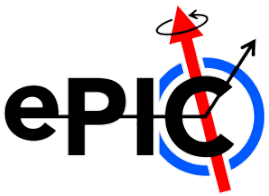
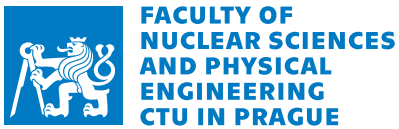
Performance of the nHCal for ePIC experiment based on Simulations

Alexander Godál

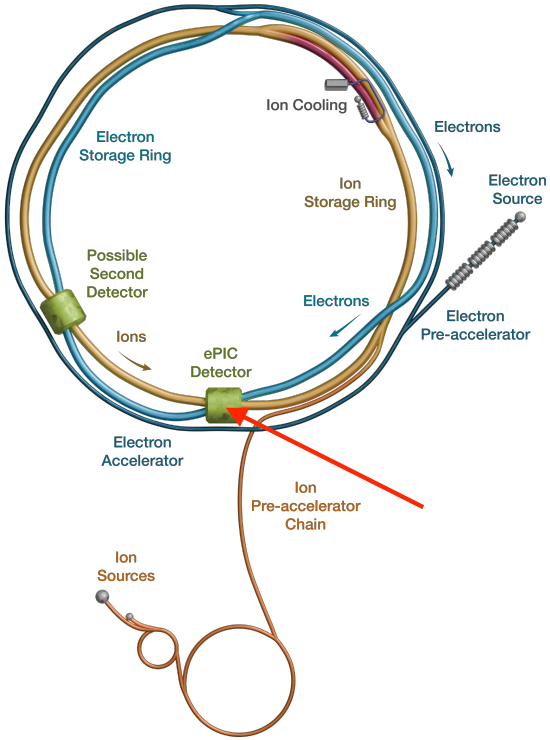
Faculty of Nuclear Sciences and Physical Engineering,
Czech Technical University in Prague

Thursday, 5 December 2024



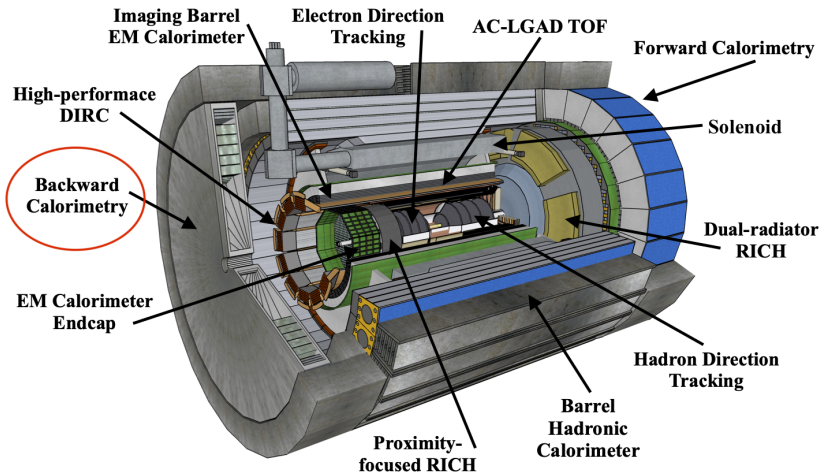


Electron-Ion Collider and ePIC detector



- approved accelerator for BNL
- repurposing a lot of infrastructure from RHIC
- both colliding beams polarised
- center-of-mass energies in the range from 20 GeV up to 140 GeV

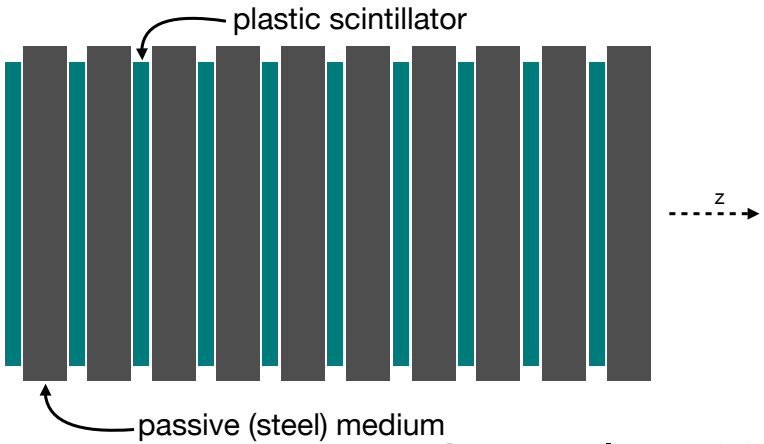
- 9.5 m long cylindrical barrel detector
- located at Interaction Point 6
- tracking and vertexing, PID, EM and hadronic calorimetry
- asymmetrical design to accommodate the difference in energies of opposing colliding beams
- large coverage in pseudorapidity



Negative Hadronic Calorimeter (nHCal) and Simulations

- sampling calorimeter in e^- direction
- tail catcher for ECal in e^- PID
- critical for ePIC $\rightarrow$ enables precise studies at low-x

$\downarrow$ 4 mm plastic scintillators $\times$ 10

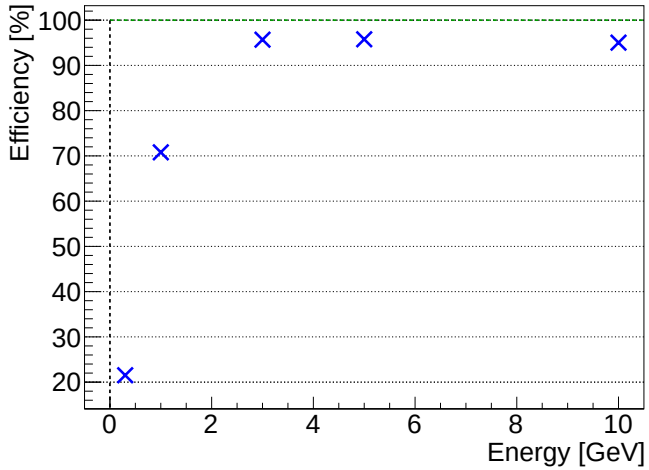


$\uparrow$ 4 cm non-magnetic steel $\times$ 10

ANGULAR RESOLUTION $\longrightarrow$

$\hookrightarrow$ difference of reconstructed and Monte Carlo angles

RECONSTRUCTION EFFICIENCY



- improves with higher energies
- efficiency $>$ 95% for E $\geq$ 5 GeV