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Constraining neutrinoless double beta decay matrix elements from ab initio nuclear theory

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As experiments searching for neutrinoless double beta decay are in the planning phase of a next generation with hopes to completely probe the inverted mass hierarchy, the need for reliable nuclear matrix elements, which govern the rate of this decay, is stronger than ever. Since a large discrepancy is found when computing this quantity with different nuclear models, a large unknown still exists on the sensitivity of these experiments to the effective neutrino mass. We tackle this problem from first principle using the valence-space in medium similarity renormalization group ab initio method, which allows to assign rigorous theoretical uncertainties. We present converged results for isotopes of interests for mass number up to A=136 with multiple nuclear interactions obtain from chiral effective field theory. Furthermore, we study correlations with other observables such as the double Gamow-Teller giant resonance in an attempt to betterr constrain our uncertainties.

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