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Constraining neutrinoless double-beta decay matrix elements

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Neutrinoless double-beta decay, if detected, would proof the Majorana nature of neutrinos. The decay lifetime is governed by the absolute neutrino masses and the nuclear matrix elements of the transition. Therefore accurate matrix elements are needed to asses the sensitivity of current and future experiments, and to determine the absolute neutrino masses and hierarchy with neutrinoless double-beta decay. However, present nuclear matrix element calculations show significant uncertainties. These affect the nuclear structure description of the mother and daughter nuclei, and also the treatment of the transition operator. In this talk I cover recent progress on neutrinoless double-beta decay nuclear matrix element calculations. On the one hand, I discuss the role of the size of the configuration space and of nuclear structure correlations. By comparing matrix elements obtained with different nuclear structure approaches and interactions, optimal strategies for improving the nuclear structure calculations capturing the most important correlations are identified. On the other hand, I describe first attempts to include two-body currents in the double-beta decay operator. They can be related to the "quenching" of the spin-isospin operator empirically found in nuclear structure studies.