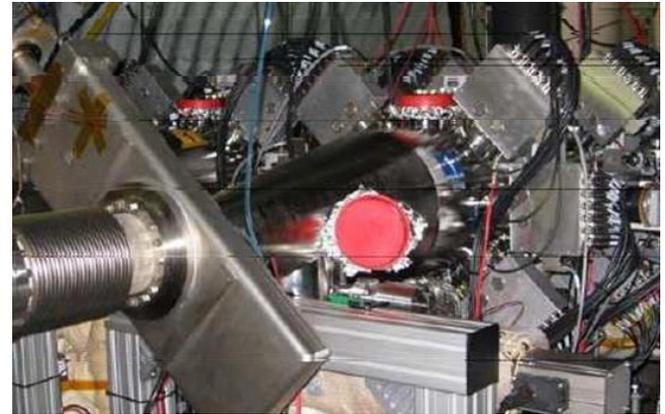
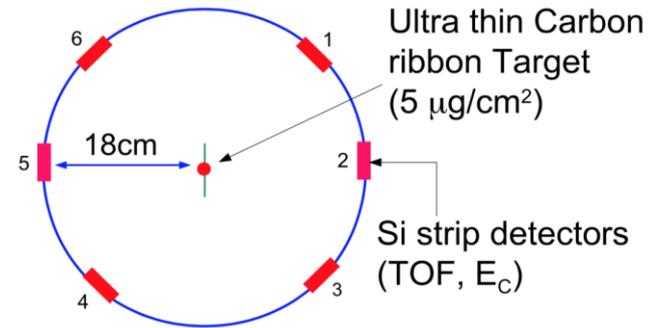


# Local Hadron Polarimetry

- Measurement of the polarization vector at the interaction point (IP-6)
  - Inside spin rotators and crab cavities
  - Ensure longitudinal polarization orientation
- Non-destructive with minimal impact on beam lifetime
- Rapid, quasi-online analysis for fast feedback during accelerator setup
- Elastic recoil from ultra-thin Carbon target
- Silicon strip detectors
  - Measure energy and time-of-flight
- Move part of the setup from RHIC IP-12 to EIC IP-6
  - Vacuum chamber, target station, detector chambers
- Modify detector setup for improved inelastic background rejection
- Modify readout for reduced bunch spacing
- Identify adequate target material for EIC conditions
  - Target heating from beam



# Subsystem Interest – Local Hadron Polarimetry



**Please indicate the name of the contact person:**

Oleg Eyser ([keyser@bnl.gov](mailto:keyser@bnl.gov))

Bill Schmidke ([wshmidke@bnl.gov](mailto:wshmidke@bnl.gov))

**Please indicate all institutions collectively involved in this subsystem interest:**

Brookhaven National Laboratory (Physics, CAD)

**Are you interested in joining a new consortia towards a new EIC experiment at IP6:**

Yes

**Are you interested in actively participating in the detector proposal preparation for a new EIC experiment at IP6:**

Yes

**Please indicate the items of interest for potential equipment cooperation:**

- Local hadron polarimeter will be very similar to setup at IP-12 (absolute and relative polarimetry)
- Vacuum chambers:
  - Vacuum chambers exist for single and double polarimeter setup
  - Modification may be necessary
- Si strip detectors
  - Improved design for inelastic background rejection
  - May affect the vacuum chambers
- Readout & DAQ
  - Collision rate will require better resolution of waveform analysis (ASIC)
  - DAQ will need to be upgraded / replaced

# Subsystem Interest – Local Hadron Polarimetry



## Opportunities for engagement of other groups / institutions or areas where help is needed:

- Readout & DAQ is currently assuming to take advantage of general EIC developments
- Detector modifications will be tested in RHIC Runs 2022/2024
  - Production of Si layers with minimally invasive support frames
  - Simulation and data analysis
- Target development will be crucial for high luminosity measurements
  - Collaboration with Center for Functional Nanomaterials to study target materials and production

## Any additional information you think may be useful for the community to know about your subsystem interest for a new EIC experiment at IP6 (Prior experience, R&D programs, institutional infra-structure, in-kind contributions etc.):

- Local polarimetry is very similar to polarimetry at IP-12 and BNL has experience from 20+ years of RHIC operations
- EIC luminosities are a challenge
  - Target lifetime from sublimation is problematic
  - Potentially other physics processes are being discussed
    - Forward neutron production (requirements for local polarimetry less stringent, but space may be an issue)
- R&D efforts are supported by CAD until 2024
  - Detector modifications
  - Feasibility studies of He3 polarimetry (beam break-up, size of analyzing power)