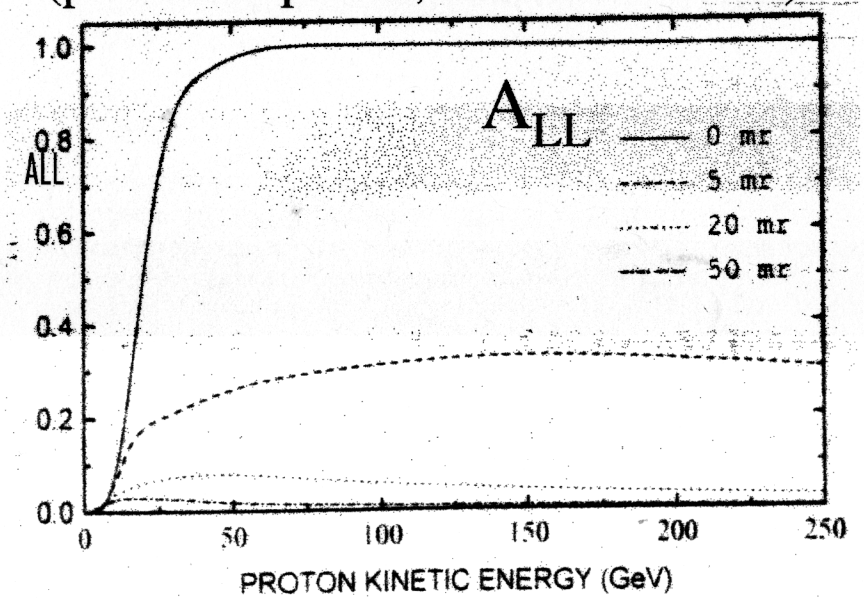
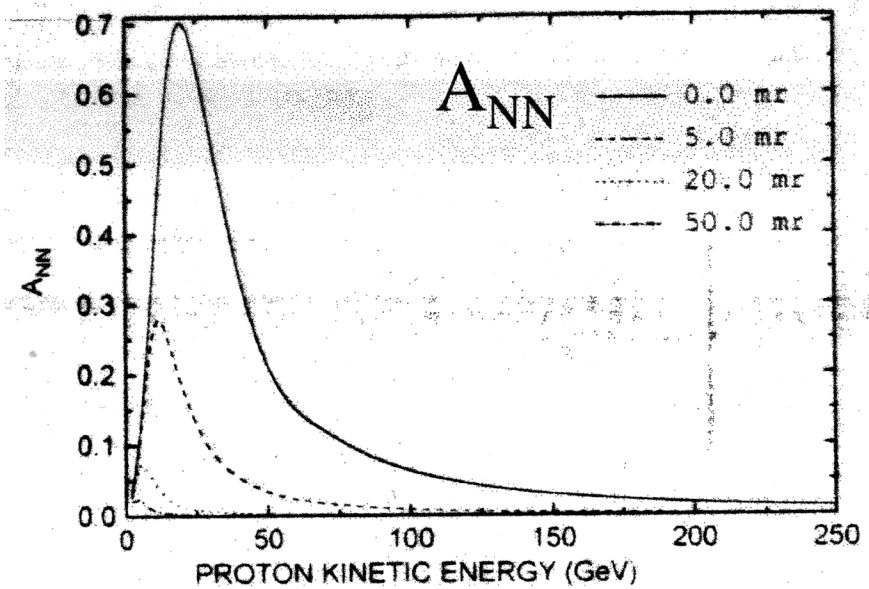
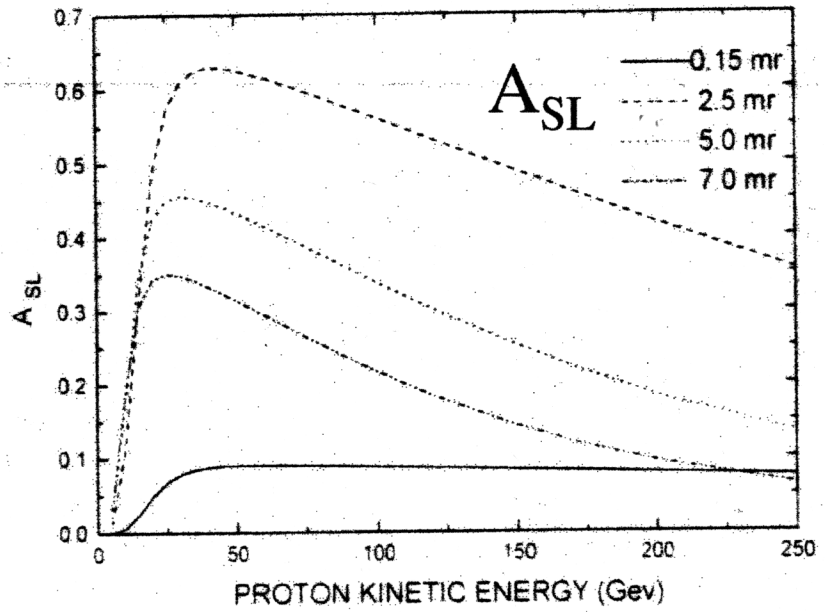
Asymmetries

- A_{LL}-expensive
- A_{NN}-small (<1%) in the interesting kinematics
- A_{SL}~0.1-0.4
- A_N single spin l-r asymmetry
  Transv. pol. proton on unpol. electron
  Mott-Schwinger, very low Q^2

(p on fixed proton, Glavanakov et.al)







Fixed Target

Electrons at rest from gas jet target

Particles bend out for detection

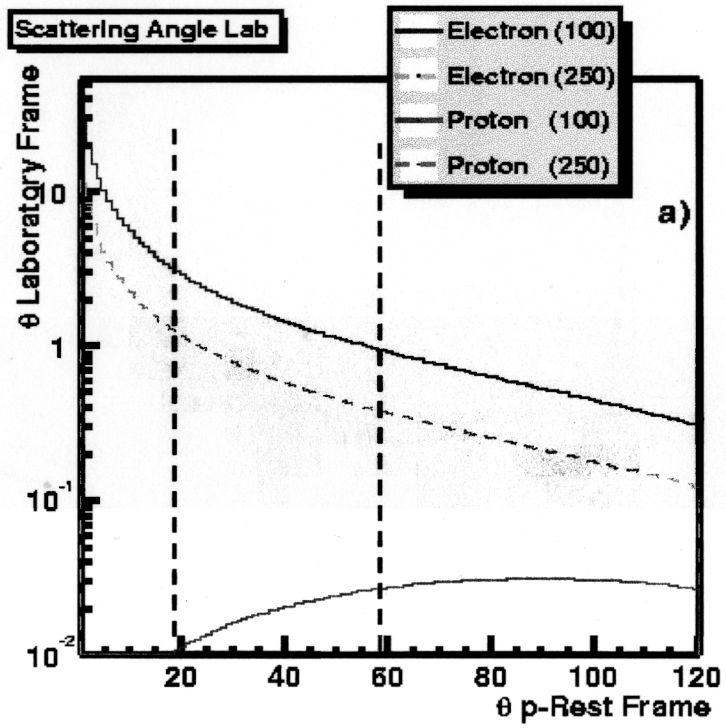
Background from pp ?!

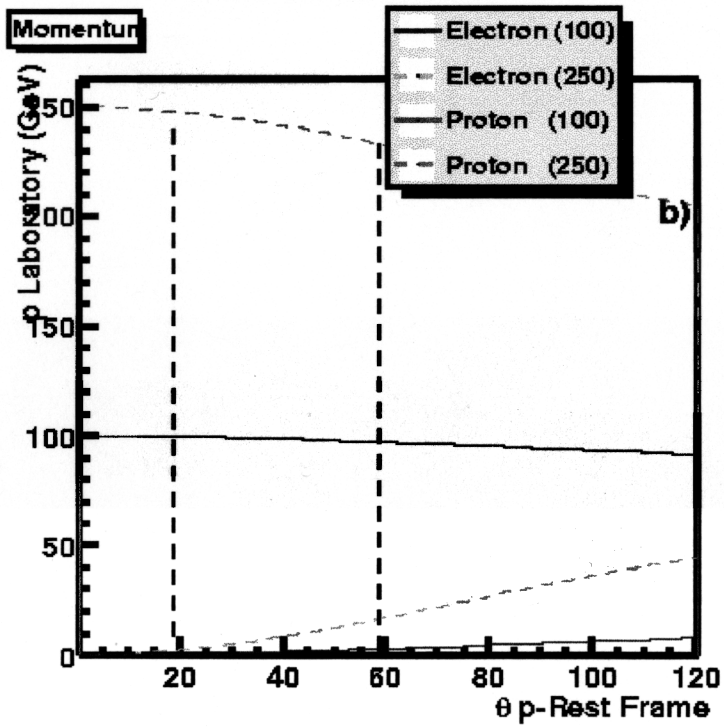
Assume: 10^11 atms/cm^2

Pe=1. Pb=0.5 ANN~0.01 ASL~0.1

Free electron target ? – No background !

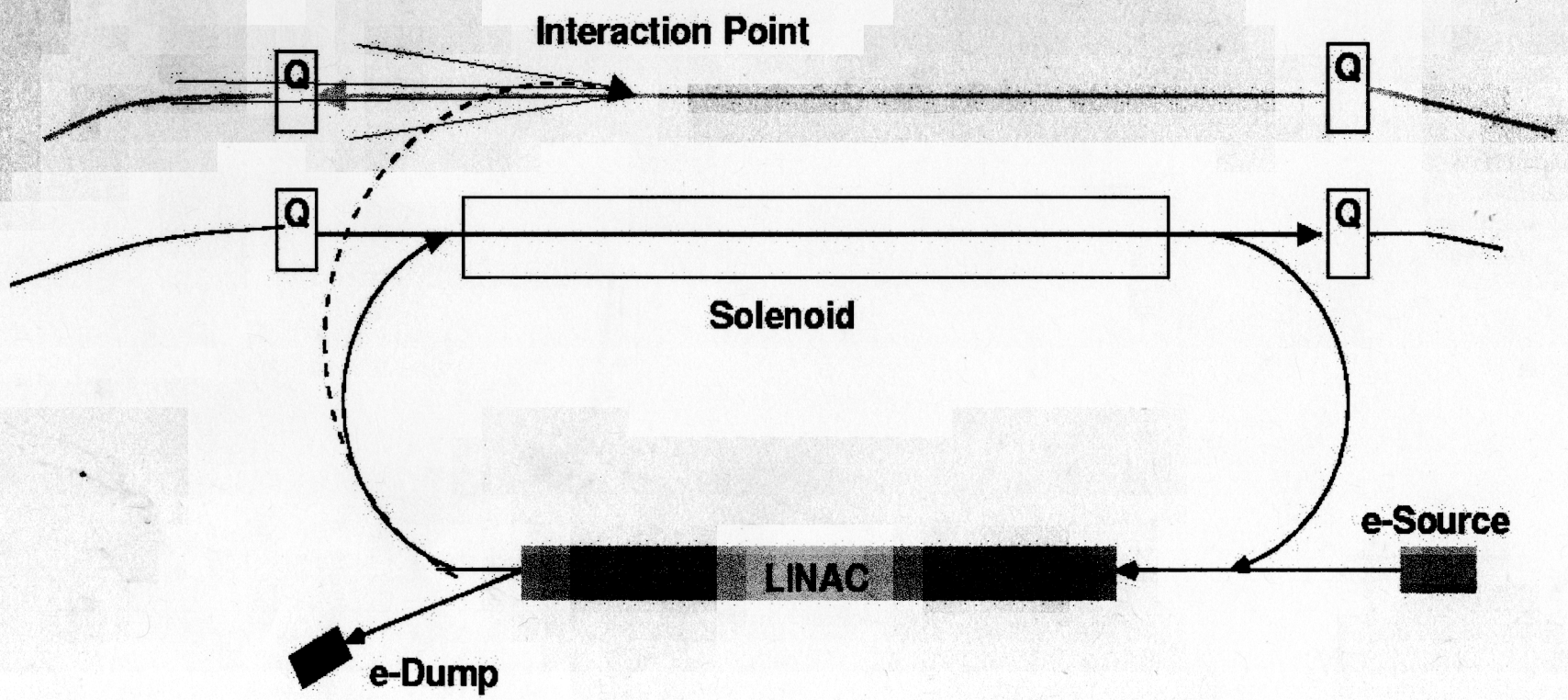
Pp (GeV)	100	250
X-section (mb) $20<\theta_{p\text{-rest}}<60$	1.3	0.2
Hz	30	12
dA_{NN}/A_{NN} (10hrs)	~0.2	~0.3
dA_{SL}/A_{SL} (10hrs)	~0.02	~0.03



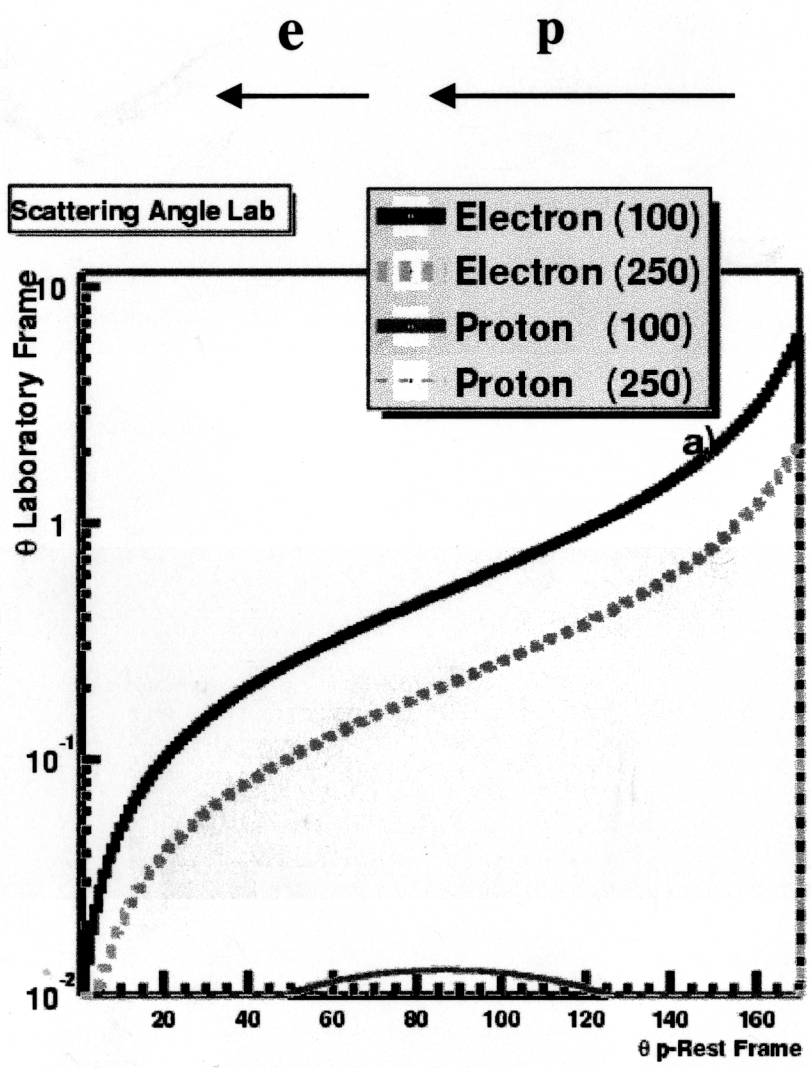


Electron Cooler

- Electron parallel to Au beam in solenoid
- Ee~50MeV; Ie ~100mA
- Not used as cooler for protons, tune kinematics with Ee
- Can put polarimeter option into design
- Measure A_N, A_{SL}



Anti-Collider



(Glavanakov et.al)

- Electrons parallel to p-beam
- Ee~2Mev
- Large x-section and asymmetries
- Low Q2

⇒Small scattering angles and momentum change w.r.t. incoming part.

⇒Difficult to detect

Collider

Assume:

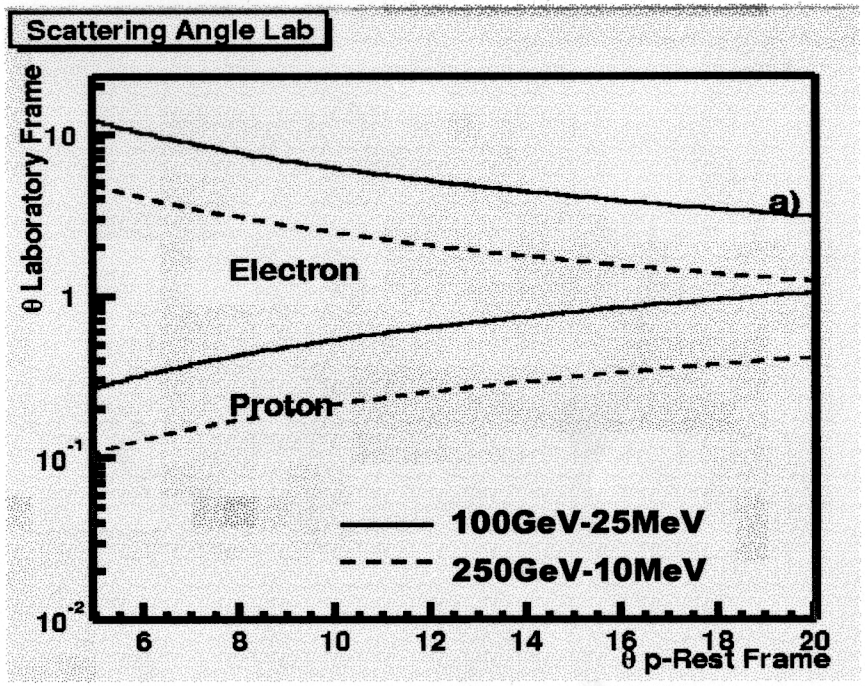
- Acceptance: 2π x 0.1-10 deg
- Luminosity: 2*10^31 $cm^{-2}s^{-1}$

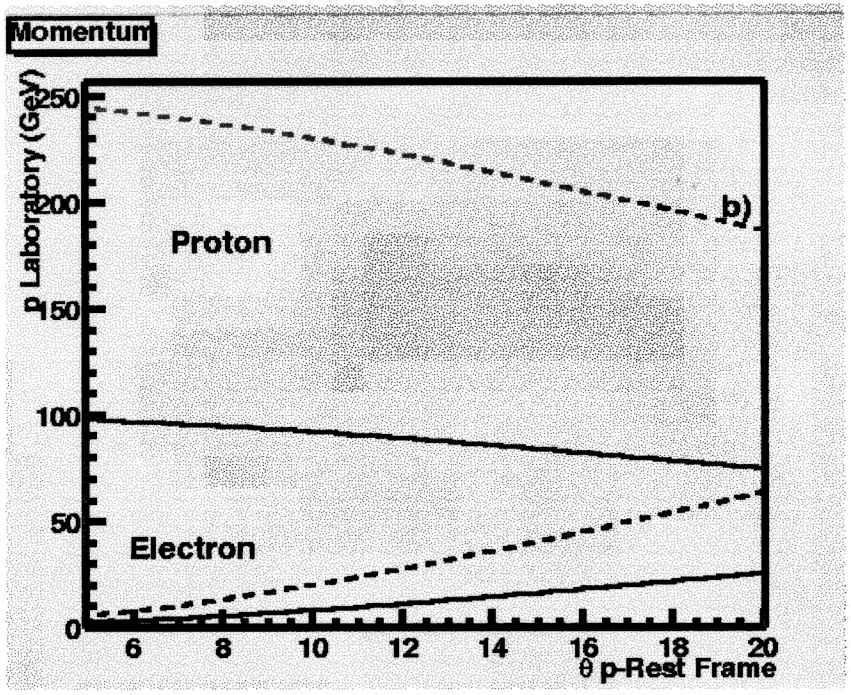
1% EIC, 10% pp Ie ~50mA (15mA)

- Polarizations: P_B=0.5, P_e=1

ASL measurable with 2% statistical uncertainty within a 10hr fill

Pp - Pe (GeV)	100-0.025 250-0.010
X-section (mb) $5<\theta_{p\text{-}rest}<20$	0.004
Hz	10
dA_{NN}/A_{NN} (10hrs)	~0.2
dA_{SL}/A_{SL} (10hrs)	~0.02





Summary

Ep from Gas Target:

-A_N, A_{NN} only

- pp-background, kinematics tricky

+comes with the target

Free electron target ? Measure A_N

Cooler

+if cooler is built see were we are in terms of pol. measurements

A_N, A_{SL} good options

anti-collider: large analyzing power but unfavorable kinematics

collider: favoured setup, needs 'cross over' e-beam

Polarimeter option could be included in the cooler design.