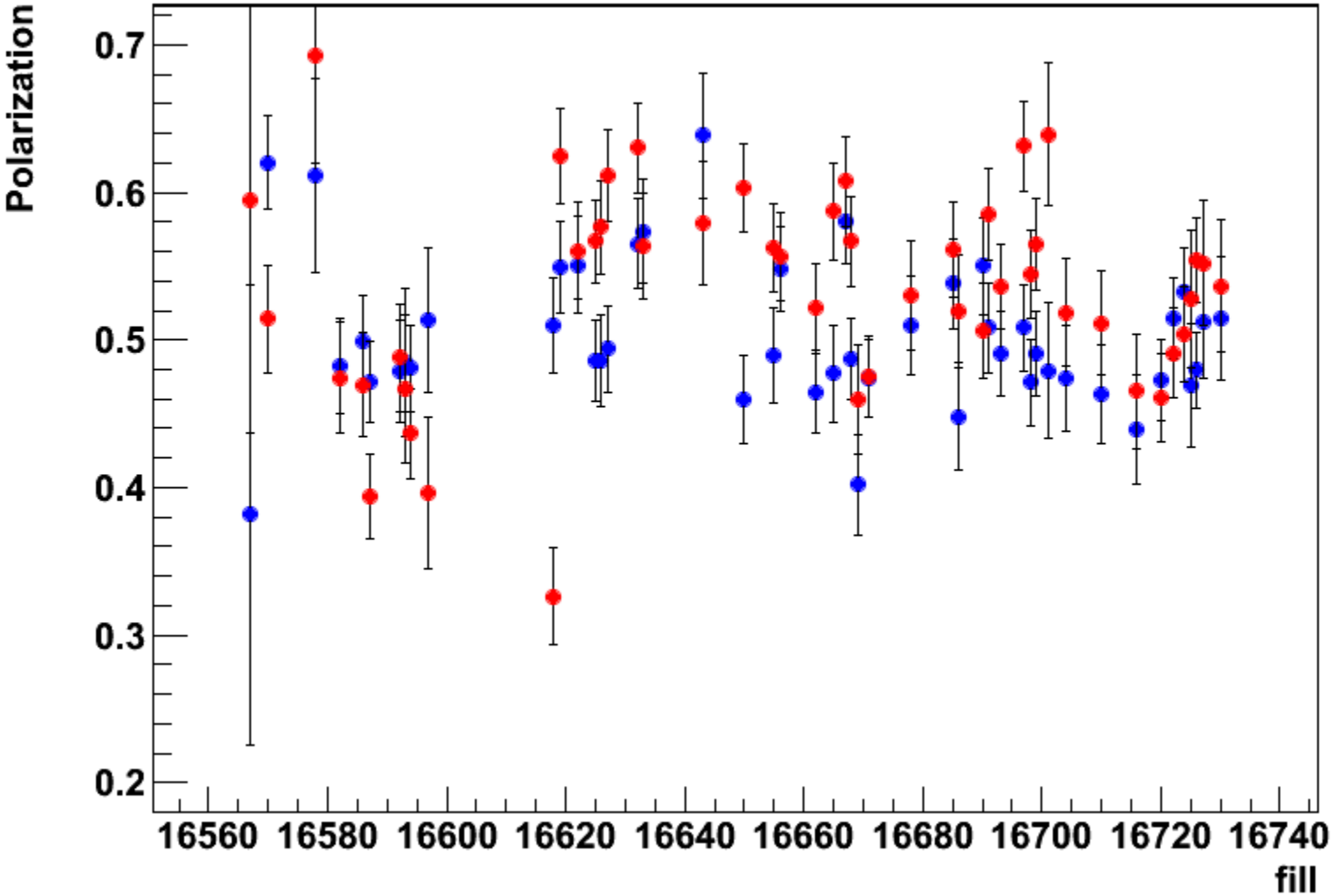
# A SUMMARY ON POLARISATION IN RUN-13 FOR 255 GEV

E.C. ASCHENAUER
PRESENTING THE WORK DONE
BY BILL, DIMA AND OLEG

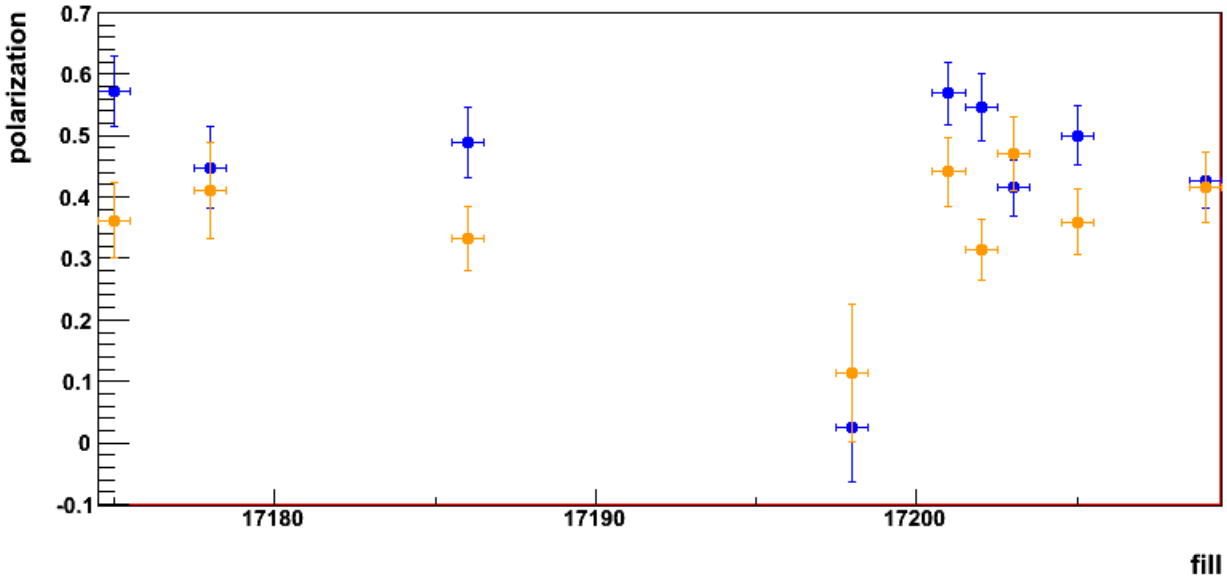
BROOKHAVEN
NATIONAL LABORATORY
a passion for discovery

U.S. DEPARTMENT OF
ENERGY
Office of
Science

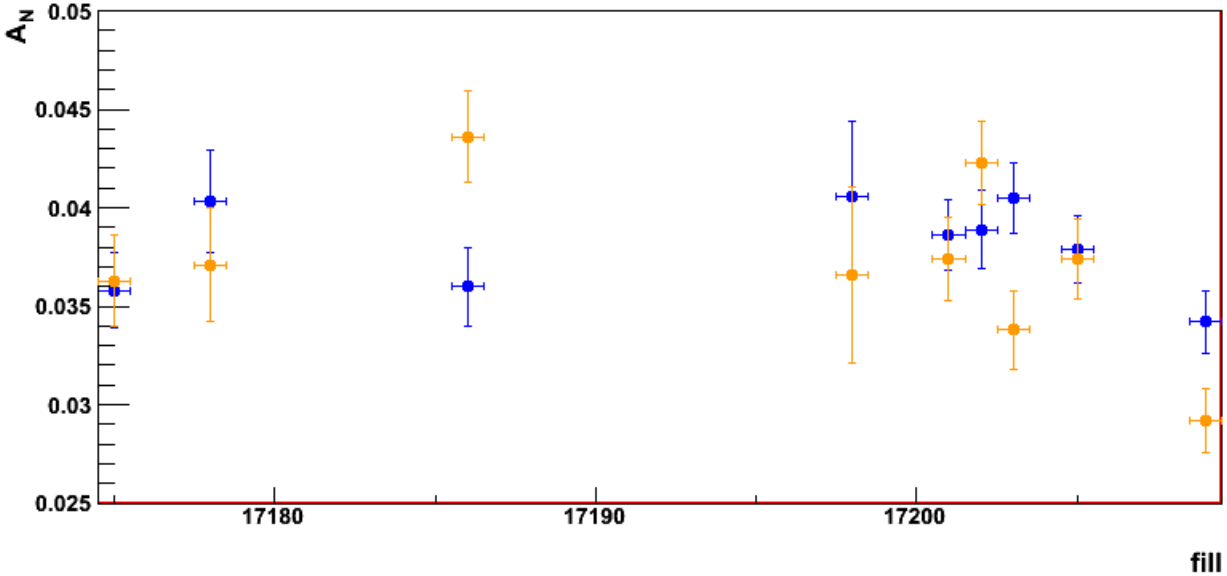
# 2012: H-JET RESULTS



# H-JET RESULTS




polarisation for
Blue and Yellow




$t_o$-calibration underway
minimal impact on polarization,
makes $A_N$ more stable

→ should be done by tomorrow
→ next step calibrate pC

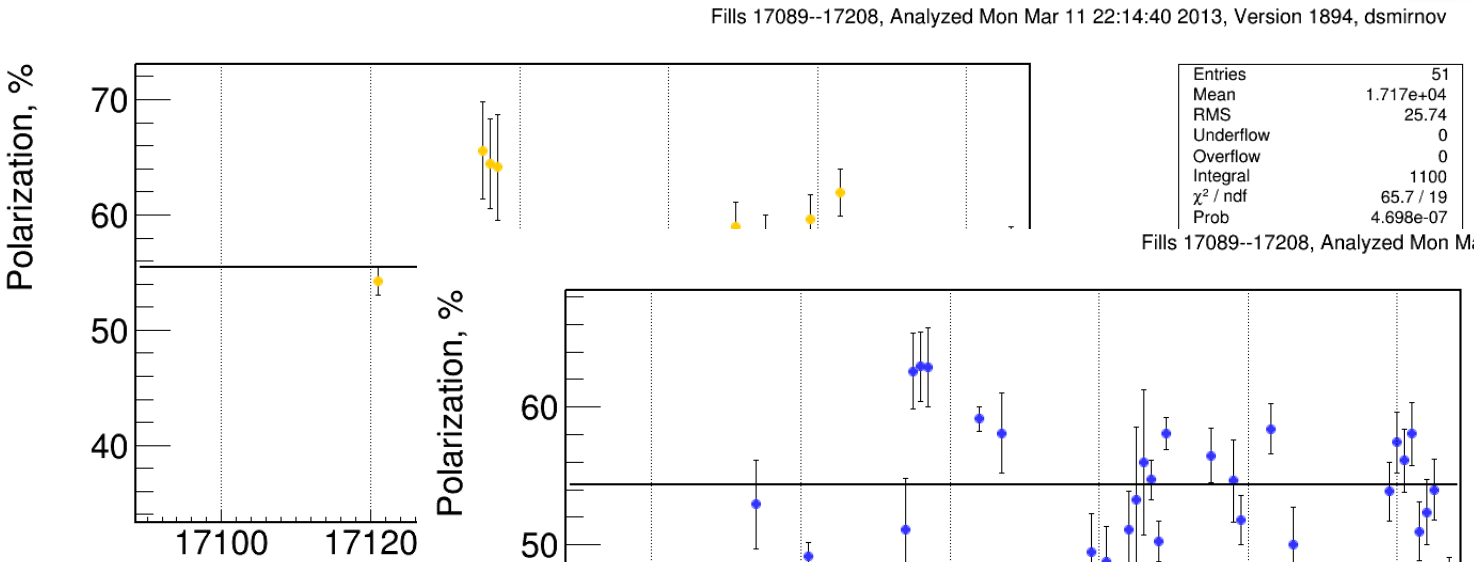
# pC RESULTS

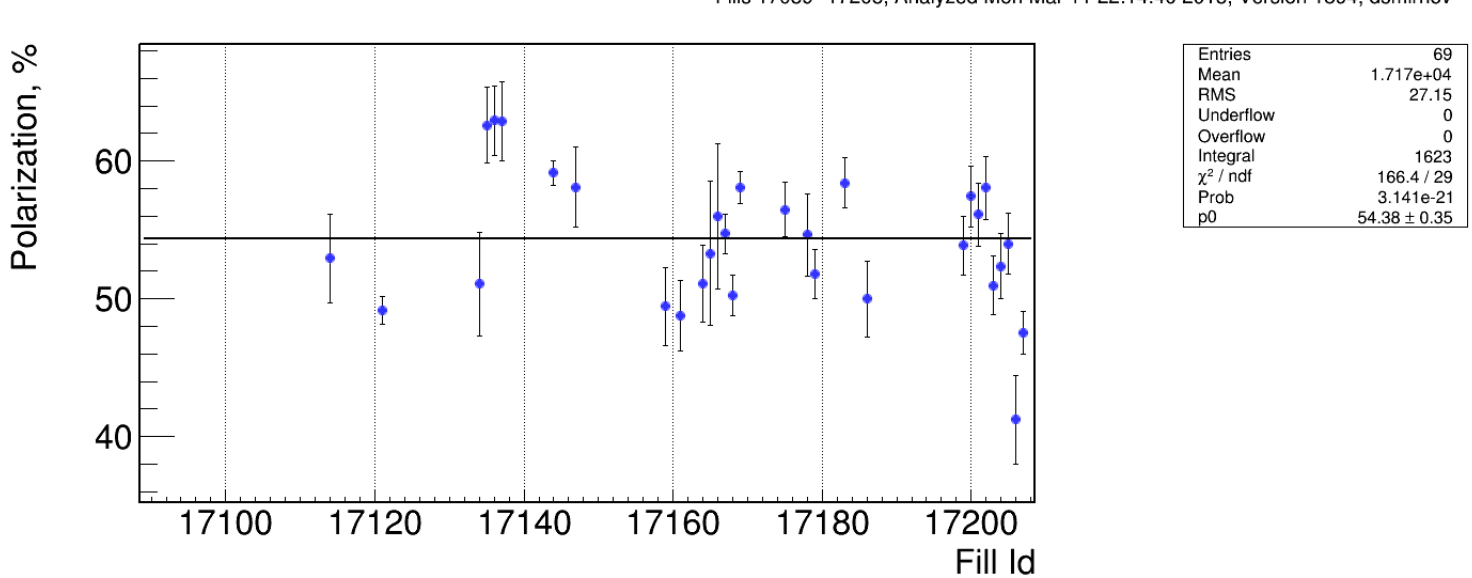
**Caveat:** not yet normalized to jet – simple reason need statistics

**Note:**
measured analyzing power for injection, 100GeV and 255 GeV in run 11/12
have not seen an energy dependence of pC/H-jet normalization
→ can use the same normalization factor for flat top and injection
→ so injection measurements will be pretty accurate

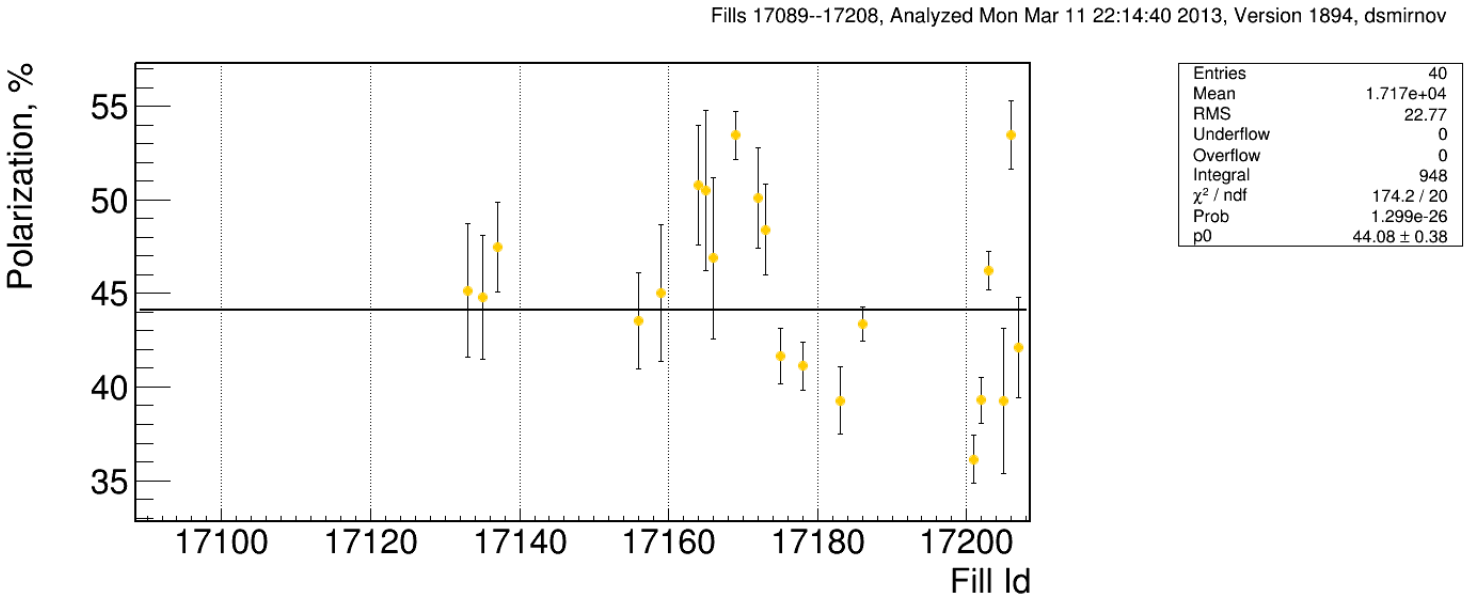
→ fills shown in all plots: 17085—17208 for B1 and Y1

## Injection

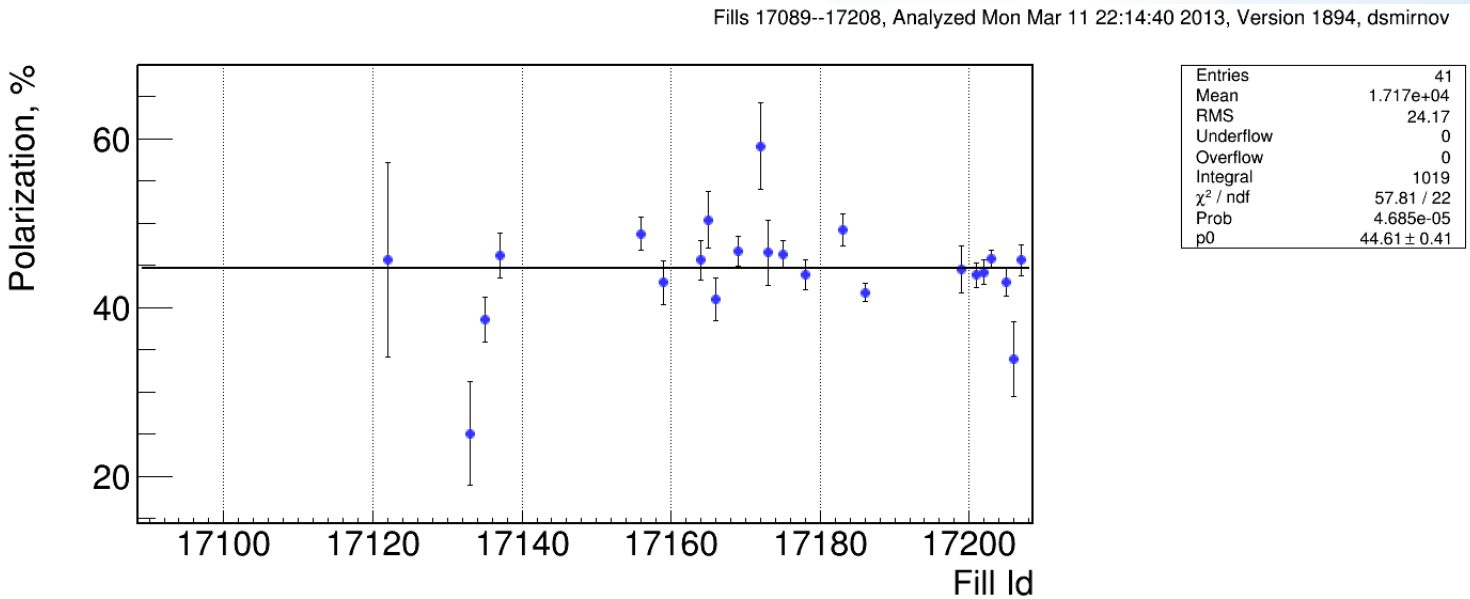


# pC RESULTS

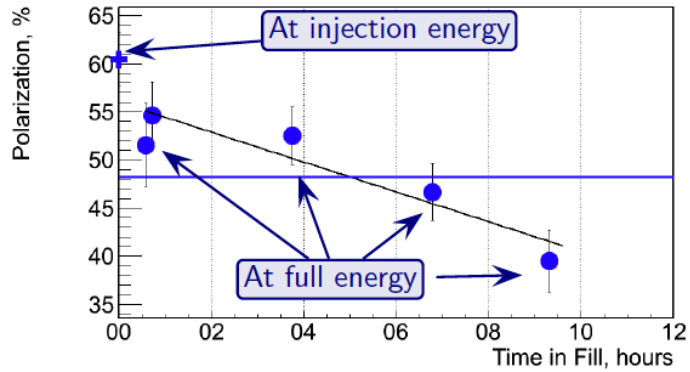


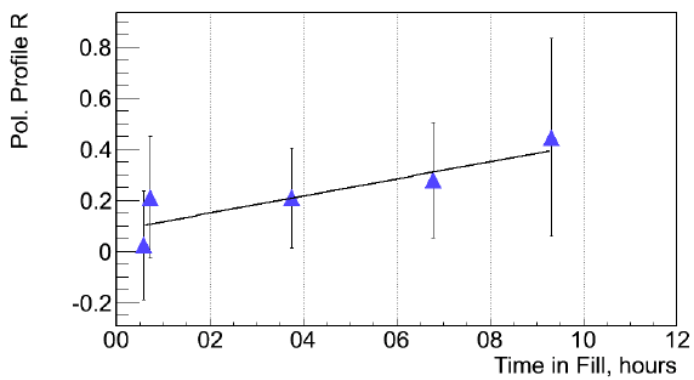

at flat top



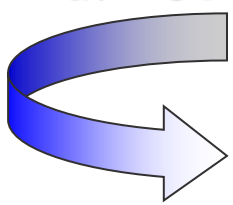
# HADRON POLARISATION FOR EXPERIMENTS

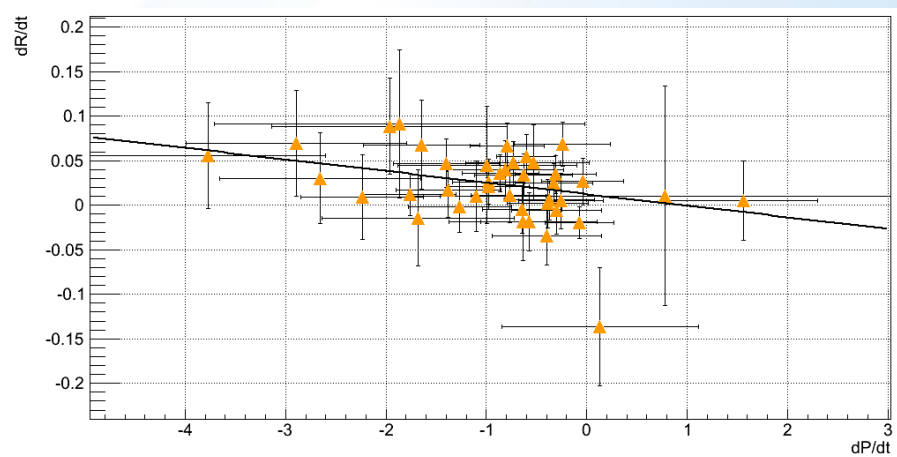
Account for
beam polarization decay through fill → $P(t)=P_0\exp(-t/\tau_p)$
growth of beam polarization profile R through fill




correlation of dP/dt to dR/dt for all 2012 fills at 250 GeV



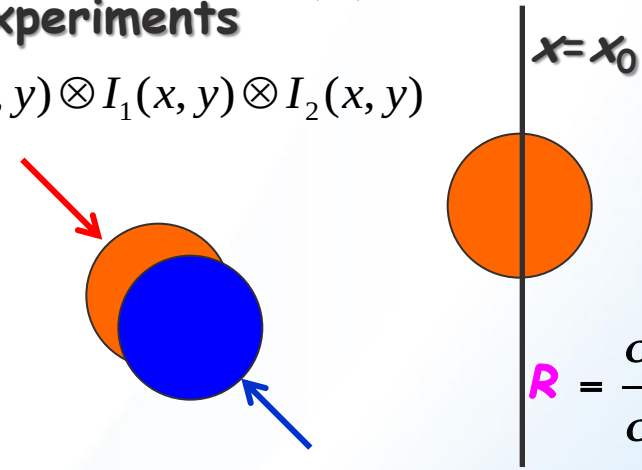



pCarbon polarimeter

$$\langle P_1 \rangle = P_1(x_0, y) \otimes I_1(x_0, y)$$

Collider Experiments

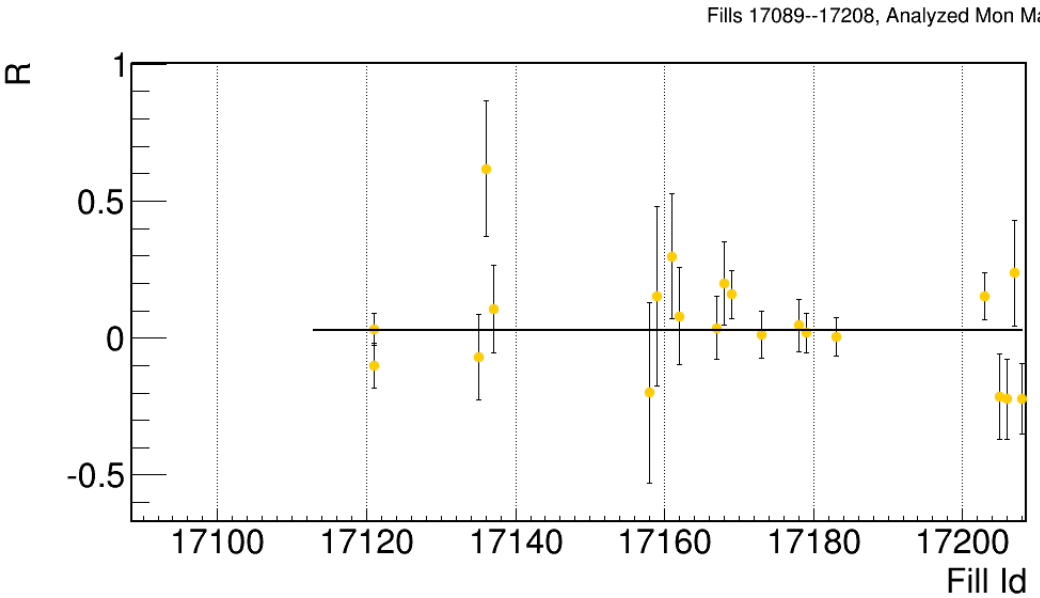
$$\langle P_1 \rangle = P_1(x, y) \otimes I_1(x, y) \otimes I_2(x, y)$$




$$R = \frac{\sigma_I^2}{\sigma_P^2}$$

Polarization lifetime has consequences fo
physics analysis
→ different physics triggers mix over fil
→ different <P>

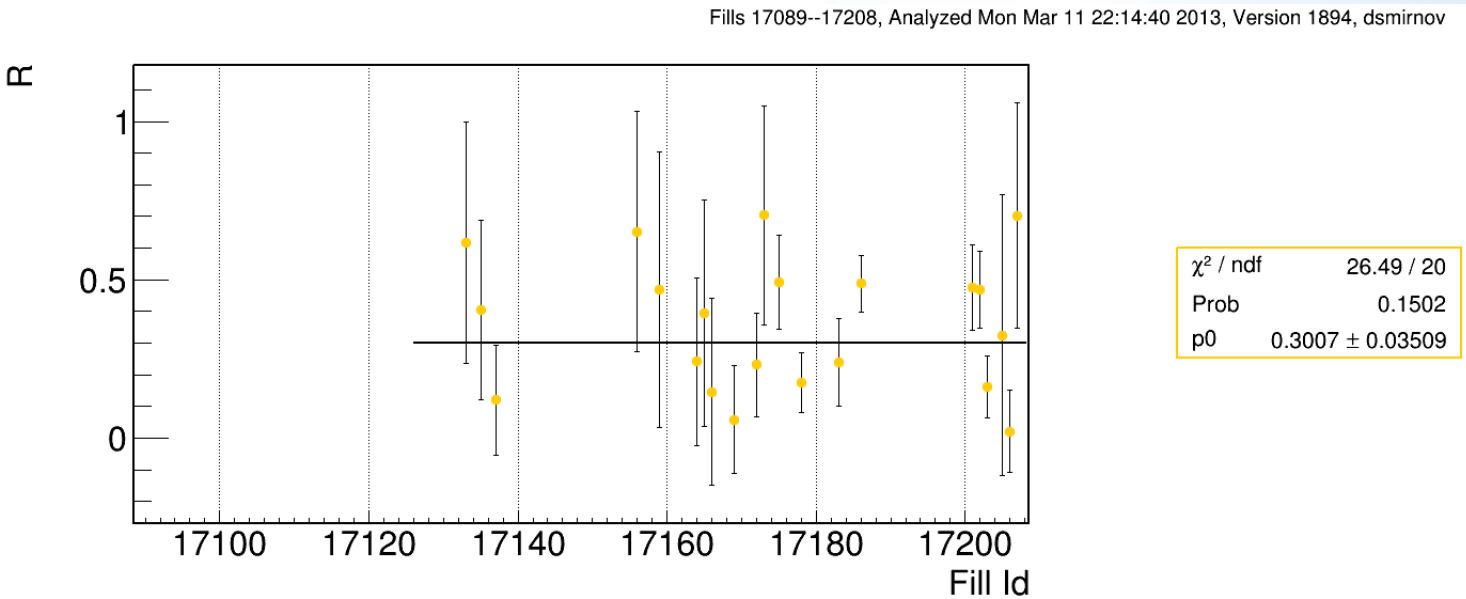
# pC RESULTS: PROFILE R




**at injection**
**2012: 0.054+/-0.0104**

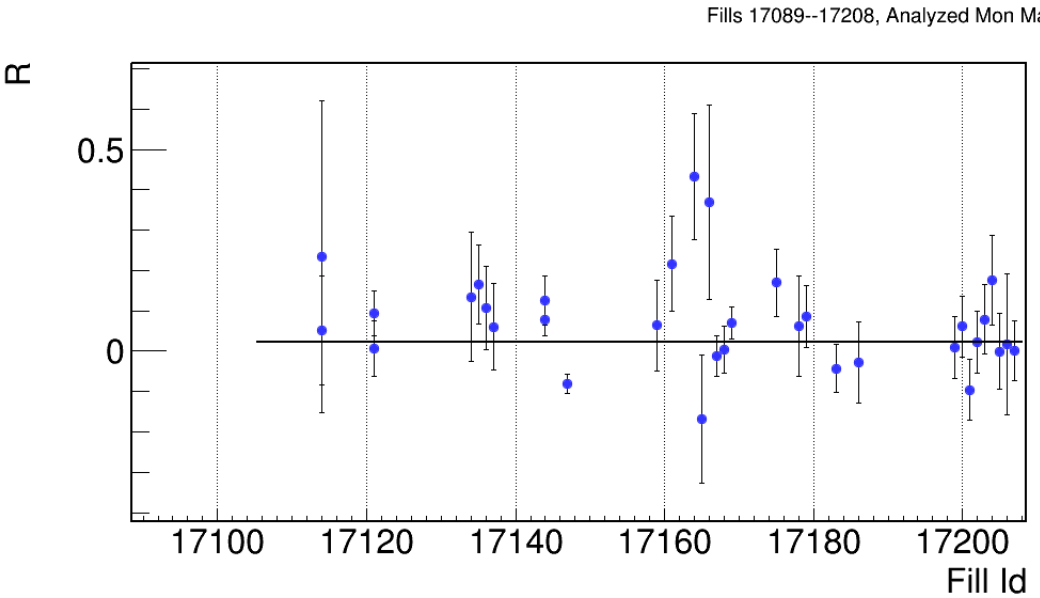
| | |
|---|---|
| $\chi^2$ / ndf | 26.94 / 20 |
| Prob | 0.1369 |
| p0 | 0.02814 ± 0.02355 |

**at flat top**
**2012: 0.133+/-0.009**




| | |
|---|---|
| $\chi^2$ / ndf | 26.49 / 20 |
| Prob | 0.1502 |
| p0 | 0.3007 ± 0.03509 |

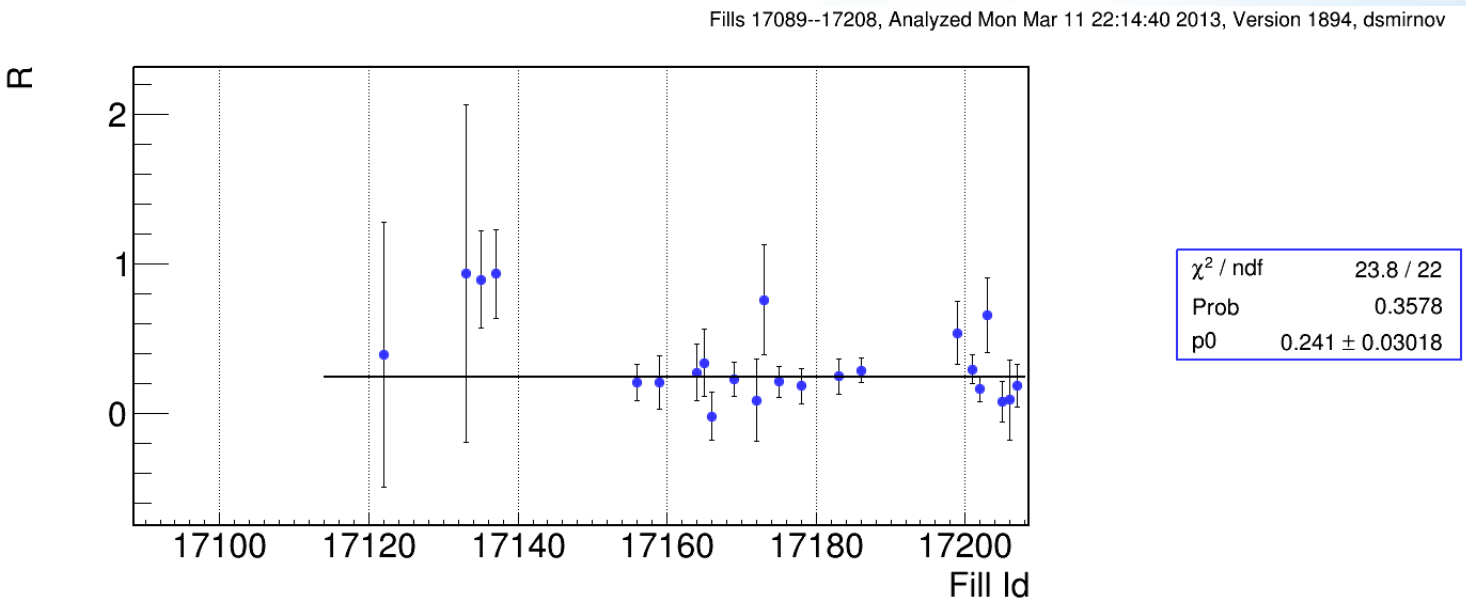
# pC RESULTS: PROFILE R




**at injection**
**2012: 0.038+/-0.014**

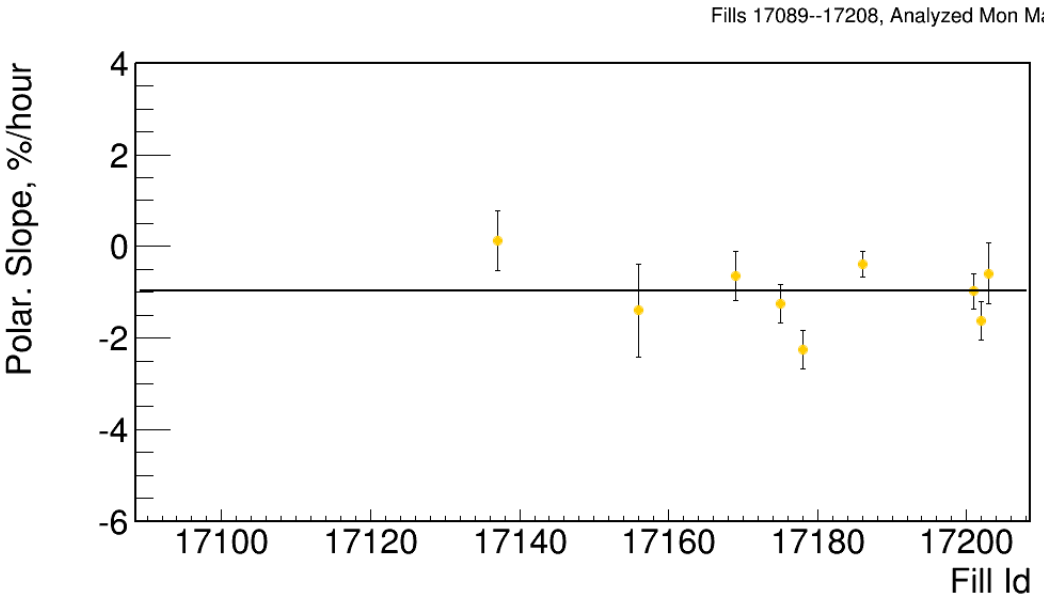
| | |
|---|---|
| $\chi^2$ / ndf | 53.75 / 32 |
| Prob | 0.009388 |
| p0 | 0.02135 ± 0.01196 |

**at flat top**
**2012: 0.205+/-0.011**



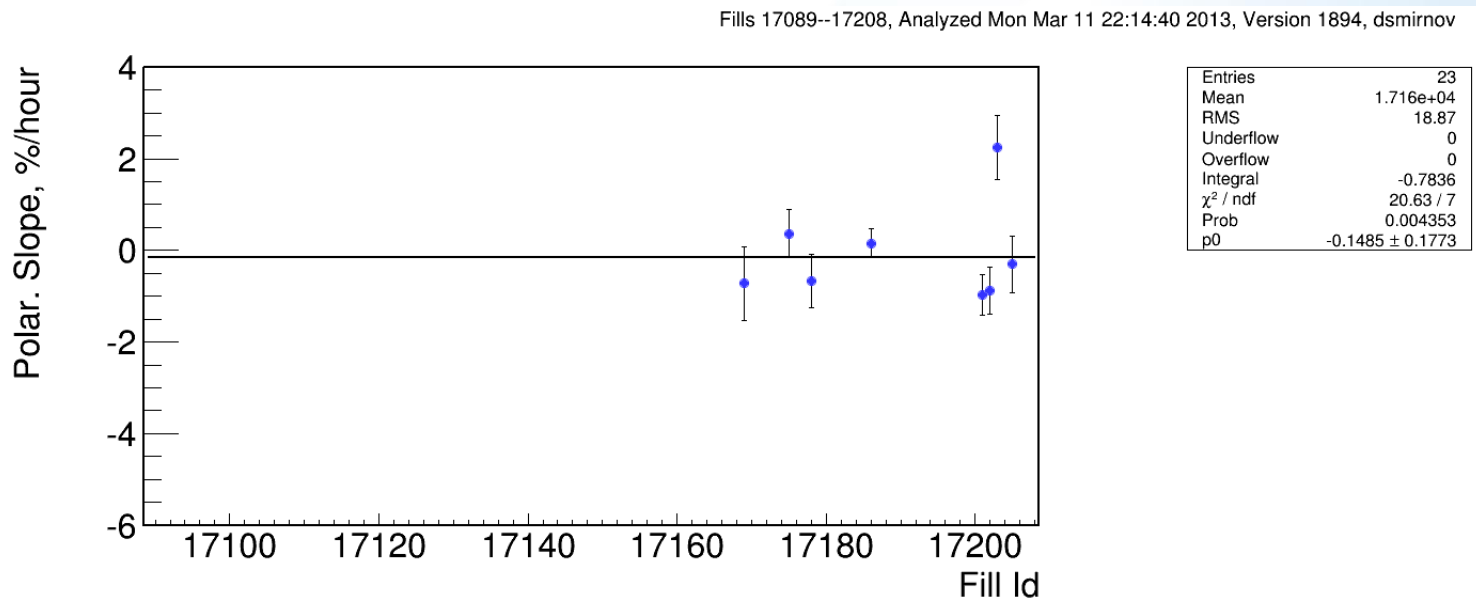

| | |
|---|---|
| $\chi^2$ / ndf | 23.8 / 22 |
| Prob | 0.3578 |
| p0 | 0.241 ± 0.03018 |

# pC RESULTS: POLARISATION DECAY




**2012: -0.61+/-0.056**

**2012: -0.67+/-0.056**



# OUR WORRIES TARGET DEATH RATE

- Use factor 2 thicker targets compared to 2012
  - but still high death rate

| Fill | Date | Time | Energy | B1 | B2 | Y1 | Y2 |
|---|---|---|---|---|---|---|---|
| 17208 | 03/11 | 18:43 | 27 | H5 | | | |
| 17208 | 03/11 | 18:47 | 27 | H2 | | | |
| 17208 | 03/11 | 18:47 | 27 | H4 | | | |
| 17205 | 03/11 | 6:39 | 255 | | | | V5 |
| 17203 | 03/11 | 21:59 | 255 | H1 | | H3 | V3 |
| 17114 | 02/26 | 16:31 | 27 | H6 | | | |
| 17172 | 03/05 | 18:43 | [illegible] | | | | |
| [illegible] | [illegible] | [illegible] | 255 | | V3 | H1 | |
| 17134 | 03/01 | 23:33 | 255 | | V1 | | |
| 17121 | 02/27 | 18:55 | 27 | | | | V1 |
| 17209 | 03/12 | 05:08 | 255 | | | | V4 |

Will have to replace targets at one of the next access

Remaining Targets:
==========
B1: 0 horizontal and 6 vertical
B2: 6 horizontal and 0 vertical
Y1: 4 horizontal and 6 vertical
Y2: 6 horizontal and 2 vertical