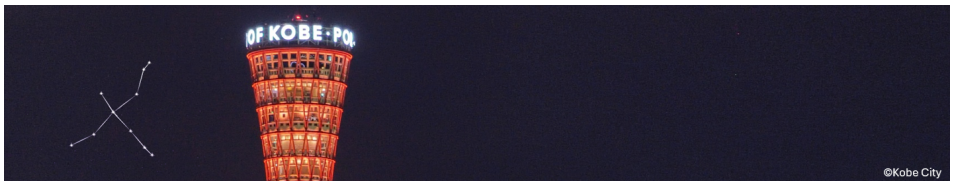


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# Electron-Recoil Angular Resolution in Gaseous Time Projection Chambers

*Wednesday, 25 February 2026 09:15 (25 minutes)*

We present an experimental study of electron-recoil angular resolution using the BEAST gaseous time projection chambers (TPCs) with pixel ASIC charge readout, which measure the three-dimensional ionization distribution of electron tracks. The goal of this work is to validate a previously developed angular-resolution model that extends the commonly used multiple-scattering formalism to electrons and incorporates detector point-resolution effects. The detector energy scale is calibrated using Fe-55 X-rays. Electron recoils with energies of order 100 keV from a Sr-90 source are measured in a He-CO2 (70:30) gas mixture. We demonstrate that the angular resolution improves with increasing electron energy, transitioning from a low-energy regime dominated by multiple scattering to a high-energy regime limited by the detector point resolution, with the total resolution given by the quadrature sum of these contributions. The results demonstrate 3D reconstruction of low-energy electron recoils in gaseous TPCs with highly segmented charge readout and provide direct experimental feedback on angular-resolution models that inform detector optimization for future directional recoil experiments.

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**Session Classification:** Gas detector R&D