Competition Between Single-Particle and Collective Excitations in the Region of $30 \leq Z \leq 38$ and $32 \leq N \leq 50$ \(^1\) S.L. RICE, Y.Y. SHARON, G.J. KUMBARTZKI, N. BENCZER-KOLLER, Rutgers University — The experimental data for the excitation energies and B(E2) reduced transition probabilities for the $2^+_1$, $4^+_1$ and $2^+_2$ states in the long chains of stable and radioactive even-even isotopes of Zn, Ge, Se, Kr and Sr were examined in terms of the competition between single-particle and collective modes of excitation. The magic numbers of 28 and 50 were used for both protons and neutrons. While the level-energy information is not particularly informative when plotted as a function of the neutron number $N$, the B(E2) values showed obvious trends towards collectivity as $Z$ increases towards the middle of the shell. The data were also analyzed as a function of the number of protons (proton holes) $N_p$ and neutrons (neutron holes) $N_n$ in the valence shells and of the parameter $P = \frac{N_pN_n}{N_p+N_n}$. Increasing values of $P$ correspond overall to larger B(E2)'s but the scatter of the data indicates structures with complex wave functions.

\(^1\)This work was supported in part by the National Science Foundation.