



# ATHENA's MPGD Tracking Detectors for the Electron-Ion Collider

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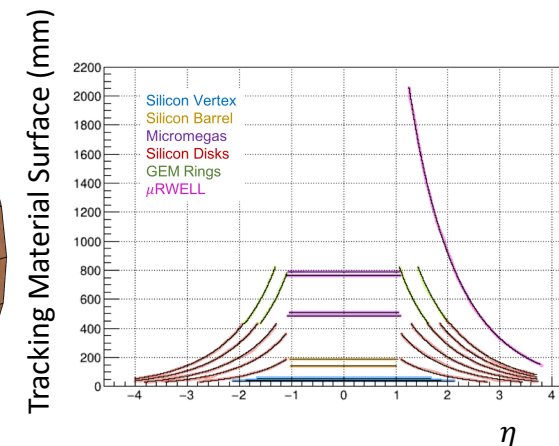
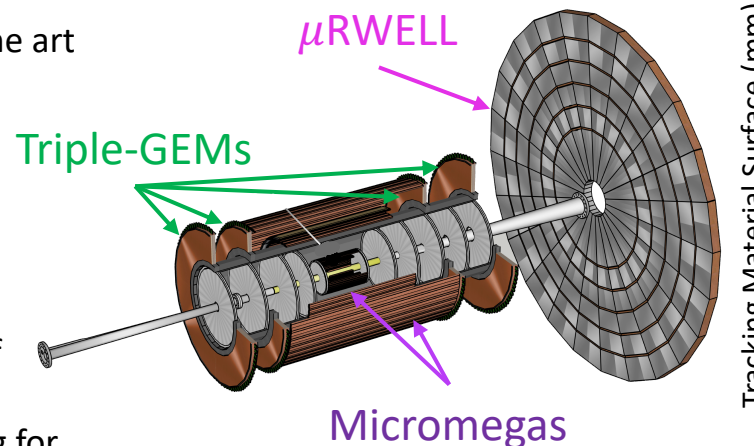


## ATHENA

- A **Totally Hermetic Electron-Nucleus Apparatus** (ATHENA) is a state of the art detector concept which was proposed as a potential EIC detector.
- The EIC physics program places stringent requirements on the tracking system, requiring it to have a low material budget, cover a large pseudorapidity range, and provide excellent momentum resolution.

## ATHENA MPGD Tracking Detectors

- The tracking system is built around a 3T solenoid magnet and consists of silicon detectors at small radii ( $< \sim 50$  cm), which are complimented by Micro-Pattern Gas Detectors (MPGDs) at larger radii ( $> \sim 50$  cm), allowing for a large tracking lever arm.
- A **micromegas barrel** provides tracking in the range  $|\eta| < 1.1$ , **triple-GEM** annular rings are used in the forward and backward directions to extend tracking coverage in the range  $1.1 < |\eta| < 2.0$ , and a large-area  **$\mu$ RWELL** detector is positioned behind the dRICH to aid in its PID capabilities.



## ATHENA Performance

- ATHENA's tracking performance is able to meet nearly all of the physics requirements that were set in the EIC Yellow Report ([arXiv:2103.05419](https://arxiv.org/abs/2103.05419)).

## R&D

- R&D focused on EIC MPGD detectors is currently being carried out through eRD108 and is focusing on material budget reduction, lowering readout channel counts, and developing large-area  $\mu$ RWELL detectors

