

Abstract Submitted
for the APR20 Meeting of
The American Physical Society

New Isospin-Breaking “USD” Hamiltonians and their Predictions for Nuclei in the sd -shell AARON MAGILLIGAN, B. ALEX BROWN, Michigan State Univ — Two new USD-type Hamiltonians, USDC and USDI, have been developed that directly incorporate Coulomb and other isospin-breaking interactions. Starting from *ab initio* interactions, linear combinations of two-body matrix elements were constrained by experimental energy levels in sd -shell nuclei. With this method, binding energies and excitation energies of proton-rich nuclei in the shell can be added to the data set used in the fit. USDC and USDI contain an analytic Coulomb interaction with Miller-Spencer short range correlations and an effective isotensor interaction. Also presented are the modified interactions, USDCm and USDI_m, that have had the Coulomb interaction constrained to better reproduce experimental mirror energy differences. These Hamiltonians are used to provide new predictions for the proton-dripline, to examine isospin level mixing matrix elements, and to calculate the b - and c -coefficients of the IMME. Several examples of states with large Thomas-Ehrman Shifts are modeled using USDC and a single-particle interaction.

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Date submitted: 10 Jan 2020

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