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Collective aspects of nuclear structure as a constraint on neutrinoless double-beta decay nuclear matrix element calculations JACK HENDERSON, JAMES SMALLCOMBE, ADAM GARNSWORTHY, TRIUMF, JENNA SMITH, Reed College — Large discrepancies are found between calculations of the neutrinoless double-beta decay nuclear matrix element performed in different theoretical frameworks, corresponding to differences of almost order-of-magnitude when translated to deviations in the decay rate. Given this discrepancy, experimental nuclear-structure input is essential to constrain calculations. To date a number of studies have been performed, for example probing nuclear occupancies and Gamow-Teller strengths. Meanwhile, work utilizing beyond mean-field methodologies has demonstrated a significant dependence of the neutrinoless double-beta decay transition strength on the deformation of both the parent and daughter nuclei. That this dependence exists can also be concluded based on simple arguments regarding the geometric overlap of the initial and final states. It is important, therefore, to experimentally verify the nuclides' collective nuclear properties. To that end I will describe a proposed campaign of measurements utilizing well-established nuclear structure techniques such as Coulomb excitation and $E0$ spectroscopy to determine the collective properties of neutrinoless double-beta decay candidates. These measurements can provide both qualitative and quantitative constraints on the nuclear matrix element.

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