

The Nature of 0^+ States in ^{158}Gd

S.R. Leshar

K.U. Leuven, Instituut voor Kern-en Stralingsfysica, Celestijnenlaan 200D, B-3001 Leuven, Belgium

Considerable interest exists in the nature of 0^+ states in deformed nuclei and the description of these excitations as, for example, β vibrations or two-phonon states. Recent $^{160}\text{Gd}(p,t)$ reaction studies have revealed the existence of more than ten 0^+ states in ^{158}Gd below 3.0 MeV. These states in ^{158}Gd have been examined with the $(n,n'\gamma)$ reaction and neutron energies up to 3.5 MeV, at the University of Kentucky, to confirm the identification of these as 0^+ states and to determine their lifetimes through DSAM measurements. Gamma-ray excitation function and angular distribution measurements have been performed, and γ - γ coincidences have been measured with the KEGS array of detectors. These results as well as other methods of probing 0^+ states will be presented as well as the considerable theoretical interest in this nucleus and the levels observed.