TPOL analysis

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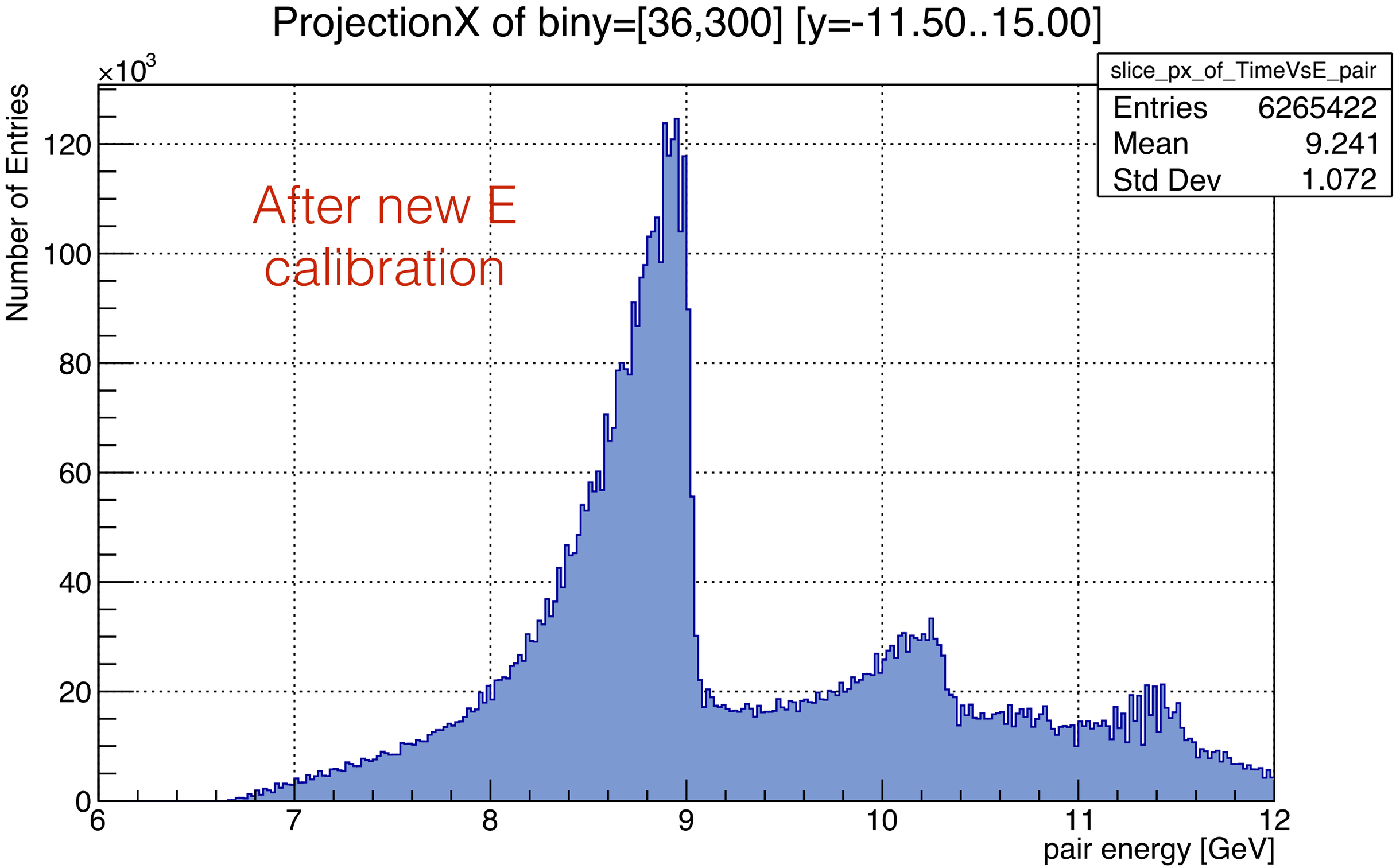
Event selection

- Photon energy from PS between 8.4 to 9.0 GeV
- Time difference between pairs within 1.3 ns
- Energy difference between pairs within 1.75 GeV
- TPOL pulse must start below ADC threshold and have pulse height larger than 100 ADC counts
- TPOL hits must be prompt with PS trigger time, within 30 ns window (140 to 170 ns)

- Remaining events with multiple hits are discarded
- Accidental timing coincidences are subtracted from phi distributions by using sidebands

Run 11367

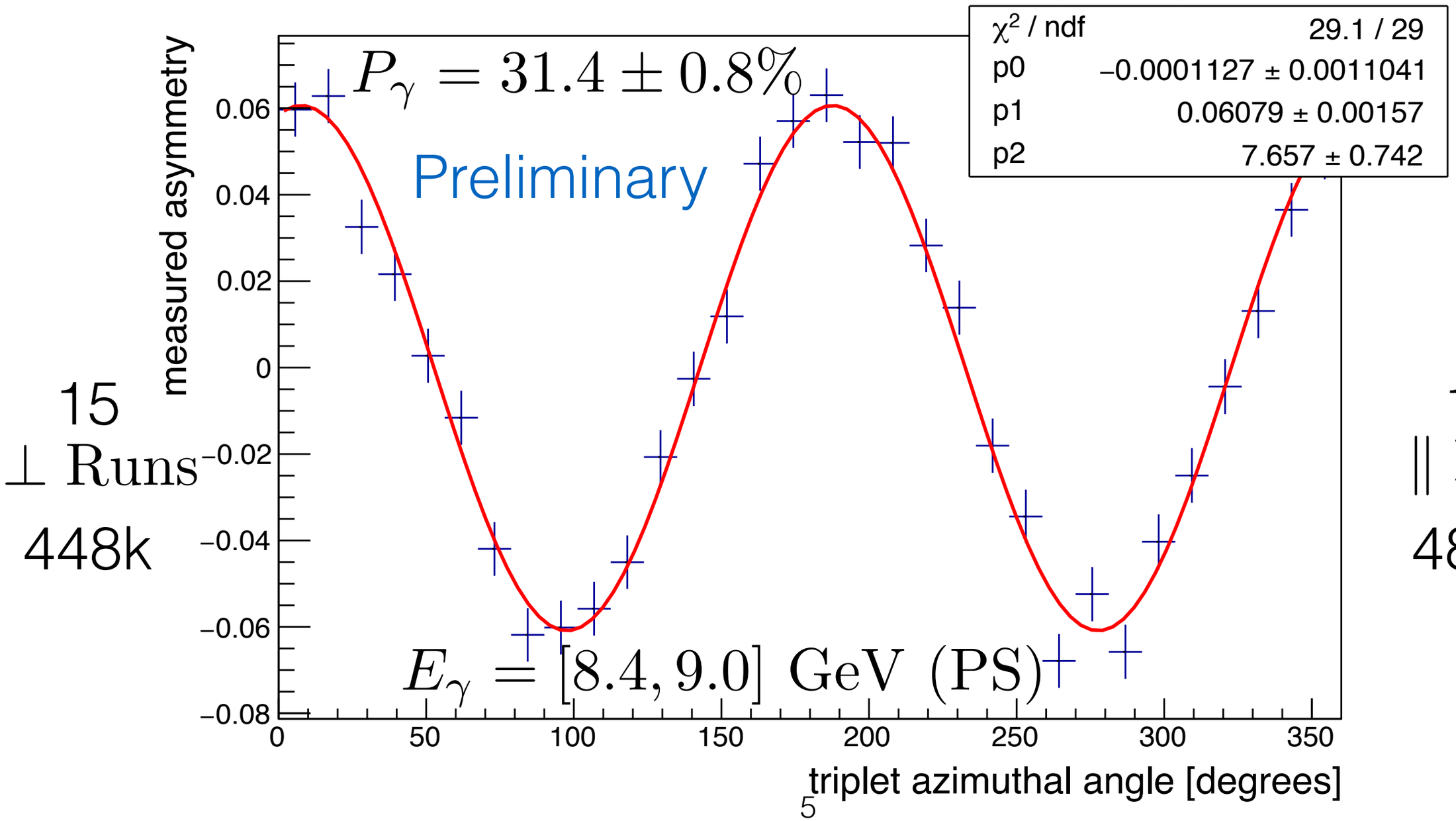

ProjectionX of biny=[36,300] [y=-11.50..15.00]
slice_px_of_TimeVsE_pair
Entries 6265422
Mean 9.241
Std Dev 1.072
After new E calibration
Number of Entries
×10^3
120
100
80
60
40
20
0
6
7
8
9
10
11
12
pair energy [GeV]

J1A50 (50um), 3 mm hole

75 um converter

$$\frac{N(\phi)_\perp - N(\phi)_\parallel}{N(\phi)_\perp + N(\phi)_\parallel} = P_\gamma \Sigma \cos(2\phi)$$

PERP/PARA
11445 to 11554



15
⊥ Runs
448k

15
∥ Runs
482k

Analyzing power

- Generate triplet events, and weight distributions by triplet production cross section
- Apply same cuts as for real data and fit phi dist.
- Correct for delta-ray dilution
- Conversion of ADC counts to energy deposit (keV)
  - dE = (ADC counts)*2000.0*1125.0/(200.0*4095.0)

Analyzing power, Sigma

- 75 um TPOL converter
  - delta-ray dilution factor = 95.6%
  - Sigma = 19.4 +/- 0.1%
    8.4 to 9.0 GeV

8 to 9 GeV generated,
9 GeV coherent edge

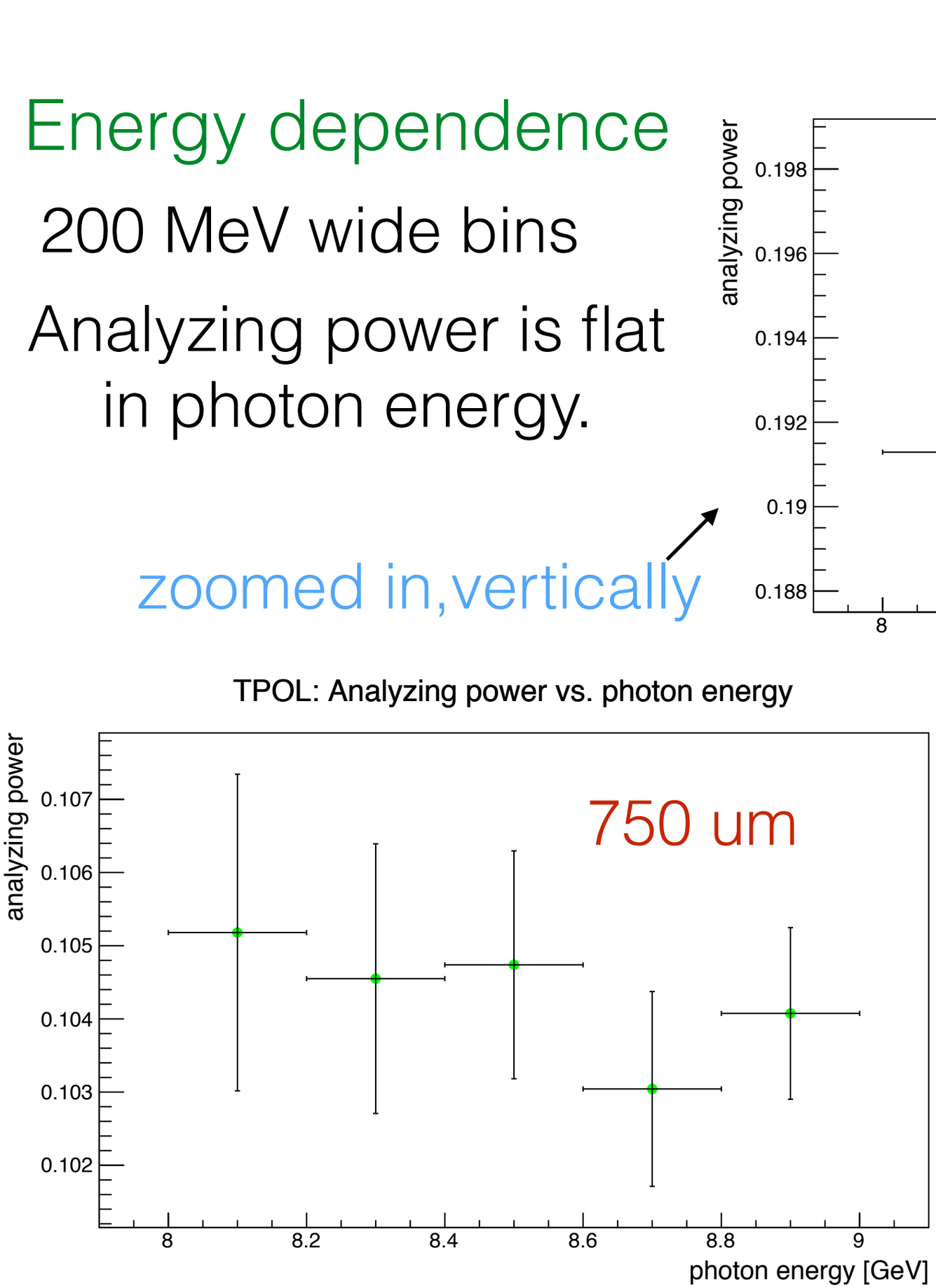
- 750 um TPOL converter
  - delta-ray dilution factor = 68.4%
  - Sigma = 10.4 +/- 0.1%
    8.4 to 9.0 GeV

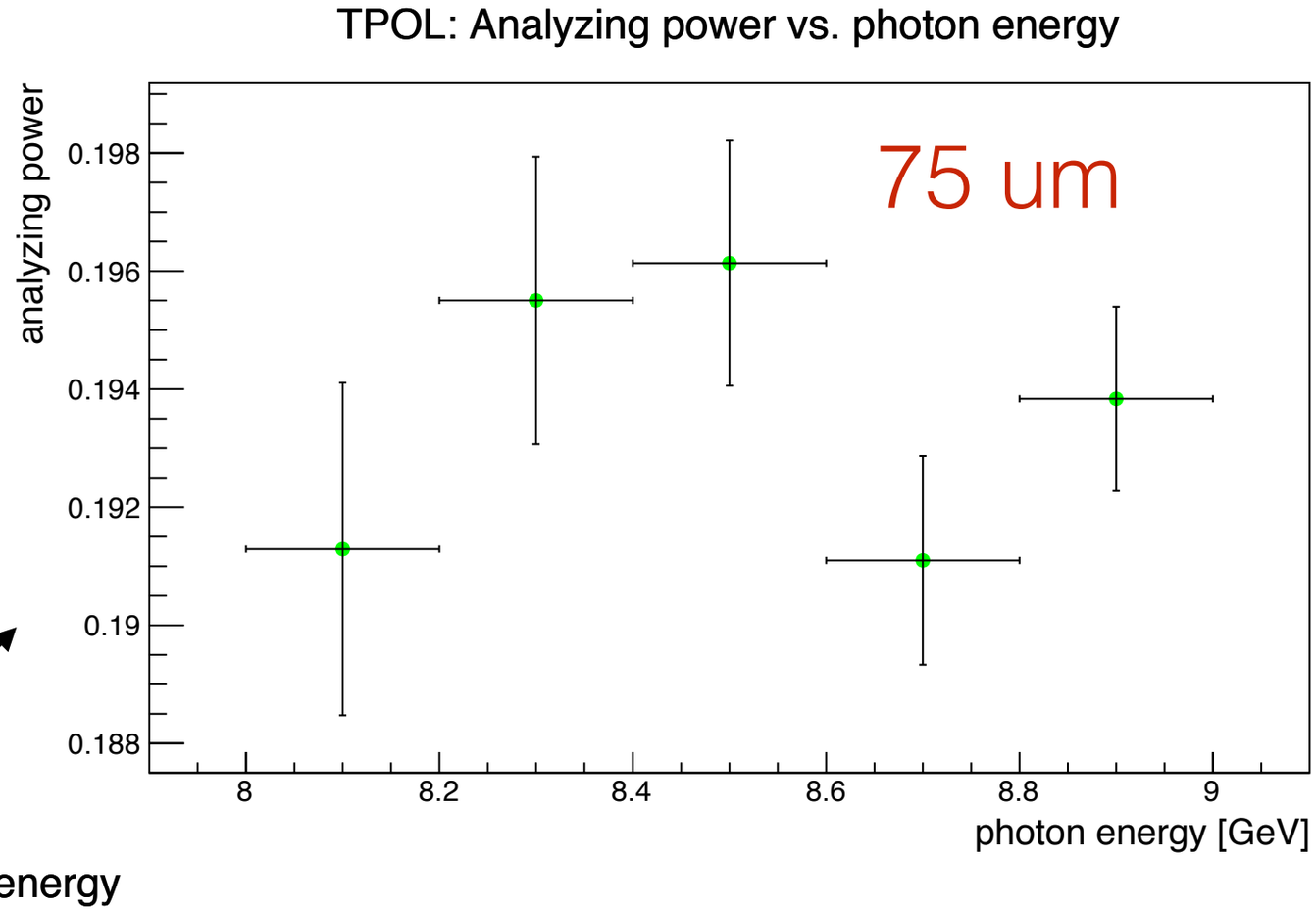
Energy dependence

200 MeV wide bins

Analyzing power is flat in photon energy.

zoomed in,vertically





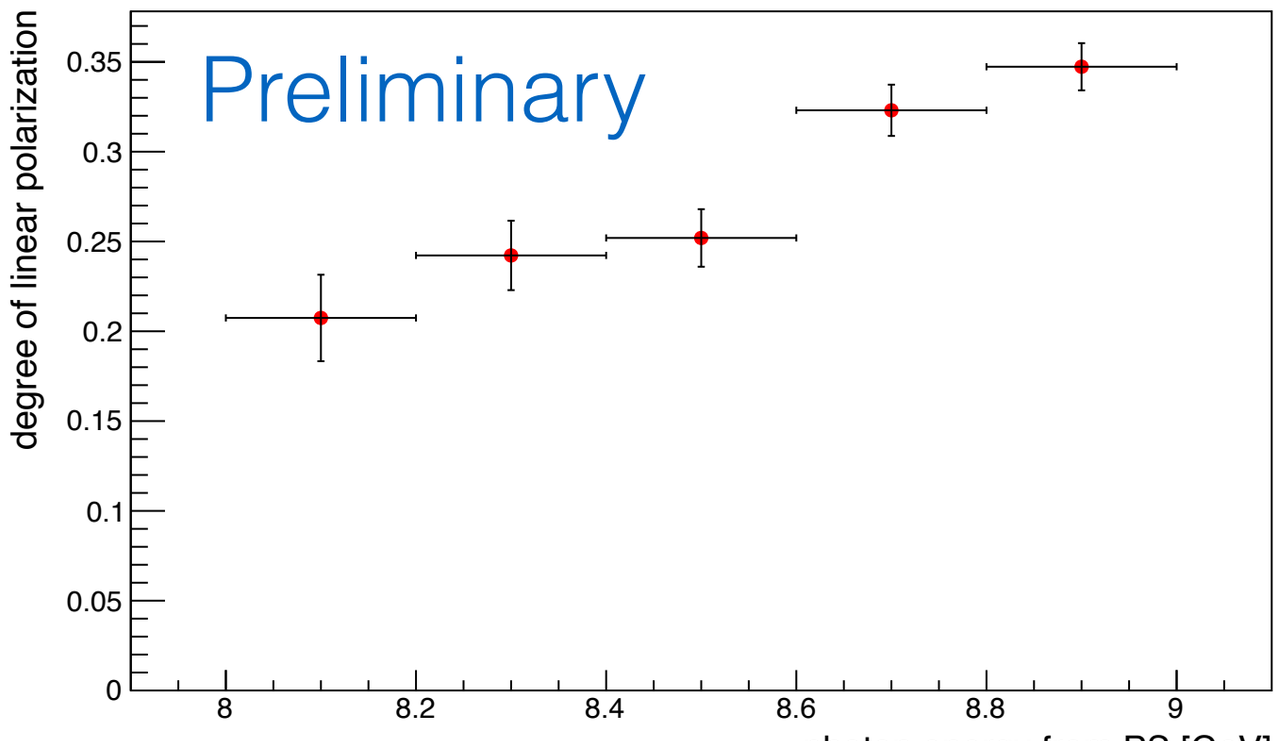
Energy dependence

J1A50, 3mm hole

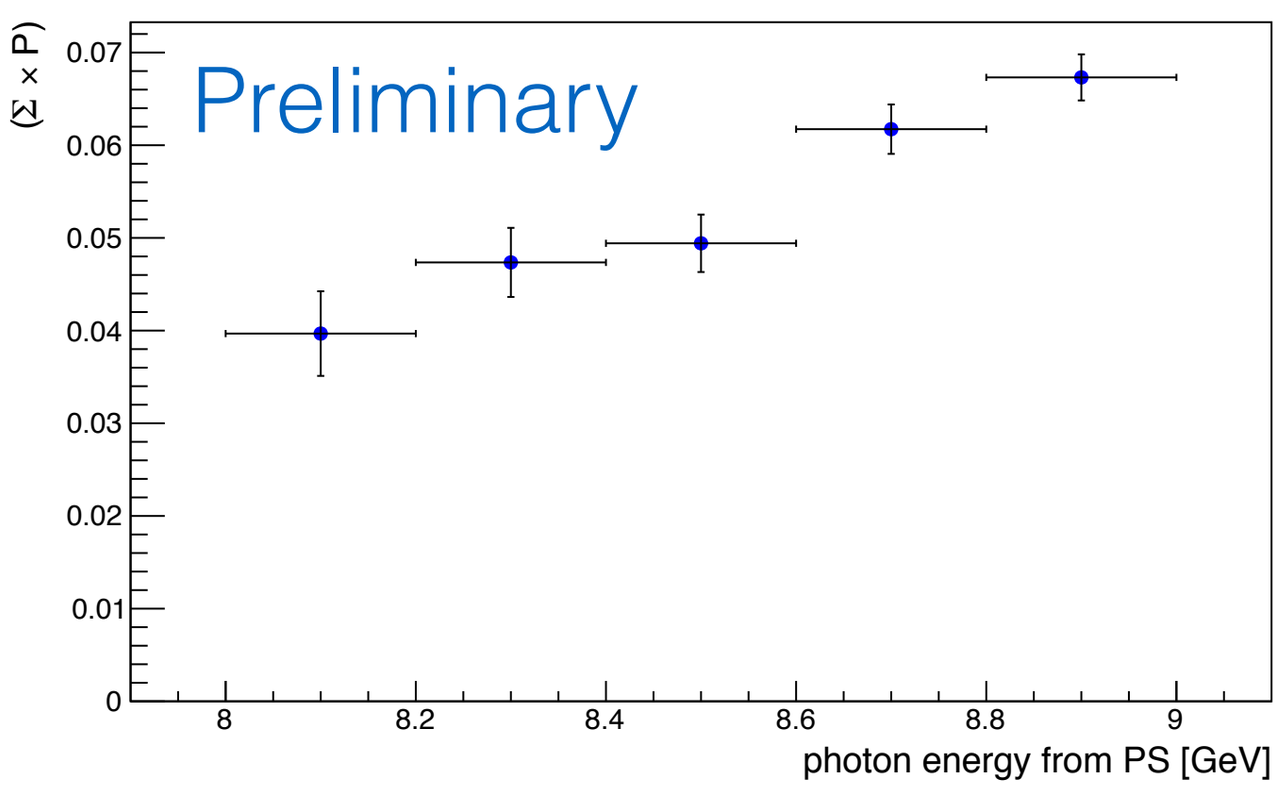
PERP/PARA runs
11445 to 11554

2016-04-16 to
2016-04-20

TPOL: Polarization vs. photon energy



TPOL: (Σ × P) vs. photon energy



This seems too low.
Need to look at location of coherent edge.

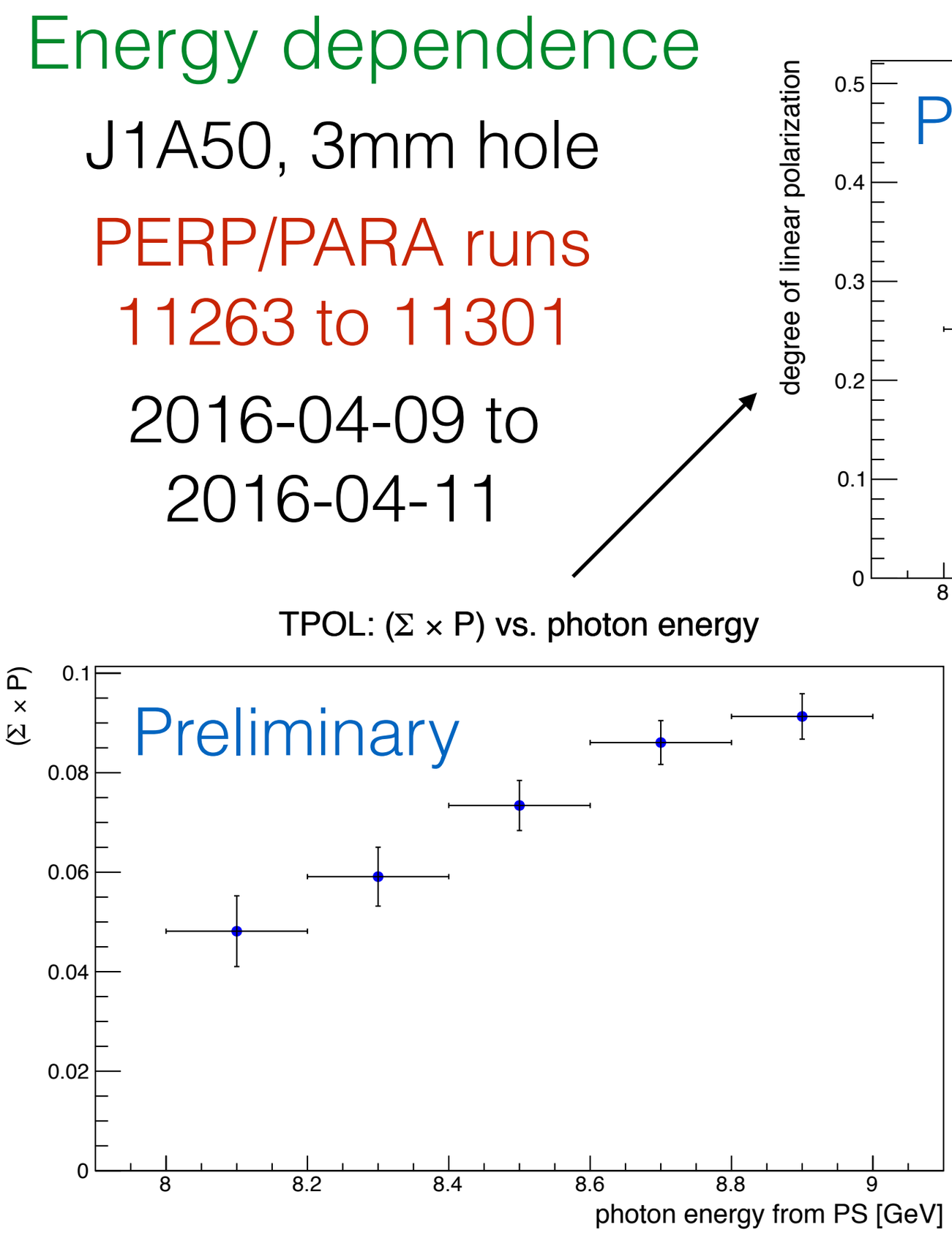
Edge may be at higher energy than usual.

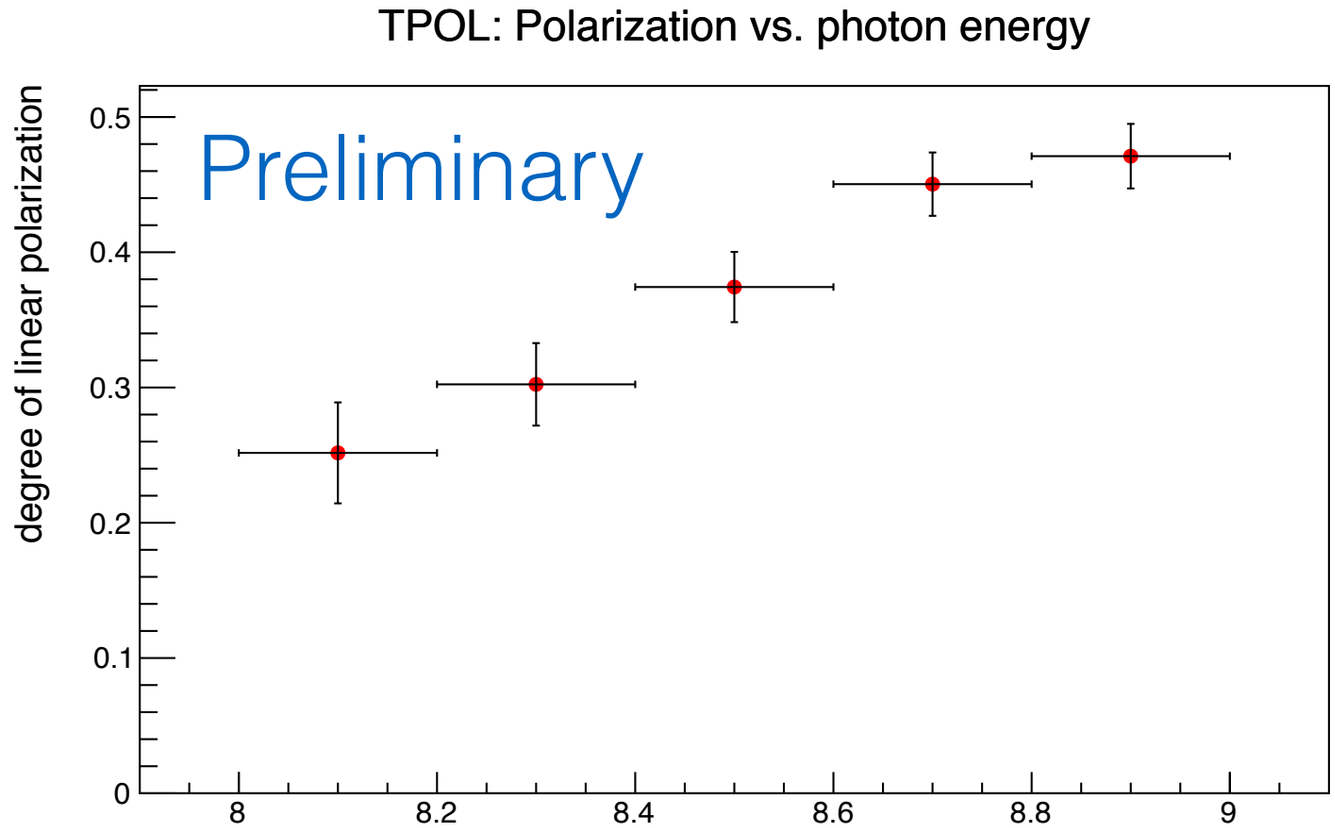
Energy dependence

J1A50, 3mm hole

PERP/PARA runs
11263 to 11301

2016-04-09 to
2016-04-11





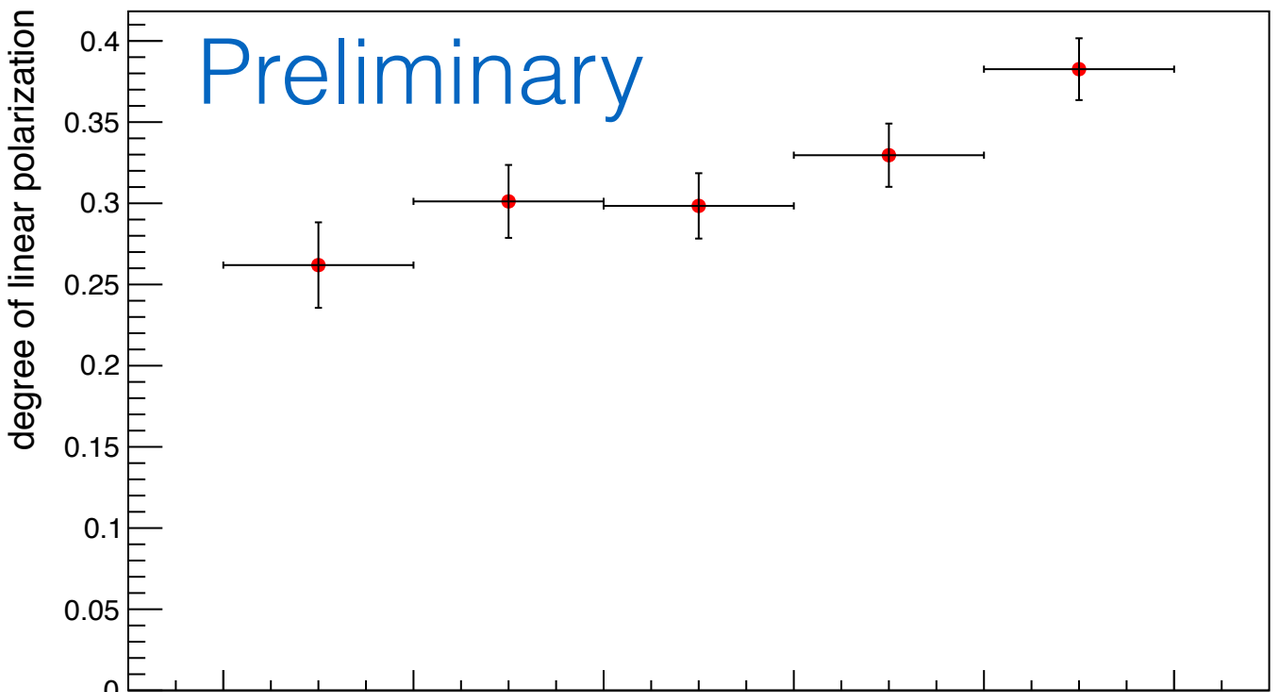
Same diamond, collimator but higher polarization.

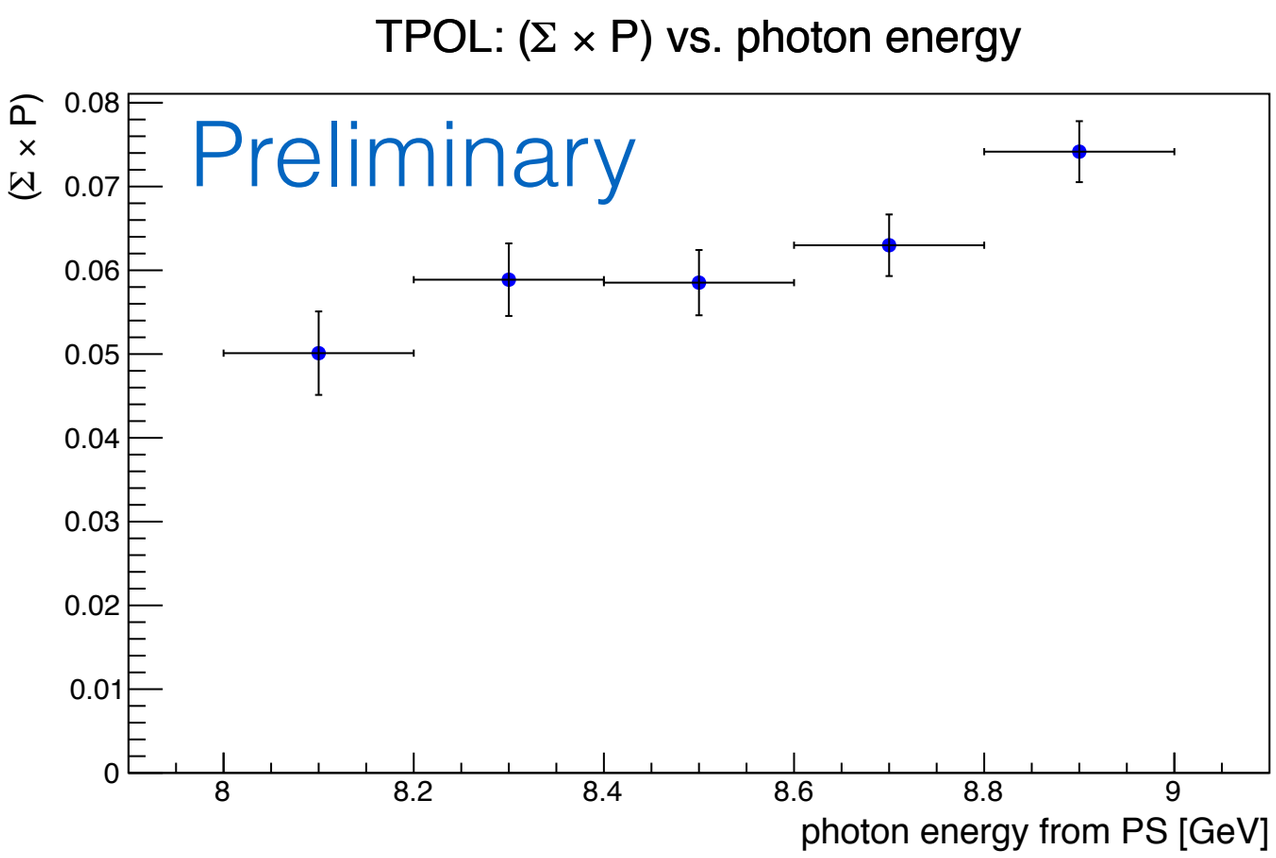
Energy dependence

J1A50, 5mm hole

PERP/PARA runs
11565 to 11668

2016-04-21 to
2016-04-25





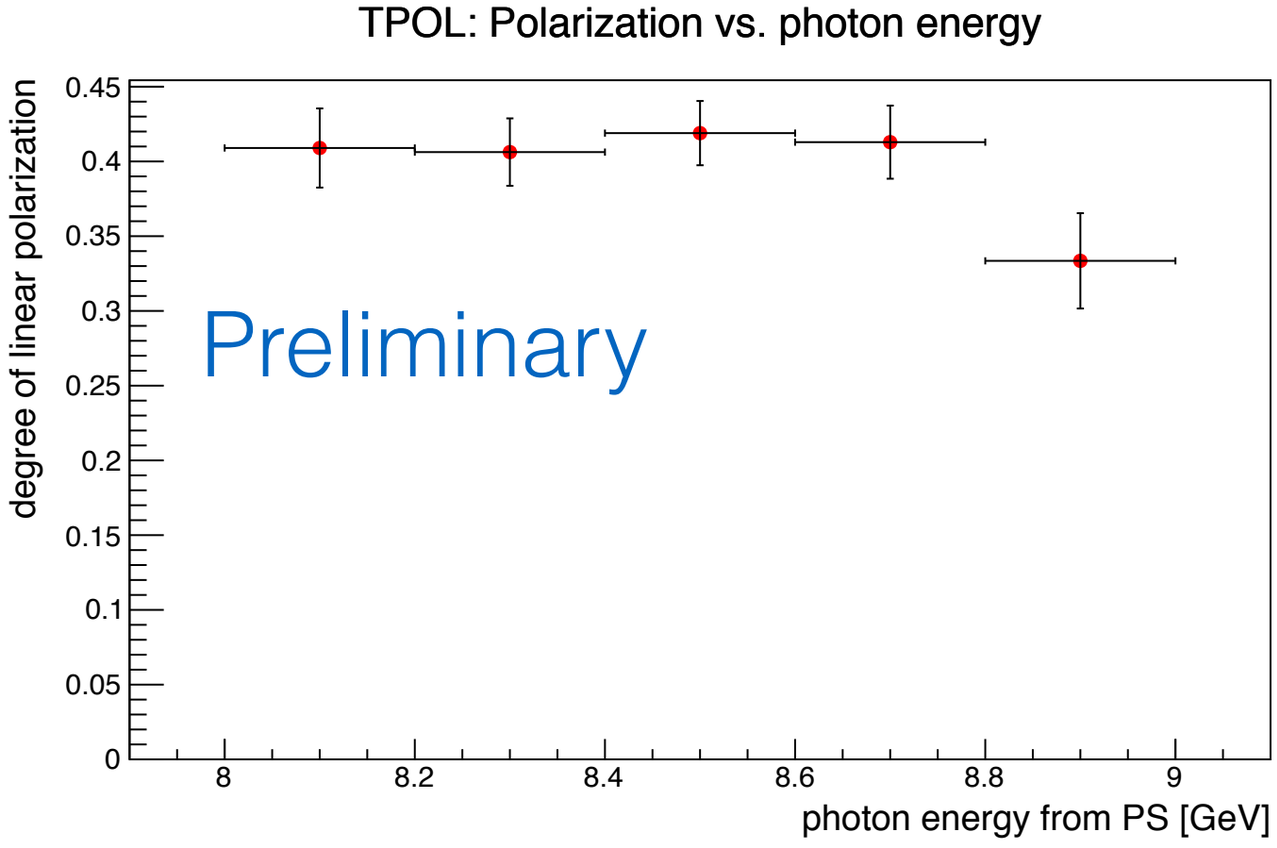
Slightly higher polarization than for runs 11445 to 11554 with smaller collimator hole.

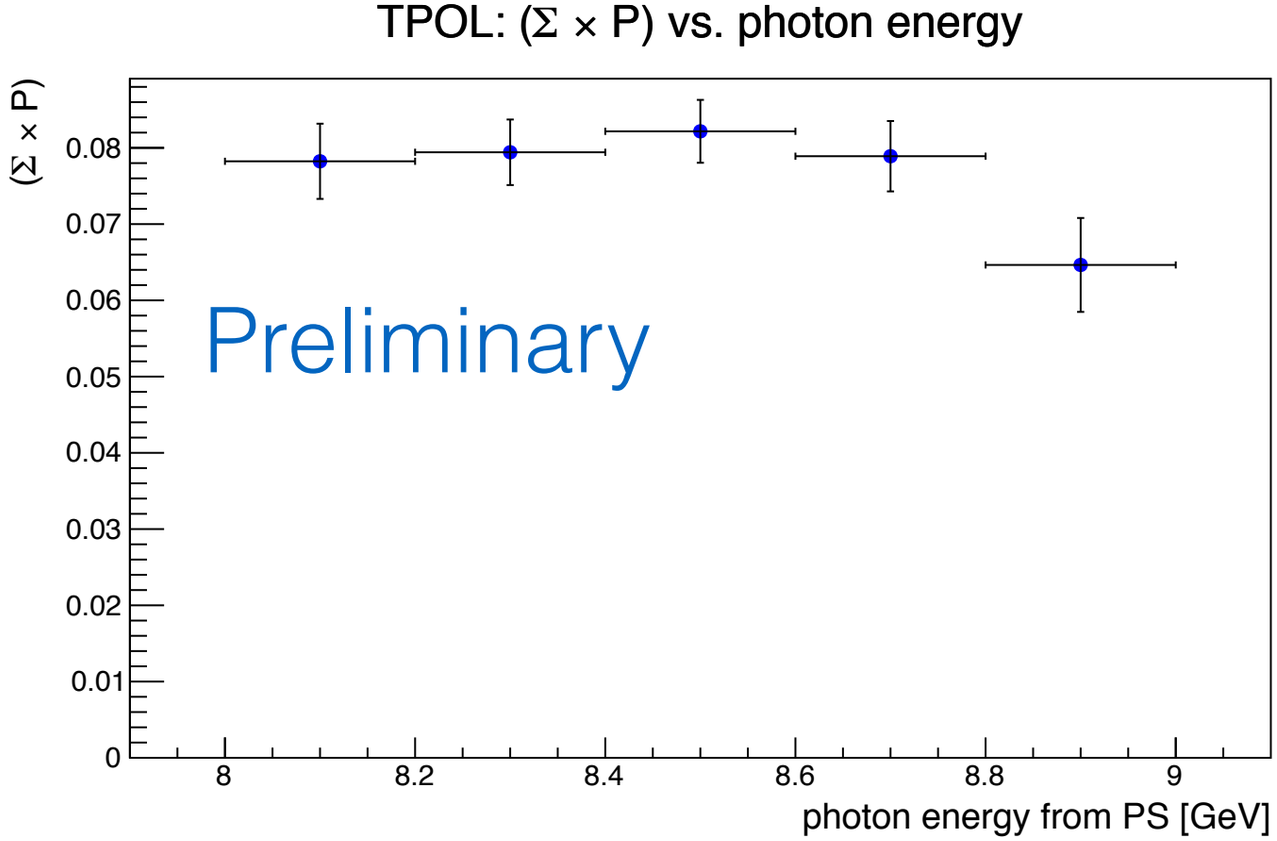
Energy dependence

JD70-119 (20um), 3mm hole

PERP/PARA runs
11140 to 11218

2016-04-03 to
2016-04-09





Energy dependence of polarization is flat from 8.0 to 8.8 GeV.