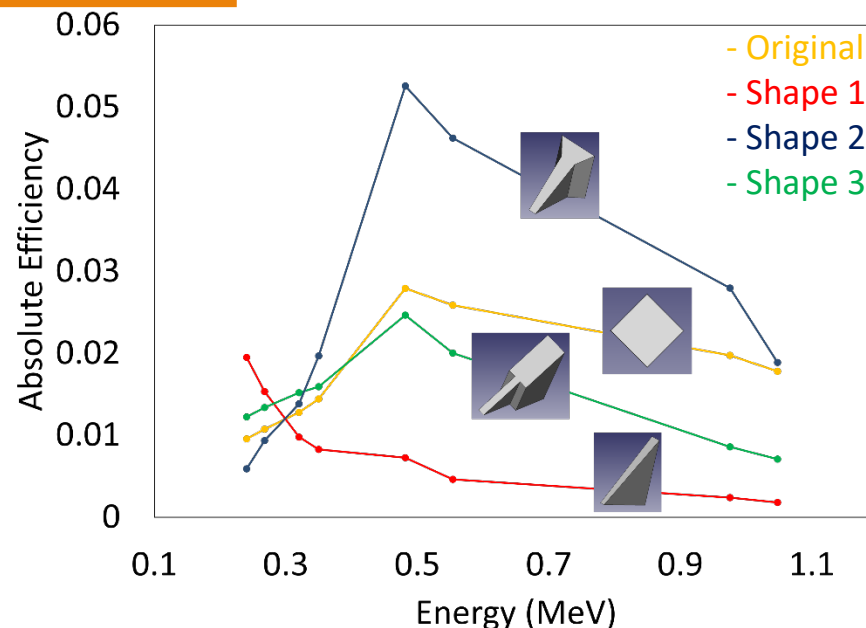
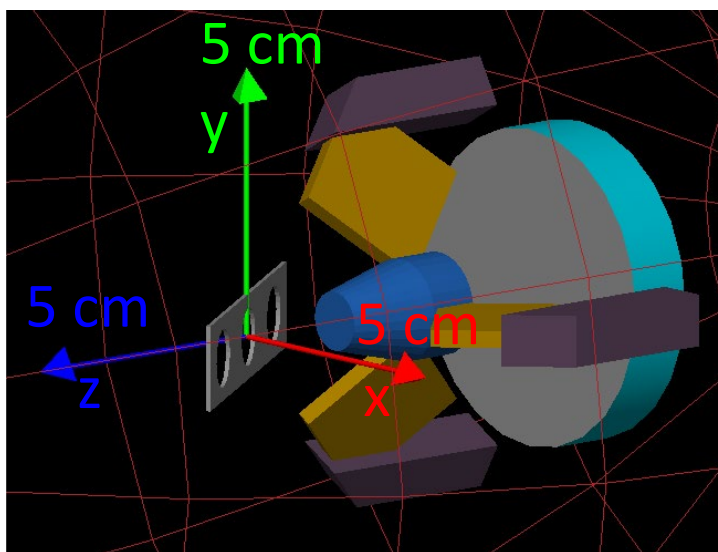


The New *FIREBALL*



ICEBall, a mini-orange spectrometer originally developed at the University of Pittsburgh, has been transformed into the improved *fIREBall* (**f**Internal **conveR**sion **E**lectron **B**all).

The core of the improvement was an increase in efficiency of the spectrometer and new detectors.



A combination of FreeCAD, COMSOL, and Geant4 simulations were implemented to search for new magnet shapes that could significantly improve the efficiency of electron collection in the energy range of 200 keV-1 MeV. The new magnet shapes achieved a peak improvement in absolute efficiency from 2.8% to 5.3% for the 482 keV, nearly a 100% improvement as measured by the K electron line in ^{207}Bi for a single magnet filter and detector pair.



K. Lee *et al.*, NIM A **1052**, 168288 (2023)
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