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The 132Sn giant dipole resonance as a constraint on nuclear matter properties BRANDON ROACH, Department of Physics, University of Notre Dame, GIACOMO BONASERA, SHALOM SHLOMO, Cyclotron Institute, Texas A&M University — Nuclear giant resonances provide a sensitive method for constraining the properties of nuclear matter (NM) - many of which have large uncertainties - and thereby improve the nuclear energy-density functional. In this work, self-consistent Hartree-Fock random-phase approximation (HF-RPA) theory was employed to calculate the strength function and energy of the isovector giant dipole resonance (IVGDR) in the doubly-magic ^{132}Sn nucleus. Several (17) commonly-used Skyrme-type interactions were employed. The correlations between the IVGDR centroid energy and each nuclear matter property were explored, as were correlations between the nuclear matter properties and the ^{132}Sn neutron skin thickness $r_n - r_p$. Experimental data for the IVGDR centroid energy was used to constrain the symmetry energy density, the symmetry energy, and its first and second derivatives, respectively, of NM. Further investigation, particularly of nuclides far from stability, will be needed to extend the nuclear energy-density functional to the extremes of density and neutron abundance found in neutron stars and astrophysical nucleosynthesis environments.

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