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Half-life Predictions for Double Beta Decay and Competing Modes[1] JENNI KOTILA, Yale University, JOSE BAREA, Universidad de Concepcion — The fundamental nature and direct determination of the neutrino mass through double-β decay is at the present time one of the most important areas of experimental and theoretical research in nuclear and particle physics. Even though, double electron decay is the most promising decay mode at the moment, in very recent years interest in the double positron decay, positron emitting electron capture and double electron capture has been renewed. The probability of neutrinoless double electron capture can be resonantly enhanced by some orders of magnitude and recent progress in high-precision Penning-trap mass spectrometry has finally provided suitable means for a determination of atomic masses with a sufficient precision. This has given rise to the campaign for a search for resonantly enhanced transitions. Using complete and improved calculation of phase space factors for $\beta\beta$-decay including competing modes, $EC\beta$ and $ECEC$, and nuclear matrix elements from microscopic interacting boson model we make realistic predictions for the expected half-lives in neutrinoless double-β decay, as well as for the less studied competing modes, in terms of neutrino masses.

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