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Searches for Neutrinoless Double-Beta Decay

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The first decade of the 21st century saw the culmination of several tenacious experiments which placed the phenomenon of neutrino flavor oscillation on a firm experimental footing and with it the existence of nonzero neutrino masses. The consequences of this discovery are still being explored, in particular the question of whether or not neutrinos are Majorana particles. The quest to observe neutrinoless double-beta (0) decay has been at the forefront of experimental efforts to explore this question. This decay has a relatively robust experimental signature and its discovery would at once demonstrate lepton number violation and establish that neutrinos are Majorana fermions. In addition the observed decay rates would shed light on the absolute neutrino mass scale. In this talk, we will discuss the motivation for neutrinoless double beta-decay, and review ongoing experimental searches and the prospects for next- generation experimental efforts.