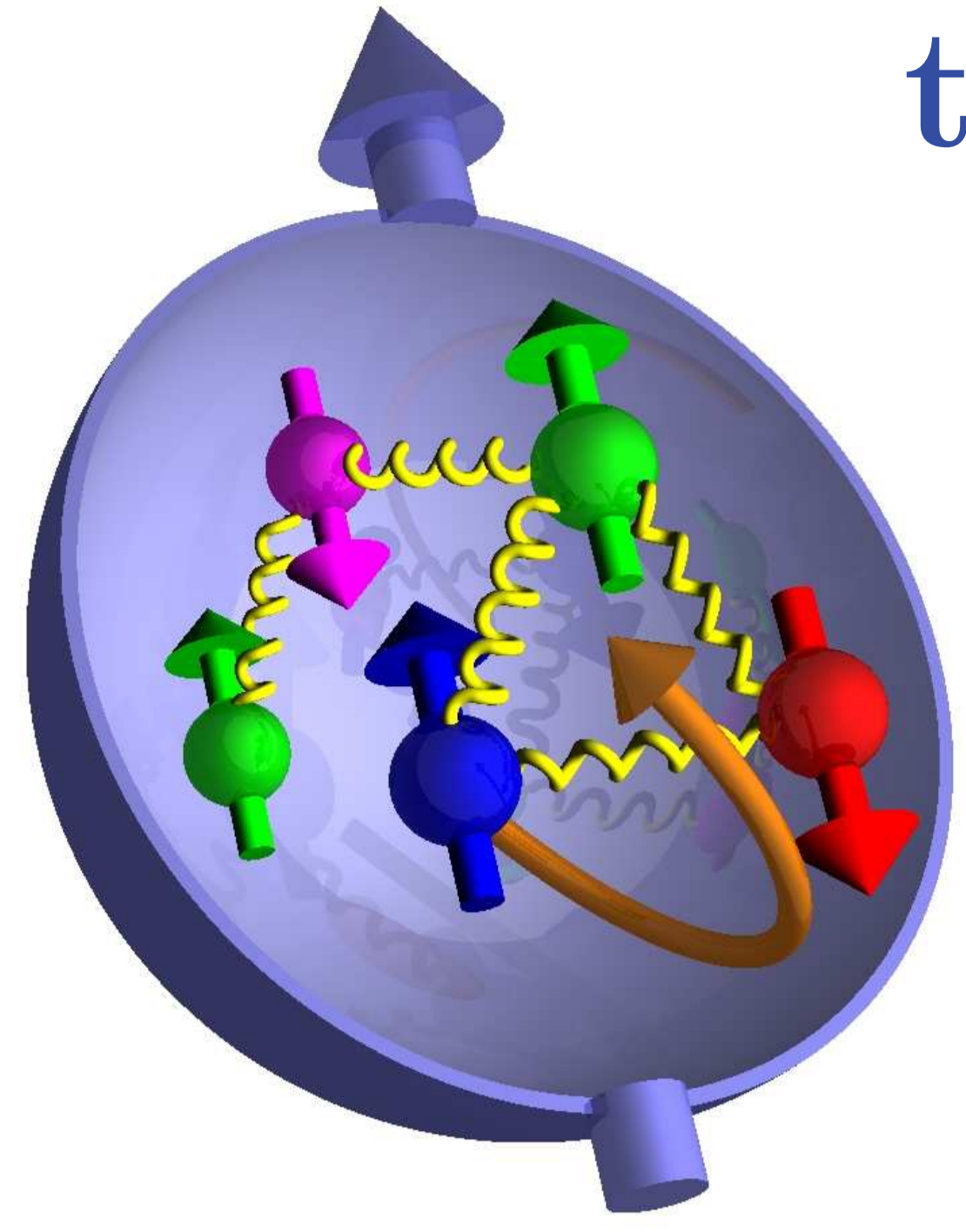


Further insights into the PROTON SPIN with the new HERMES RECOIL DETECTOR

Ignazio Vilardi

University of Bari, Department of Physics, Via Orabona 4 70126 Bari Italy
HERMES collaboration at DESY, Hamburg



quark spin

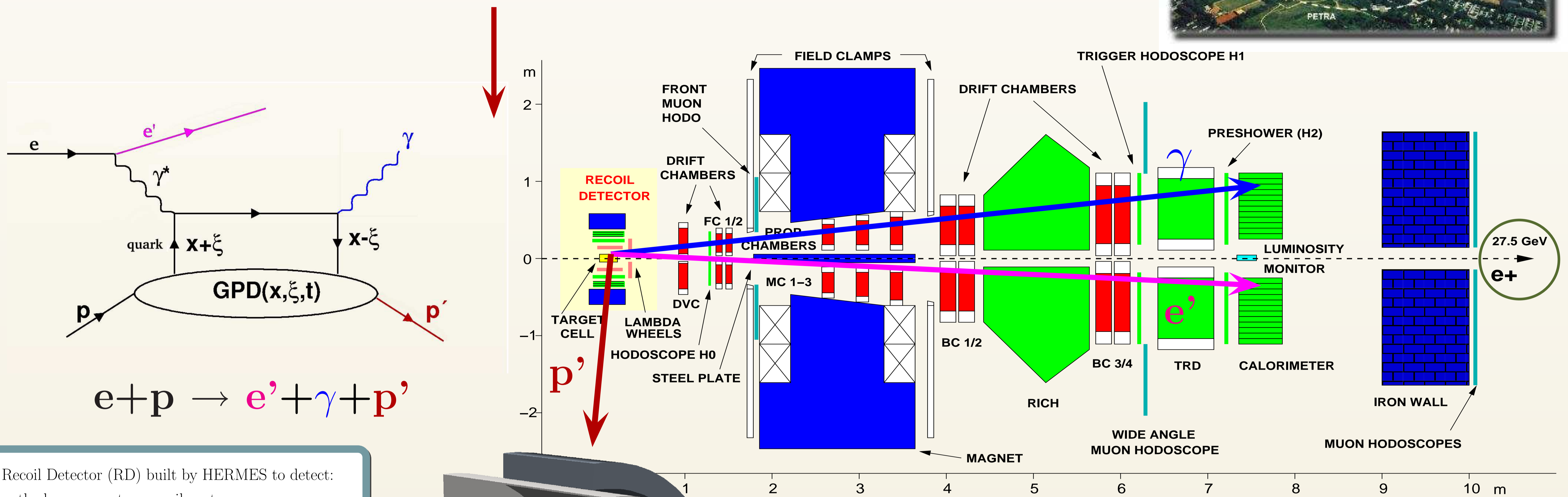
~ 30 %

Proton Spin

gluon spin?

quark orbital angular momentum?

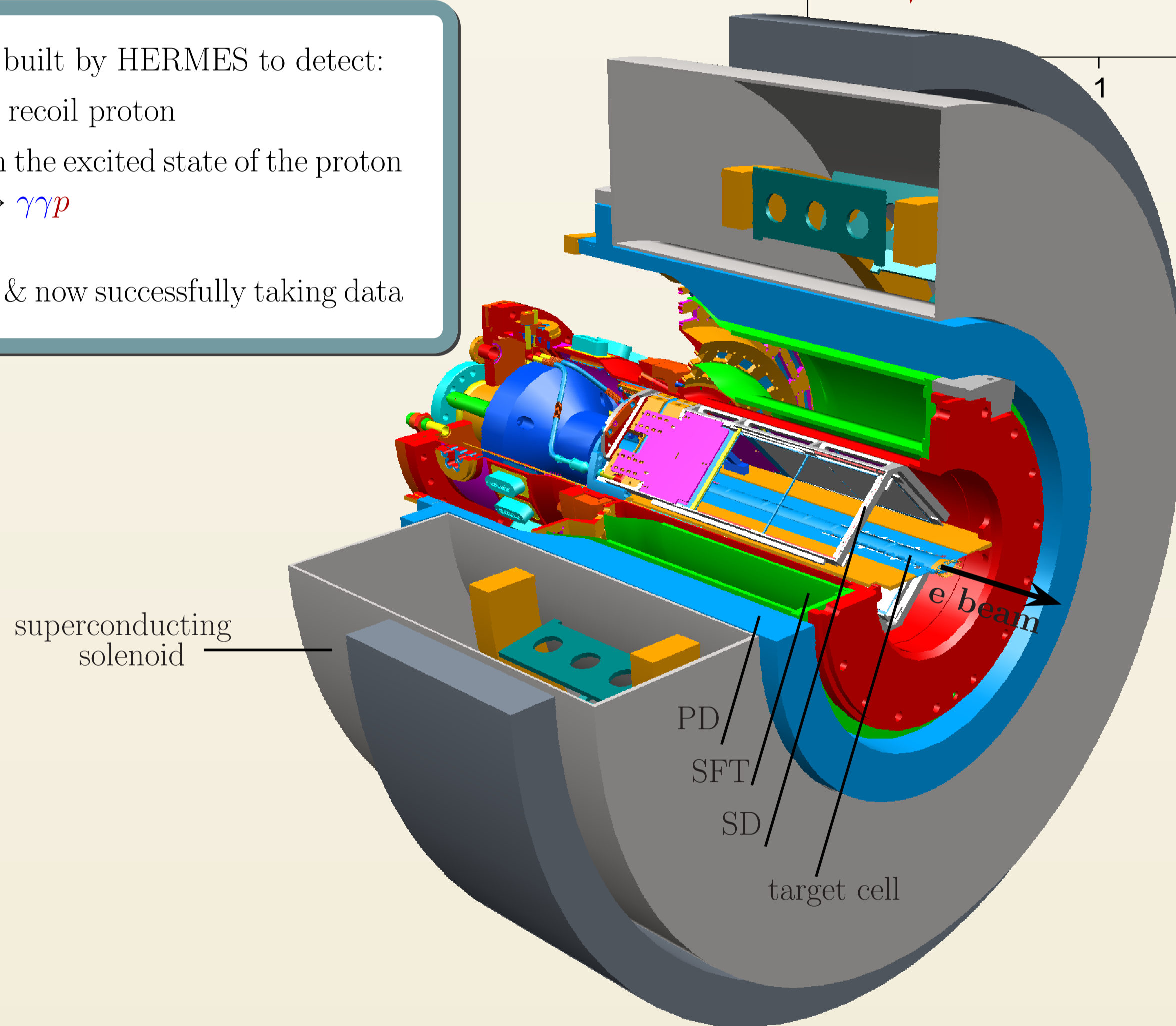
gluon orbital angular momentum?



Recoil Detector (RD) built by HERMES to detect:

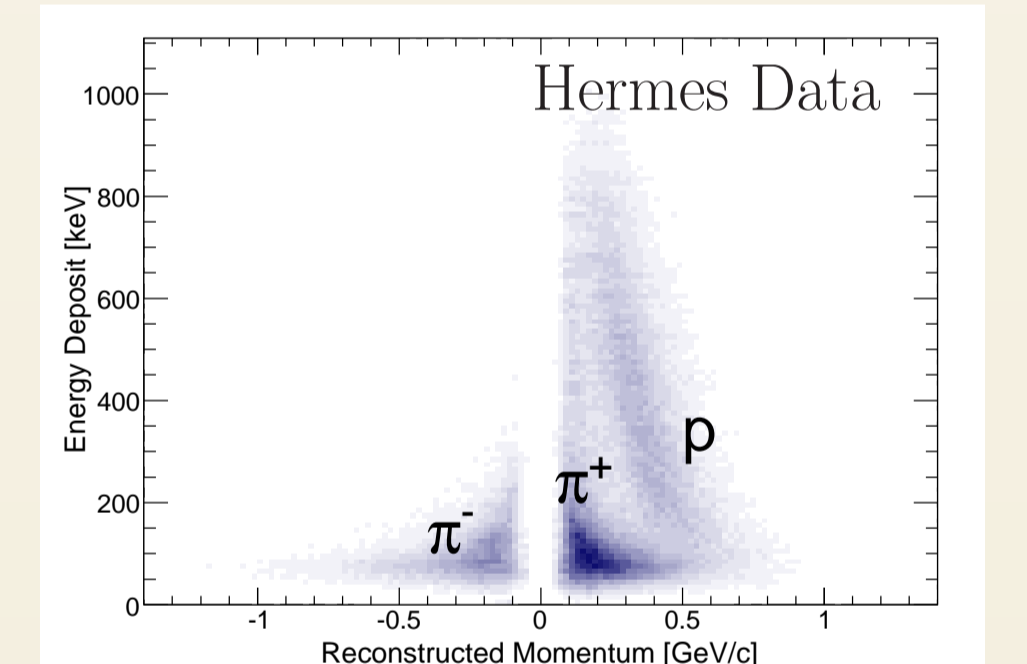
- the low momentum recoil proton
- decay products from the excited state of the proton
 $\Delta^+ \rightarrow \pi^0 p \rightarrow \gamma \gamma p$
 $\Delta^+ \rightarrow \pi^+ n$

RD installed begin '06 & now successfully taking data



Silicon Detector (SD):

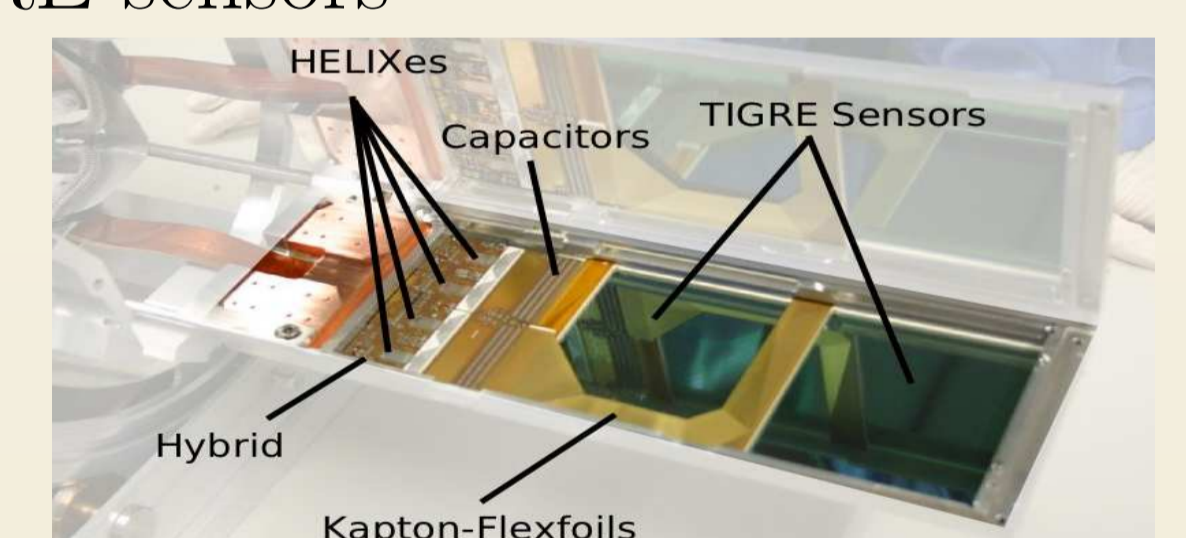
- Momentum measurement from 135-450 MeV/c by energy deposition
- Particle identification by energy deposition



- Two layers of each 8 double sided TIGRE sensors

- TIGRE sensor:
thickness = 300 μm
strips are \perp with a pitch of 758 μm

- each strip is read out twice:
high gain and low gain channel \rightarrow dynamic range of 70 MIPs

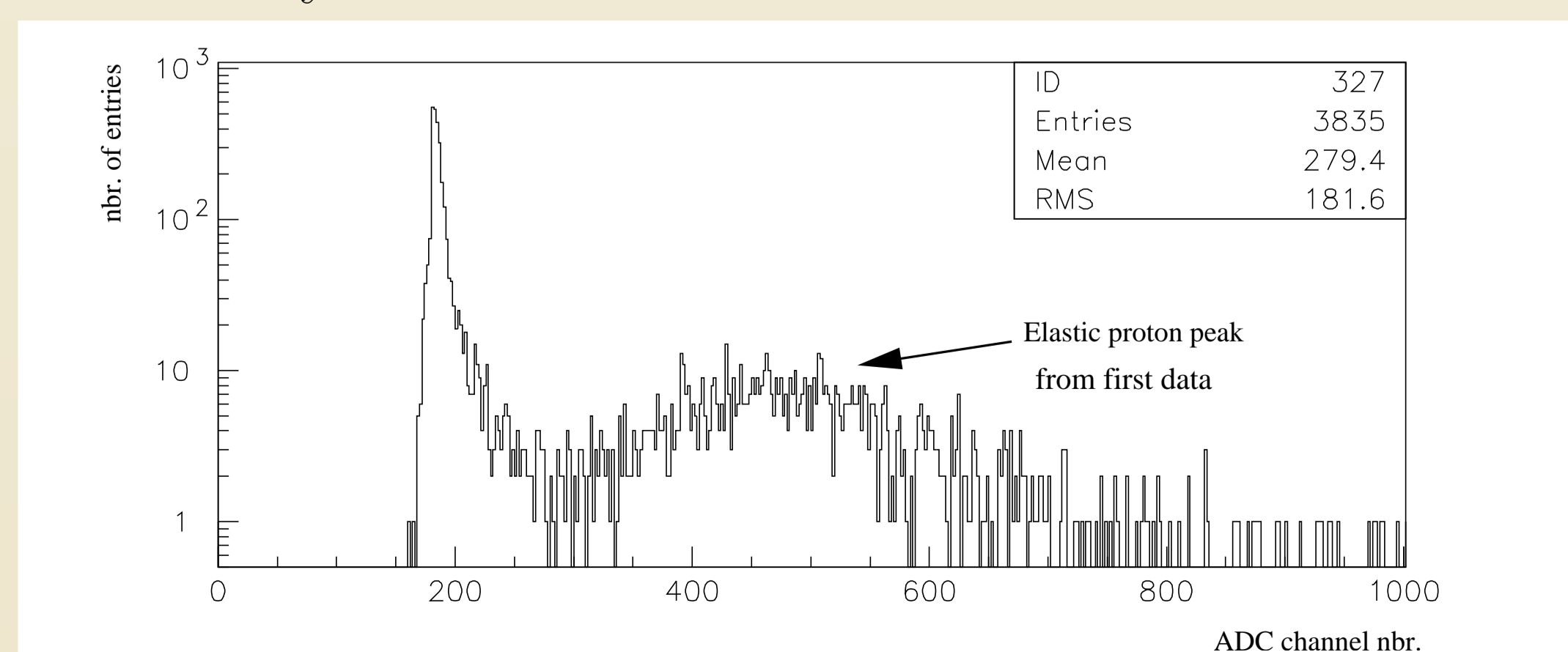


Photon Detector (PD):

- detect γ 's from π^0 decay & reconstruct π^0 if both γ 's are detected
- contribute to particle identification for momenta > 650 MeV/c
- 3 layers of tungsten-scintillator:

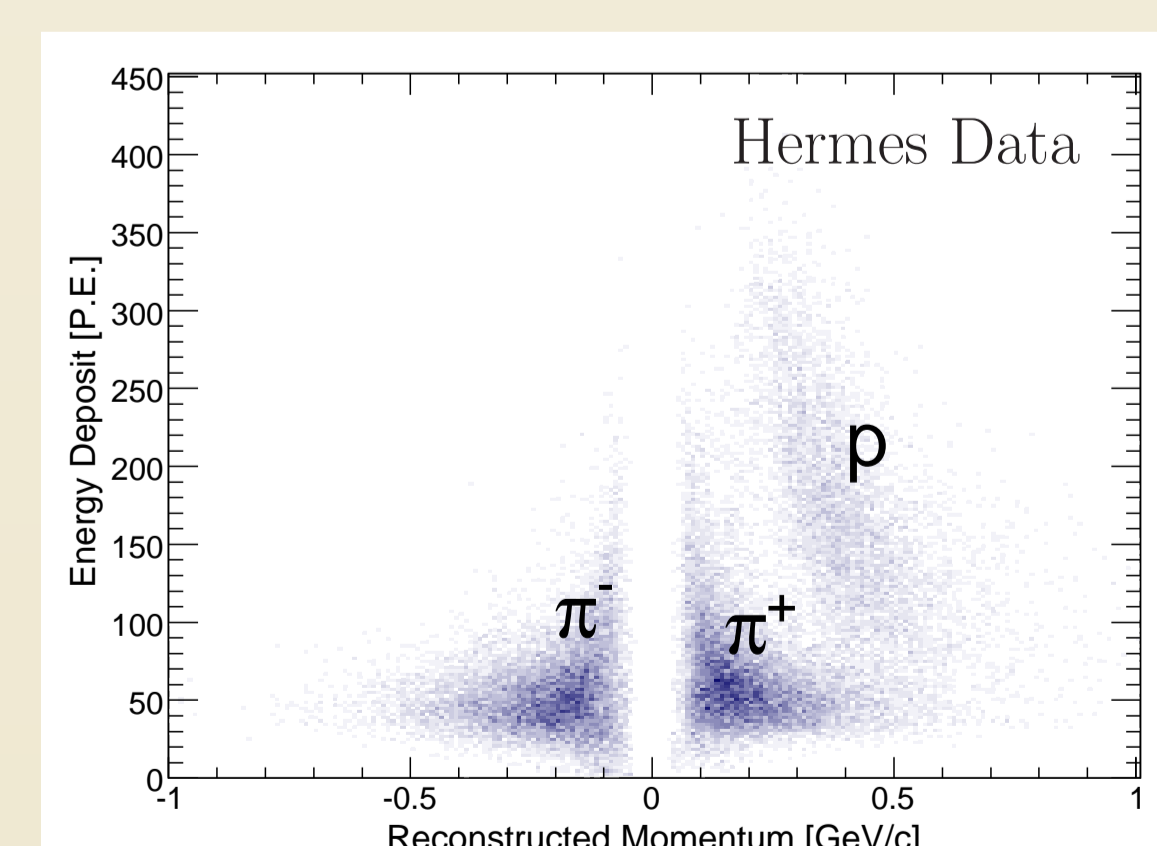
6mm Tungsten
11mm Scintillator Bars
3mm Tungsten
11mm Scintillator Bars
3mm Tungsten
11mm Scintillator Bars

 1st inner layer: 60 bars \parallel with beam
 2nd layer: $+45^\circ$ with beam (44 bars)
 3rd layer: -45° with beam (44 bars)
- strip dimension: $2 \times 1 \times 28$ cm³
- read out by multi-anode PMTs

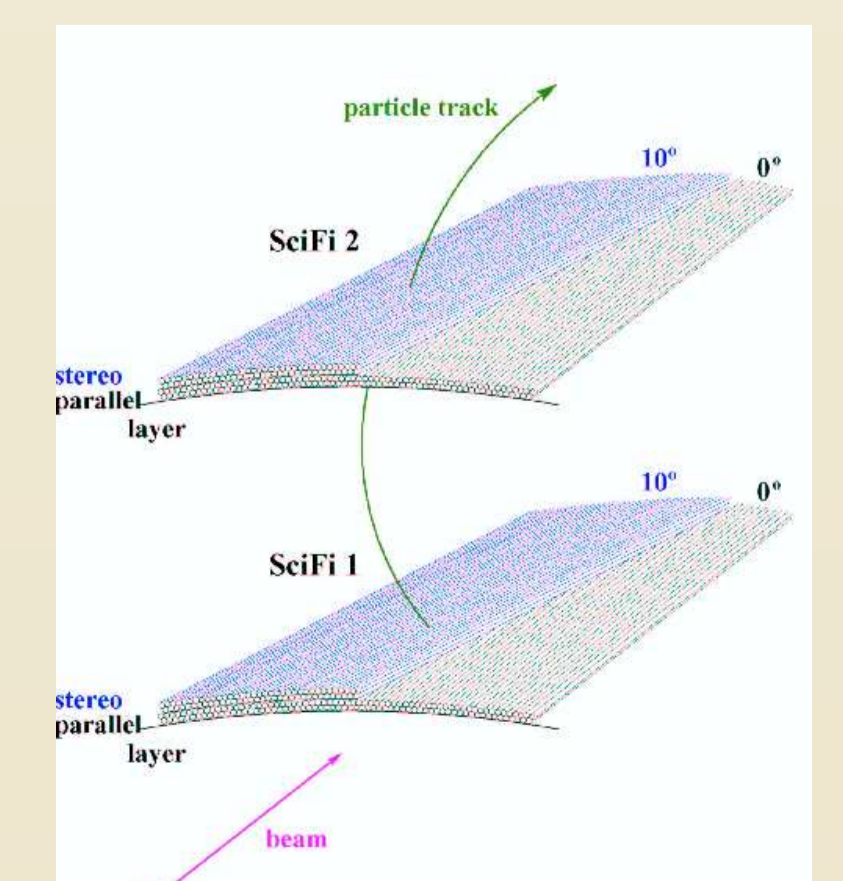


Scintillating Fiber Tracker (SFT):

- Momentum measurement from 250-1400 MeV/c by bending in 1T magnetic field
- Particle identification by energy deposition



- Two barrels of mirrored ending scintillating fibers with a diameter of 1 mm
- Each barrel has:
2 layers \parallel with beam
2 layers under \angle of 10° with beam



- 4992 channels read out by multi-anode PMTs