Møller Systematics

Dave Gaskell

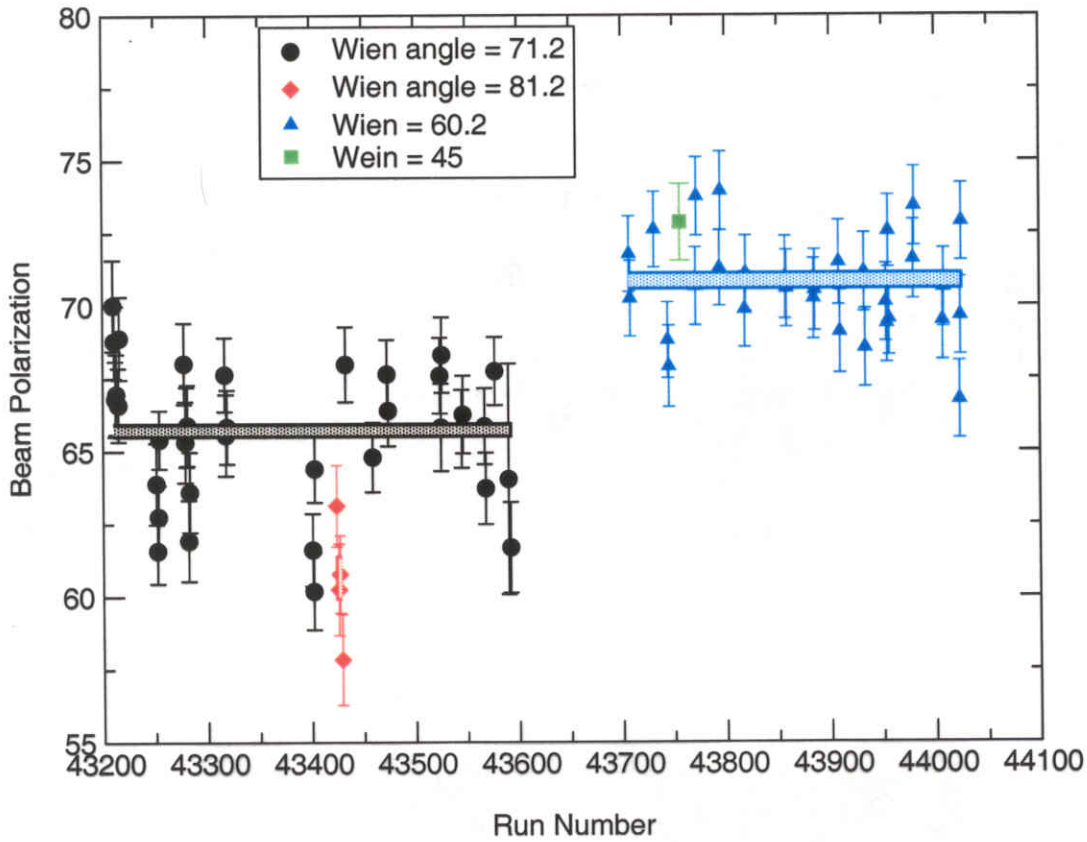
(plots courtesy of Mark Jones and Damon Spayde)

Hall C Collaboration Meeting

January 10, 2003

- Results from RSS
- G0 Studies
  - → Target dependence
  - → Current dependence
  - → Phase dependence
  - → Half–wave plate

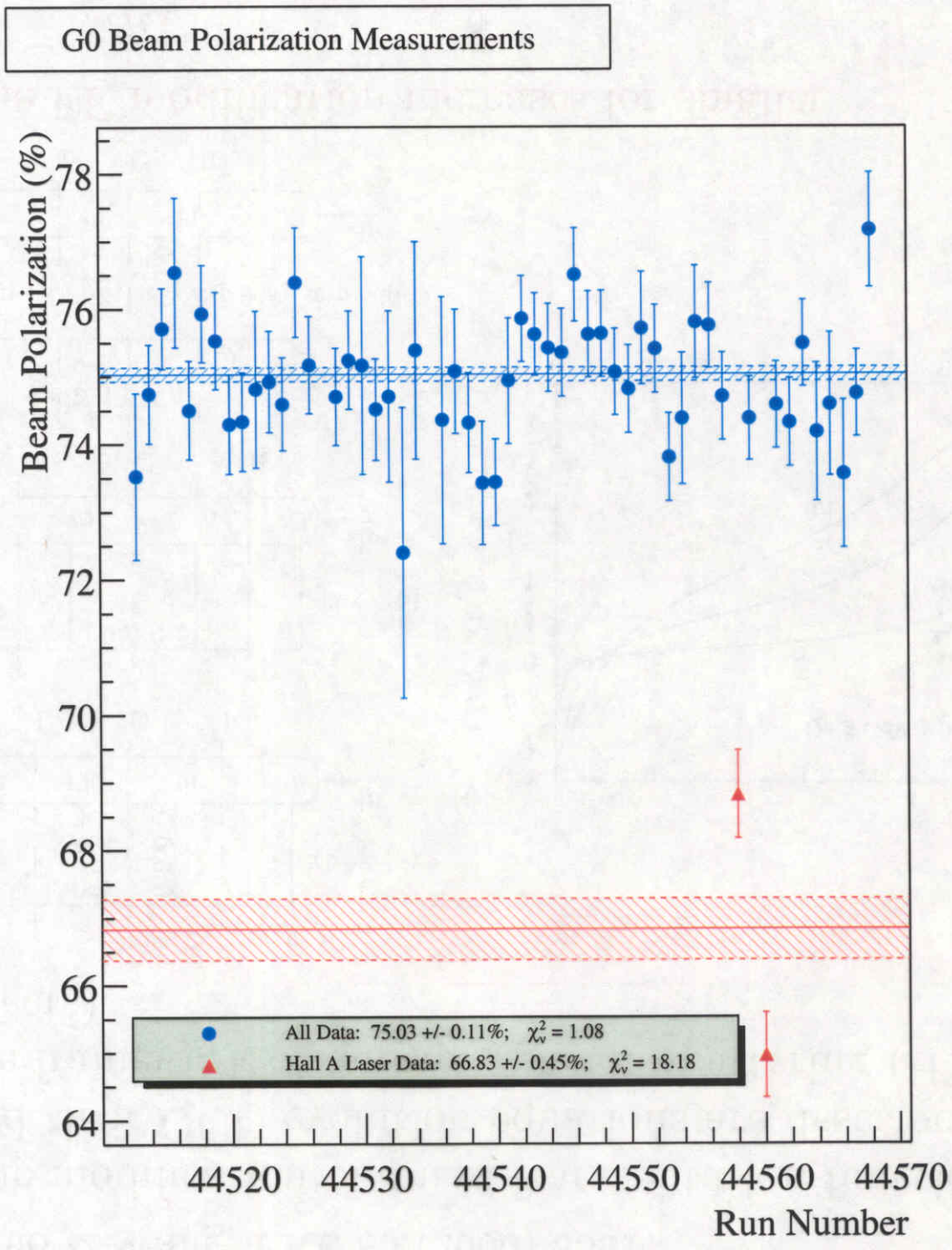
Results from RSS



Wein angle	Weighted Mean	Gaussian Fit
71.2°	65.55 ± 0.22	66.30 ± 2.4
60.2°	70.74 ± 0.24	70.91 ± 1.8

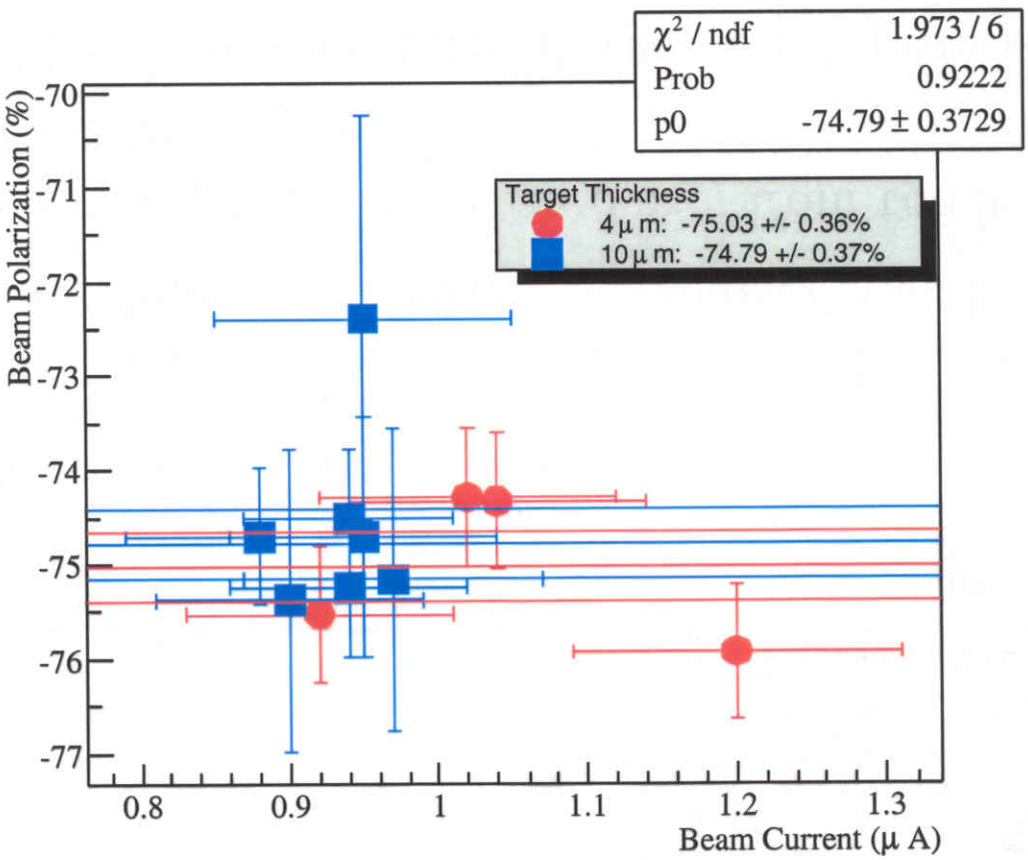
- Seems to be some systematic jumps
- Fit to Gaussian gives σ about 10 times larger than error on weighted mean
- Related to Hall A bleed–through?

G0 Studies



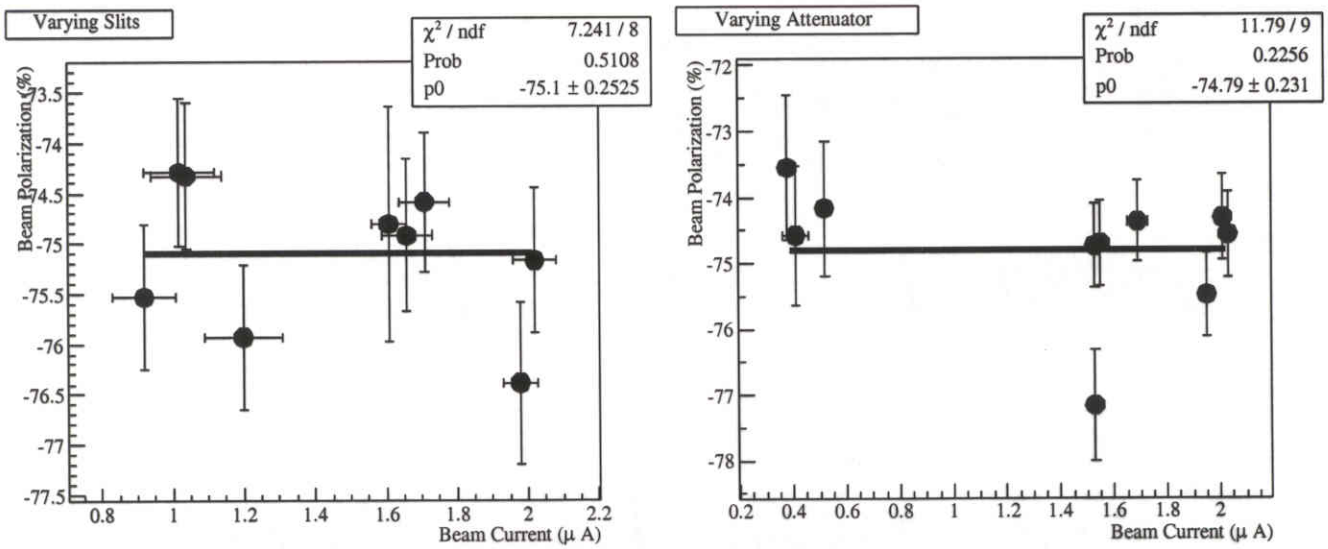
- Runs taken in December with Hall A off

Target Dependence



- Data taken with 4 μm and 10 μm targets
- $I_{beam} \approx 1$ μA

Current Dependence



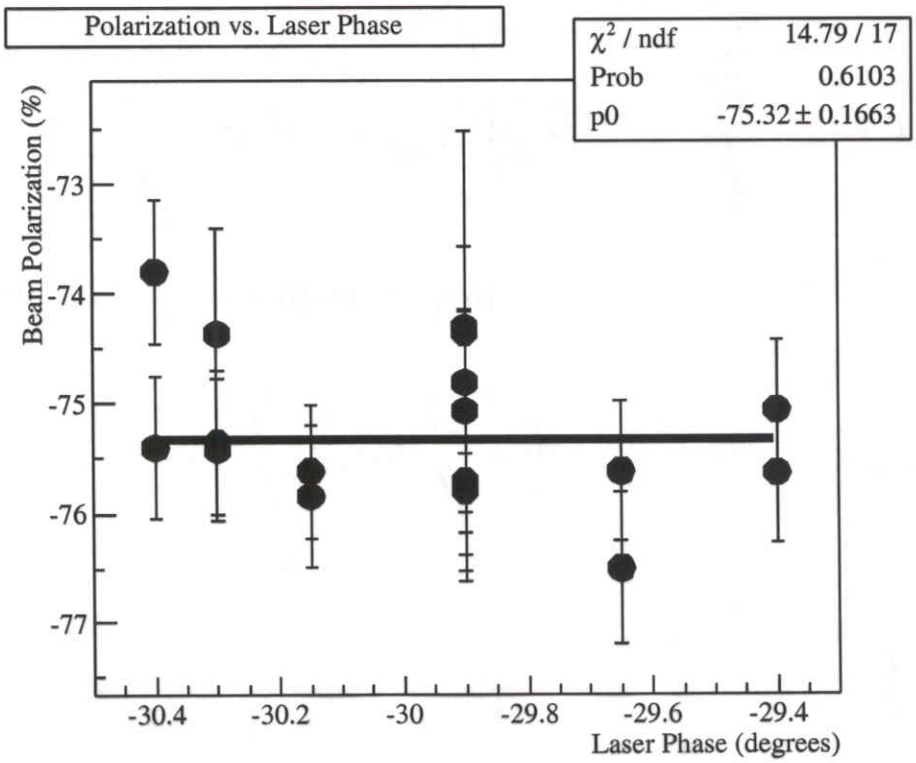
- Checked current dependence when current is changed by:

  → closing the slits
  → using the attenuator

- No systematic dependence apparent for either method

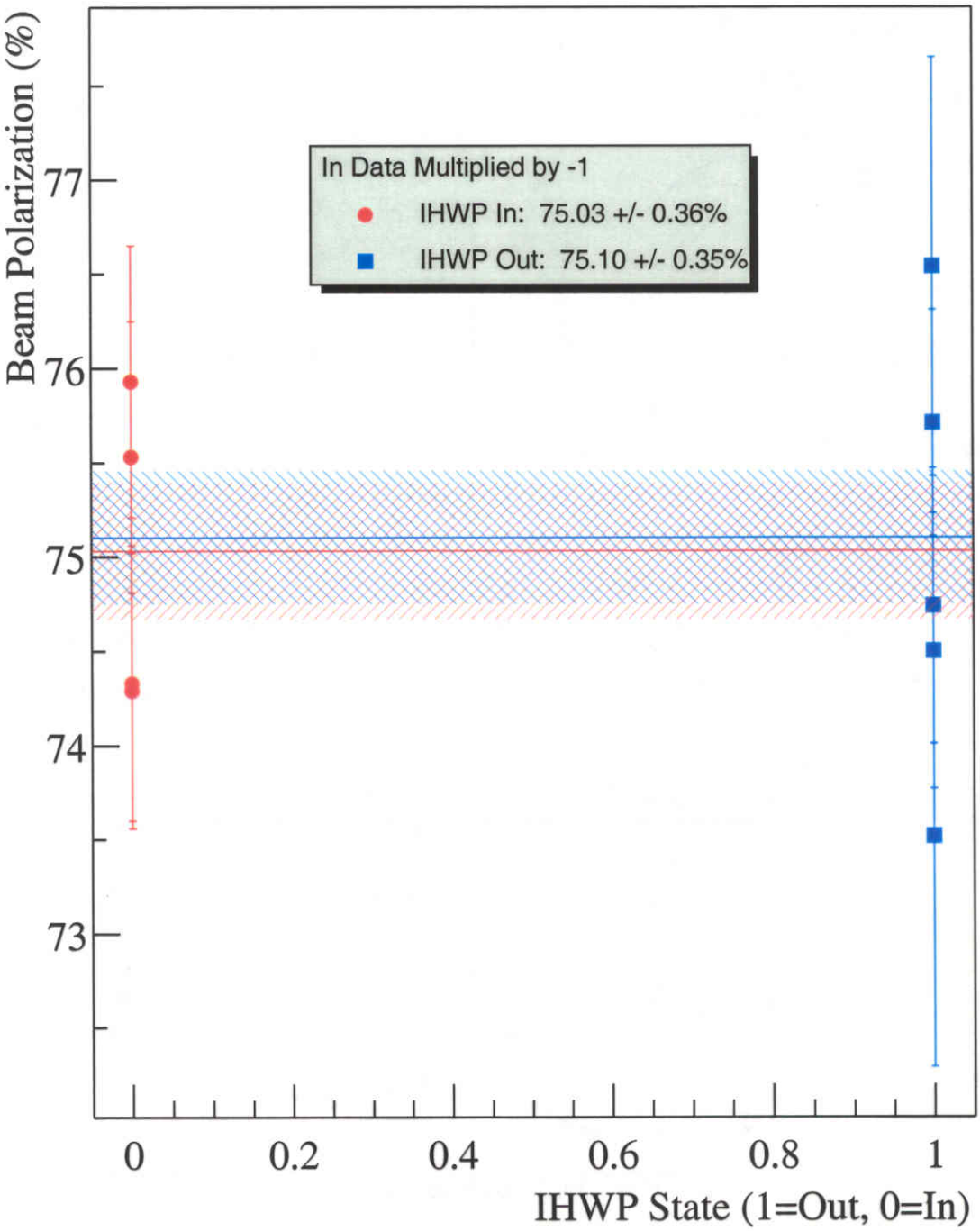
- Note: Hall A off

Laser Phase Dependence

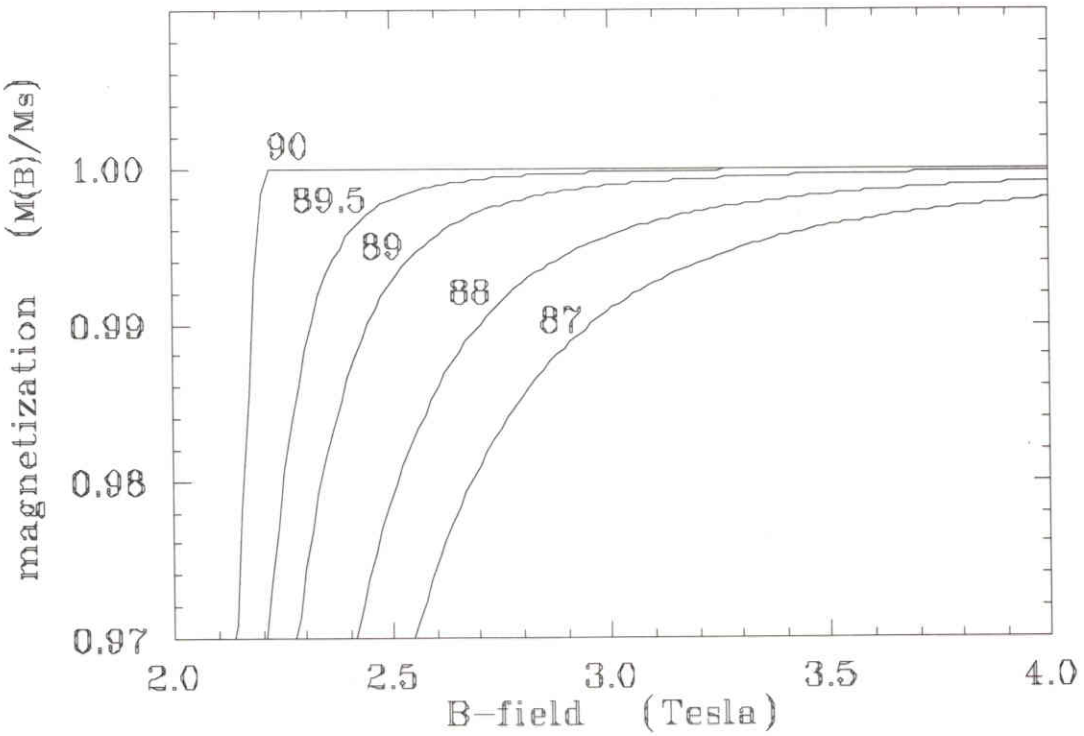


- Changing phase may change what part of pulse gets through slits
- If polarization changes across laser pulse, changing phase may change the measured polarization
- Checked laser phase dependence with Hall A laser on and using slits to reduce Hall C current (note: not "real" G0 beam)
- No apparent dependence on laser phase

Insertable Half–Wave Plate



Other tests



- Beam position tests
- Target position tests - "wrinkles" in target?
- No discernable effect in either

Summary

- Møller measurements seem relatively independent of:
  - → Beam current (small lever arm!)
  - → Target thickness (at least up to 10 μm
  - → Laser phase
  - → Beam position on Møller target
  - → Target position
  - → Hall A – when using slits!
- Møller is affected when Hall A is on and using attenuator to reduce current
- Need to examine G0 data further to see if there are inconsistencies a la RSS