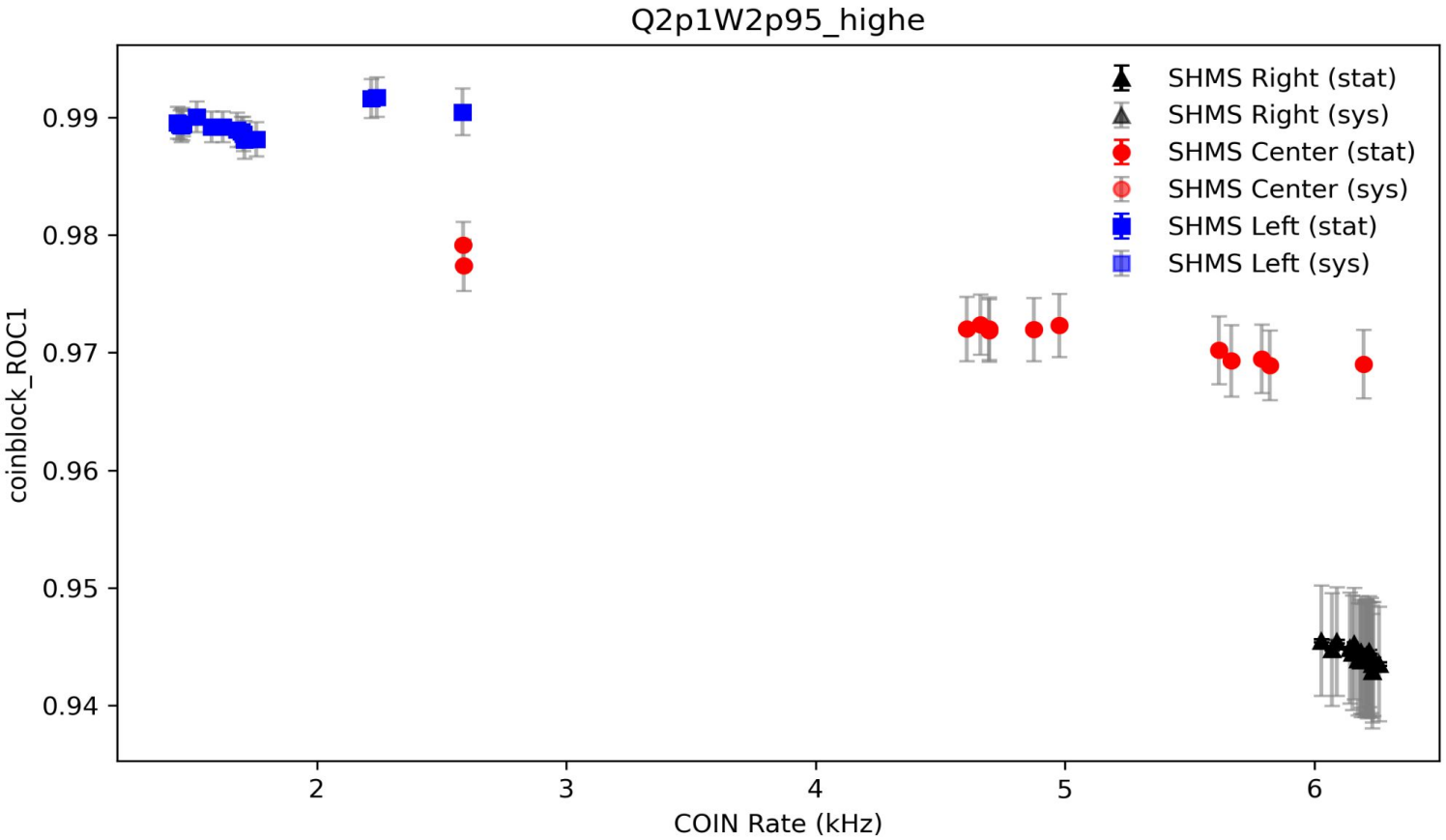
Varying cuts



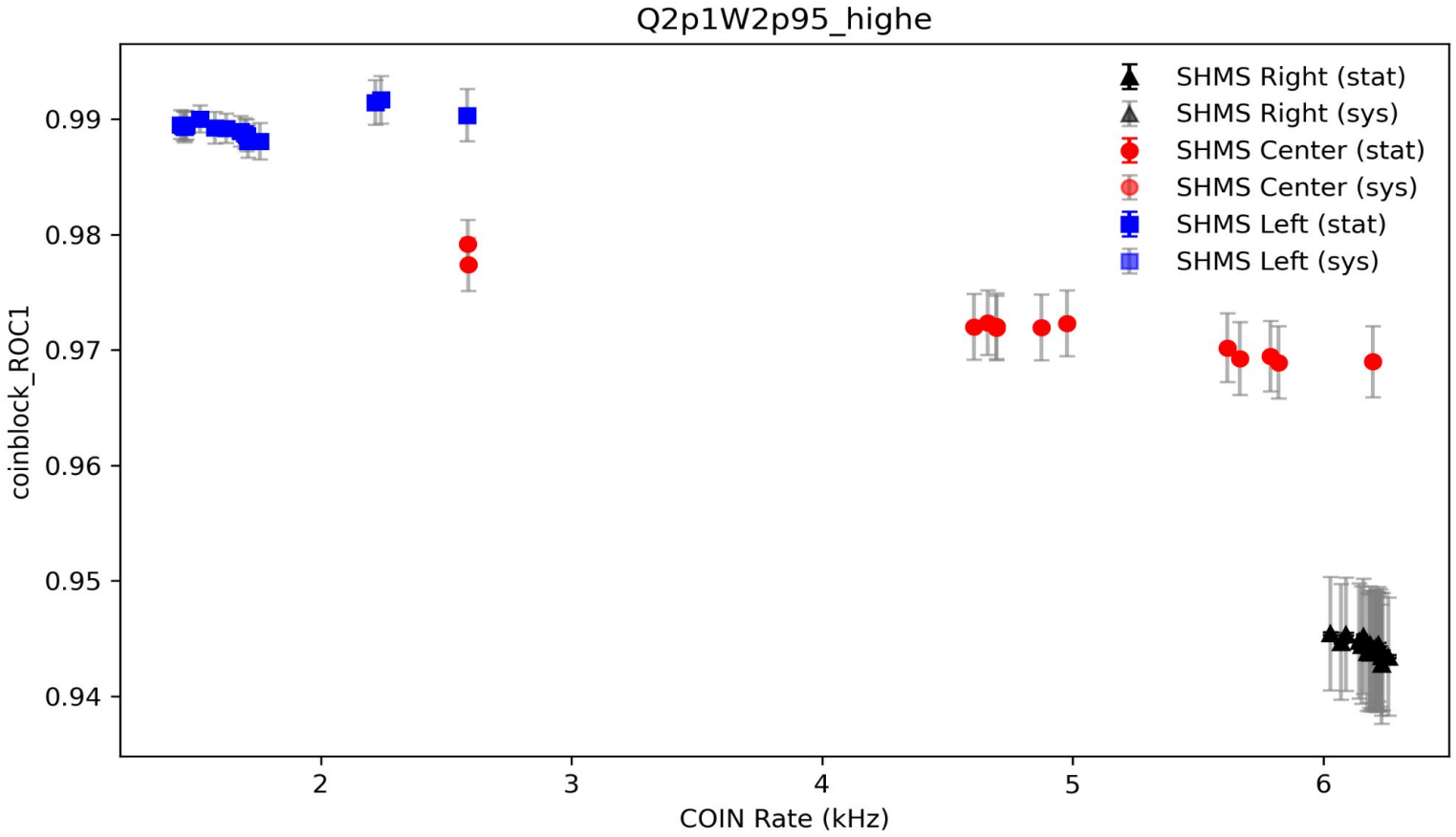
Fixed cuts


Q3p0W2p32_lowe
SHMS Center (stat)
SHMS Center (sys)
SHMS Left (stat)
SHMS Left (sys)
coinblock_ROC1
0.994
0.992
0.990
0.988
0.986
0.984
0.982
0.980
0.978
0.20
0.25
0.30
0.35
0.40
0.45
COIN Rate (kHz)

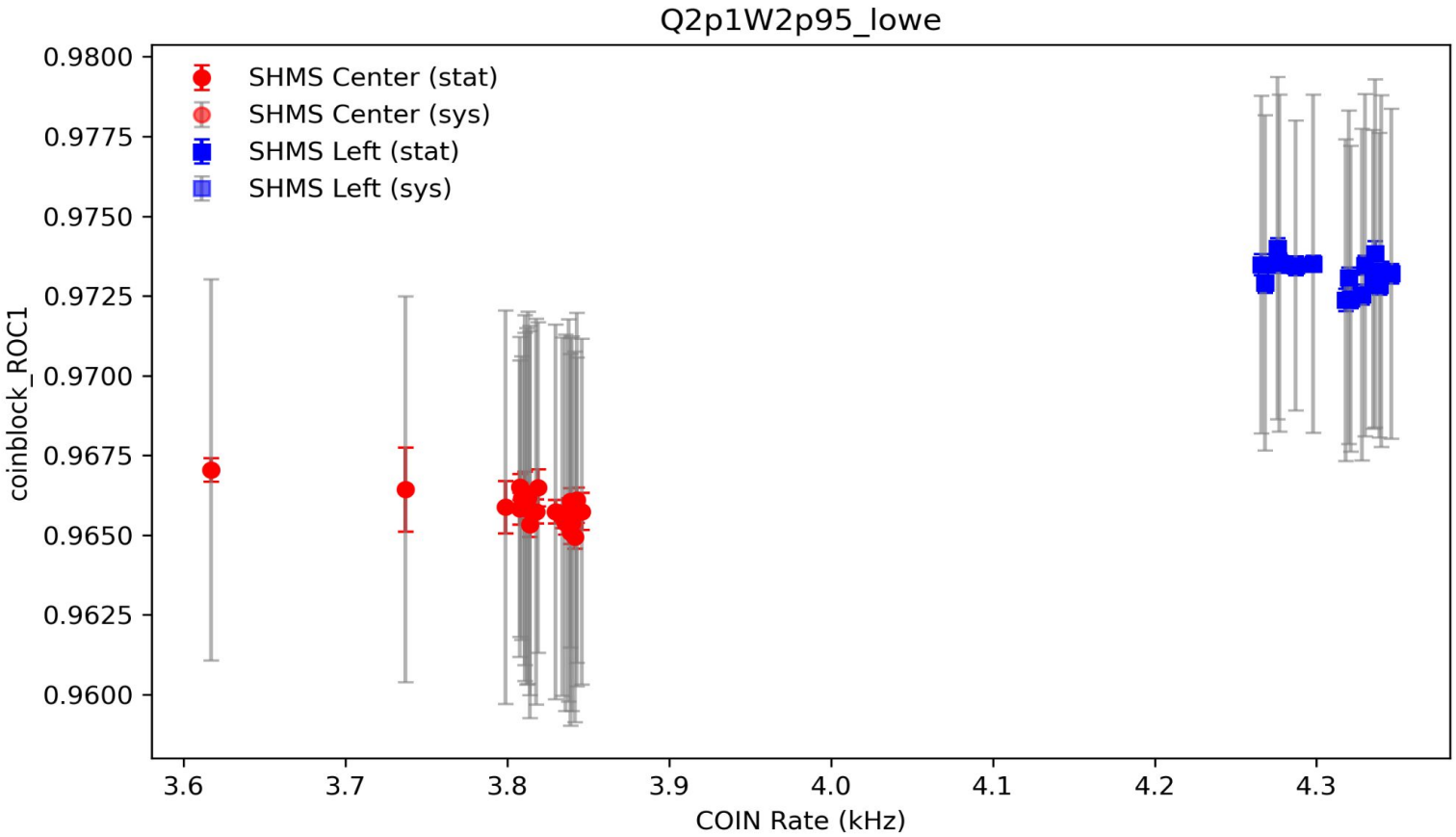
Varying cuts



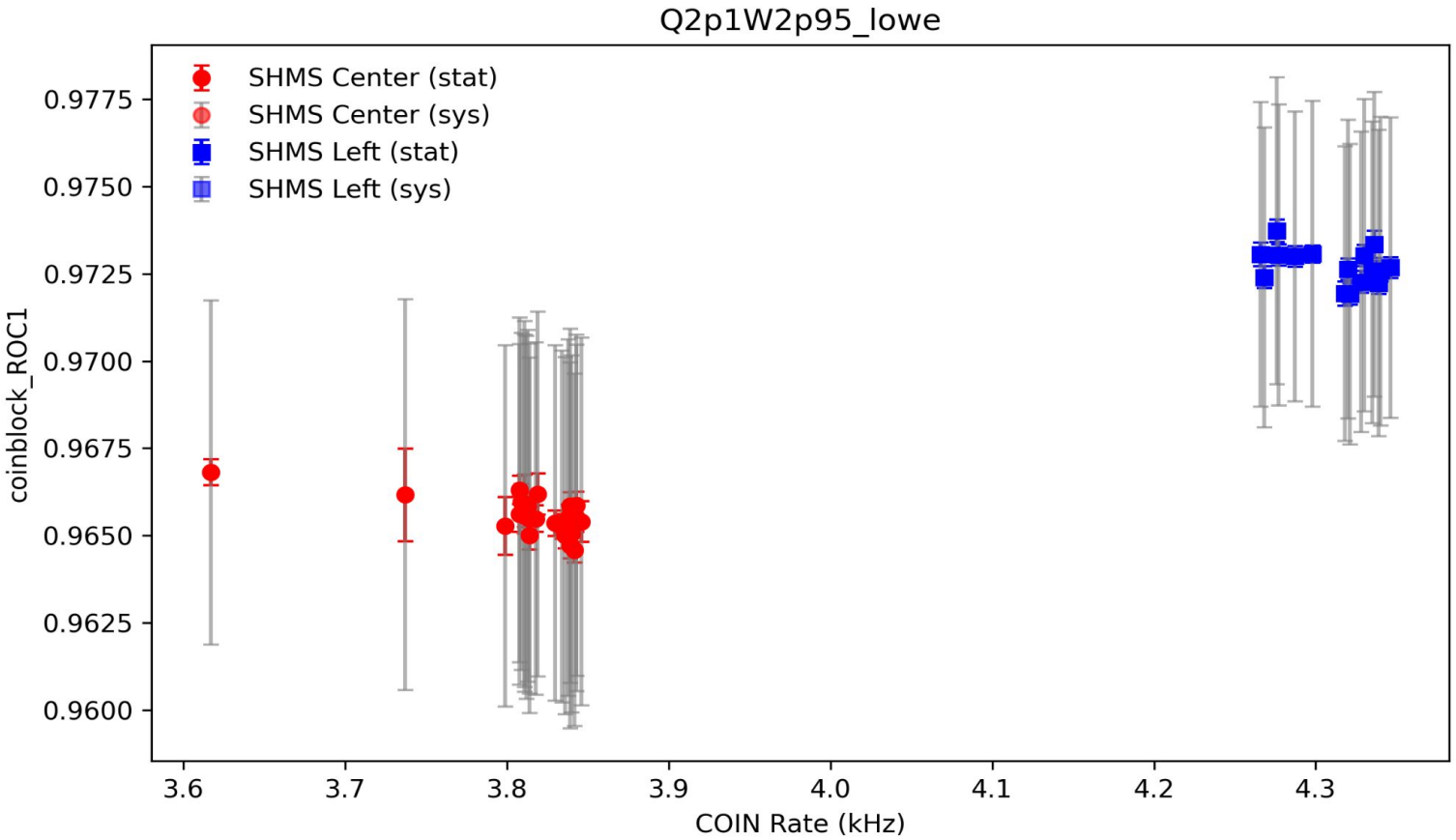
Fixed cuts


Q2p1W2p95_highe
SHMS Right (stat)
SHMS Right (sys)
SHMS Center (stat)
SHMS Center (sys)
SHMS Left (stat)
SHMS Left (sys)
coinblock_ROC1
0.99
0.98
0.97
0.96
0.95
0.94
2
3
4
5
6
COIN Rate (kHz)

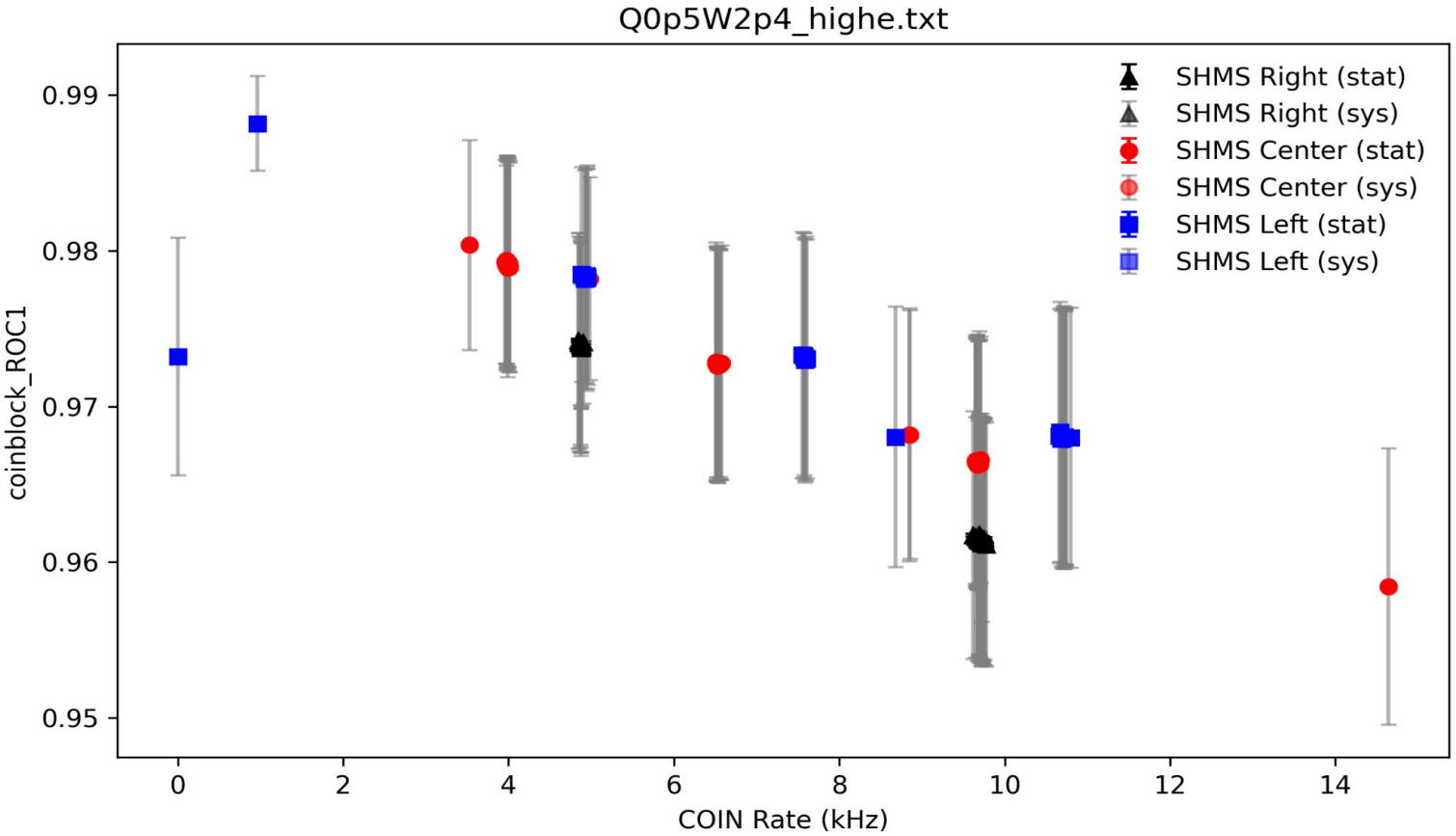
Varying cuts



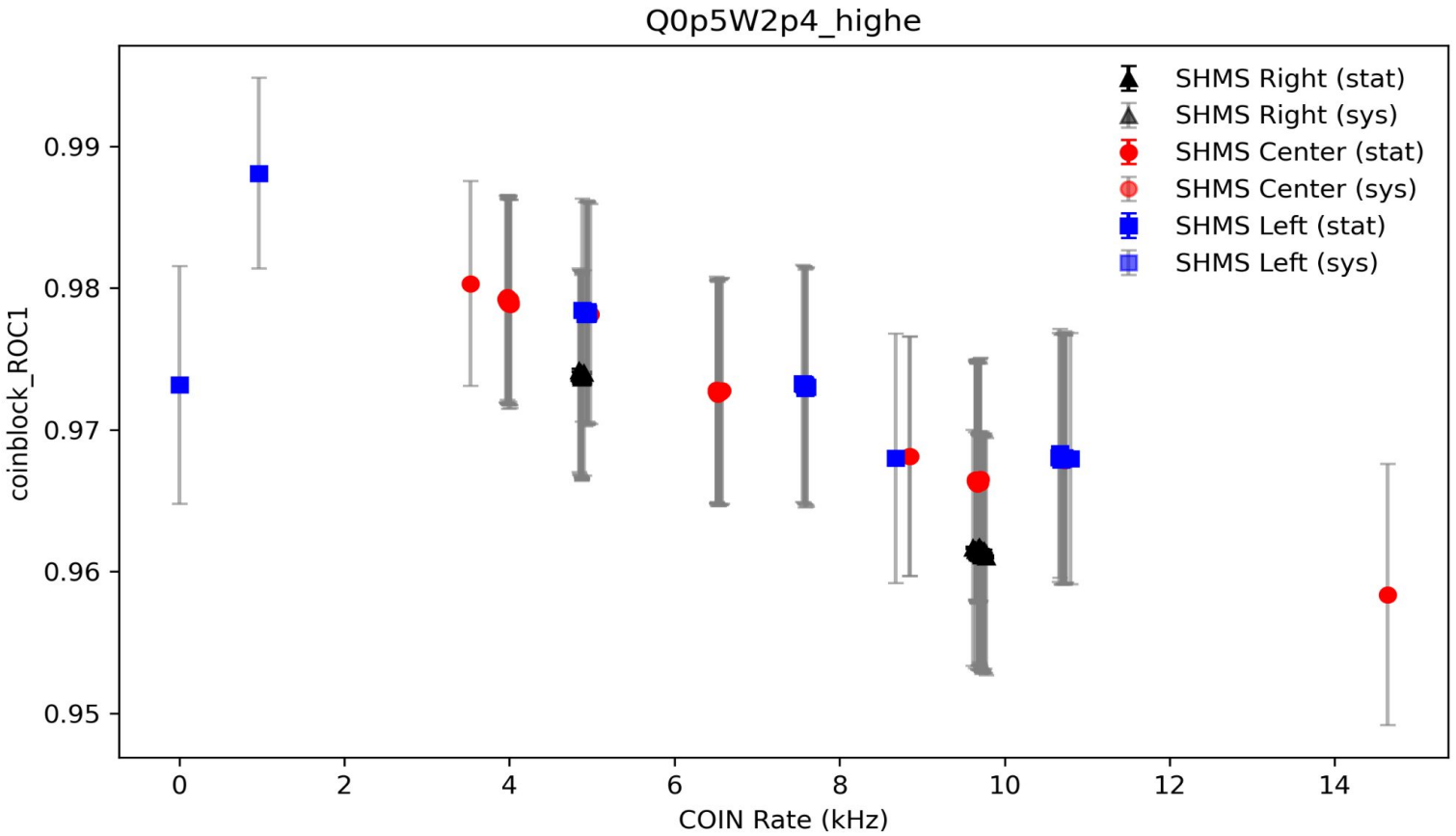
Fixed cuts


Q2p1W2p95_lowe
SHMS Center (stat)
SHMS Center (sys)
SHMS Left (stat)
SHMS Left (sys)
coinblock_ROC1
0.9775
0.9750
0.9725
0.9700
0.9675
0.9650
0.9625
0.9600
3.6
3.7
3.8
3.9
4.0
4.1
4.2
4.3
COIN Rate (kHz)

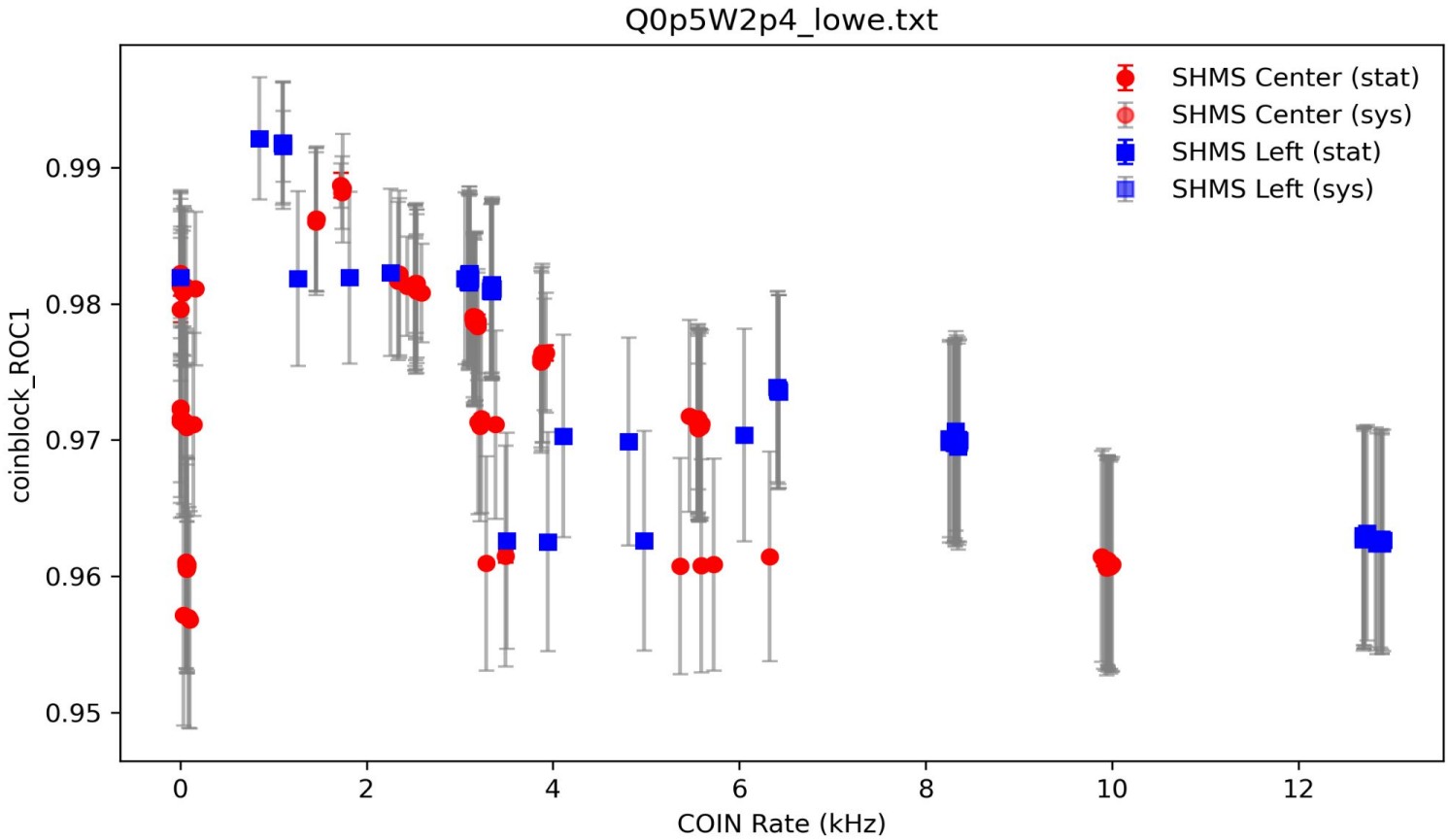
Varying cuts



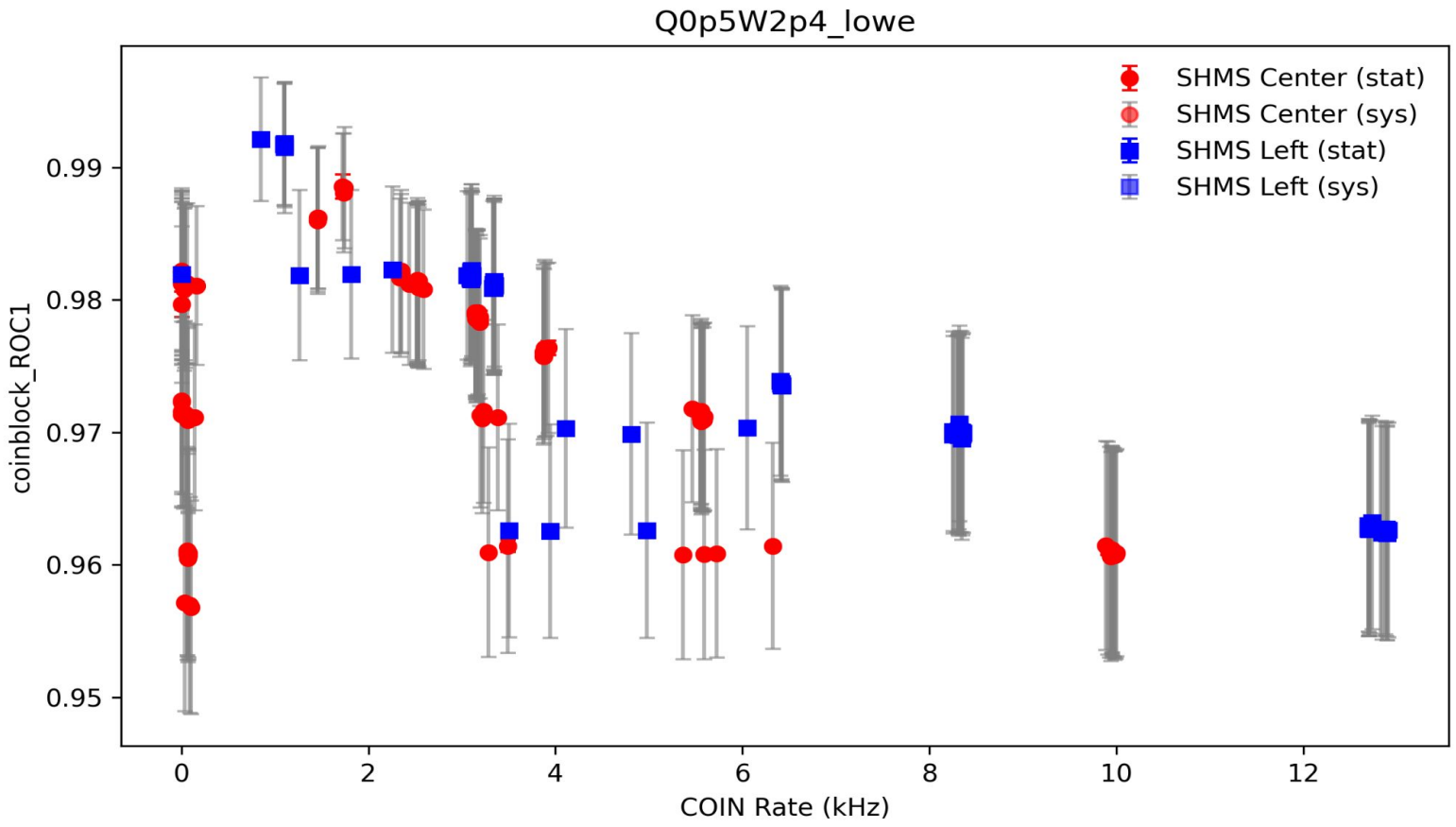
Fixed cuts


Q0p5W2p4_highe
SHMS Right (stat)
SHMS Right (sys)
SHMS Center (stat)
SHMS Center (sys)
SHMS Left (stat)
SHMS Left (sys)
coinblock_ROC1
0.99
0.98
0.97
0.96
0.95
0
2
4
6
8
10
12
14
COIN Rate (kHz)

Varying cuts



Fixed cuts


Q0p5W2p4_lowe
SHMS Center (stat)
SHMS Center (sys)
SHMS Left (stat)
SHMS Left (sys)
coinblock_ROC1
0.99
0.98
0.97
0.96
0.95
0
2
4
6
8
10
12
COIN Rate (kHz)

Summary & Outlook

➢ Results look similar for fixed and varying windows for the window size of 20ns larger than the sum of oscilloscope traces of ¾ trigger windows.

➢ Validation of correction – In process [Other efficiencies for setting Q2=3.0 W=3.14 x=0.25 from Richard].