

# **A New Link between Nuclear Masses and Structure**

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Although nuclear binding energies reflect the sum of all nucleonic interactions, and therefore are clearly related to the structure of atomic nuclei, historically, the mass and structure communities have often been quite separate. We have recently studied [1] the relation of binding and separation energies to the structure of collective nuclei, and have found a greatly enhanced sensitivity, especially in well-deformed nuclei, heretofore unrecognized. This sensitivity reaches levels where one can, in some cases, even assess the structure of intrinsic excitations at  $\sim 1$  MeV of excitation energy, or distinguish the applicability of collective model calculations of nuclear level schemes, by considering ground state binding energies. We will discuss this finding, its sensitivity to structure and model parameters, and the locus of nuclei where the effect is strongest. One upshot of this work is that future nuclear structure calculations should also consider the predicted masses, and future mass measurements should consider their implications for structure.

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[1] R. B. Cakirli, R. F. Casten, R. Winkler, K. Blaum, and M. Kowalska, preprint, to be published