

**LABORATORI NAZIONALI DEL GRAN SASSO**

**SEMINAR ANNOUNCEMENT**

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***First results from the  
GERDA experiment***

*The neutrino-accompanied double beta decay (2nbb) is the simultaneous decay of two neutrons in a nucleus with the emission of two anti-neutrinos. This very rare process has a half-life larger than  $10^{20}$  years and is allowed in the Standard Model of Particle Physics. In the case of the neutrinoless double beta decay (0nbb) no neutrinos are emitted. Since lepton number is violated in this latter process, it is forbidden in the Standard Model. The observation of 0nbb would establish the Majorana nature of the neutrino, that is that the neutrino is its own anti-particle. The GERmanium Detector Array (GERDA) experiment at the INFN-LNGS underground laboratories uses high-purity germanium detectors to search for 0nbb of Ge-76. A first phase of the experiment started in November 2011, using 15 kg of germanium crystals isotopically enriched in Ge-76. The background was reduced by one order of magnitude compared to predecessor experiments. After an introduction to double beta decay and to the GERDA experiment, this seminar will focus on the measurement of the 2nbb half-life using the first 5.04 kg·yr of GERDA data. A brief comparison to prior measurements and effects on nuclear matrix element calculations will be presented.*

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