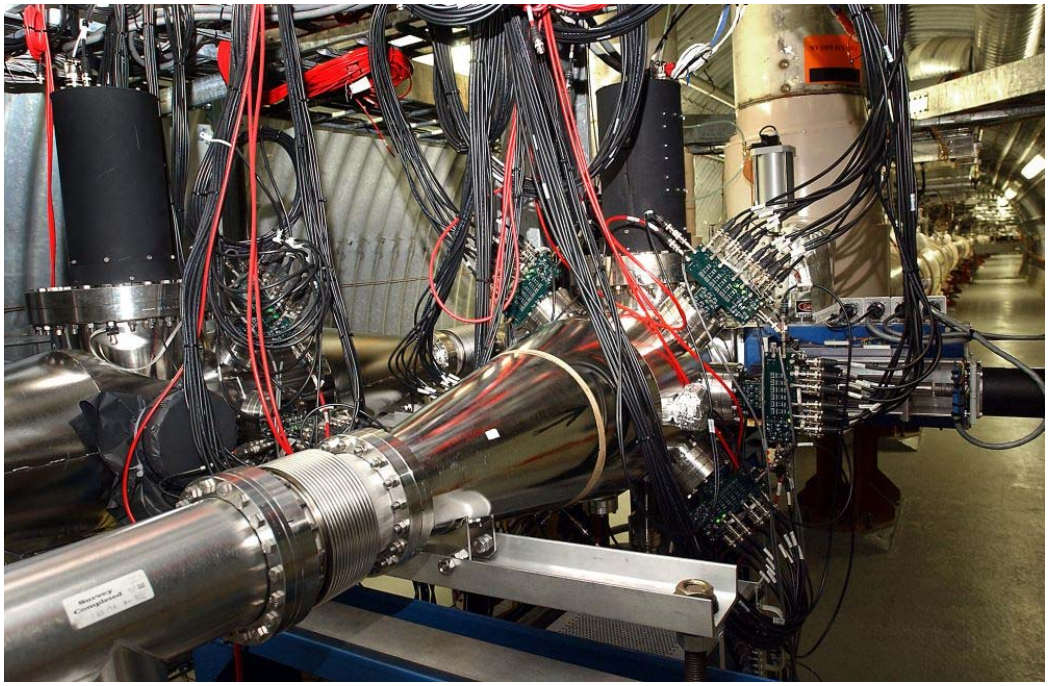
Accelerator Experiments for the RHIC Carbon Target Polarimeter



Polarimeter Improvements

During the shutdown new direct-drive mechanisms were mounted on the Blue Polarimeter to improve the accuracy and reproducibility of target positioning.

New silicon detectors were installed in the Blue Polarimeter, and bad preamps replaced.

New silicon detectors for JET.

Both Yellow and Blue Targets Holders replenished (6 horizontal + 4 vertical in each).

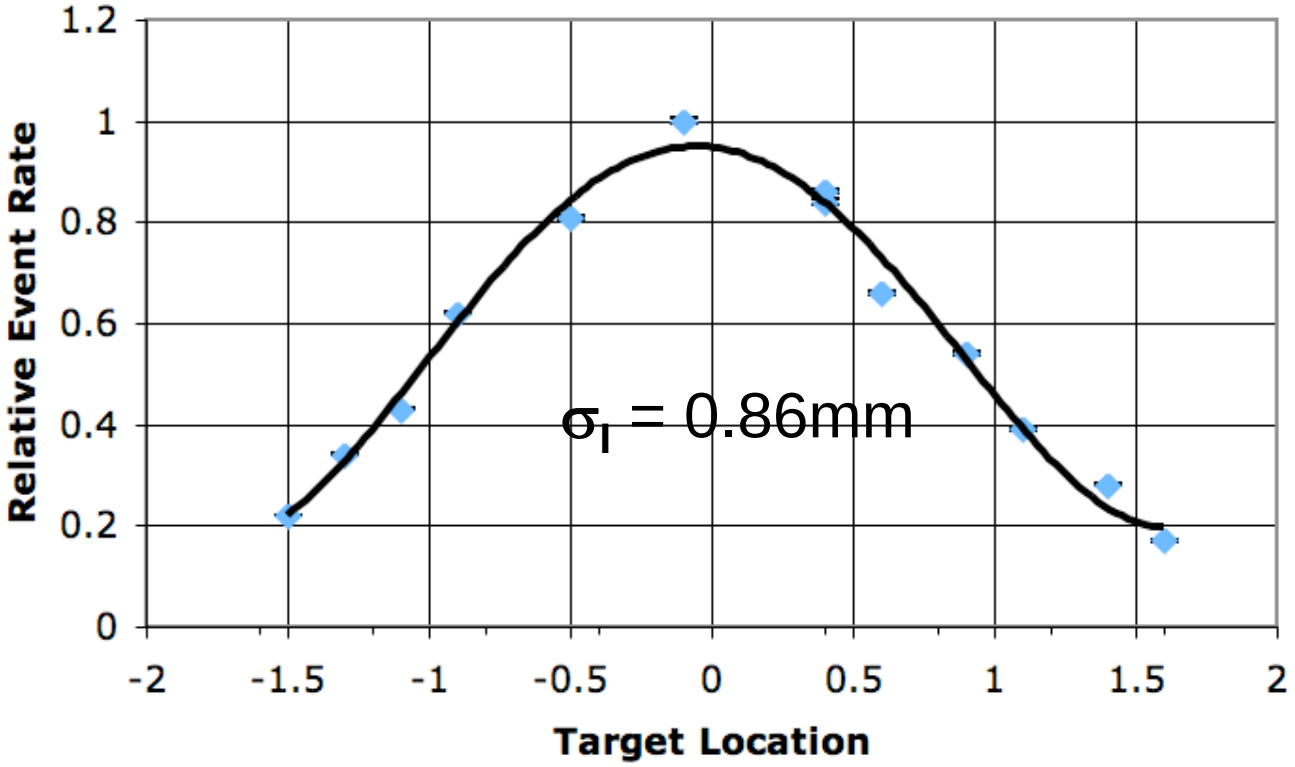
Electronics cooling improved.

2006 Carbon Target Polarimeter Performance

- Statistics
  - Precision not currently statistics limited.
- Beam Profile
  - Biggest single contributor to precision.
- Event Rate
  - Cannot accept much higher rate.
  - Cannot build much thinner targets.
  - Studies done by Morozov with Photodiode detector may improve rate capabilities (See Haixin's presentation)

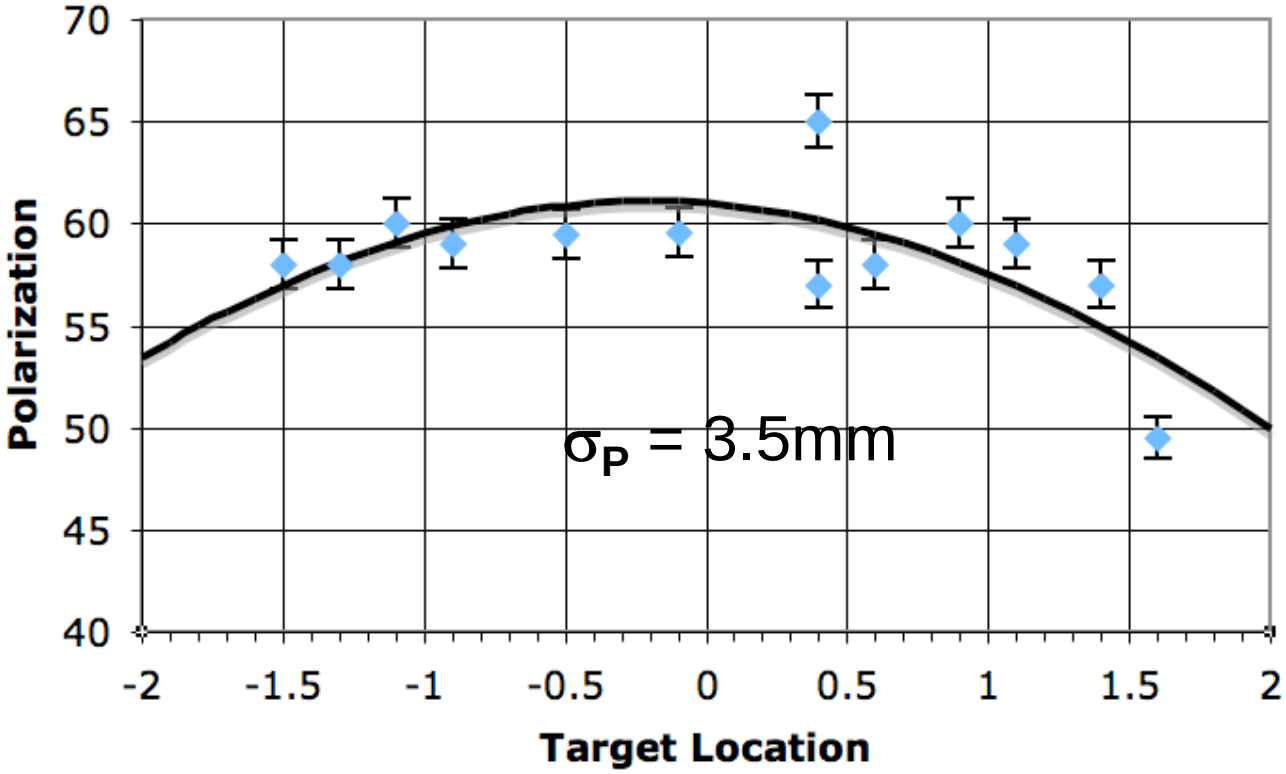
Blue Intensity Profile

Typical beam profile measurement for Blue.



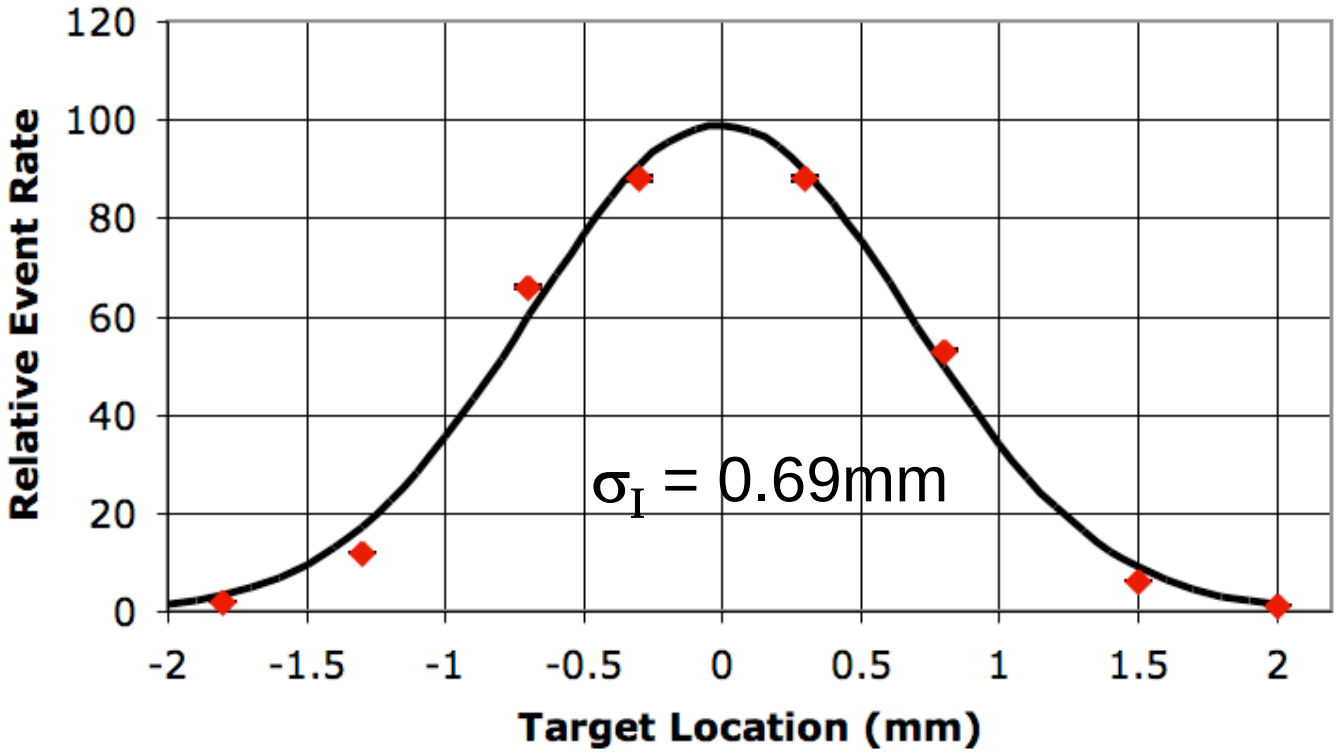
Blue Polarization Profile

We want the polarization profile to be as flat as possible. This looks pretty good.



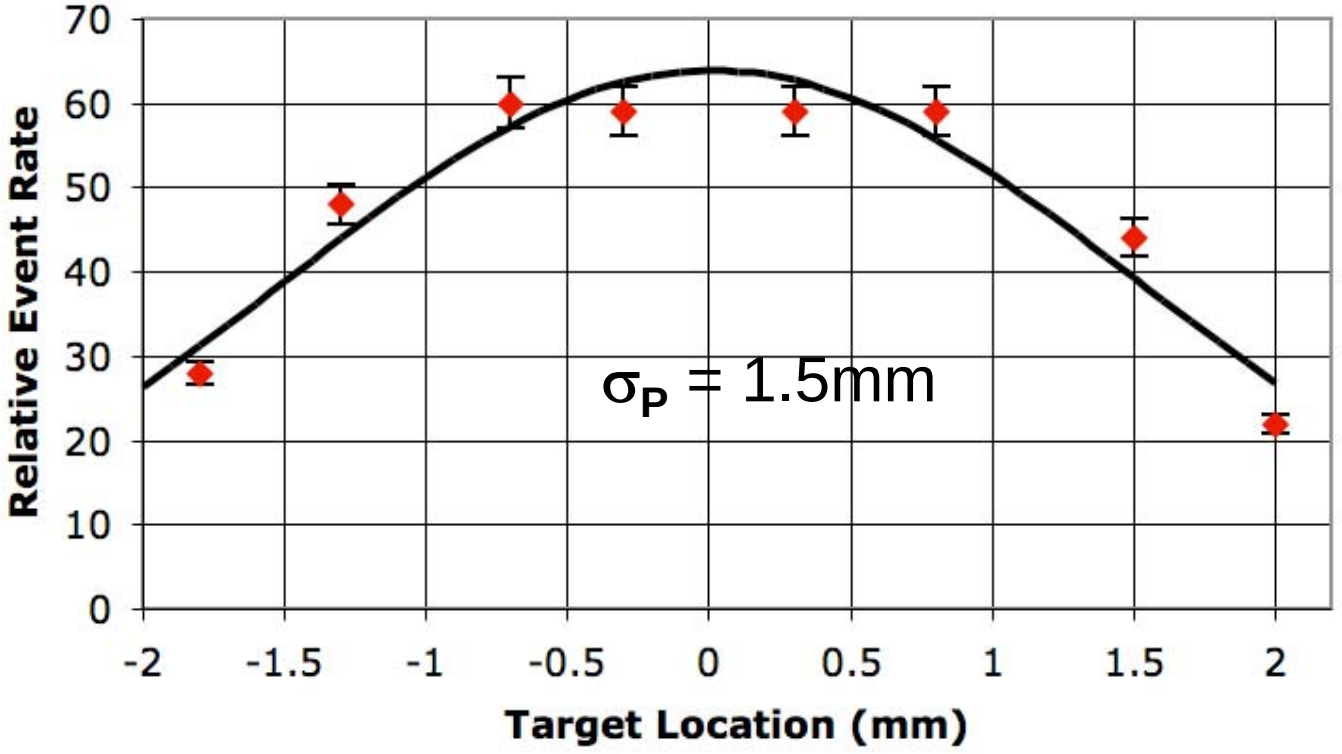
Yellow Intensity Profile

Yellow beam profile similar to Blue



Polarization vs Beam Profile

But Yellow Polarization Profile is not very flat.
Knowledge of this profile is a limiting systematic.



Polarization vs Beam Profile

We measure an “Intensity-Averaged” Polarization with JET. Experiments use “Luminosity-Averaged” Polarization.

☐Converting from Intensity- to Luminosity-Average requires good knowledge of beam profile and polarization dependence on profile.

Better Beam Scanning Tools should allow us to make the measurements we need for Run 08.

Requesting 2 hours of APEX time to conduct a dedicated Polarization Profile Measurement.

Rate vs Intensity Dependence

Polarimeter Detectors may be rate sensitive. We have no data that allows us to extract the rate dependence from intensity dependence.

Request 2 hours of APEX time to compare the polarization measurements obtained with 3 different target thicknesses (i.e. Rates) with the polarization at three different beam intensities. This will allow us to disentangle the two effects.