Update on the AGS CNI Polarimeter

- Overview of CNI polarimeter
  - Kinematics
  - Set up
  - Features
- AGS noise study update
- Schedule for installation and operation

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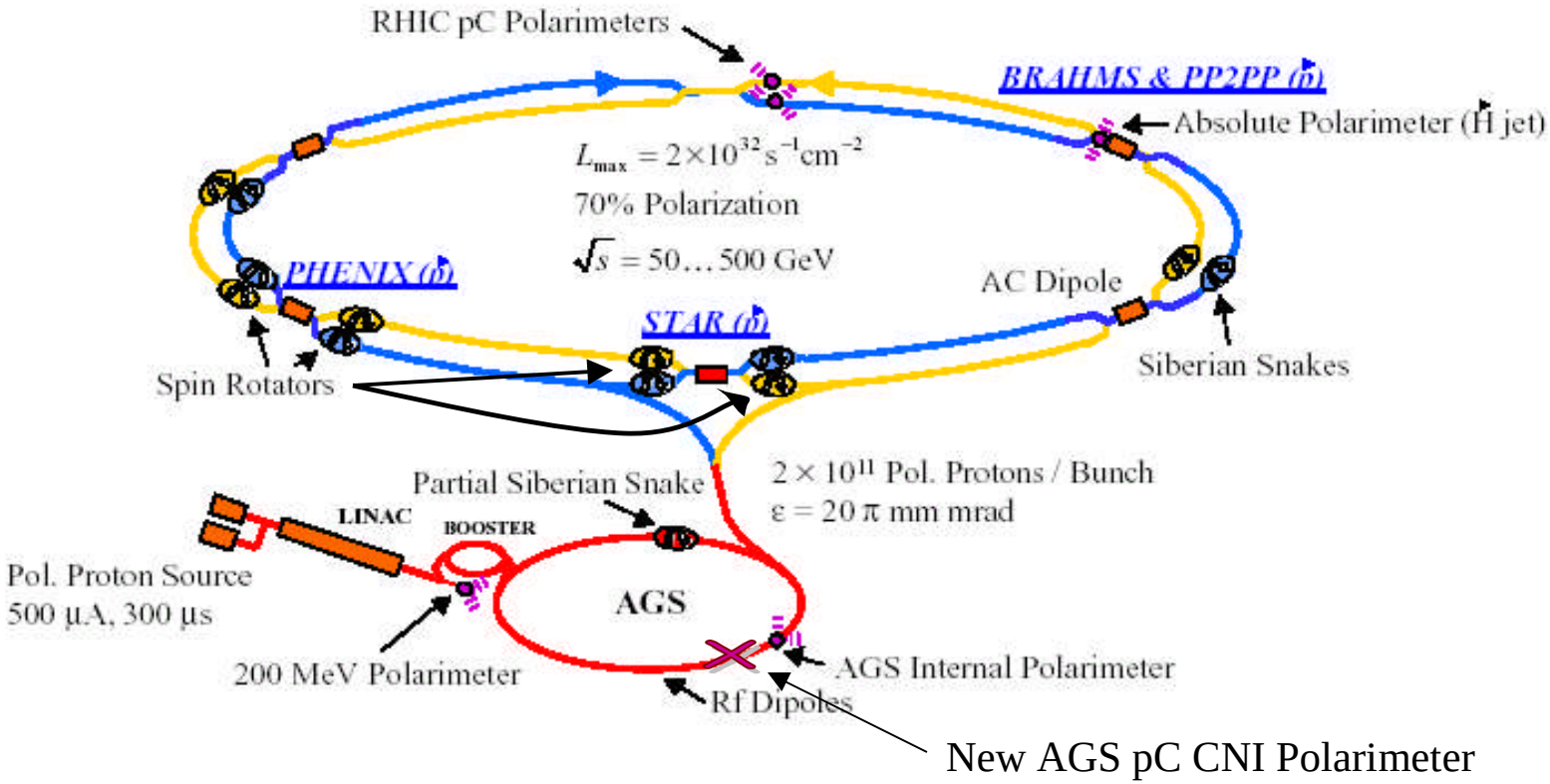
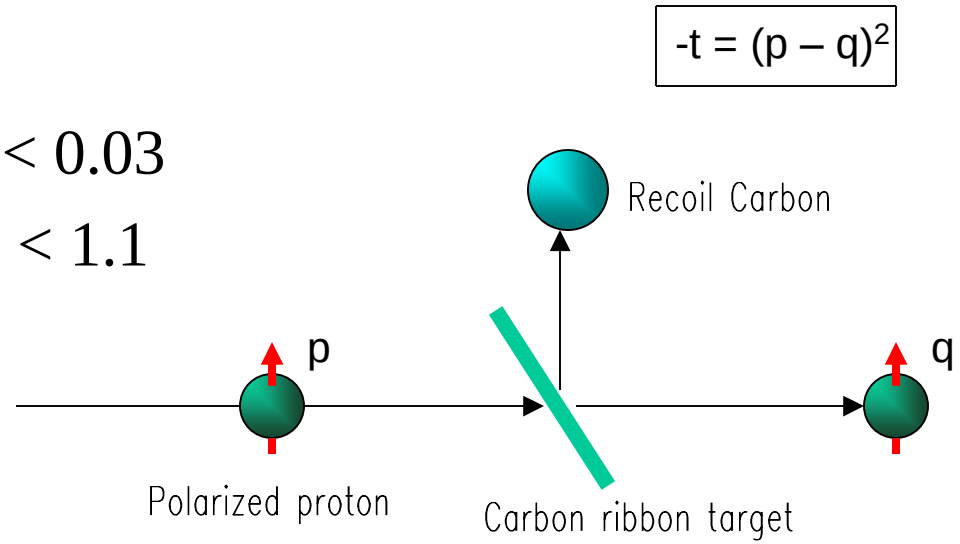
RHIC Spin Layout



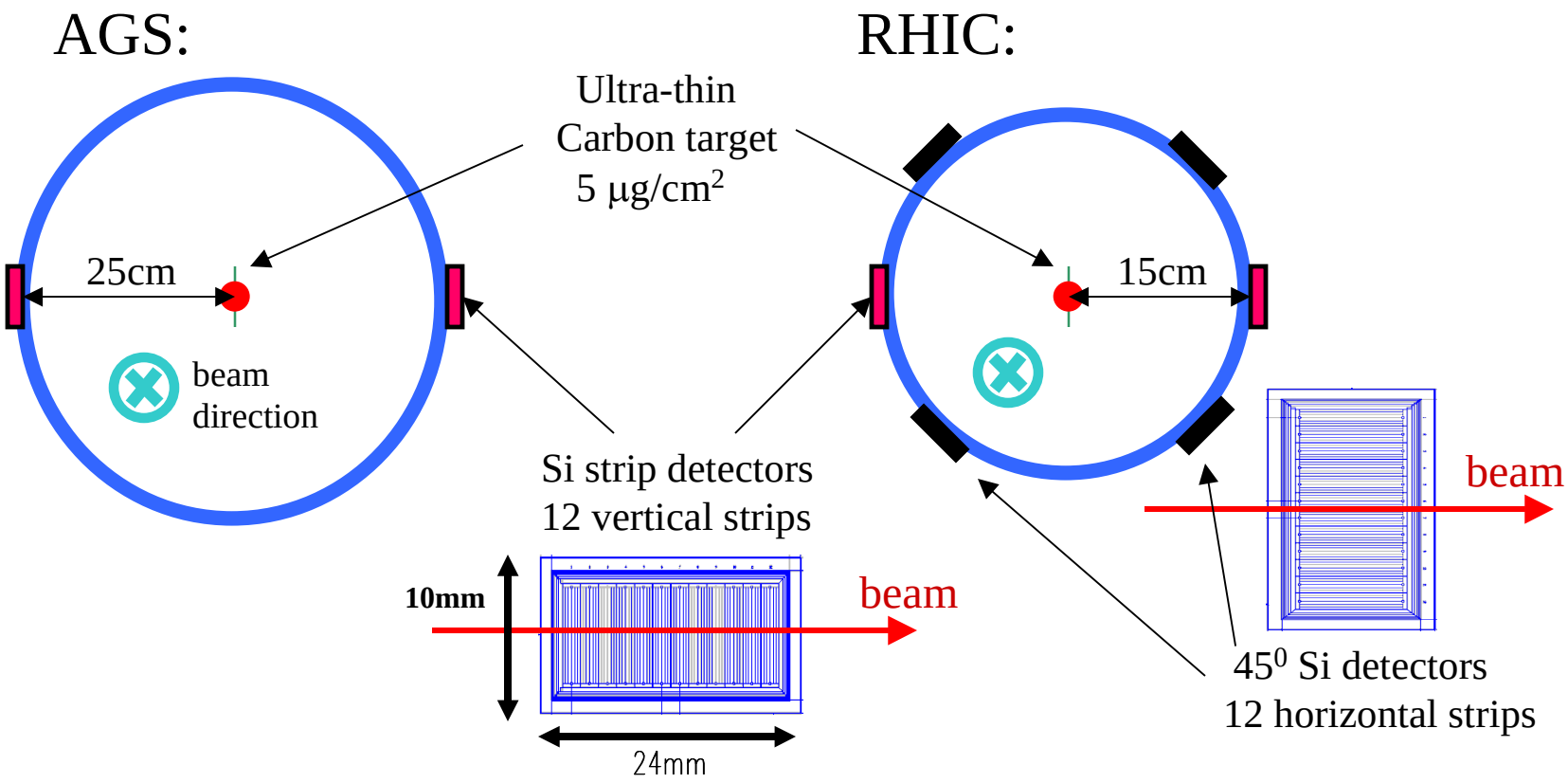
Kinematics of pC CNI Polarimeter

pC elastic scattering in the Coulomb-Nuclear Interference (CNI) region

- $A_N \propto Im(\phi^h_{non-flip} \times \phi^{em*}_{flip})$
- Measure recoil Carbons at ~90 deg.
- Calculate left-right asymmetry
- Kinematic range:
  - $0.003 < -t\ (GeV/c)^2 < 0.03$
  - $0.1 < T_{recoil\ C}\ (MeV) < 1.1$
  - $60 < tof\ (ns) < 170$



Experimental Setup



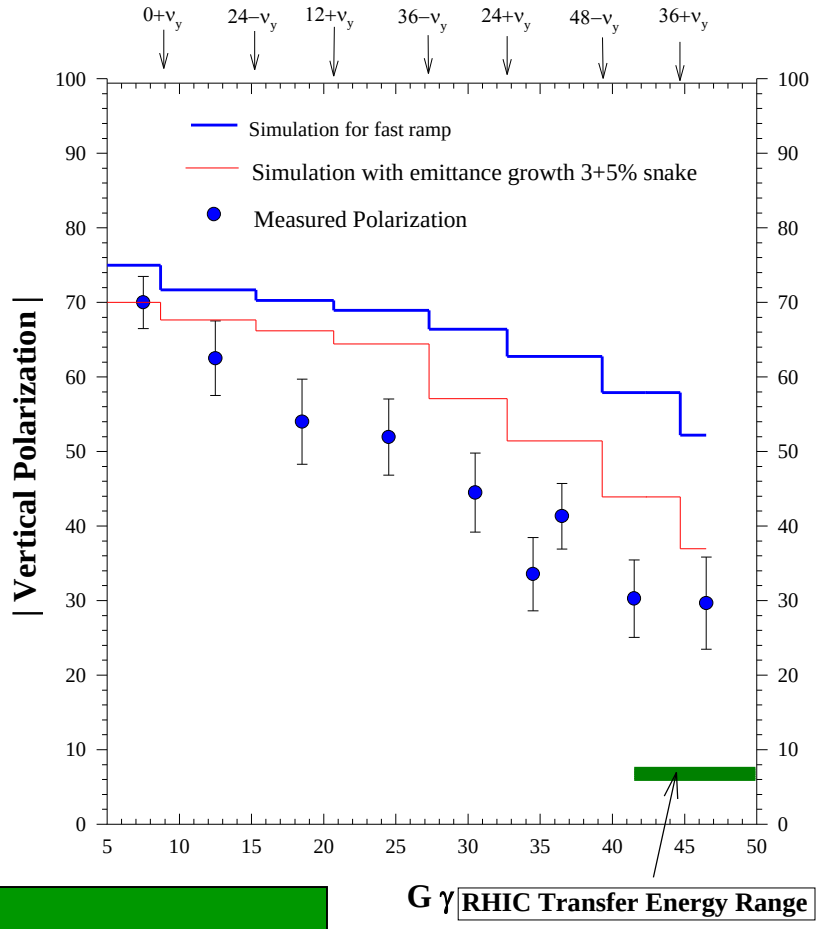
- thin carbon target is moved into the beam for measurements
- AGS target width: 600 μm RHIC: 5 μm

AGS Performance in 02

Red line: Simulation with 2002 running conditions, 70% as input from LINAC. Emittance taken as measured.

ν_x =8.70, ν_y =8.80 for most resonance except 36+ ν_y with ν_x =8.68, ν_y =8.90 and ac dipole not fired.

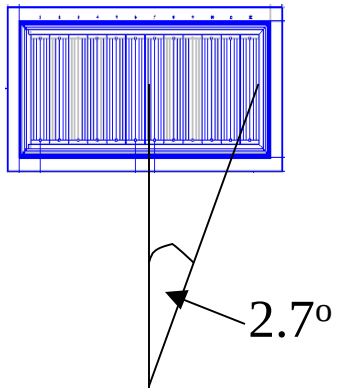
Blue line: Simulation with fast ramp rate and more tune separation at 36+ ν_y and good betatron tunes for 48-ν_y.



New polarimeter is expected to help avoid polarization losses

New AGS CNI Polarimeter will help

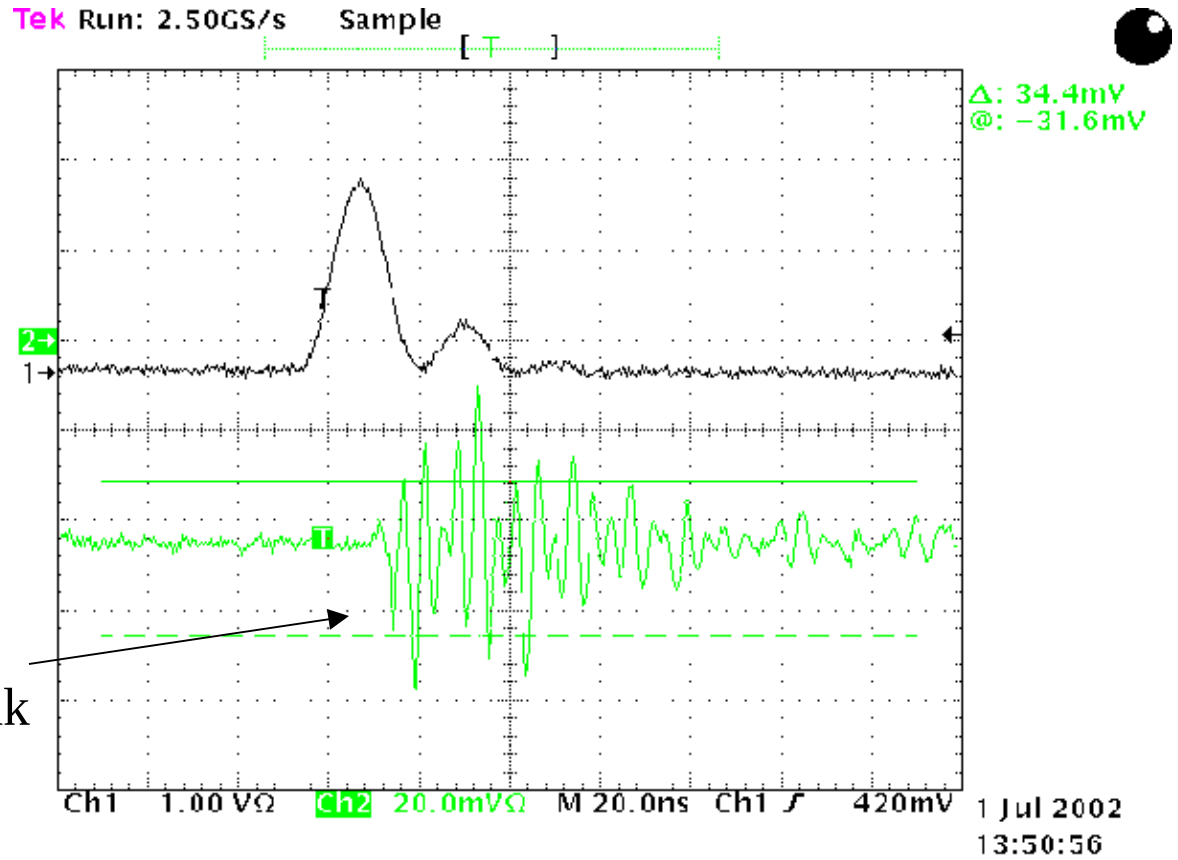
- Fast feedback for machine tuning
  - No dead time
  - ~1M events/s (with 6 bunches in AGS)
- Ability to measure during the ramp
  - Can measure 2 ms bins with several ramps
- Detector acceptance throughout AGS momentum range ($2.27 < p_{beam}$ (GeV/c) < 24.32)



Acceptance:
90^o +/- 2.7^o
Worst case recoil angle:
$\theta_{recoil} = 88^o$
(at p=2.27, -t=0.03)

Update on AGS Noise Study

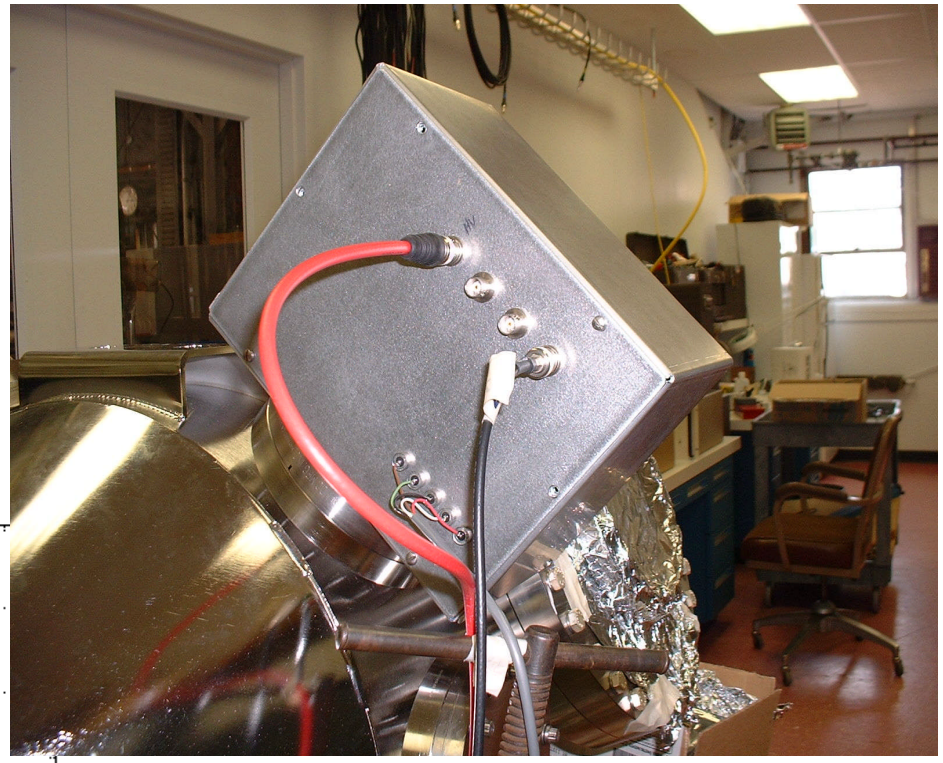
- Reflection signal from passing bunches seen in RHIC and AGS
- Pulsed wire tests
  - Current pulse sent through chamber
  - Signal induced on detector

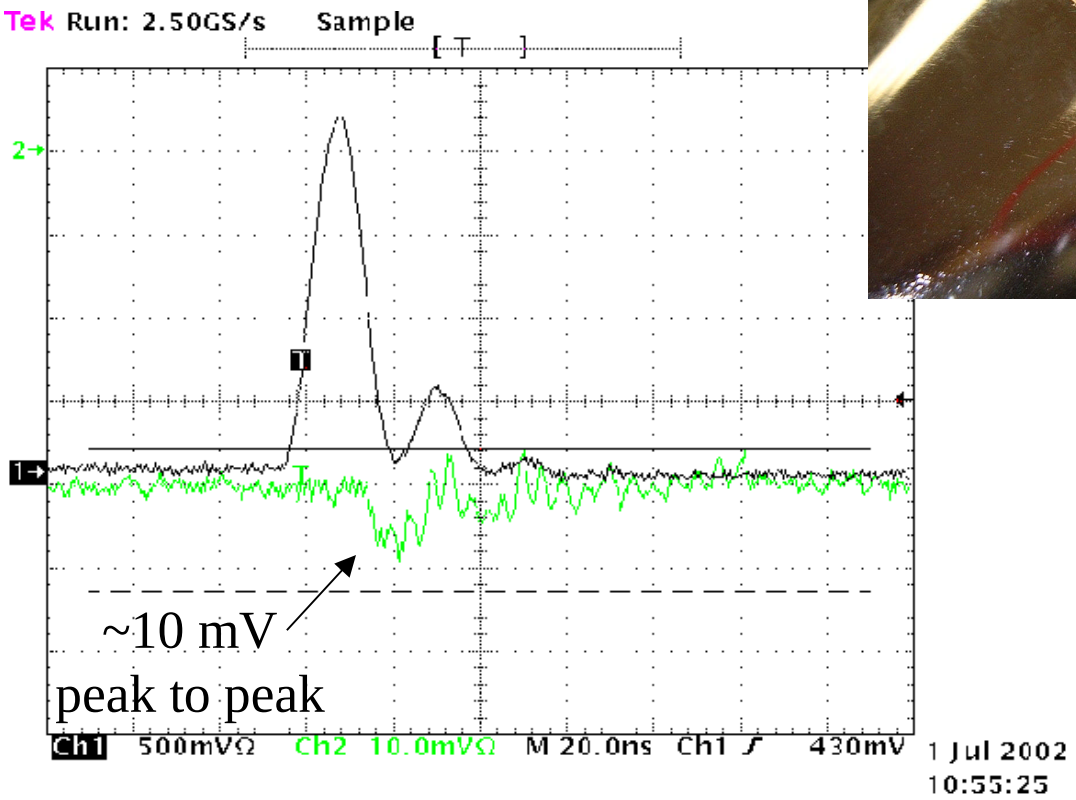


~60 mV
peak to peak

Shielding Box

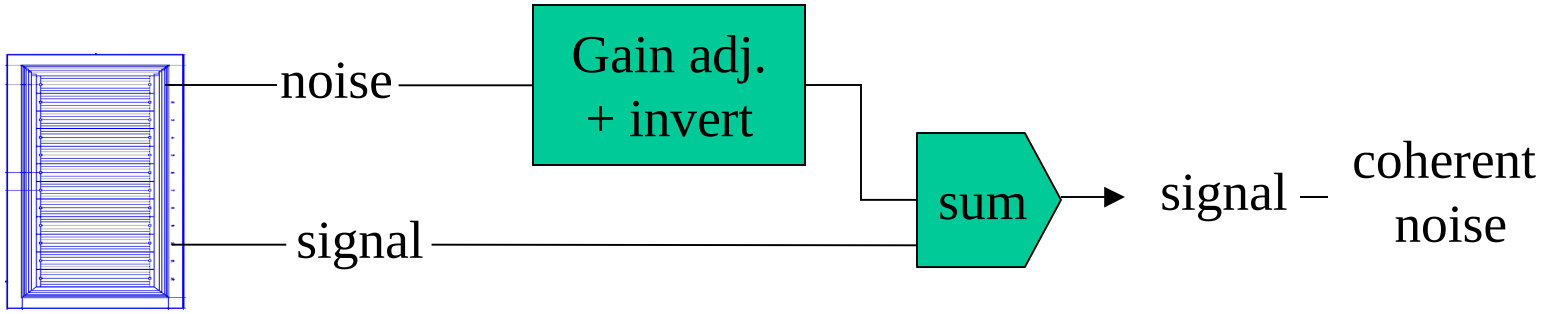
Addition of shield box reduces signal size





- Effect on measurement is minor
  - signal persists for ~60 ns

Noise Subtraction



- Build a new module based on experience from E950

  Or

- Use WFD – if possible

Noise difference between left and right may cause problems

Installation Schedule

First beam in AGS scheduled for 10/15

- Installation of chamber must be complete
  - Chamber itself – motor tests complete 9/15
  - Detectors – ready
  - Preamps – arriving end of Sept.
  - Cables – pulled first week in Oct.
  - Targets – delivered from IUCF by end of Sept.

Commission/Operation Schedule

- Set up DAQ
  - New WFD modules – arrive mid-Nov.
  - Program WFDs – Nov./Dec.
  - Shapers, Bias Volt. Supply, etc. – in hand
- May try dC scattering during RHIC commissioning in Dec.
- First pol. p in AGS – Jan.

Summary

- AGS CNI pol. will provide fast feedback for machine tuning
  - Minimize polarization loss
- Noise studies look promising
- Installation by 10/15
- Polarized p beam in Jan.