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Nuclear Structure in Even-Even Nuclei, $24 \leq Z \leq 72$[1] SARAH BUCHHORN, HSHSP-MSU — Analysis of the spectra of excited nuclei has been used for decades to reveal trends and build models. Power regressions of the form $E(J) = a(\sqrt{J(J+1)})^b$ fitted to the *yrast* line of isotopes reveal an average b of $\sim 4/3$. It should be noted that this is the value predicted for large angular momenta by the Variable Moment of Inertia model [1,2]. A second plot of R_J $(R_J = E_{J_1^+} / E_{2_1^+})$ vs. J reveals curves described by power regressions where $0.66 \leq b \leq 1.81$. Graphs of b vs. neutron number (N) reveal V-shaped patterns for many nuclei, with the lowest exponent corresponding to a magic N. In addition, sharp jumps in exponents are seen at the $(N = 88) \rightarrow (N = 90)$ transition point in several nuclei. A third chart – an abbreviated energy level diagram including 0_1^+,0_2^+,2_1^+,2_2^+, and 4_1^+states illustrates the energy increases at magic numbers, along with the near-degenerate two-phonon triplet of 0_2^+, 2_2^+, and 4_1^+ - most clearly observed in isotopes of Z=28,34,36,38,44,46, and 48. Lastly, a fourth chart of $E_{3_1^-}$ against $E_{2_1^+}$ shows positive correlation that is well described by equation $E(3^-) = A - \frac{B^2}{E(2_1^+)}$ - not only for Z=54 [3] but also for Z=36,42-52, and 68. Data obtained through ENSDF database. [1] M.A.J.Mariscotti,G.Sharff-Goldhaber and B.Buck, *Phys.Rev.***178,1864**(1969). [2] M.I. Stockmann and V.G.Zelevinsky, *Phys.Lett.***41B**,19(1972). [3] W.F. Mueller et al.,*Phys.Rev.C* **73**, 014316(2006).

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