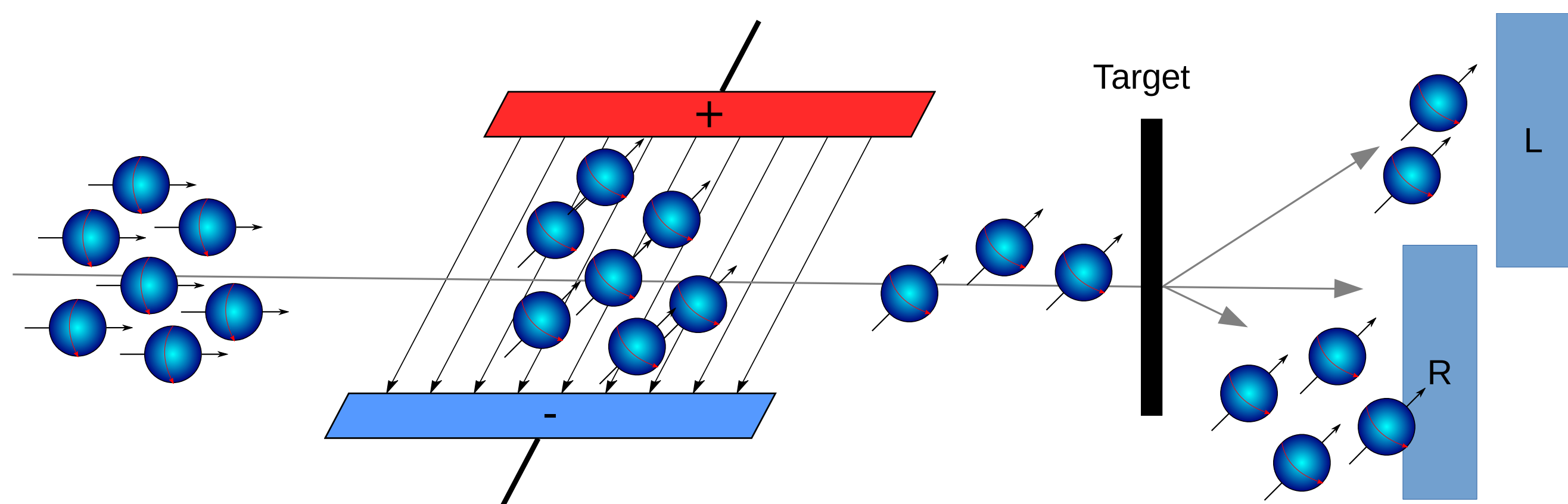


The EDM Polarimeter Development at COSY-Jülich

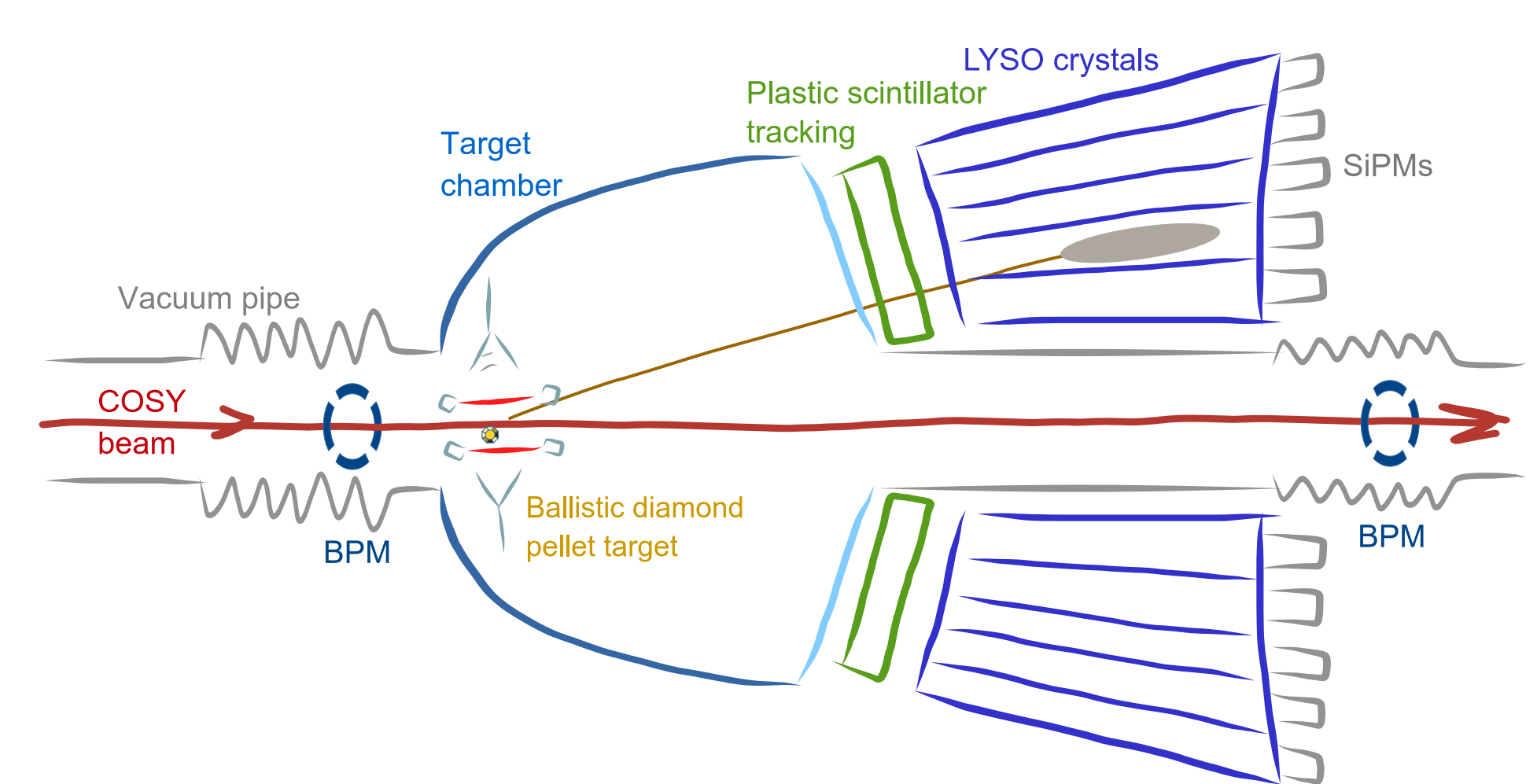
Fabian Müller
Institut für Kernphysik (IKP), Forschungszentrum Jülich
III. Physikalisches Institut B, RWTH Aachen

Principle / Method



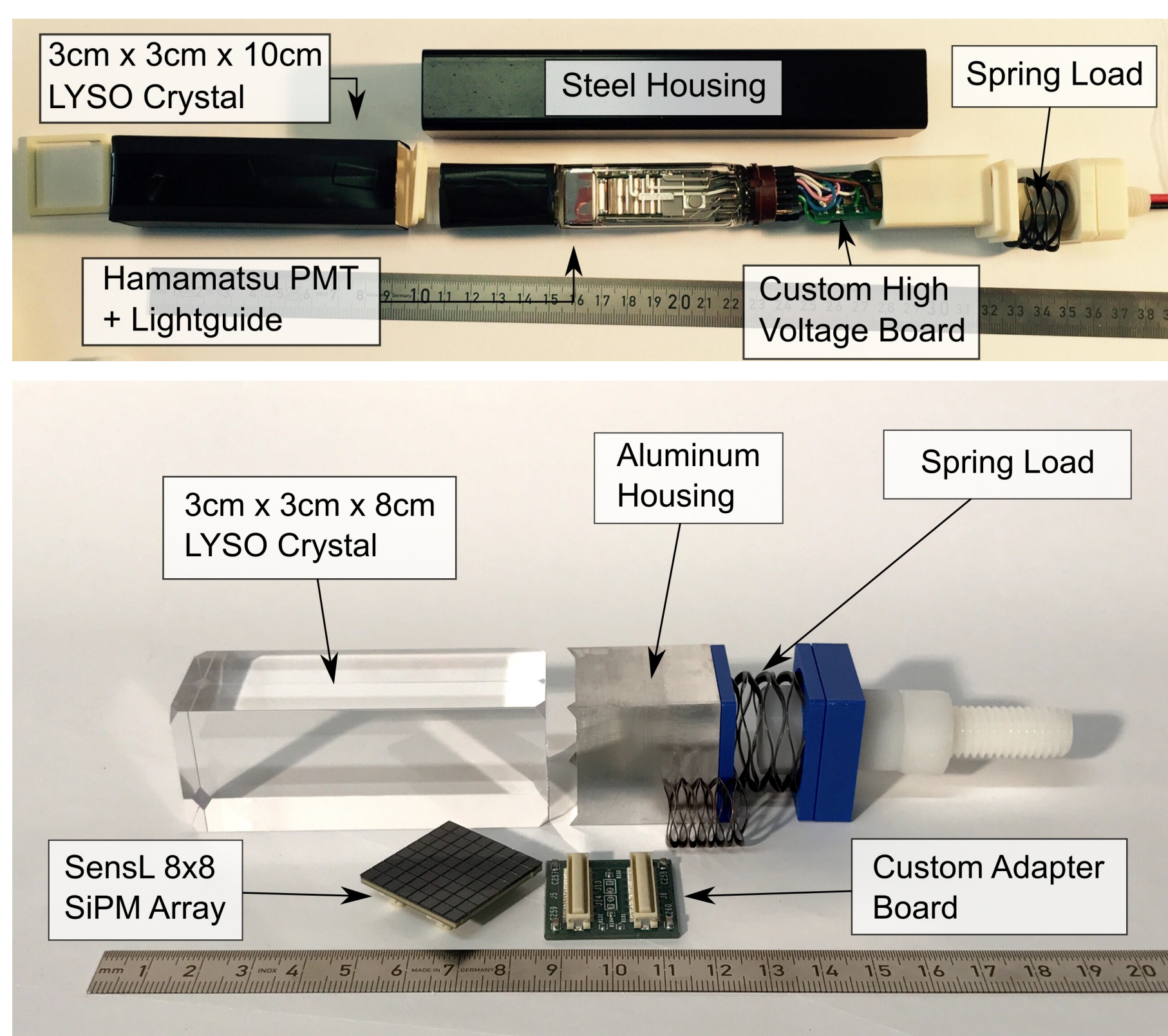
- Apply **electric field** $\vec{E}$ to particles in storage ring
- Finite EDM $\vec{d}$ **rotates spin** out of horizontal plane
- Measure vertical **polarization build-up** $\frac{d\vec{s}}{dt} \propto \vec{d} \times \vec{E}$

Concept



- Energy measurement without magnetic fields
- Continuous on-line operation with high efficiency
- Spin rotation measurement ($\sim 1 \mu\text{rad/s}$ for $10^{-26} \text{ e}\cdot\text{cm}$)

LYSO Modules



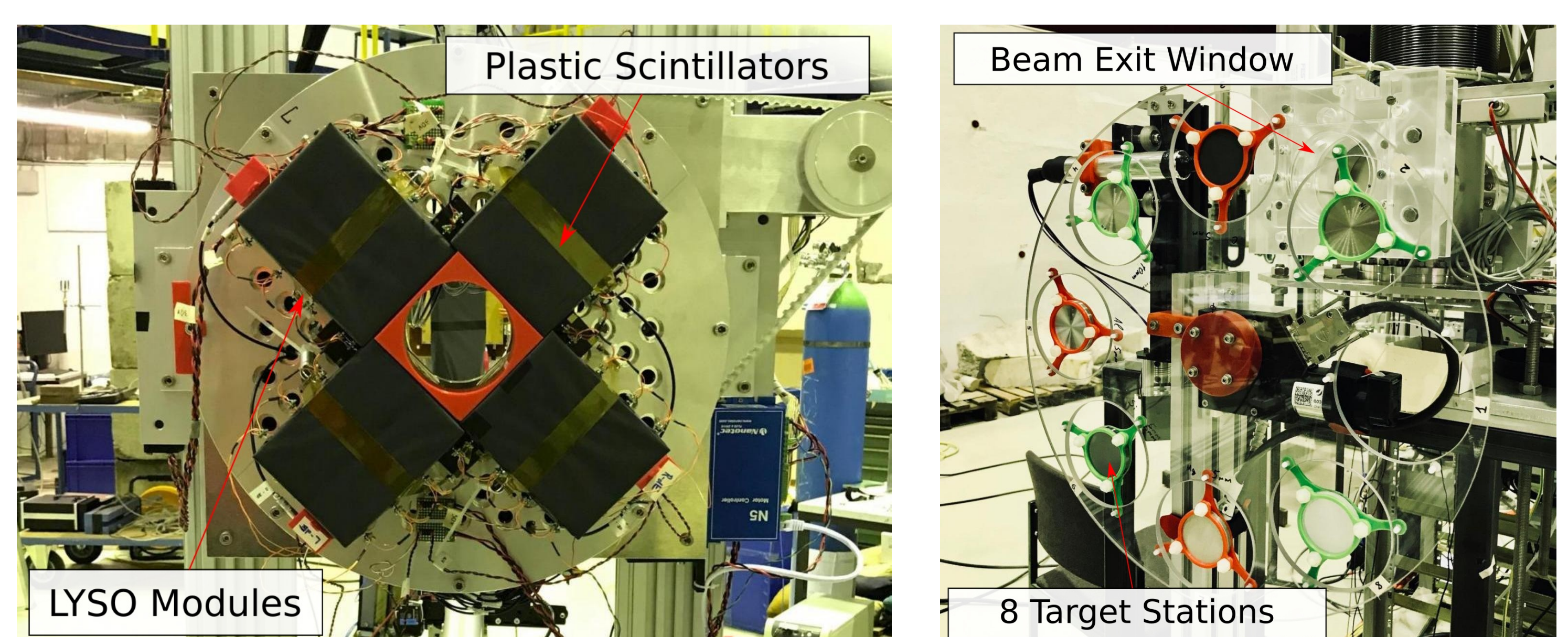
Version I

Hamamatsu PMT
 $\sim 1000 \text{ V}$ supply

Version II

SensL SiPM
 $\sim 29 \text{ V}$ supply

Tests at COSY

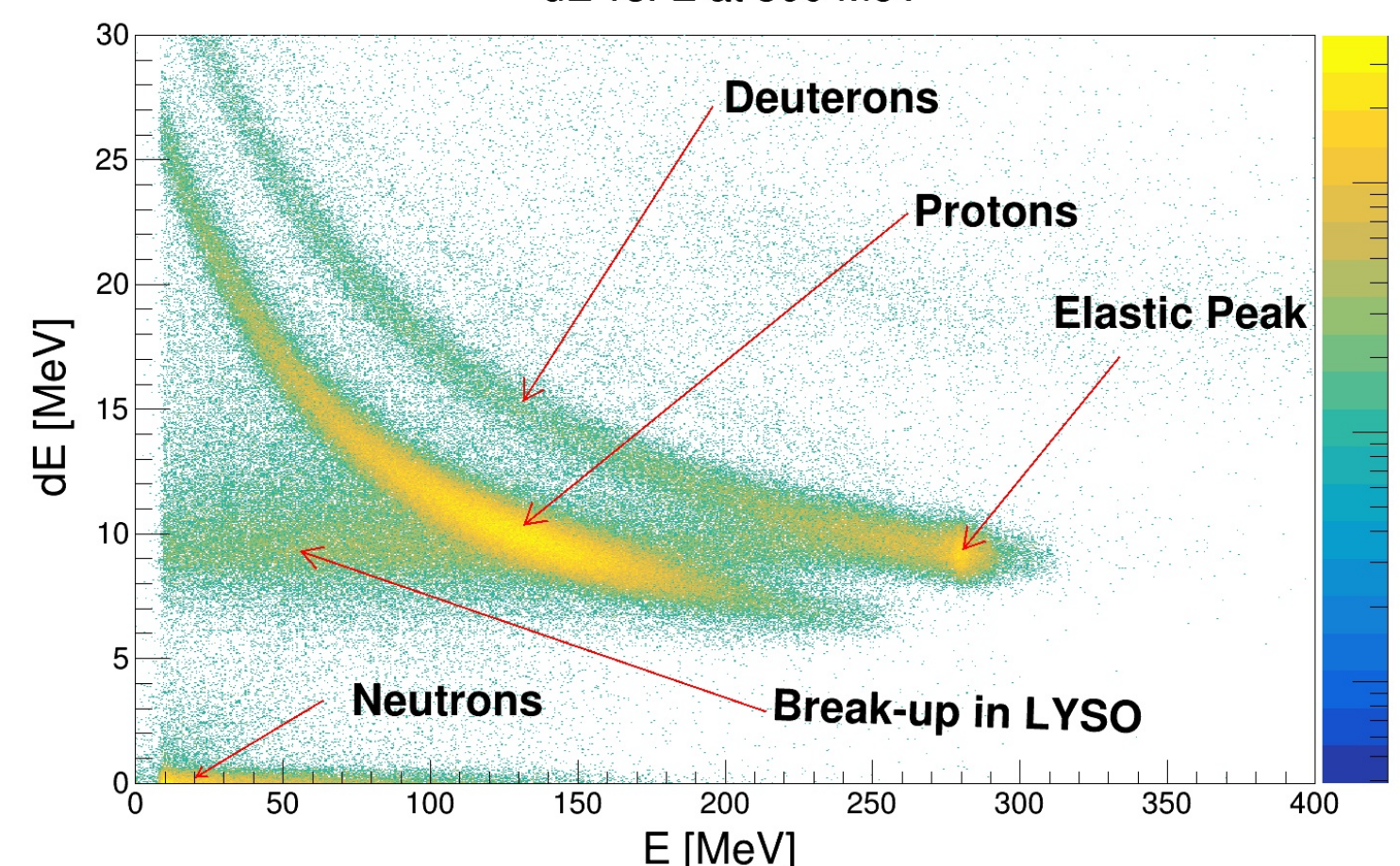


- Detector tests with external beam
- Target materials C, Si, Al, Sn and Mg

Results

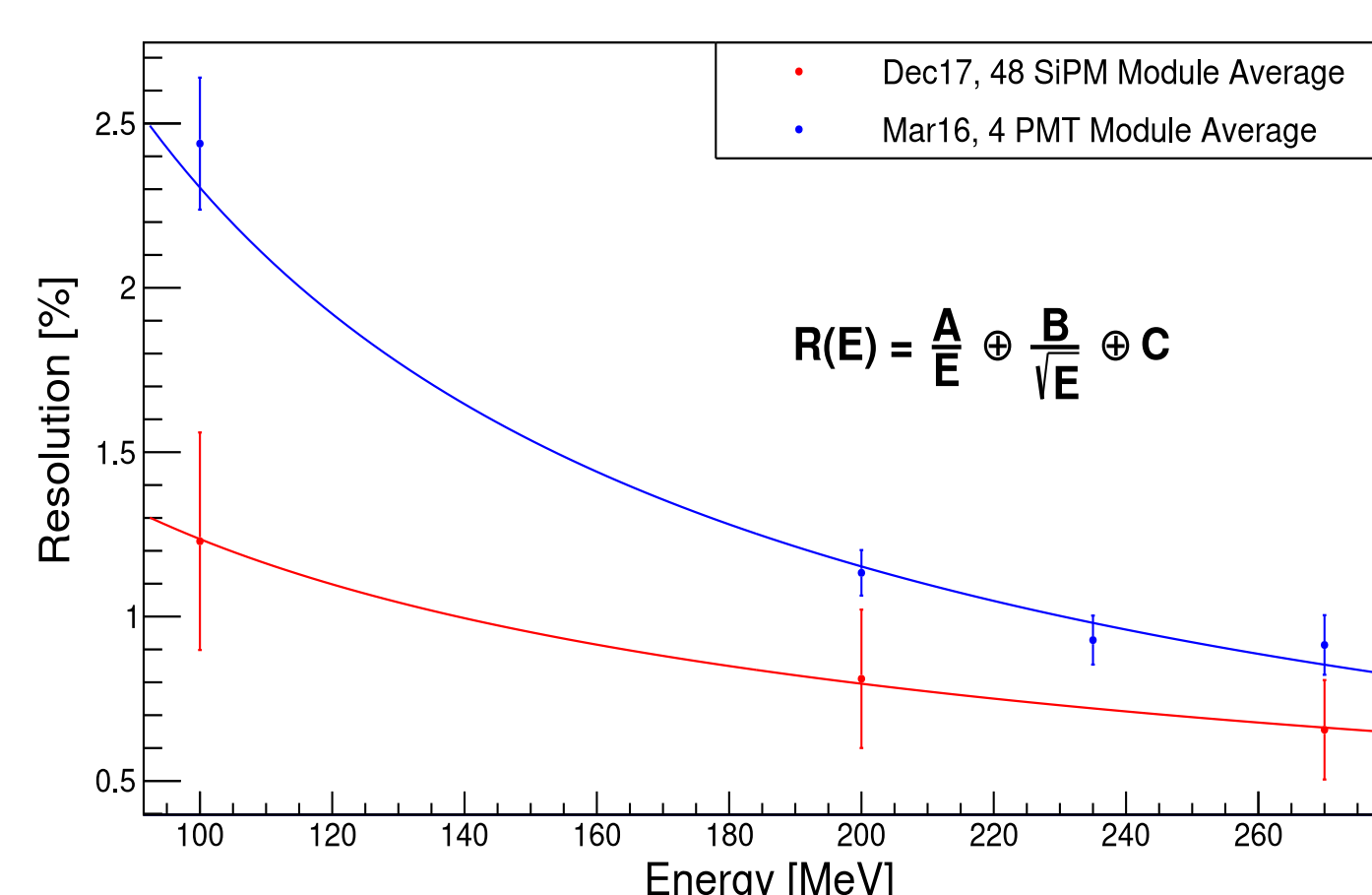
• Clean PID using ΔE vs E

dE vs. E at 300 MeV

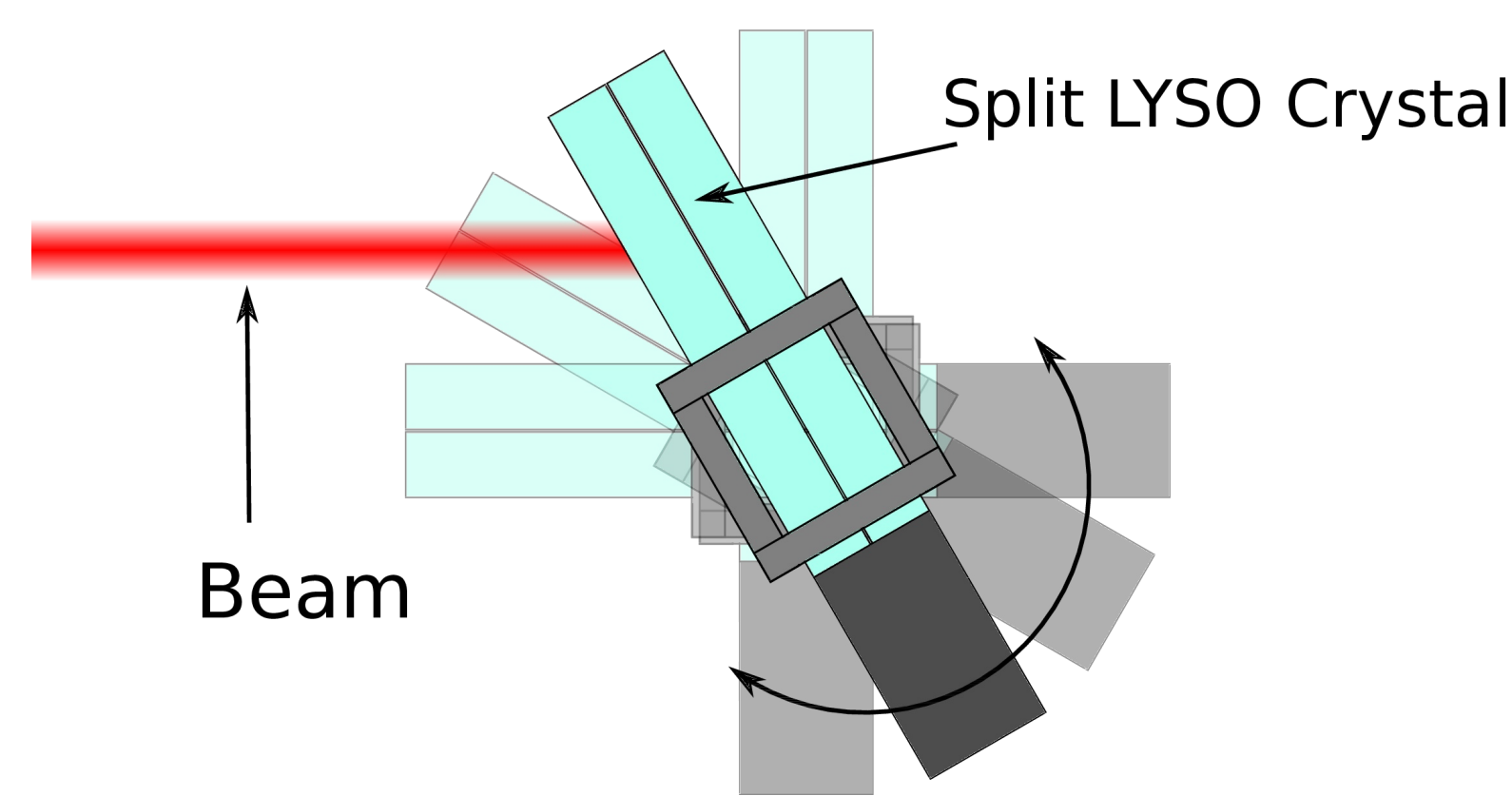


• High energy resolution $\sim 1 \%$

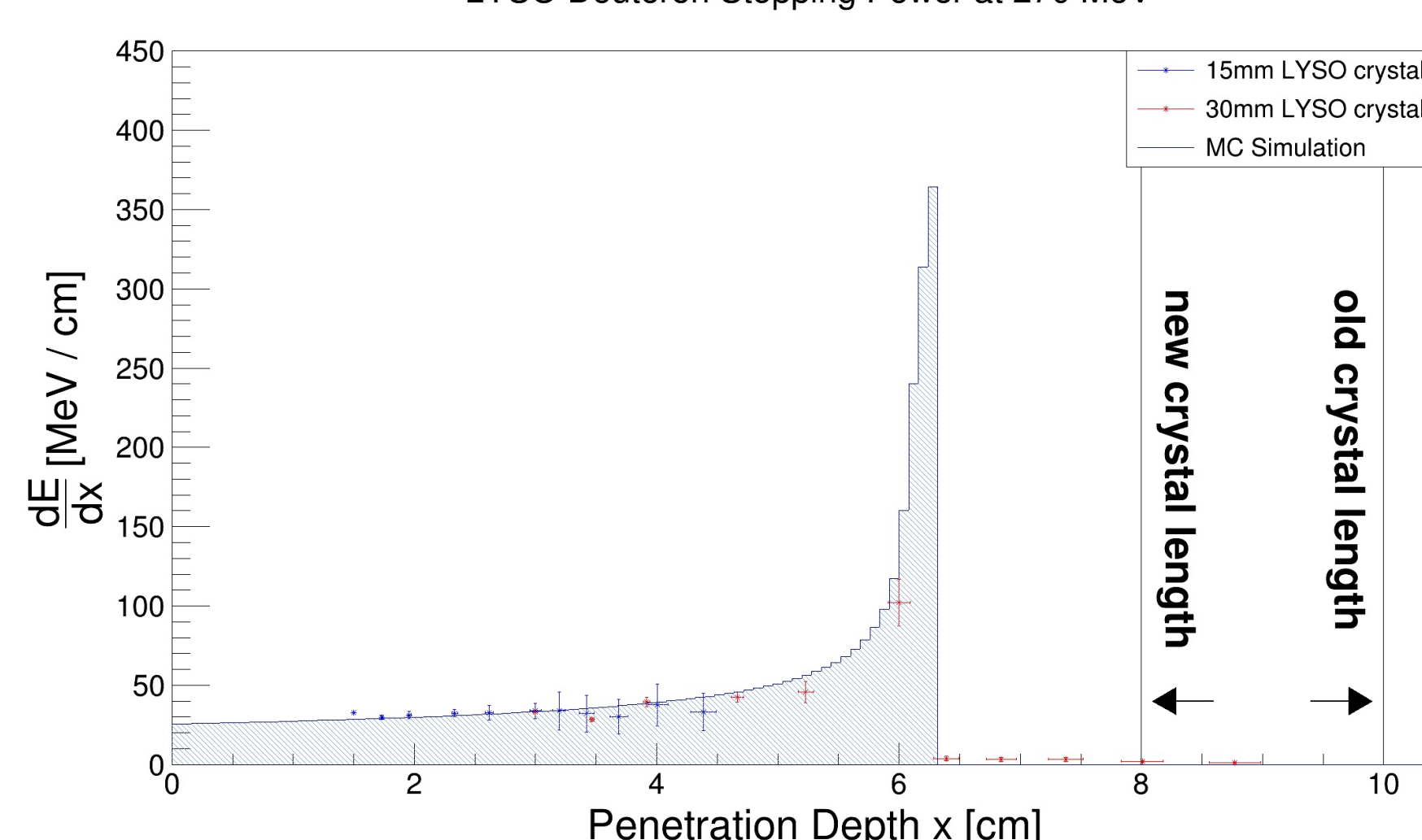
Resolution of LYSO Modules



• Bragg-Peak measurement



LYSO Deuteron Stopping Power at 270 MeV



• Triangular ΔE Position Reconstruction

Triangular Scintillator Position Reconstruction

