AFE characterization

Antoine

CBPM meeting: May 19, 2023

Where we were at

Previously: 10 pF capacitors (C146, C147 forming voltage divider) removed

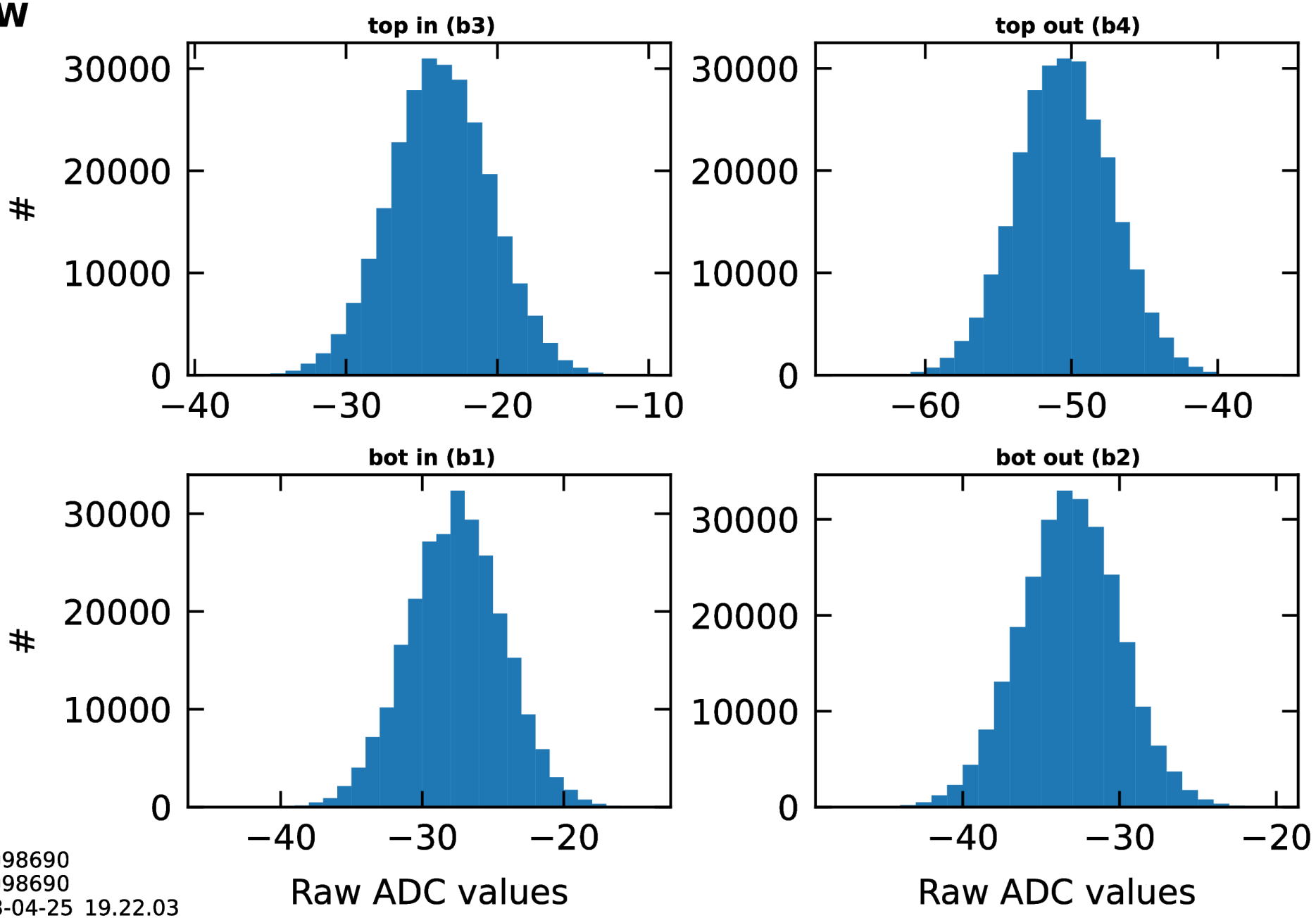
- ✗ factor ~2 amplification expected
- ✗ beam characterization on Tuesday May 9: instr elog 2115

Observed:

- ✗ factor ~2 signal amplification
- ✗ factor ~1.7 noise amplification

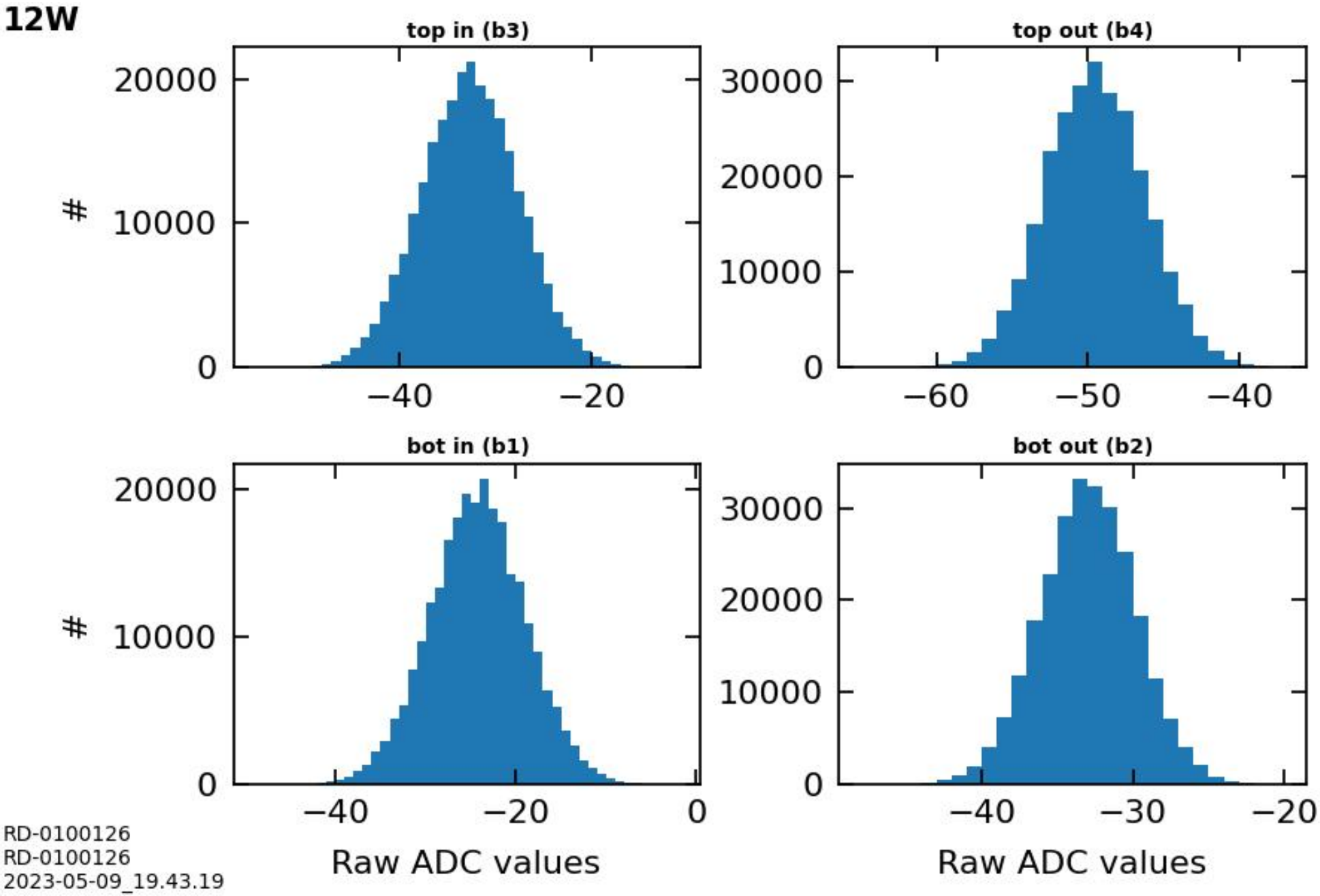
Noise distribution: **BEFORE** capacitor removal

12W



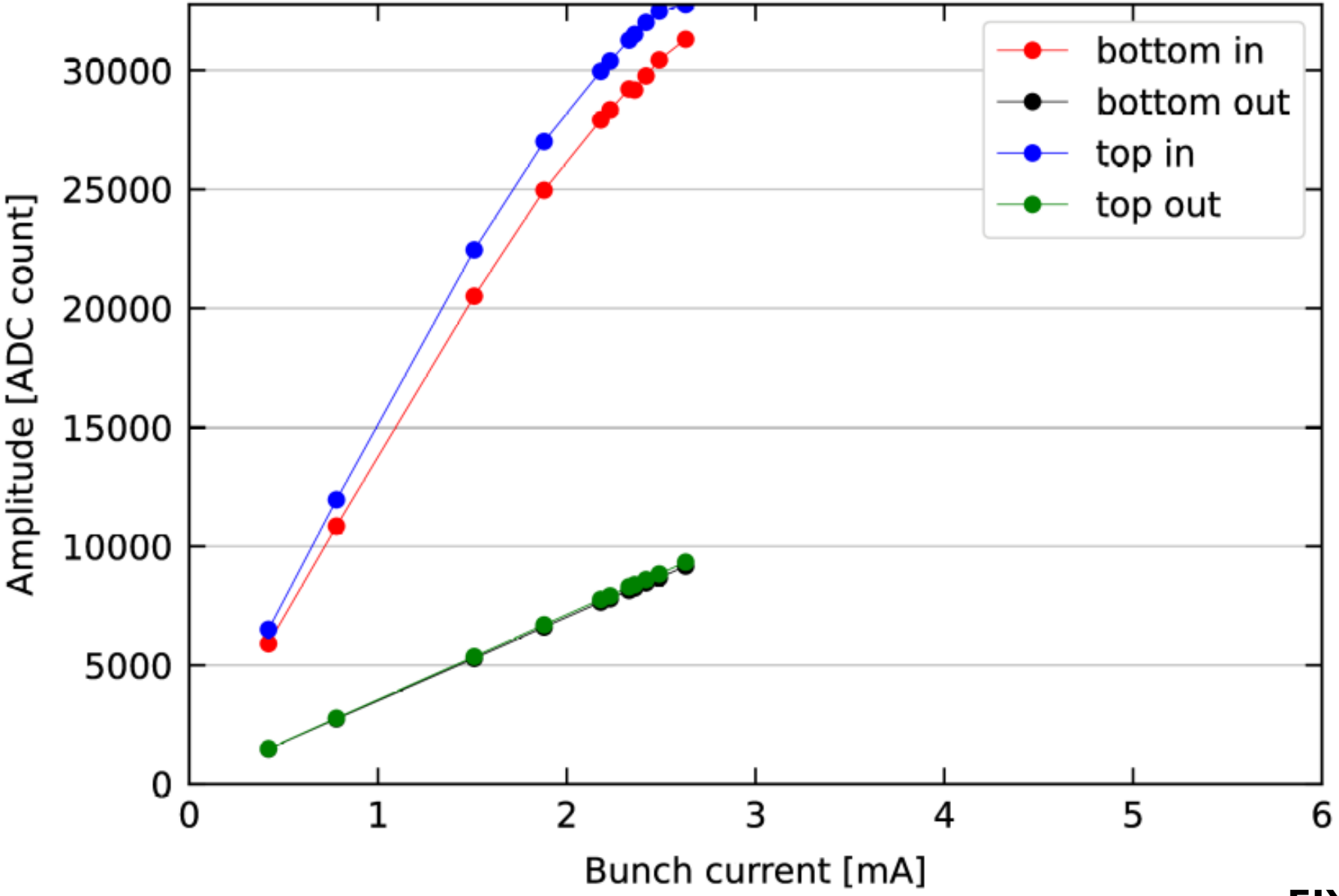
RD-098690
RD-098690
2023-04-25_19.22.03

Noise distribution: **AFTER** capacitor removal



After capacitor removal

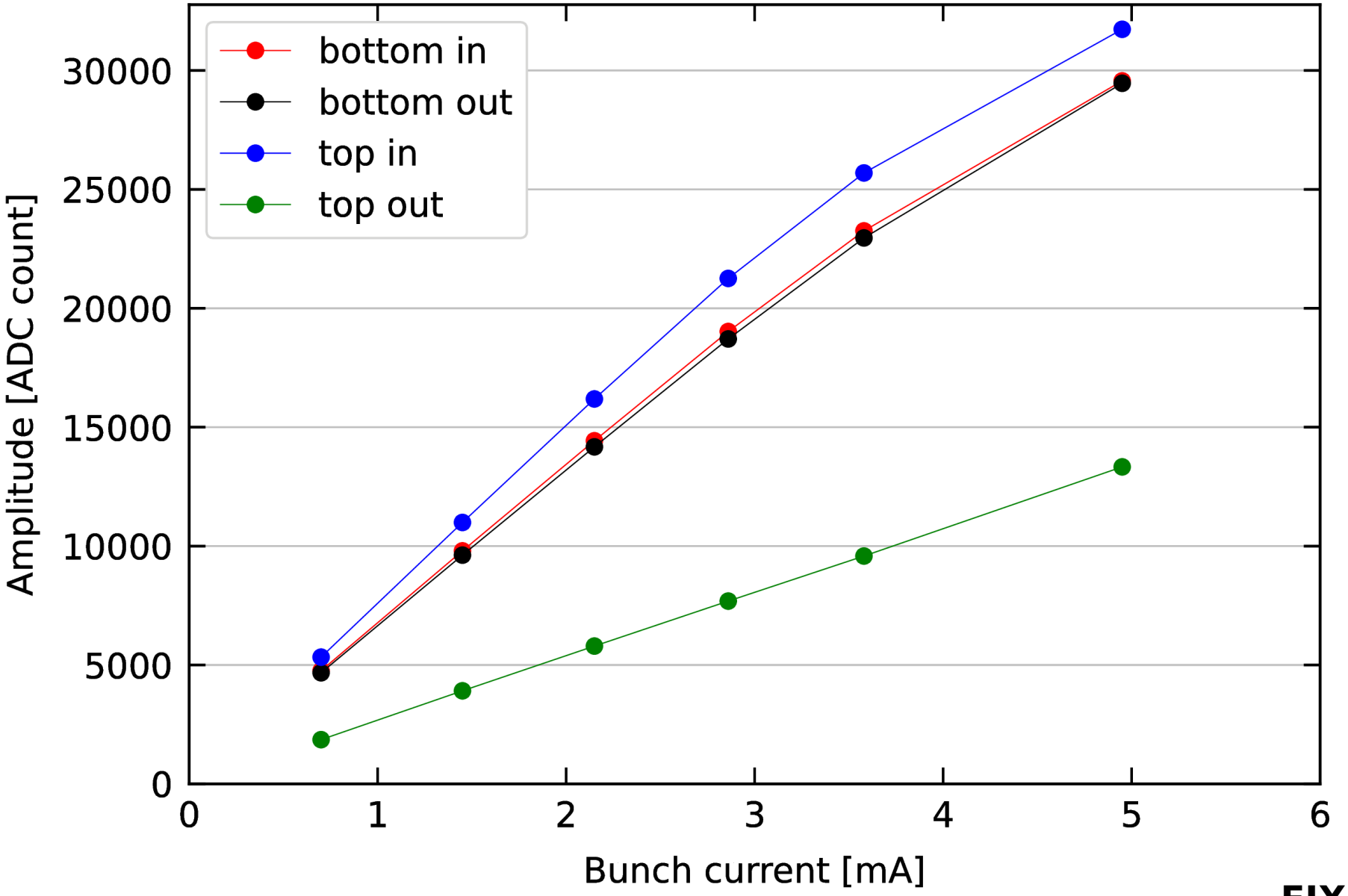
12W (ctactf133), peak-aligned at each current step – Tuesday **5/9**



FIXED GAIN

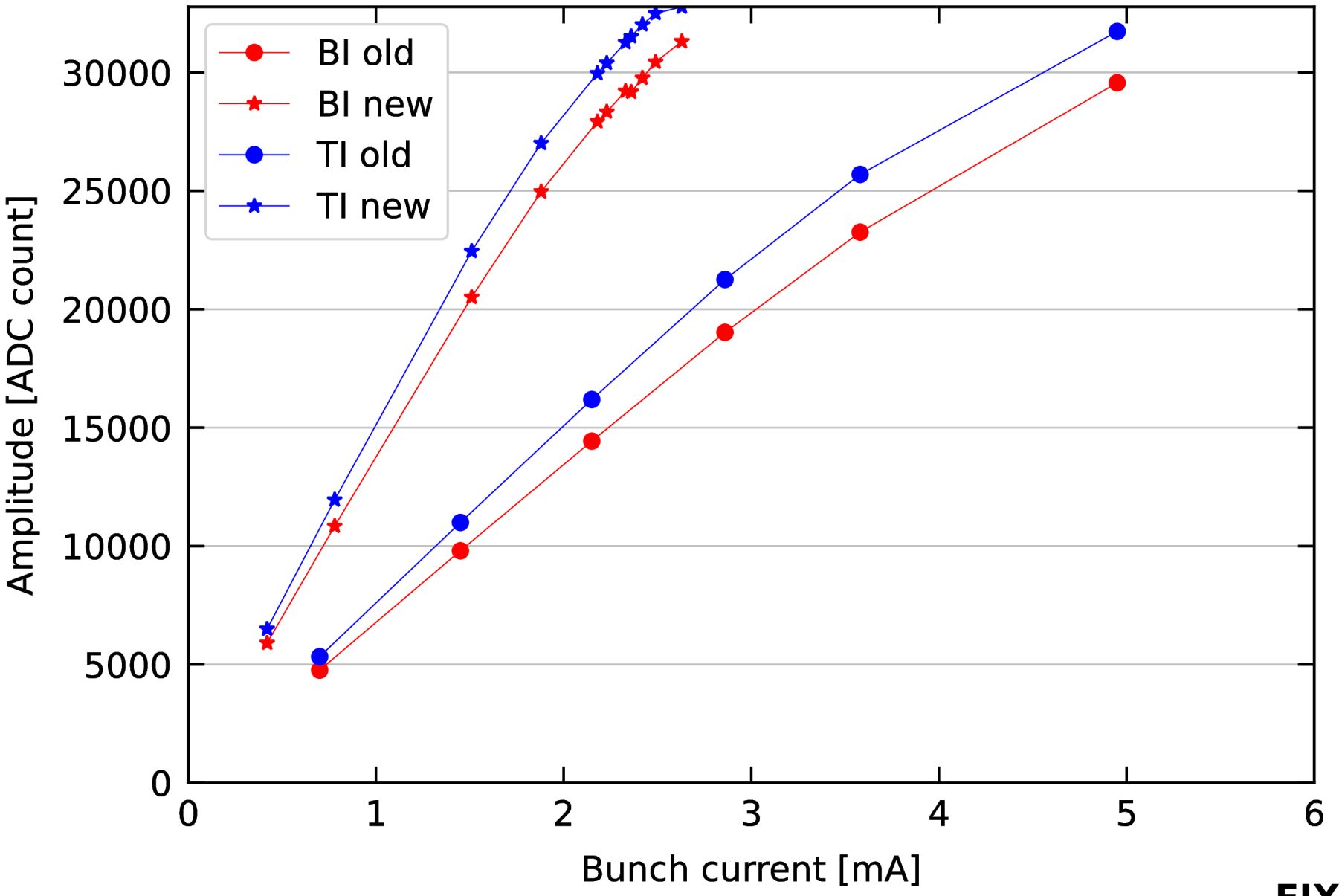
“Old” board with unity gain (only modification)

12W (ctactf133), peak-aligned at each current step – Tuesday **4/25**



FIXED GAIN

“Old” vs “New” board



FIXED GAIN

Where we are at now

Previously: 10 pF capacitors (C146, C147 forming voltage divider) removed

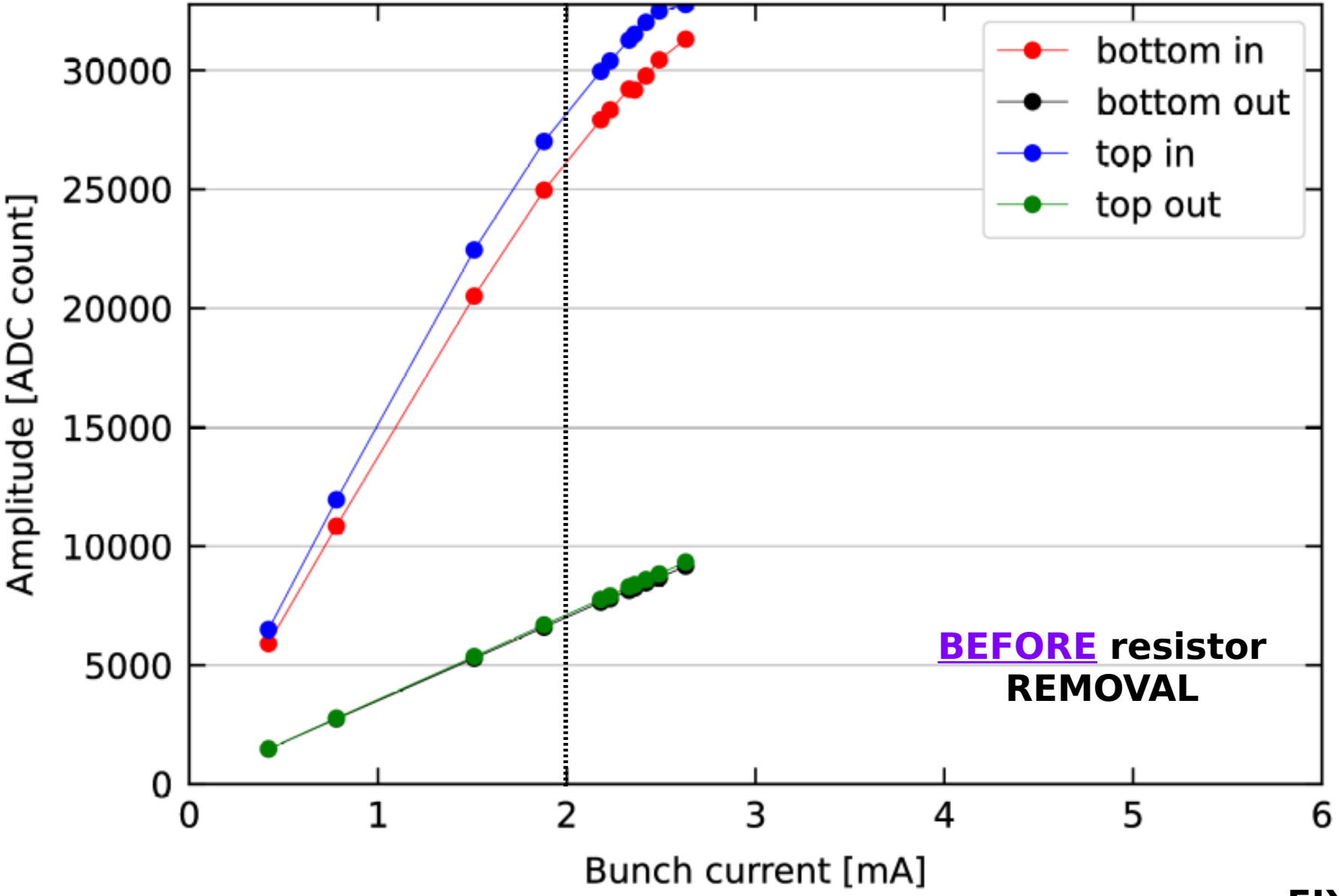
- ✗ factor ~2 amplification expected
- ✗ beam characterization on Tuesday May 9: instr elog 2115

Now: 33 ohms R134 resistor replaced by 0 ohm resistor

- ✗ beam characterization on Tuesday May 16: instr elog 2119

Amplitude vs bunch current

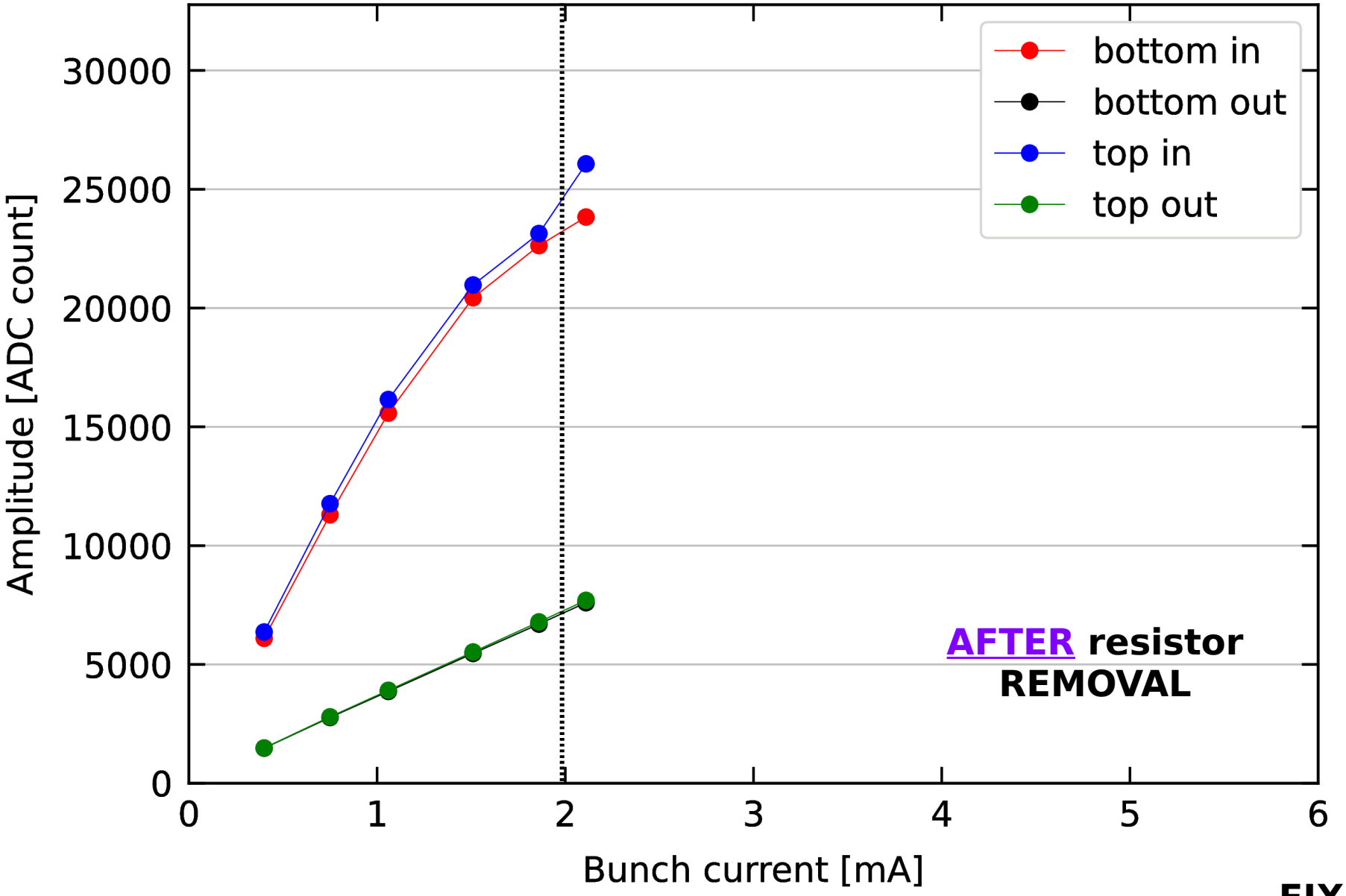
12W (ctactf133), peak-aligned at each current step – Tuesday **5/9**



FIXED GAIN

Amplitude vs bunch current

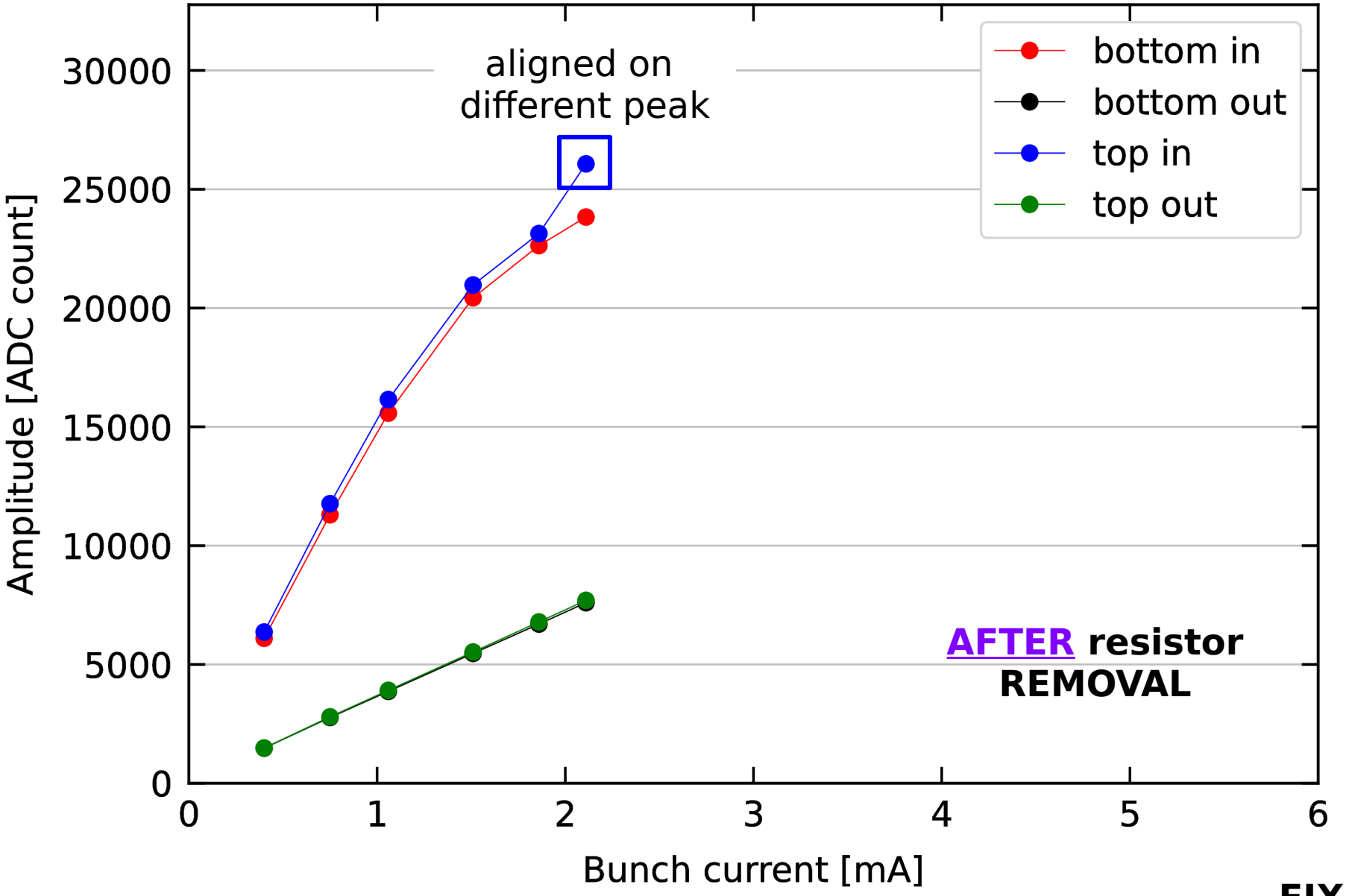
12W (ctactf133), peak-aligned at each current step – Tuesday **5/16**



FIXED GAIN

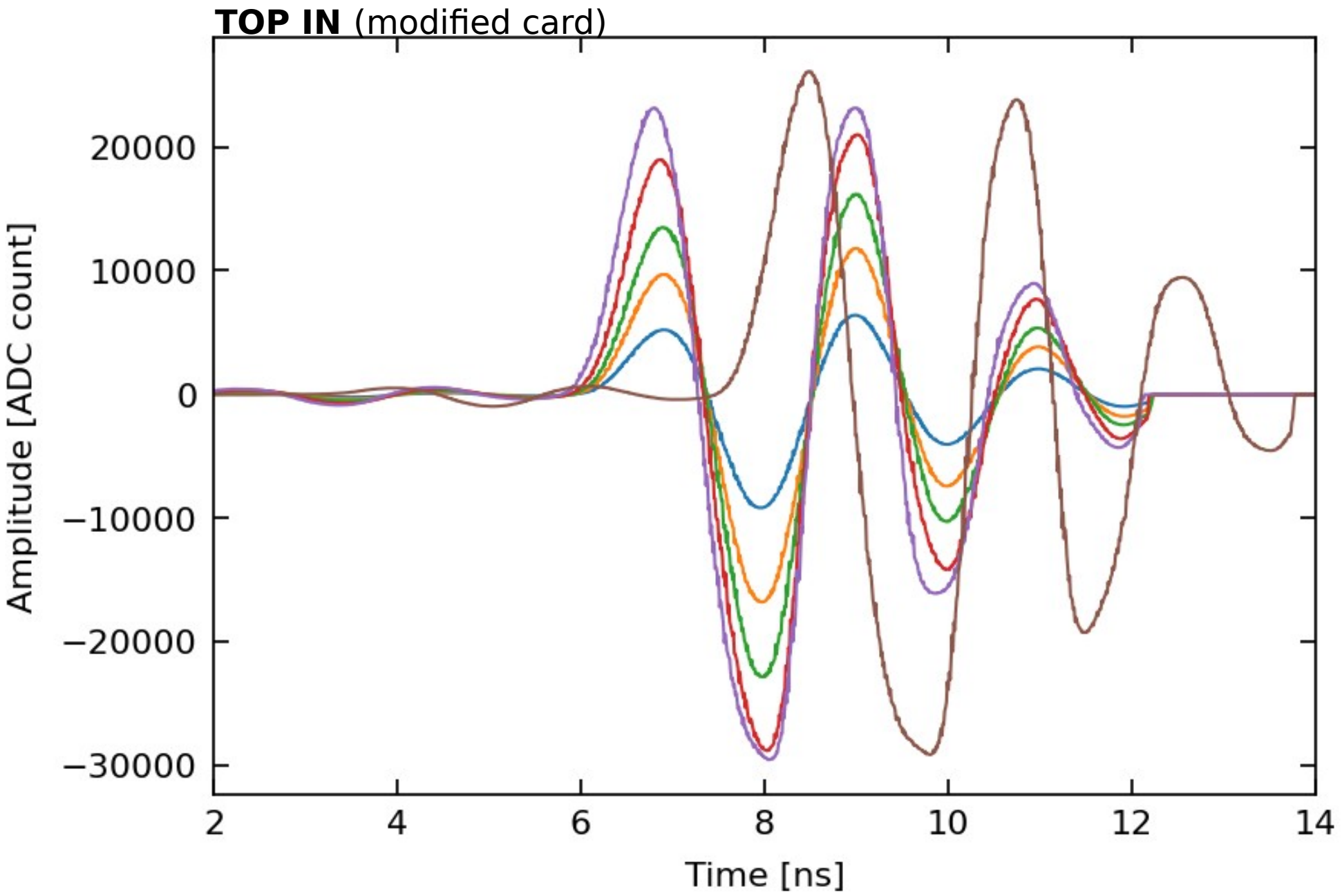
Amplitude vs bunch current

12W (ctactf133), peak-aligned at each current step – Tuesday **5/16**

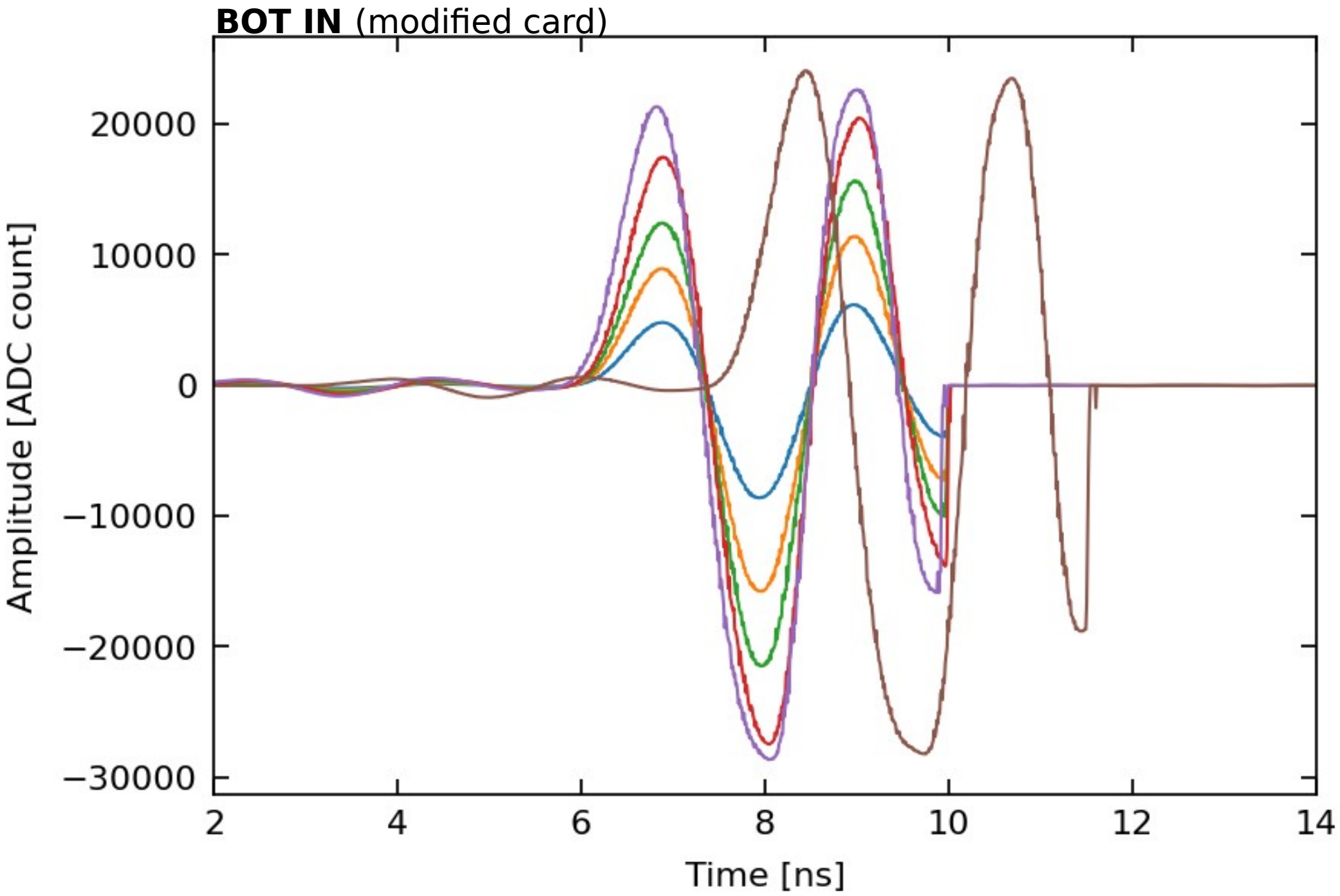


FIXED GAIN

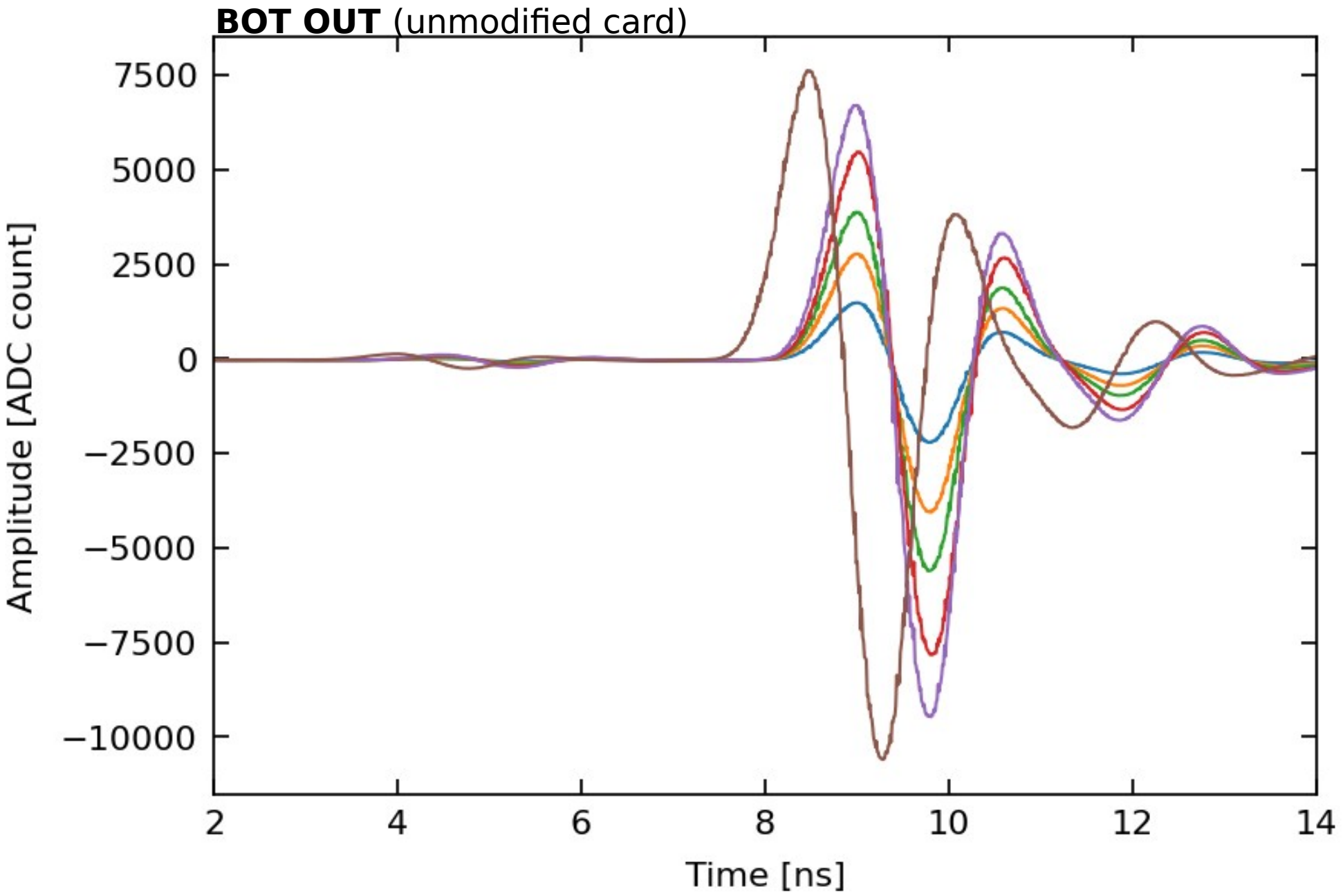
Waveform vs beam current



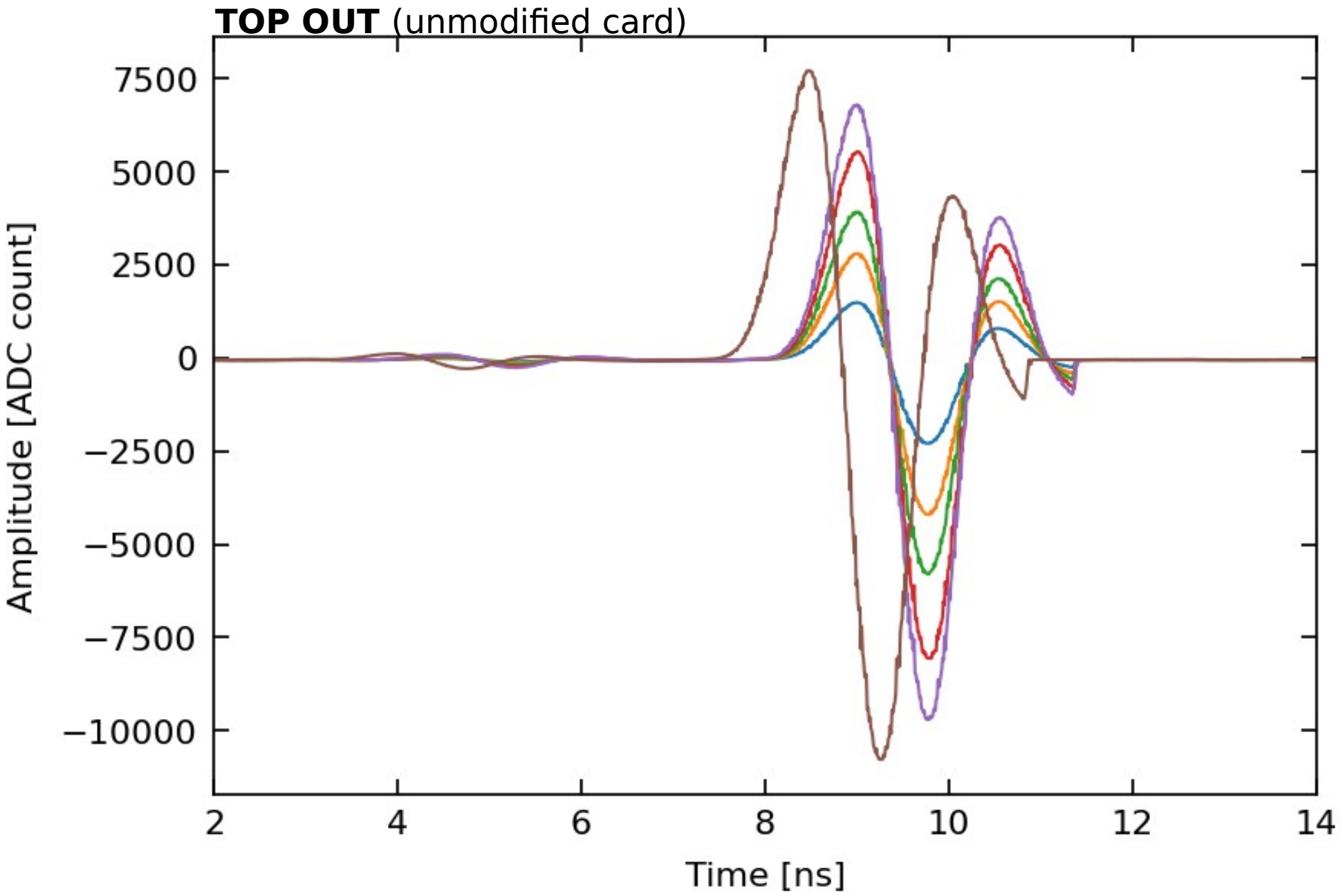
Waveform vs beam current



Waveform vs beam current



Waveform vs beam current



Notes

After resistor removal:

- ✗ less damping → more ringing
- ✗ increased nonlinearities → less signal amplitude
- ✗ second peak larger than first one below 2 mA
- ✗ first peak becomes larger above 2 mA

Highest current of 2.11 mA saw a timing shift in the 4 cards

Additional materials