# pp2pp Running Plan for Year-2 (2003)

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for

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## Elastic and Total Cross-Section Measurements in Polarized Proton-Proton Scattering

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For the pp2pp Collaboration

### Outline of the Talk

1. Short Introduction
2. Summary of Year-1 Run
3. Plan for Run in 2003





## pp2pp Physics Programme

Primary Goal:

Study of total and elastic cross-sections in polarized proton-proton scattering over a large kinematic range

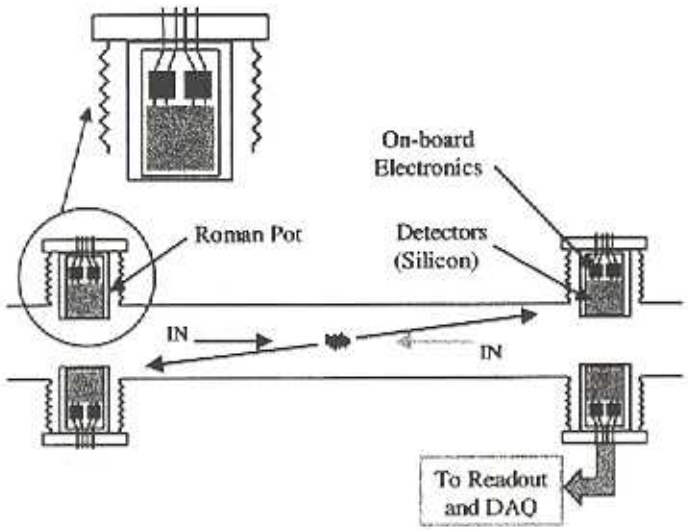
$$50 \leq \sqrt{s} \leq 500 \text{ GeV}/c$$

$$4 \cdot 10^{-4} \leq |t| \leq 1.5 \text{ (GeV}/c)^2$$

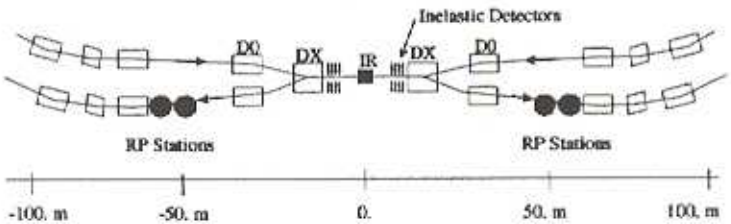
Measure

- Kinematic dependence of $\sigma_{tot}$ and $d\sigma_{el} / dt$
- $s$ dependence of nuclear slope parameter, $b$
- Ratio of real to imaginary part of forward scattering amplitude, $\rho$
- Spin asymmetries $A_N$, $A_{NN}$, $A_{LL}$

# pp2pp Detectors in Year-1 (2002)




RHIC Intersection Region with PP2PP Basic CB Setup



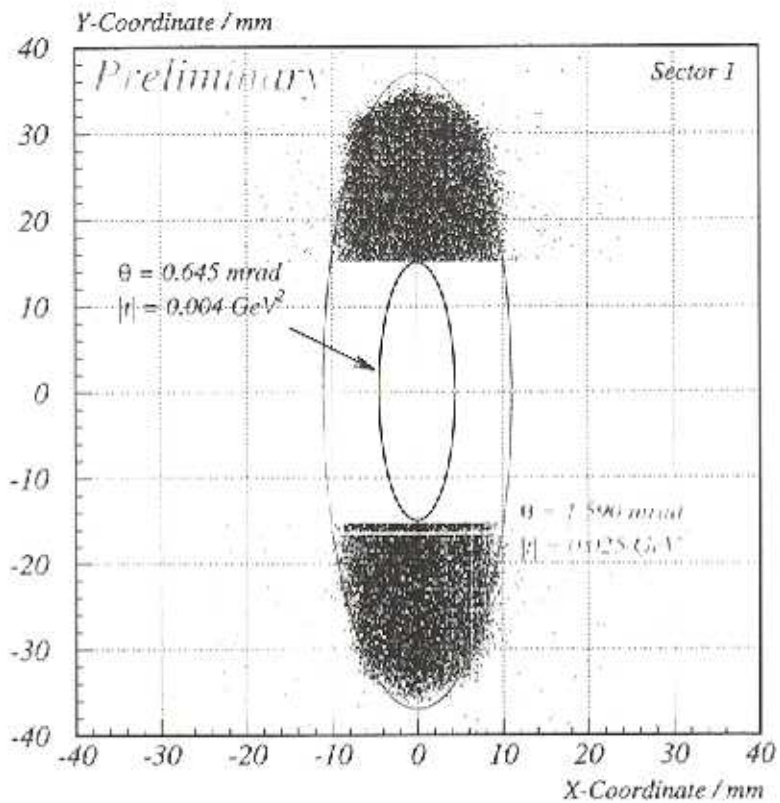







# Conditions during Run in Year-1 (2002)

- 4 Roman Pots total equipped, each with
  - 2 X silicon microstrip detectors
  - 2 Y silicon microstrip detectors
  - 1 trigger scintillator (8 mm thick)
- 15 mm proximity of first detector strip to beam covering $4 \cdot 10^{-3} \leq |t| \leq 0.03\ (\mathrm{GeV}/c)^2$
- 4 planes of inelastic scintillator counters on either side of the IP (covering $2.4 < |\eta| < 5.3$)
- Average beam intensity of $4.4 \cdot 10^{11}$ protons in either ring with 55 bunches $\Rightarrow$ $L \approx 1.2 \cdot 10^{28}\ \mathrm{cm}^{-2}\ \mathrm{sec}^{-1}$
- Special tune of $\beta^* = 10$ m
- Beam emittance reduced to about 12 $\pi$ mm · mrad via scrapping
- Collected about 400,000 elastic triggers






# Plan for Run in Year-2 (2003)

- Replace silicon detectors to improve efficiency and coverage
- Have 4 fully equipped Roman Pot Stations
- Reduce minimum distance of detectors from beam to reach lower $t_{min}$ increasing coverage to $2\text{-}3\cdot10^{-3} \leq |t| \leq 0.03\ (\mathrm{GeV}/c)^2$
- Increase maximum allowed intensity to ~$10^{12}$ protons per beam (safety issue) ?
- Include Van-der-Meer scans for luminosity determination
- Collect about 2-3 million elastic triggers to reduce statistical error
- Achieve accuracy $\delta A_N \approx 0.002$ and $\Delta\sigma_{tot} \approx 3\%$
- Need 1 day commissioning and 2-3 days for data taking (depending on beam efficiency, 50% ?)