

Development of Germanium (Ge) Ring Contact Detectors for Ge-based Neutrinoless Double-Beta Decay Experiment

Tuesday, May 14, 2024 2:40 PM (20 minutes)

The next generation neutrinoless double beta ($0\nu\beta\beta$) decay experiments aim to achieve sensitive to a decay with a half-life of $\sim 10^{28}$ years. A germanium-76 (Ge-76)-based experiment can achieve the discovery potential for this rare decay process due to its excellent energy resolution and ability to reject scattered gamma-ray events. LEGEND-1000 prefers large-size detectors (>3 kg per detector) to further reduce backgrounds, complexity, and cost. This talk will explore large-size Ge fabricated in a novel ring contact (GeRC) geometry using high-purity Ge crystals grown at USD. The GeRC detector, a collaborative effort between ORNL, UNC, TAMU, and USD, has undergone significant improvements since its inception. Last year, an initial GeRC detector has been successfully fabricated at TAMU and subsequently tested at UNC. Regrettably, this first iteration did not meet our expectations. However, this presents an opportunity to enhance our research capabilities. By establishing an upgraded workshop at USD, we are now better equipped to study GeRC detectors comprehensively. Leveraging the invaluable experience gained from TAMU, we are poised to refabricate the first detector at USD. In this presentation, we will present some preliminary results obtained from the GeRC detector fabricated at USD, utilizing crystals grown exclusively at USD.

Primary authors: BOS, Brady (University of North Carolina); Dr RADFORD, David (Oak Ridge National Laboratory); MEI, Dongming (University of South Dakota); Dr WILKERSON, John (University of North Carolina); DONG, Kunming (University of South Dakota); Dr HARRIS, Rusty (Texas A&M University); Dr WEI, Wenzhao (University of South Dakota)

Presenter: DONG, Kunming (University of South Dakota)

Session Classification: Double Beta Decay

Track Classification: Double Beta Decay