

Microscopic calculations for upper fp shell / $g_{9/2}$ level nuclei: Ge & Se

J. P. Draayer and K. P. Drumev

Department of Physics and Astronomy

Louisiana State University, Baton Rouge, Louisiana 70803-4001 USA

Abstract

Shell-model calculations for isotopes of Ge and Se are reported where valence nucleons beyond the $N=28=Z$ core are considered to fill levels of the normal parity upper fp shell and the unique parity $g_{9/2}$ intruder configuration. Results are for realistic interactions of the Kuo-Brown-3 type with various model space truncations that key on the number of nucleon pairs allowed to occupy the intruder level. Electromagnetic (E2 & M1) rates as well as decay probabilities are calculated, some of which are key in a determination of the structure “waiting point” nuclei that tend to regulate nucleo-astrosynthesis processes. The role of the intruder level, which is treated on an equal basis with the normal parity orbitals, is shown to be important for reproducing structural details. The levels of the upper fp shell are handled within the framework of a normal jj -coupled basis as well as its pseudo-SU(3) counterpart where one sees the effect of deformation on the results.