Colloquium:
Neutrinoless Double-Beta Decay and the Neutrino

Understanding the origin of life on Earth motivates many of the questions that drive inquiry across all scientific subfields. Certainly, such questions influence nuclear and particle physics research. For example, the matter-antimatter asymmetry observed in today’s Universe is necessary for our existence, but its origin is not well understood. The neutrino may play a significant role in understanding this asymmetry. Specifically, a promising class of theories that explains the asymmetry requires that the neutrino be its own anti-particle. The nuclear process of neutrinoless double-beta decay ($0\nu\beta\beta$) can only occur if neutrinos have mass and are their own antiparticle. Although it is known that neutrinos have a small mass, we do not know the value or their particle-antiparticle nature. If a rate for $0\nu\beta\beta$ is measured it will help elucidate the mass, but critically, $0\nu\beta\beta$ is the only feasible experimental technique to determine if light neutrinos are their own antiparticle. This situation has resulted in a great deal of excitement for $0\nu\beta\beta$ research. This Colloquium will discuss the motivations for the search for $0\nu\beta\beta$, the experimental issues, and the use of the radiation-detection technology of germanium detectors to search for this process; the MAJORANA and LEGEND experiments.

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WEDNESDAY, OCTOBER 23
4PM ROOM 100 SCIENCE HALL
REFRESHMENTS AT 3:30PM IN 108 SCIENCE HALL