Breakdown of Isobaric Mass Multiplet Model for the sd-shell Nuclei[1] AARON MAGILLIGAN, Department of Physics, Florida State University, Tallahassee, Florida 32306, USA, B. ALEX BROWN, National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, Michigan 48824, USA — The Isobaric Multiplet Mass Equation (IMME) relates the masses of Isobaric Analogue States with the same quantum numbers, and is quadratic in form. Many individual cases of isobaric multiplets deviating from the quadratic IMME have been analysed; however a systematic scan of the available data has not been done to the authors' knowledge. We examine the experimental data for Isobaric ground-state Multiplets in the sd-shell for inconsistencies of the quadratic IMME. Shell model calculations using two sd-shell Hamiltonians, USDA and USDB, are performed for the same region and checked against the quadratic IMME for deviations. Significant corrections to the IMME are found to be needed for the $T = 2$, $A = 20$ and the $T = 3/2$, $A = 35$ ground state multiplets. These corrections are due to nearby states inducing isospin mixing in ^{20}Ne and ^{35}Ar; predictions are made for the energies of these levels. They require experimental confirmation of their properties. Our work shows that the breaking of the IMME can be understood in the framework of the sd-shell.

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