Polarim. tests early 2020's: d, h

W. Schmidke
BNL EIC polarim. mtg.
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Beams available (Haixin):

- d: unpolarized in AGS, RHIC
  (already done, e.g. dAu 2016)
- h: polarized in AGS,
  lower polarization after ramp in RHIC

Jet target beams available (Anatoli):

- d: polarized
- h: polarized

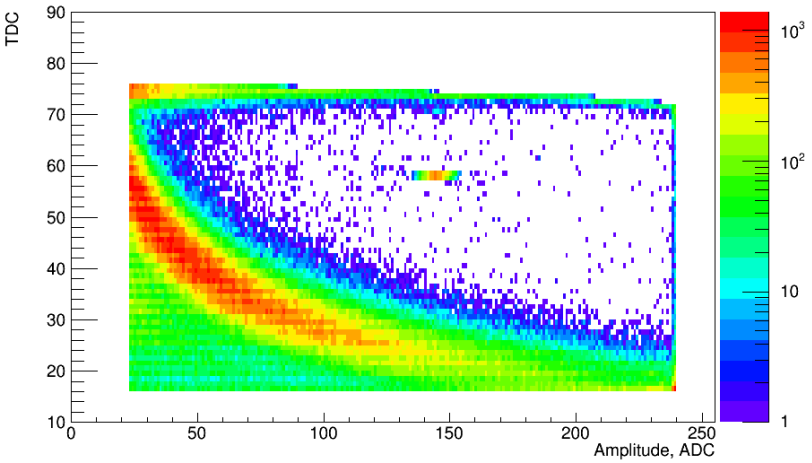
pC polarimeters

- in AGS, RHIC

Polarimeter studies

pC polarimeters:

- unpolarized beam:
  - check TOF vs. E_{kin} (carbon bananas):
- polarized beam:
  - beam asymmetry

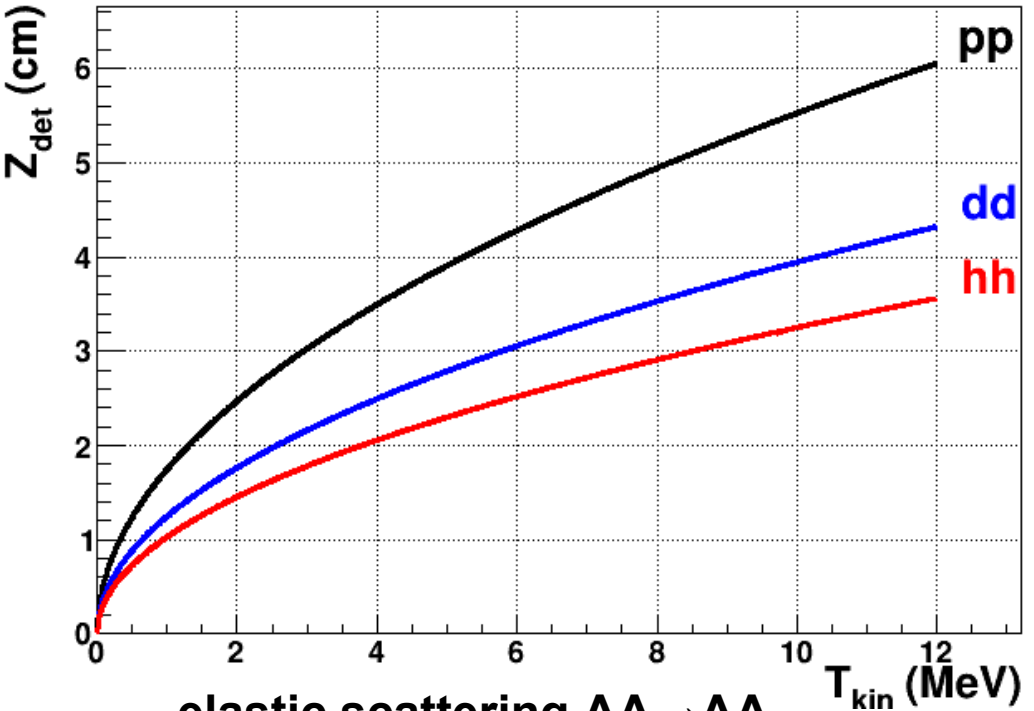


Jet target:

- unpolarized beam:
  - check TOF vs E_{kin}

    different p,d,h 'bananas'
  - check scat. angle vs. E_{kin}

    different for pp, dd, hh:
- polarized target:
  - target asymmetry
- polarized beam:
  - beam asymmetry
- polarized beam & target:
  - P_{beam}/P_{target}

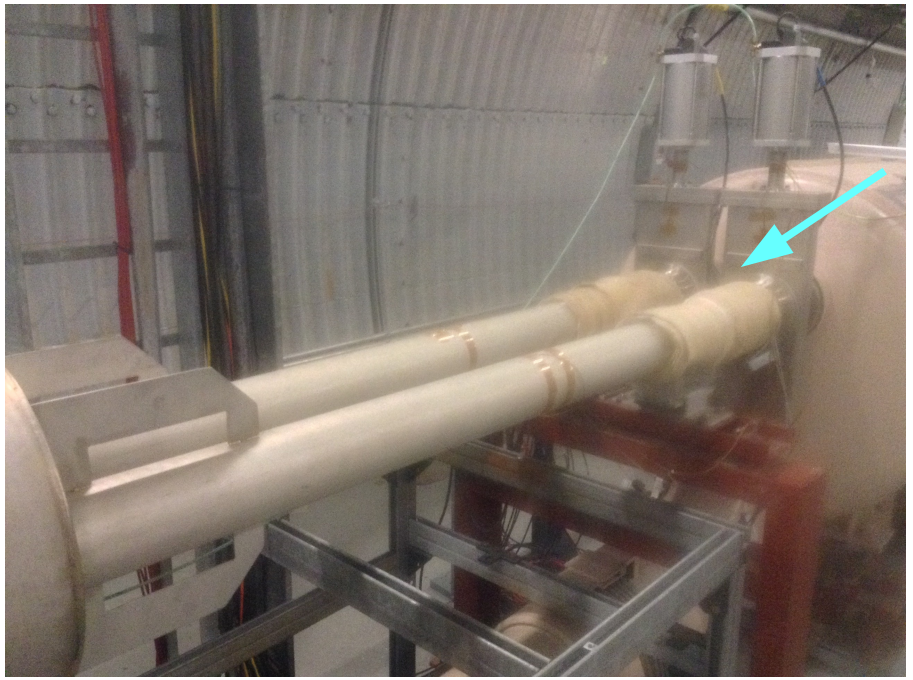


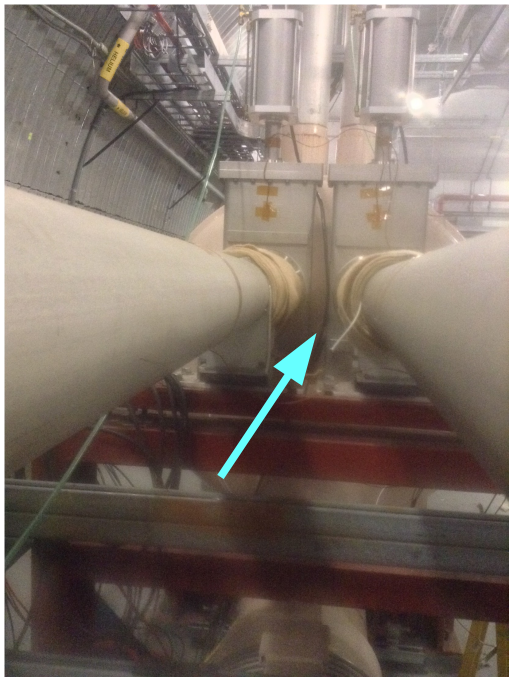
elastic scattering AA→AA
P_{beam} = 100 GeV
target → detectors 75 cm

Polarim. additions early 2020's: d, h

Easy (noninvasive) polarimeter upgrades (outside vacuum):

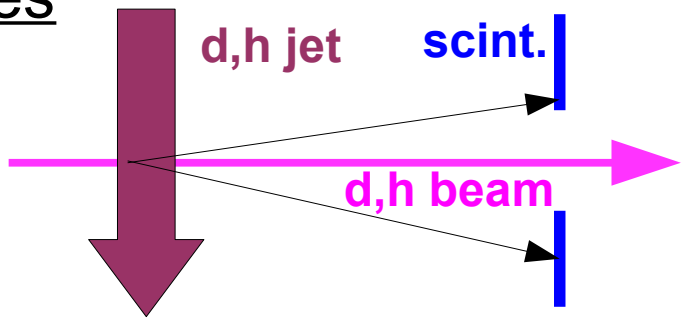
- ZDC (spare PHENIX) 18m from Hjet
  tag n spectators from d, h breakup





Harder (invasive) polarimeter upgrades (inside vacuum):

- Scintillators inside beampipe, downstream of jet target
  tag target, beam breakup



Scenarios

- AGS: studies can be done behind (any?) RHIC physics stores
- RHIC: need dedicated beam time - APEX
  parasitic other APEX studies?

question: APEX RHIC beams always same as physics beams?

Availability timelines?

Beams

- d in AGS:
- d in RHIC:
- h in AGS:
- h in RHIC:
- h↑ in AGS: 2022
- h↑ in RHIC: 2022

Jet targets

- d:
- d↑:
- h:
- h↑:

From Haixin

- On d beams:

- "The biggest problem is the source. If we have a polarized deuteron source, then it is not a problem. There is no polarization loss expected in the AGS and Booster. So whatever asymmetry you measured should be the full polarization. I will check with JLab about if they have polarized deuteron source. Last month, I was told by Wolfram not to work on polarized deuteron related work. We published a paper on feasibility of polarized deuteron in EIC in Feb. His comment is to remind me that should be it. But this can change if there is new demand to work on polarized deuteron."
- "I just got reply from JLab. They don't have polarized deuteron source or any ion source. So if want to do it, we need to develop it on our own. COSY in Germany has deuteron source, and some labs in Russia also use it."
- "For deuteron, yes it can only be unpolarized."

- On h beams:

- "The polarized He3 source supposed to be ready next year. The additional solenoid was planned to be ready by the end of this year for higher gold intensity. Then the polarized He3 beam test can follow next year. In 2022, we should be able to work on polarized He3 beam."
- "For He3, it is possible to be polarized at flattop but lower polarization. We don't expect that polarization to be completely lost in RHIC with two snakes. The other option is to stop before the strongest resonance at a lower energy.

From Anatoli

- On jet polarimeter target beams:

“we plan to further upgrade polarized H-jet polarimeter for operation at EIC.

We also consider building un-polarized H-jet cluster target with thickness 10^14 atoms/cm^2.

Polarized deuteron target can be produced by H-jet.

Polarized He-3 target, polarized by metastability exchange technique is also under consideration.”