Contribution ID: **16** Type: **Contributed Oral**

CEDAR Conversion Electron Detection ARray

Sunday, 15 February 2026 09:00 (15 minutes)

A new array of Si(Li) detectors is under development for conversion electron spectroscopy in combination with the GRIFFIN decay spectrometer at TRIUMF-ISAC. Internal conversion coefficients play a crucial role in studying electromagnetic transitions in nuclei as they assist in the assignment of spin and parity of excited nuclear states. In addition, the direct observation of L=0, E0, transitions is made possible as these are forbidden for gamma-ray emission. E0 transitions between 0+ states are of particular interest as an indicator of shape changes and as direct evidence of shape coexistence. The current detector array PACES (Pentagonal Array of Conversion Electron Spectrometers) is not optimized for the GRIFFIN geometry and often limits the maximum beam rate. GEANT4 simulations of the new CEDAR detector demonstrated significantly improved performance; including enhanced GRIFFIN and LaBr3 efficiencies, higher beam-rate tolerance, and greater angular coverage. The detector arrangement shows great promise for studying gamma-conversion electron directional angular correlations. Additionally, the incorporation of a new mechanical cooling system has demonstrated a great reduction in detector cooling time while also allowing accommodation of all sixteen GRIFFIN clovers.

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Session Classification: Nuclear Physics

Track Classification: Nuclear physics