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Theory Challenges in Neutrinoless Double Beta Decay

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The recent progress in theoretical description of the 0νββ-decay is shortly reviewed. Several simplified benchmark scenarios within left-right symmetric models are discussed. The question is raised whether light and heavy neutrino contributions to 0νββ-decay are experimentally distinguishable. New modes of the double-beta decay are introduced. The present-day results of the calculation of double-beta decay nuclear matrix elements are discussed. A connection between the 2νββ-decay and 0νββ-decay matrix elements is analyzed. An impact of the quenching of the axial-vector coupling constant on double-beta decay processes is addressed and a novel approach to determine quenched value of axial-vector coupling constant is presented.

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