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## GAMPix: A Novel Charge Readout Architecture for Enhanced Spatial and Energy Resolution in TPCs

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We introduce GAMPix (Grid-Activated Multi-scale Pixel readout), a novel charge readout system for TPCs, that is designed to enhance the accuracy of electron track reconstruction to the sub-millimeter level, while also ensuring high energy reconstruction accuracy with a low power consumption. The GAMPix system operates using coarse wire grids paired with pixel planes. The signal generated from the induction wire plane activates the pixel plane and the analog front end of a new, rapidly power-cycled ASIC. Our initial analysis indicates that GAMPix fulfills the stringent demands for GammaTPC, a proposed MeV gamma ray detector instrument concept relying on LArTPC technology. Beyond this, GAMPix showcases significant promise for broader applications, including use in the DUNE Phase 2 and similar cutting-edge experiments.

### Early Career

Yes

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