

Status of the LEGEND experiment

Thursday, May 12, 2022 8:45 AM (25 minutes)

Next-generation neutrinoless double-beta decay ($0\nu\beta\beta$) searches seek the Majorana nature of neutrinos and the existence of a lepton number violating process by covering the $0\nu\beta\beta$ half-life corresponding to the inverted-ordering neutrino mass scale, assuming the light Majorana neutrino exchange mechanism. The LEGEND experiment, building from the experience of Majorana Demonstrator and GERDA, is the next generation experiment searching for $0\nu\beta\beta$ in ^{76}Ge . The current ^{76}Ge $0\nu\beta\beta$ experiments have the lowest background levels and best energy resolution in the region of interest. The LEGEND collaboration has implemented a phased experimental program based on p-type, inverted-coaxial, point-contact ^{76}Ge detectors operating within liquid argon. The first phase (LEGEND-200) will reach a discovery sensitivity on the $0\nu\beta\beta$ half-life of 10^{27} yr in 5 years of data by operating around 200 kg of ^{76}Ge detectors at LNGS in Italy. In the final phase (LEGEND-1000), the mass of detectors will be increased to 1 ton. The technical design of LEGEND-1000, along with the energy resolution, material selection and background suppression techniques project a quasi-background-free search, achieving a discovery sensitivity on the $0\nu\beta\beta$ half-life beyond 10^{28} yr. The status of the LEGEND program, technical readiness and discovery potential will be presented.

This work is supported by the U.S. DOE and the NSF, the LANL, ORNL, and LBNL LDRD programs; the European ERC and Horizon programs; the German DFG, BMBF, and MPG; the Italian IFN; the Polish NCN and MNiSW; the Czech MEYS; the Slovak SRDA; the Swiss SNF; the UK STFC; the Russian RFBR; the Canadian NSERC and CFI; the LNGS and SURF facilities.

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Session Classification: Plenary - Undiscovered Decays

Track Classification: Double Beta Decay