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Binding-Energy Systematics of $0^+,$ $2^+,$ $3^−,$ and $4^−,$ $T=0$ States of Even-Even Self-Conjugate Nuclides from $^{16}\text{O}$ to $^{40}\text{Ca}$ FRIEDRICH EVERLING, NCSU, Raleigh, NC, and TUNL, Durham, NC, USA (Early affiliation; present address: Ringheide 24 f, 21149 Hamburg, Germany; everlingf@aol.com) — Binding energies of self-conjugate even-even nuclides are plotted as $-B^* + (9.5 \text{ MeV}) \cdot A$ versus mass number $A$, where $B^*$ is the binding energy of ground states and levels. A diagram from $A=0$ to 76 mainly for ground states shows a subshell systematics. In a diagram from $A=16$ to 40, established and hypothetical $0^+$ levels are shown; 24 states of supposed $1d_{5/2}$, $2s_{1/2}$, and $1d_{3/2}$ subshell occupations are connected by almost linear trends. Surprisingly, early insufficient measurements at $E_x = 0.65 \text{ MeV}$ in $^{20}\text{Ne}$ and 0.5 (and 0.43) $\text{MeV}$ in $^{32}\text{S}$ fit the trends. A diagram for the $0^+$, $2^+$, $4^+$, and $6^+$ band from $^{16}\text{O}$ to $^{28}\text{Si}$ suggests the $0^+$ head in $^{20}\text{Ne}$ to be at 0.65 $\text{MeV}$. A systematics of $2^+$ states supports both levels. A plot of $3^−$ and $4^−$ states contains two pairs of nearly parallel and linear 3-point trends. Two odd $2s_{1/2}$ and $1f_{7/2}$ nucleons couple to $3^−$ and (not completely established) to $4^−$ in trends $\approx 1.6$ and $\approx 1.7 \text{ MeV}$ above. Below each of the two pairs of trends, the $0^+$ trends are expected to be also nearly linear, which they are with these complementary $^{20}\text{Ne}$ and $^{32}\text{S}$ levels. A table suggests a total of 18 important experimental investigations.

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