APR20-2020-001383

Abstract for an Invited Paper for the APR20 Meeting of the American Physical Society

MAJORANA and LEGEND

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The LEGEND experiment aims for unprecedented sensitivity for the discovery of neutrinoless double-beta decay using a large array of HPGe detectors enriched in the isotope ⁷⁶Ge. The experimental approach marries the ultra-low background materials and techniques as well as the high-resolution electronics developed for the MAJORANA experiment with the active liquid-argon veto technology pioneered in the GERDA experiment, along with new developments in HPGe detector technologies. A first 200-kg phase, LEGEND-200, is already under construction at LNGS and expects to begin commissioning in 2021. A ton-scale phase, LEGEND-1000, with sensitivity to half-lives exceeding 10²⁸ years, is competing for major US funding. This talk will overview the MAJORANA and LEGEND experiments. New results from MAJORANA on double-beta decay as well as background understanding and other physics will be presented, along with the status and near-term plans of the experiment. I will also discuss progress toward the construction of LEGEND-200, planning for the ton-scale phase, and the future prospects of the LEGEND experimental program.