

# Neutrino-less Double Beta Decay and Particle Physics

Werner Rodejohann

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We review the particle physics aspects of neutrino-less double beta decay. This process can be mediated by light massive Majorana neutrinos (standard interpretation) or by something else (non-standard interpretations). The physics potential of both interpretations is summarized and the consequences of future measurements or improved limits on the half-life of neutrino-less double beta decay are discussed. We try to cover all proposed alternative realizations of the decay, including light sterile neutrinos, supersymmetric or left-right symmetric theories, Majorons, and other exotic possibilities. Ways to distinguish the mechanisms from one another are discussed. Experimental and nuclear physics aspects are also briefly touched, alternative processes to double beta decay are discussed, and an extensive list of references is provided.

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