p-Carbon RHIC Polarimeters Status Report

Dmitri Smirnov

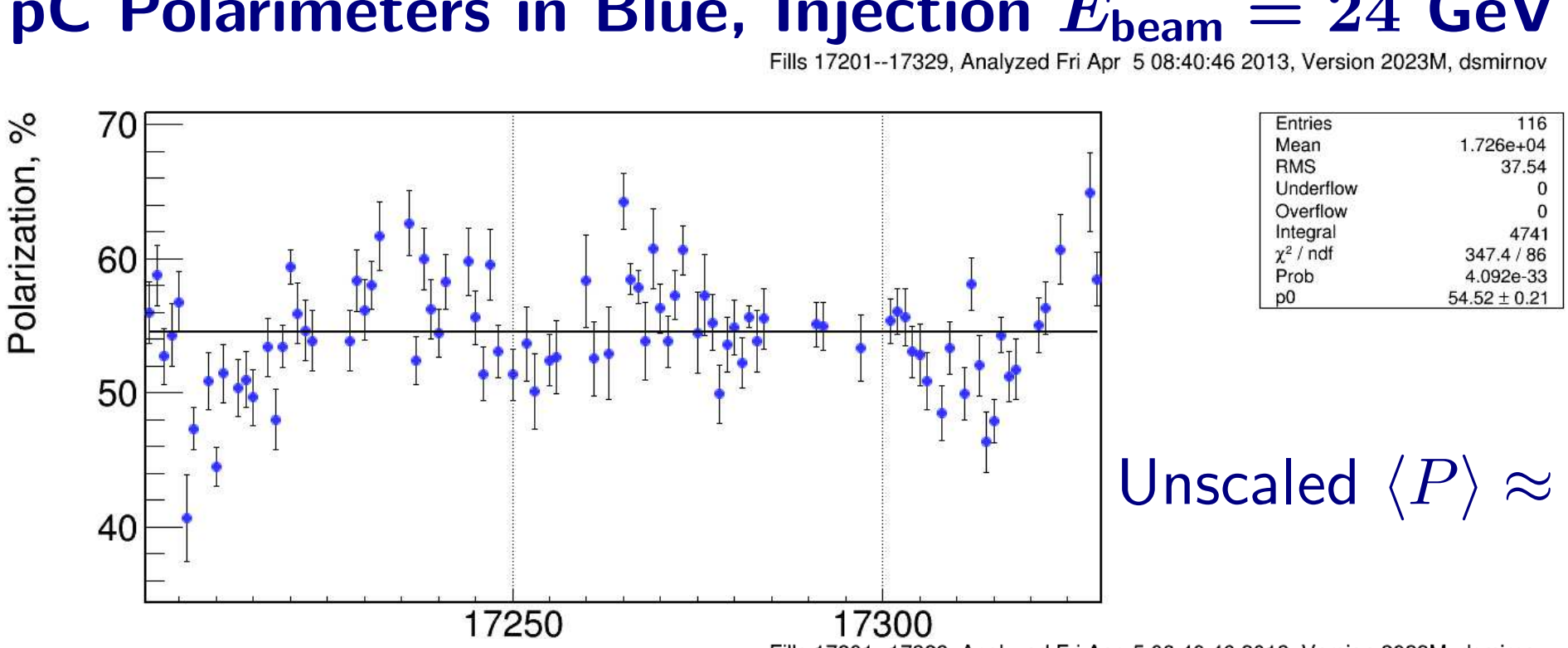
for the CNI polarimetry group

April 5, 2013

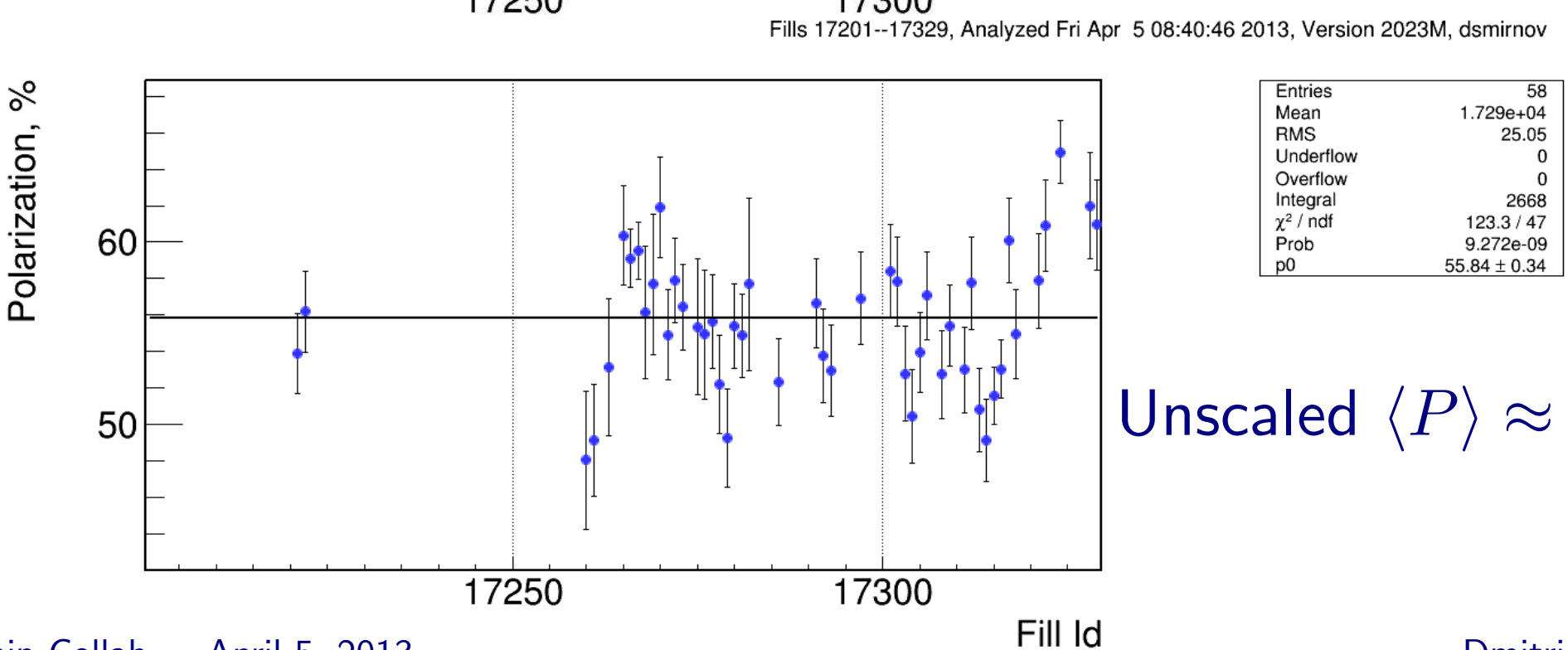
p-Carbon Polarimeters Status

- Last report two weeks ago on March 22
- Previous long access on March 20
  - Replaced all targets
    - 39 targets alive as of April 3 (checked by Haixin, Dannie, Steve)
  - After the access gain jumped in two detectors in B2 and Y1 (Y1 may have returned to normal)
  - This year alpha calibration runs were not taken as regularly as last year
  - We are setting up a automatic alpha calibration between stores (20 minutes total)

pC Polarimeters in Blue, Injection $E_{\text{beam}} = 24$ GeV

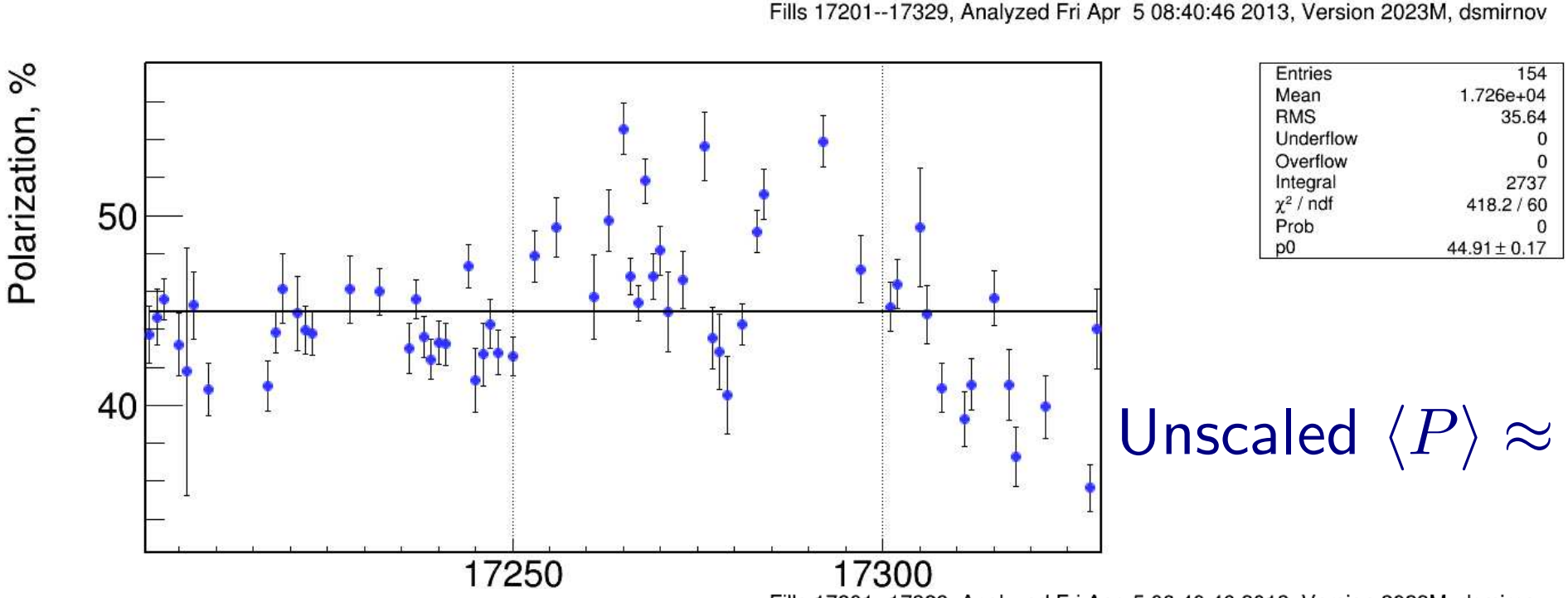


Unscaled $\langle P \rangle \approx 55\%$

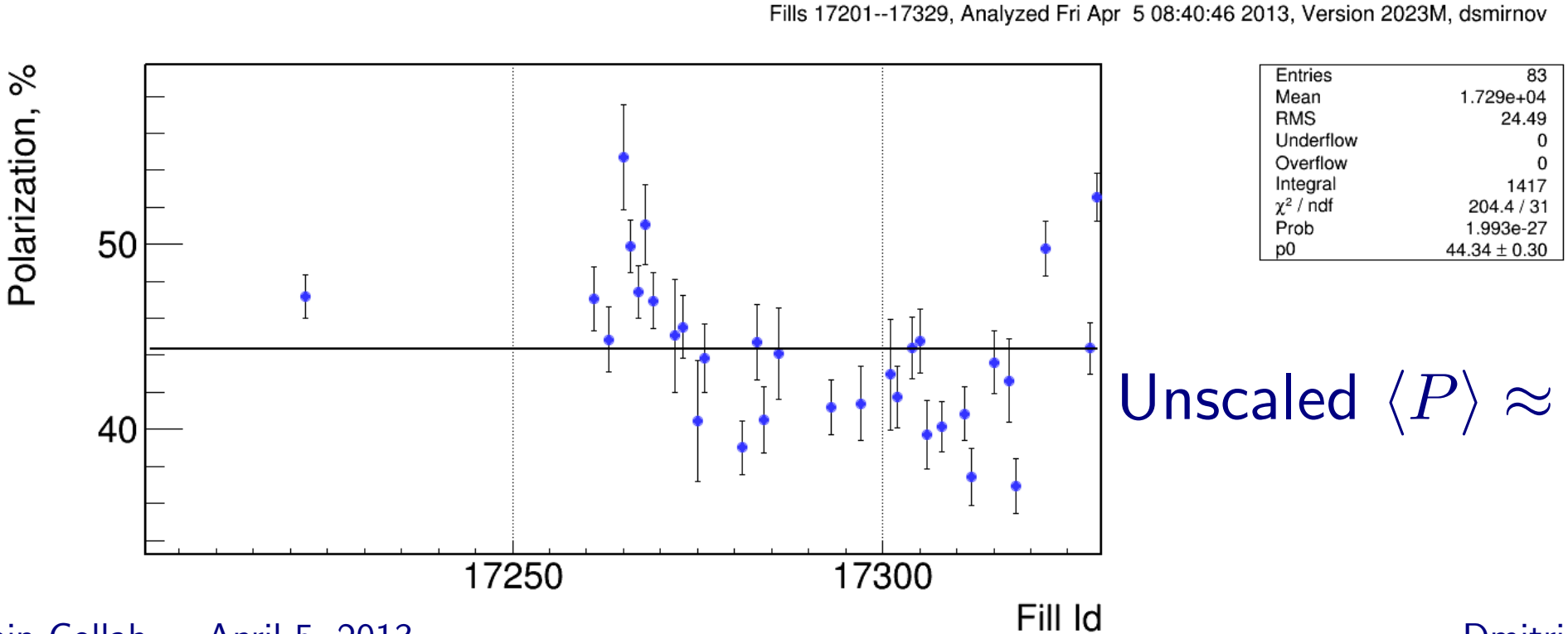


Unscaled $\langle P \rangle \approx 56\%$

pC Polarimeters in Blue, Flattop $E_{\text{beam}} = 255$ GeV

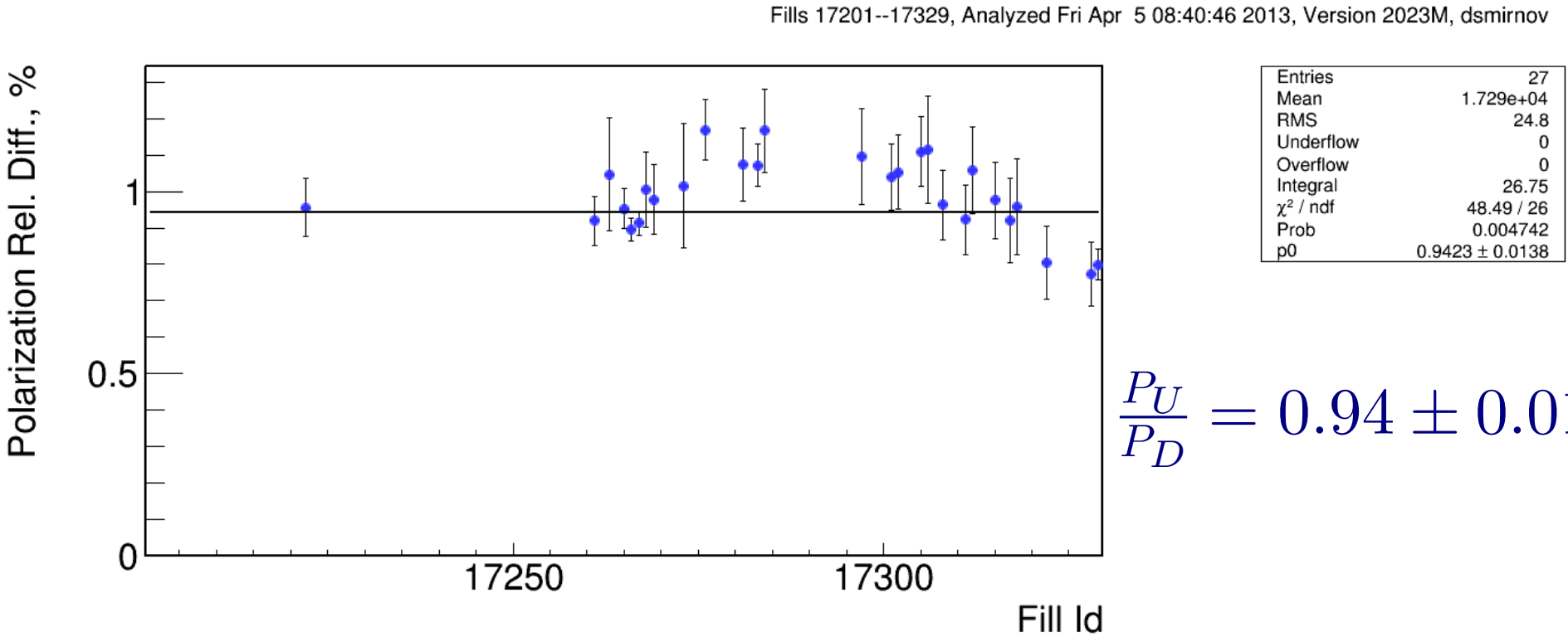


Unscaled $\langle P \rangle \approx 45\%$



Unscaled $\langle P \rangle \approx 44\%$

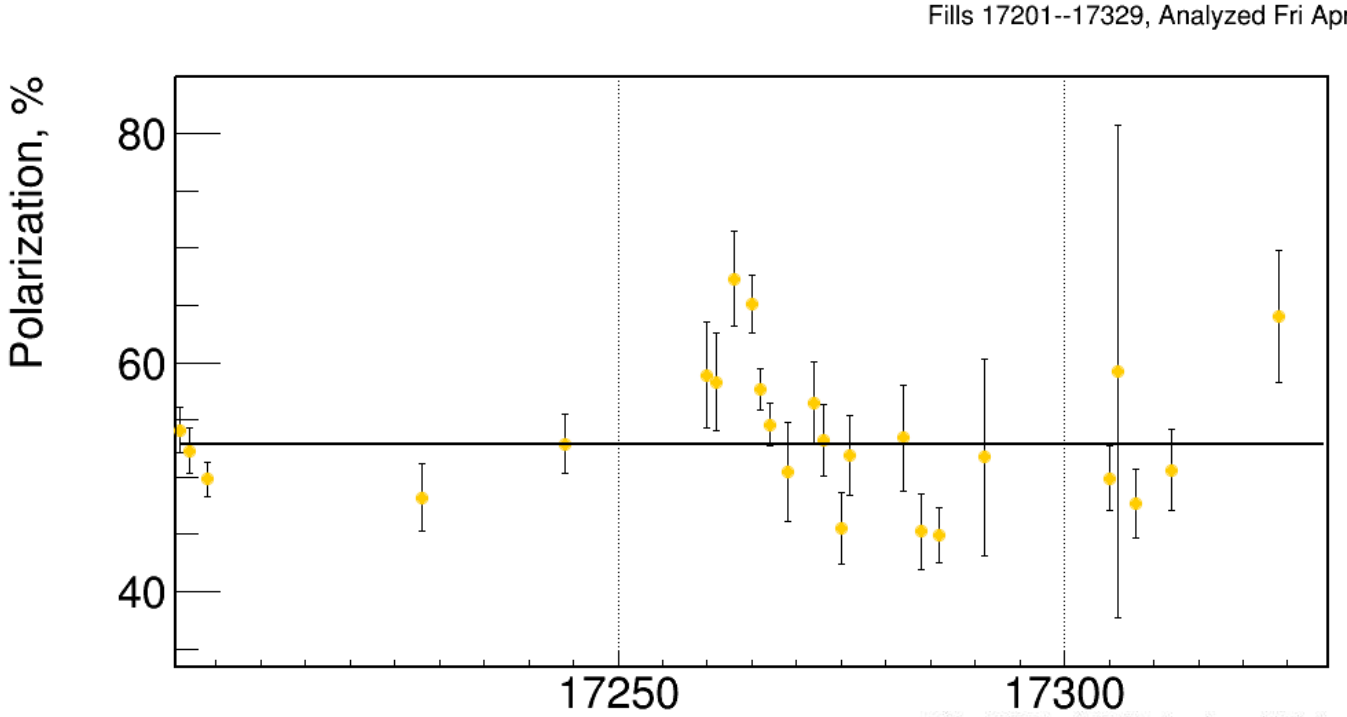
B1 and B2 Ratio at 255 GeV



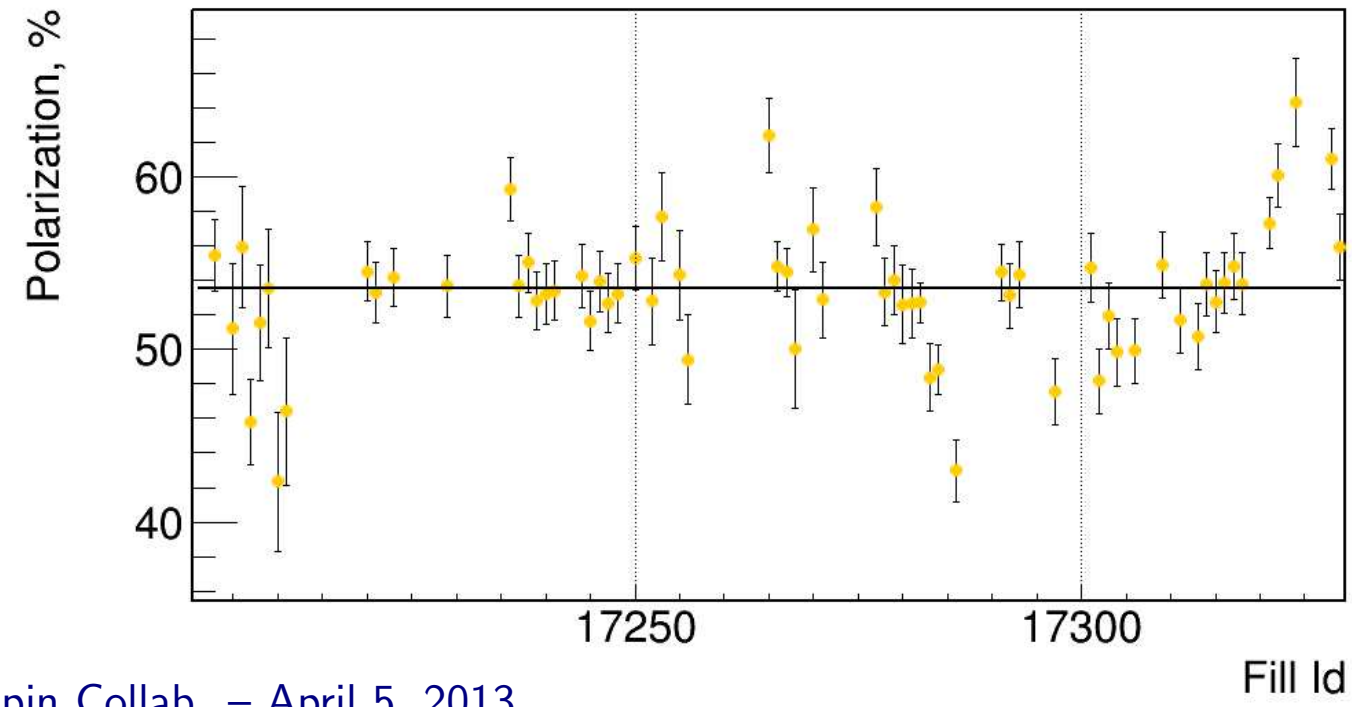
$$\frac{P_U}{P_D} = 0.94 \pm 0.01$$

- Both polarimeters agree well on average
- B1 and B2 track each other very well at injection and not so good at flattop
  - Instability in gains might be the reason for discrepancy
  - Can wider "bananas" cause less noticable difference at injection?

pC Polarimeters in Yellow, Injection $E_{\text{beam}} = 24$ GeV

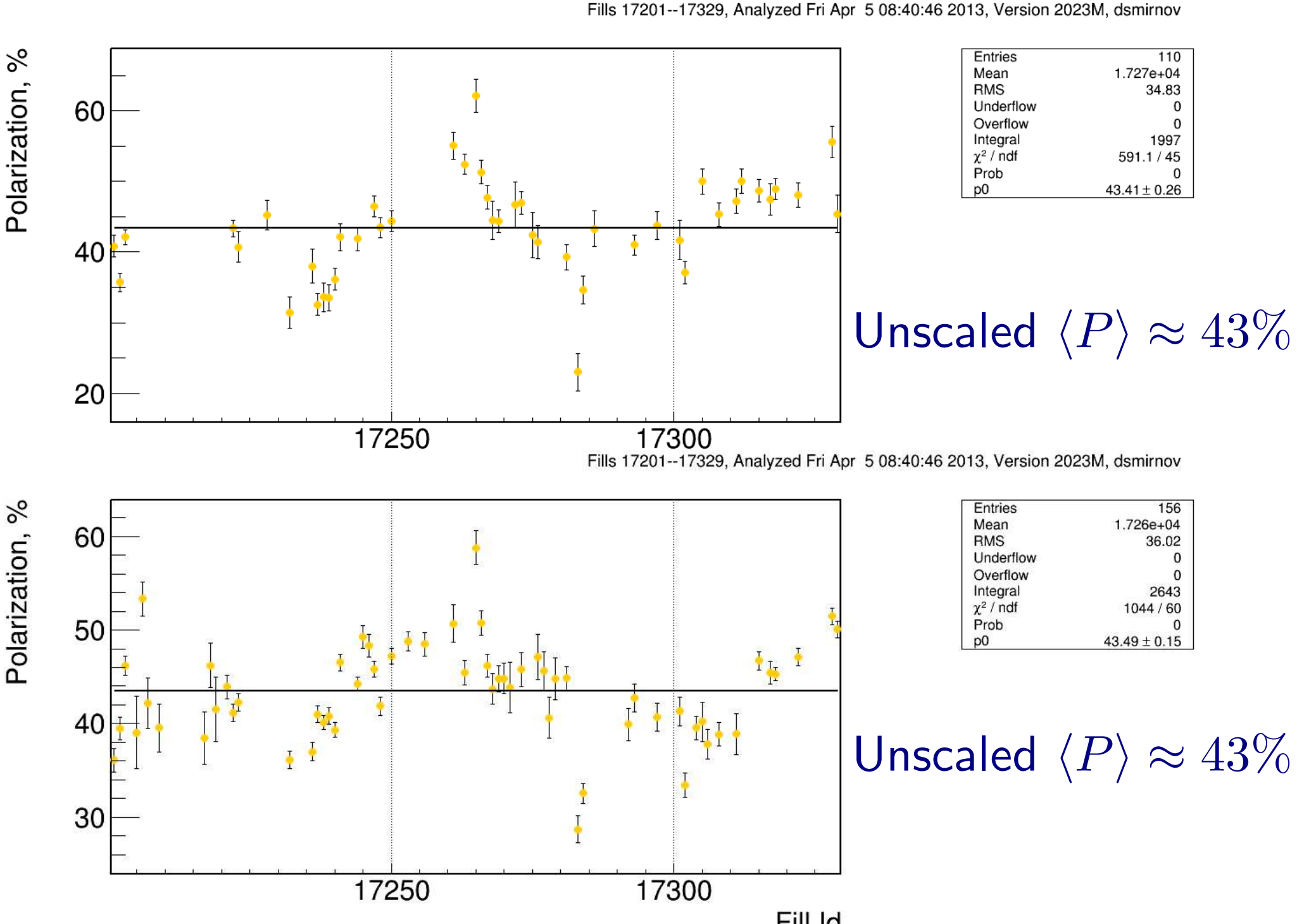


Unscaled $\langle P \rangle \approx 53\%$



Unscaled $\langle P \rangle \approx 54\%$

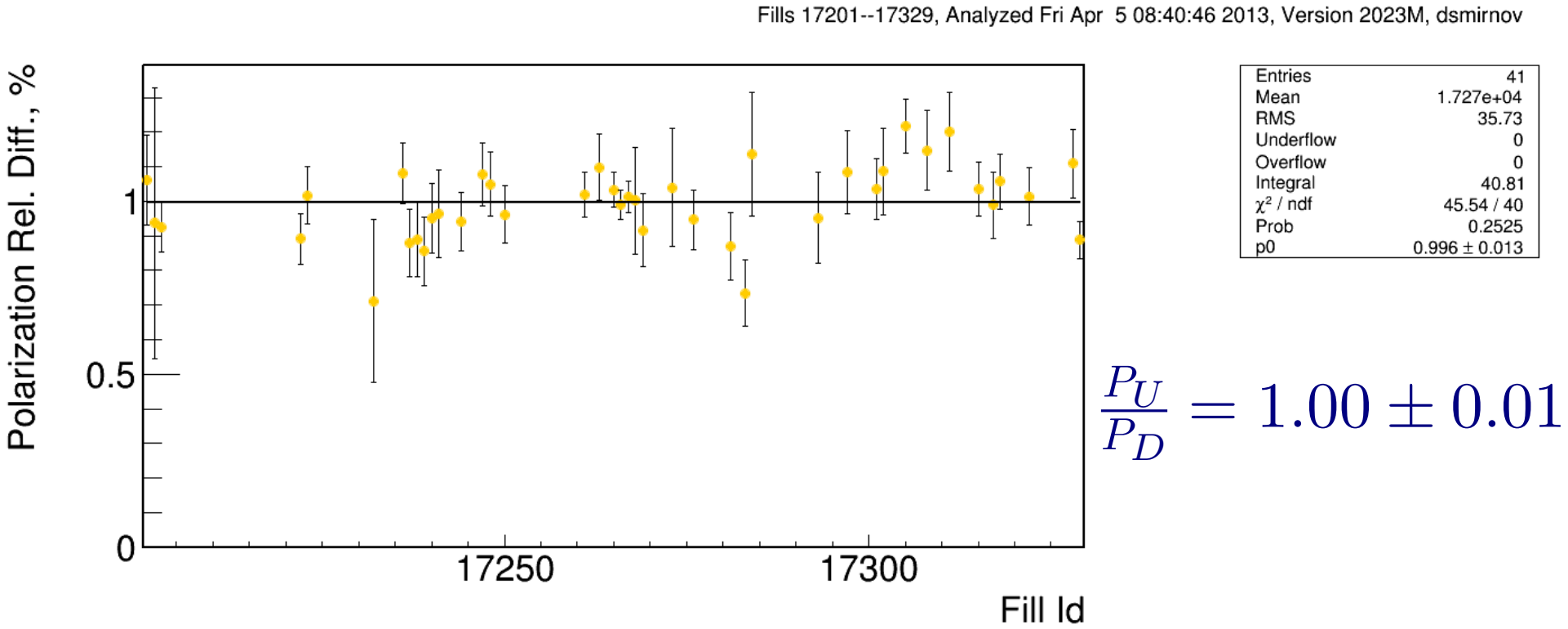
pC Polarimeters in Yellow, Flattop $E_{\text{beam}} = 255$ GeV



Unscaled $\langle P \rangle \approx 43\%$

Unscaled $\langle P \rangle \approx 43\%$

Y1 and Y2 Ratio at 255 GeV



$$\frac{P_U}{P_D} = 1.00 \pm 0.01$$

- Both polarimeters agree well on average
- Y1 and Y2 track each other very well at both injection and flattop

H-jet/p-Carbon Normalization

- Two weeks ago:

	Run 13, 255 GeV
B1U	1.08 ± 0.03
B2D	1.01 ± 0.10
Y2U	1.11 ± 0.04
Y1D	1.07 ± 0.04

- Now:

	Run 13, 255 GeV
B1U	1.06 ± 0.02
B2D	1.11 ± 0.03
Y2U	1.08 ± 0.03
Y1D	1.09 ± 0.02

- Given the disagreement between B1U and B2D the result is as expected
- All polarimeters move in the same direction. Or is it the Jet?

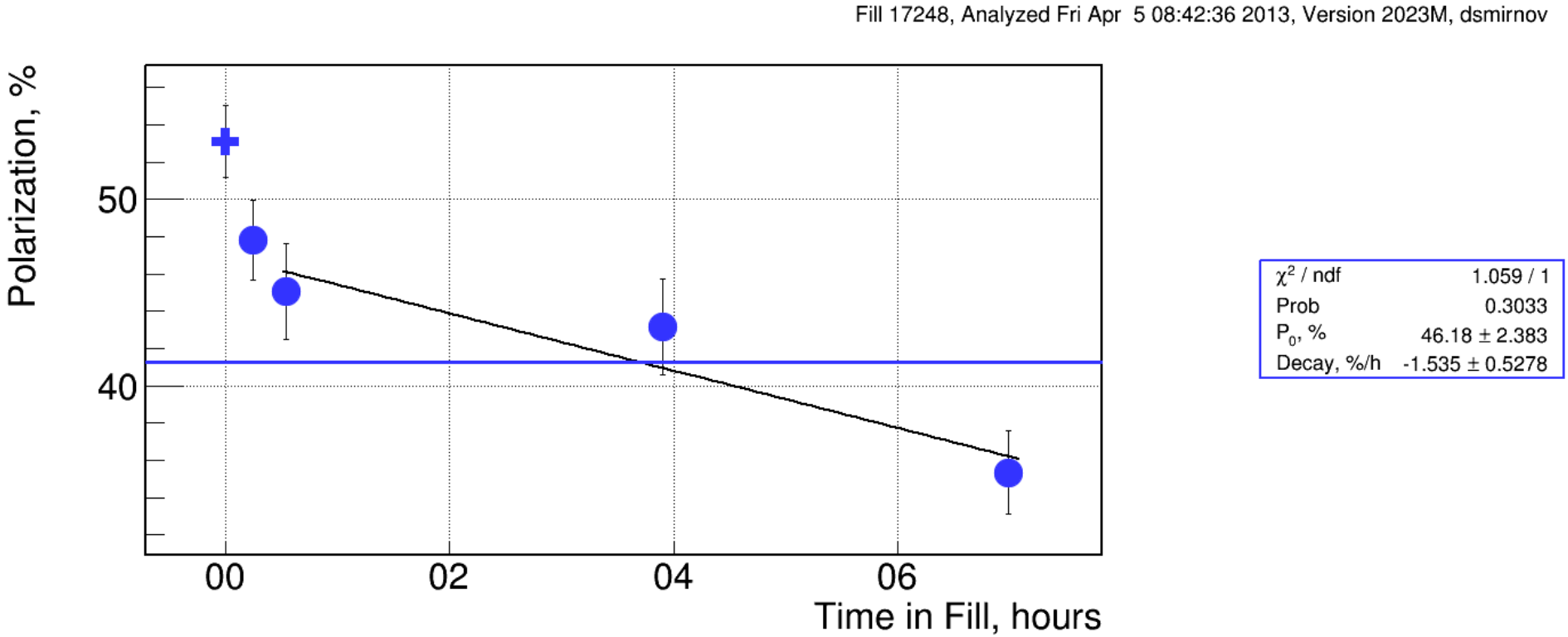
Average Polarization Profile Ratio R, Run 13

	Run 13, 255 GeV			
	Injection		Flattop	
	Blu	Yel	Blu	Yel
B1U	0.06		0.23	
B2D	0.06		0.26	
Y2U		0.07		0.25
Y1D		0.08		0.22

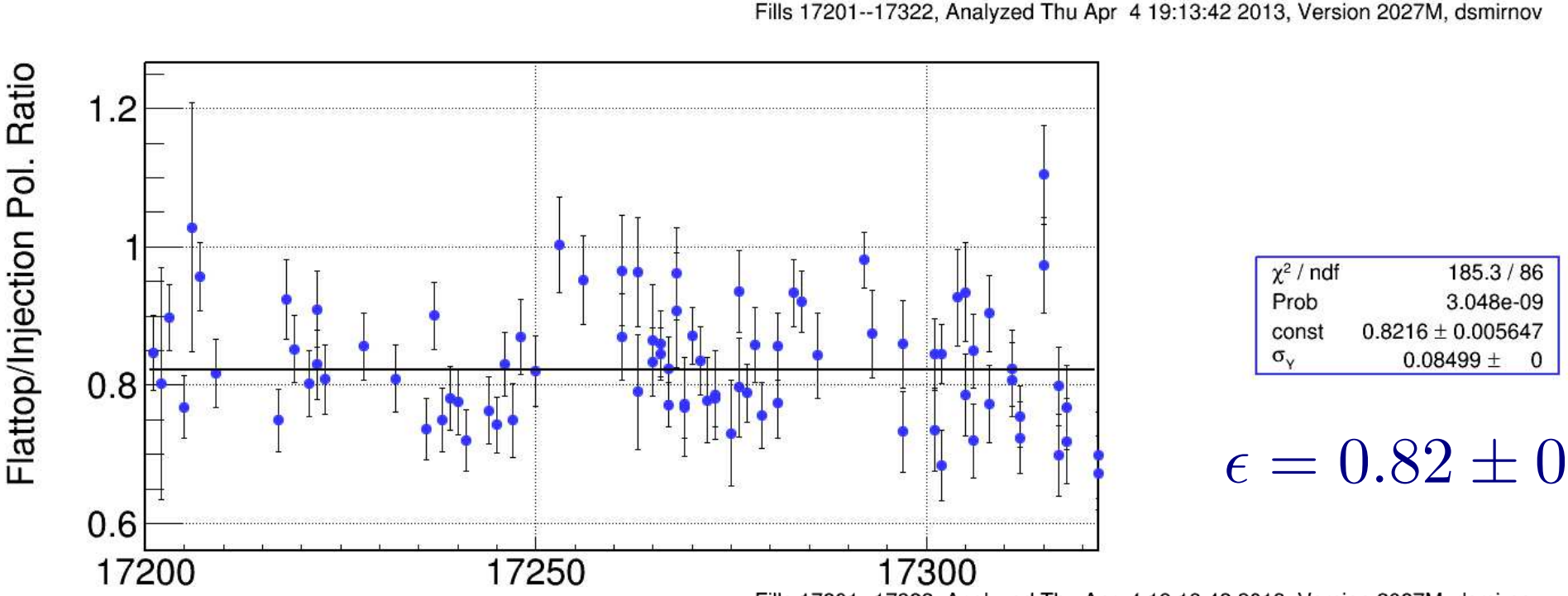
Average Polarization Profile Ratio R, Run 12

	Run 12, 255 GeV			
	Injection		Flattop	
	Blu	Yel	Blu	Yel
B1U	0.04		0.21	
B2D	0.04		0.12	
Y2U		0.07		0.13
Y1D		0.05		0.13

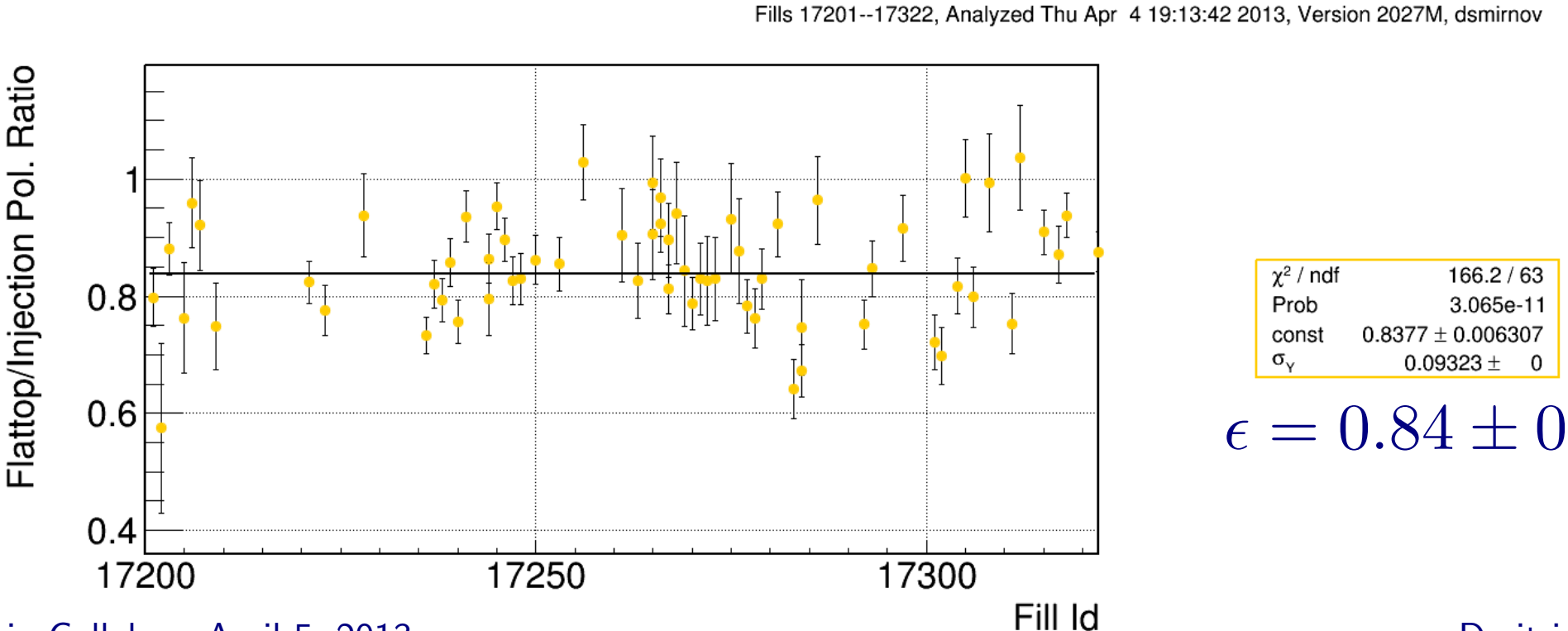
Polarization Losses in a Fill



Energy Ramp Efficiency

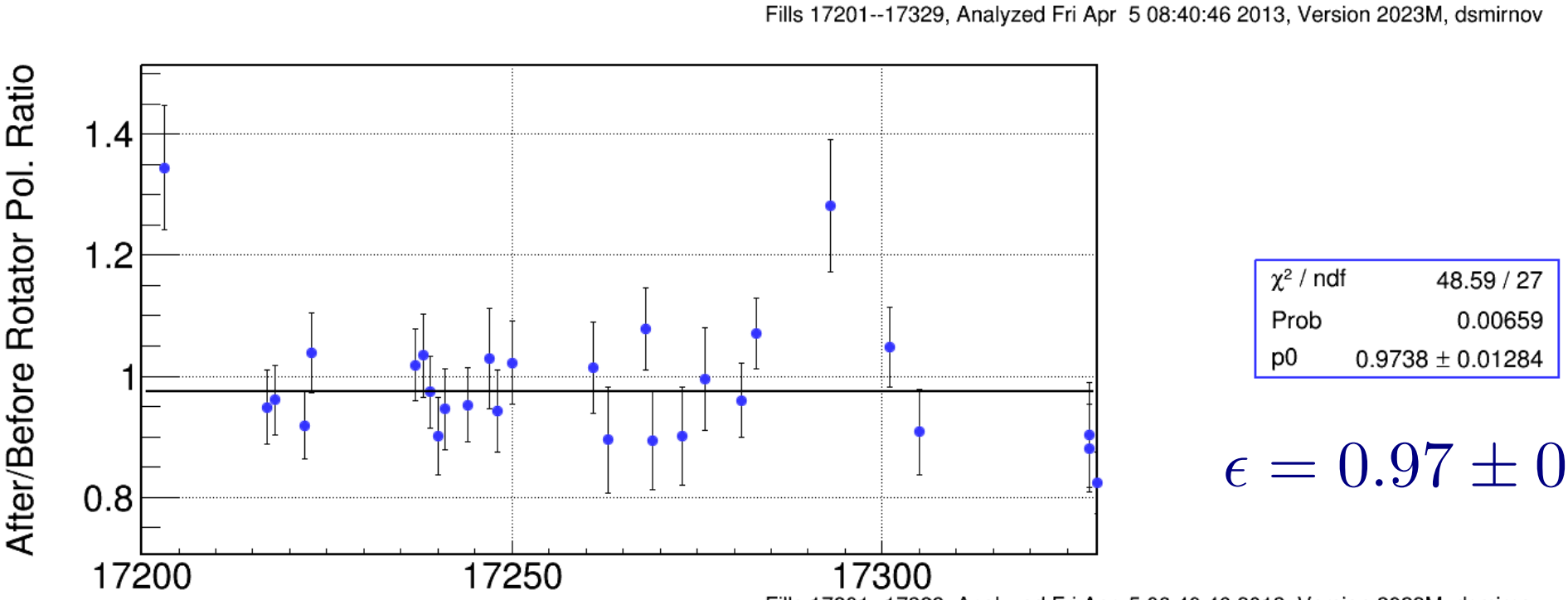


$$\epsilon = 0.82 \pm 0.01$$

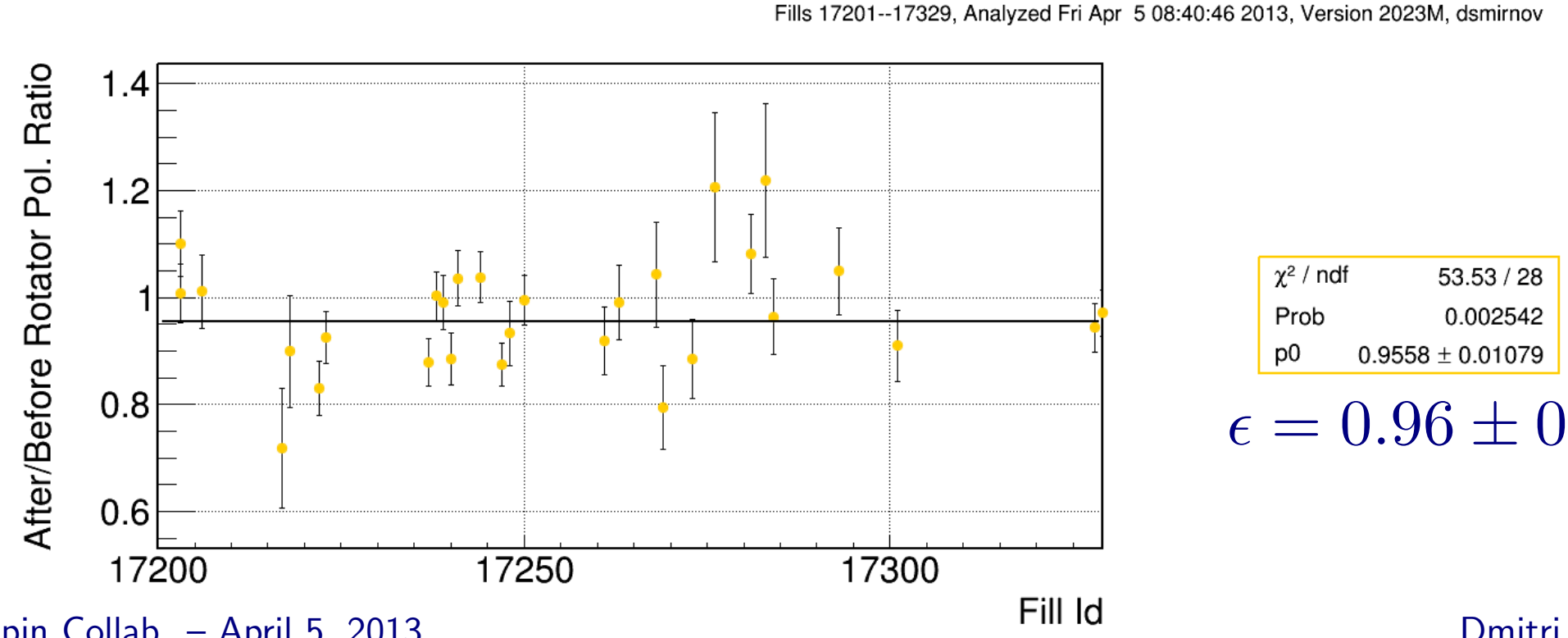


$$\epsilon = 0.84 \pm 0.01$$

Rotator Ramp Efficiency



$$\epsilon = 0.97 \pm 0.01$$



$$\epsilon = 0.96 \pm 0.01$$