RHIC pC polarims.: Run13 so far

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on behalf of the
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RSC meeting
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Run12 problems → Run13 status?

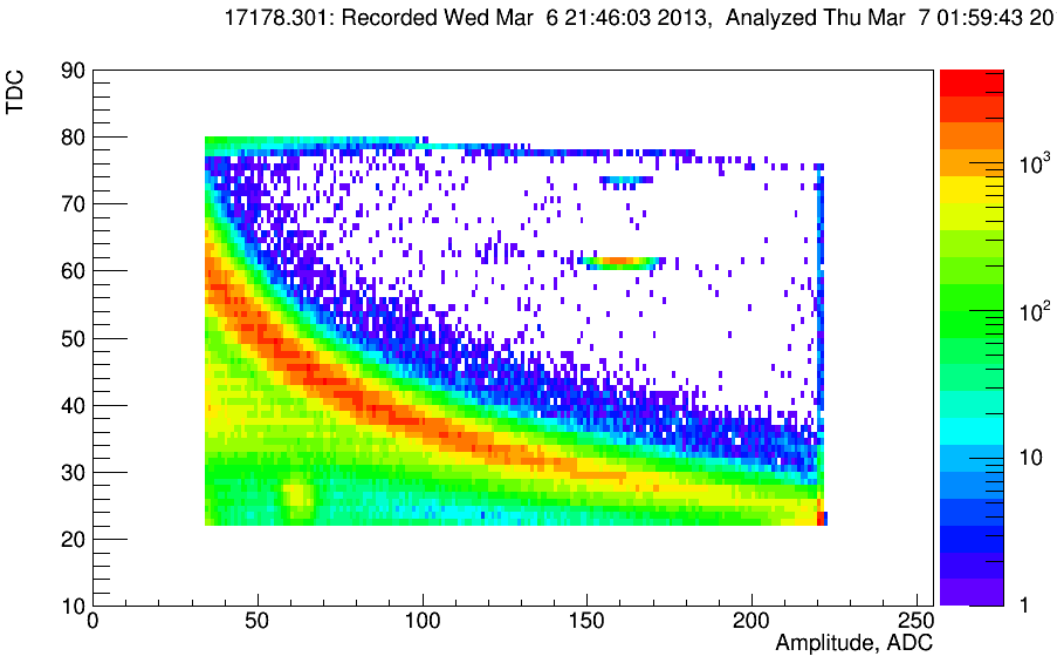
- RF pickup noise in detectors: mitigating steps and data so far
- Target breakage: mitigating steps and behavior so far
- Target monitoring: longitudinally segmented detectors
  video system

Polarization results

- Results web pages: measurements, fills, long term
- Example P(t) early fill
- Nest steps: H-jet normalization

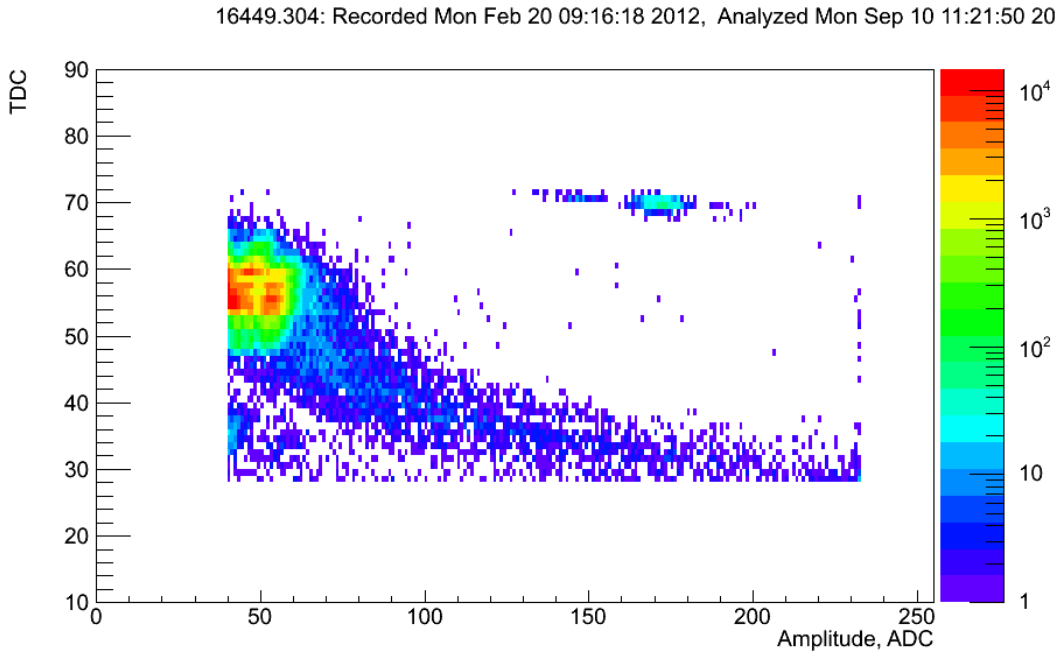
RF pickup gone (hopefully)

- Our carbon TDC vs. ADC now:



- As it should: TOF $\propto 1/\sqrt{E_{carbon}}$
- 'Banana cut' selection of carbon

- Our carbon TDC vs. ADC Run12:



- Huge RF pickup pulse swamping faint carbon signal
- Mitigated by: plugging stochastic cooling pickup; shield preamps; improved RF screen in chamber
- No sign of noise so far in data, or on scope
- Hopeful this story is over...

Carbon targets

Run12 targets had high rate of failure (breaking, usually in beam):
~all 48 targets replaced twice, lengthy maint. days, break vacuum

Run13 steps to mitigate:

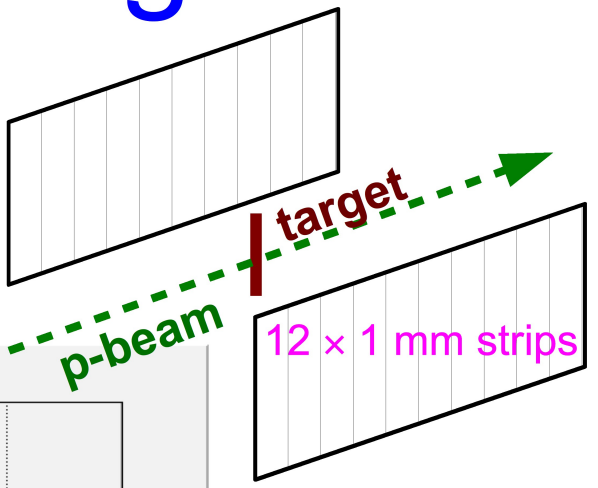
- thicker targets used: 50 nm vs. 25 nm in Run12
- ~1/3 pre-treated with flash lamp (annealing, graphetization)
- conditioning with low current beams (annealing, graphetization):
  - at injection energy, beam wider ⇒ lower power density
  - all (except 3) exposed with 12, 28, 56 bunches
  - blue polar. targets also 109 bunches (almost running conditions)

Running so far:

- 2 targets broken before beams (installation, pump down)
- 4 targets have broken after exposure in normal running
- 2 were in blue2 polar. in quick succession;
  suspect possible misalignment of target frame, check in access
- Still too early to know trend...

Target monitoring: long. seg. det.

- pC detectors usually segmented azimuthally
- Run13: each polar. pair of detectors segmented longitudinally (along beam):

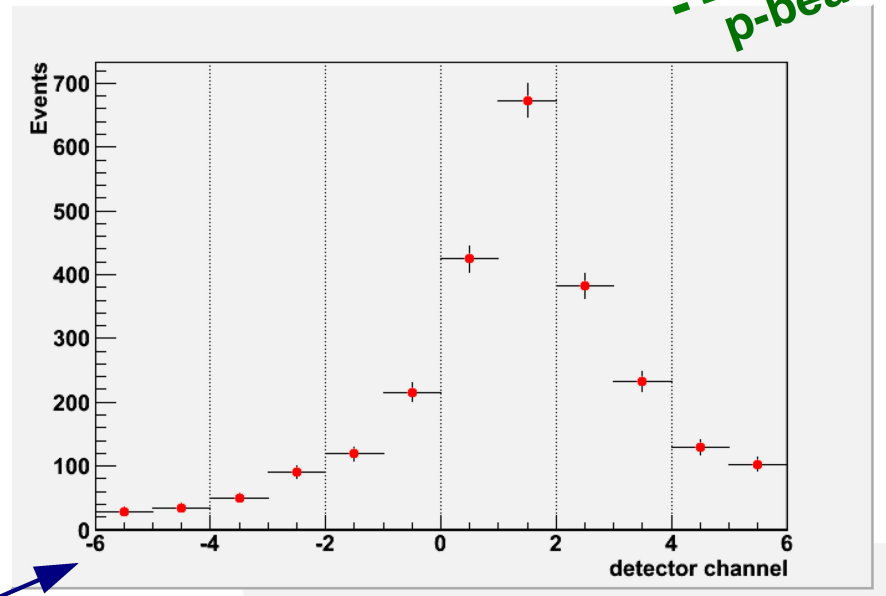


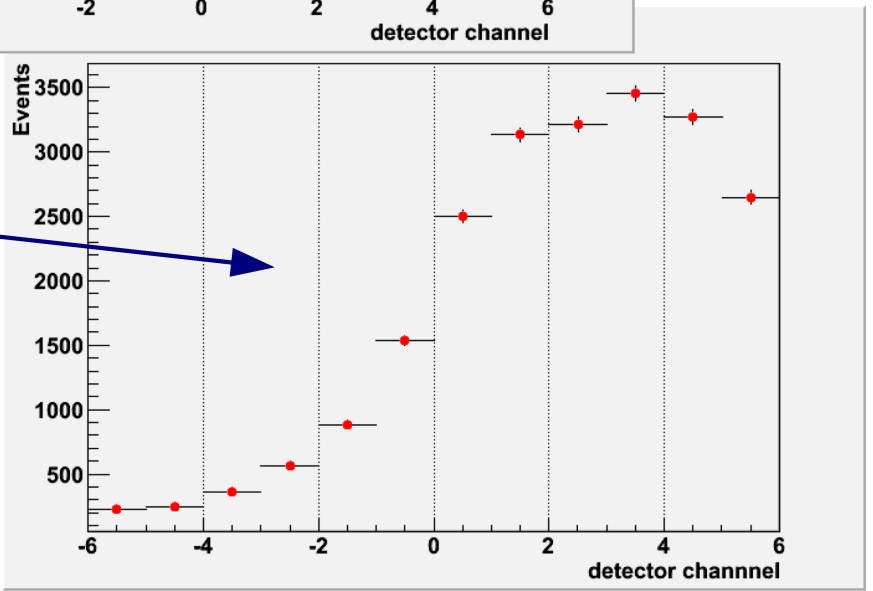
<u>Distribution of hits in strips:</u>

- Centroid ⇒ target position along beam axis
- Target may be loose, sway up to ~1 mm during sweep
- Monitor target looseness, correlate with breakage

<u>Also:</u>

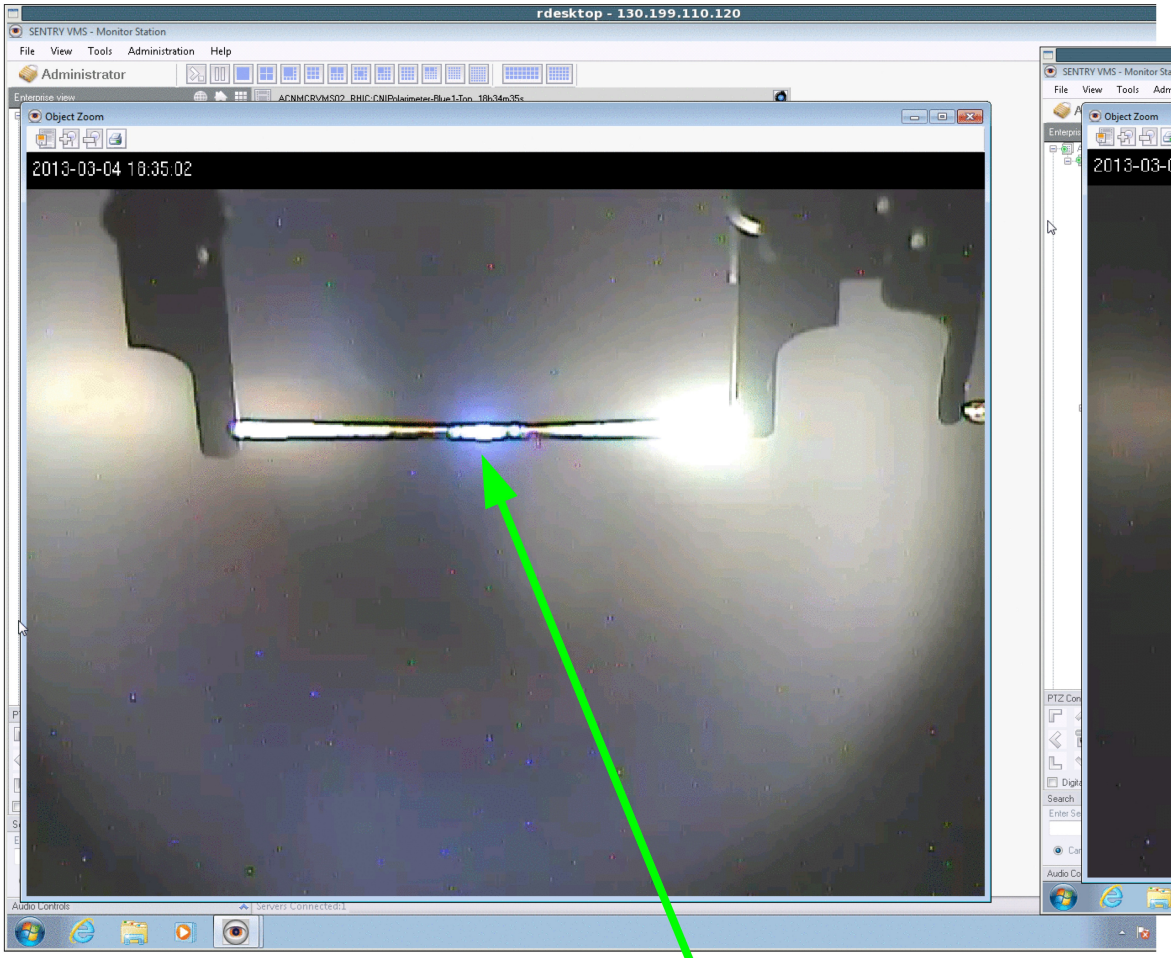
- This distribution turned to this 0.1 seconds later:
- Target broke!
- Quick feedback on breaking targets





Target monitoring: video system

- Video cameras installed to monitor target in all 4 polarimters; 1st look:



- Target in beam, center heated
- Edges glowing; RF heating?

- Target not in beam, center dark
- Edges glowing; RF heating?

- Much to observe, hopefully learn pertinent info
- Quick feedback on breaking targets

Results: web pages

The data is coming in

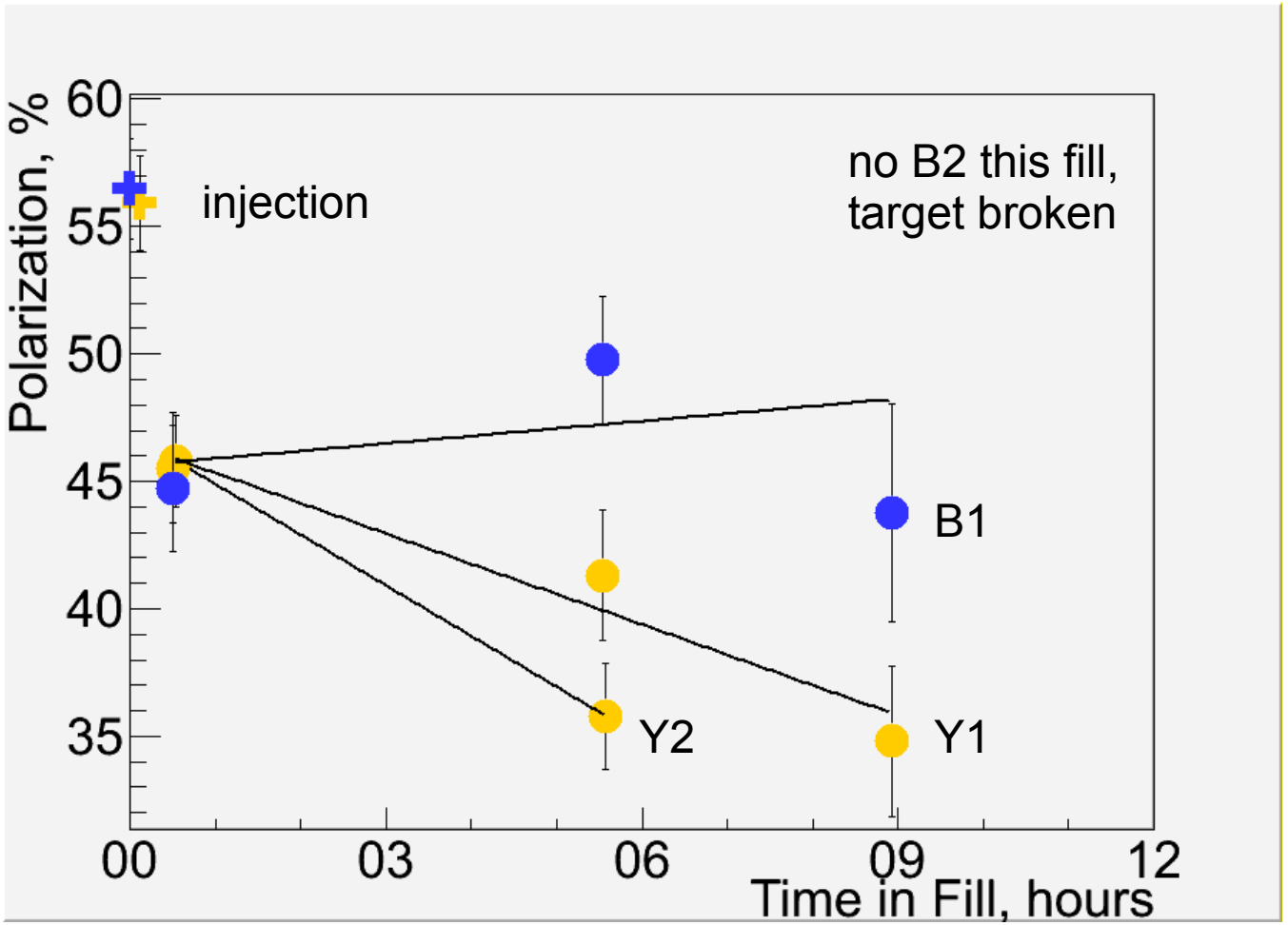
- Base page for pC results: http://www.phy.bnl.gov/cnipol/ links to:

- Detailed results, plots each pC measurement:
  http://www.phy.bnl.gov/cnipol/rundb/
- Summary pC measurements each fill (P, P-profile, P-decay...):
  http://www.phy.bnl.gov/cnipol/fills/
- Longer term summaries of fill results:
  http://www.phy.bnl.gov/cnipol/summary/

- Please be patient!
- These are all under development, constantly be improved, expanded, and corrected

An early fill: 17175 (Wed. Mar. 6 AM)

- Apparent: 24→255 GeV P drop, P decay in Yellow ring



- But: all new detectors etc. in pC: P -scale needs to be recalibrated
- Need H-jet/pC ratios for *several* fills
- H-jet results starting: Oleg