New structure information on ^{93}Ru near ^{100}Sn

M.Stanoiu[1] et al., for the E389 collaboration at GANIL

[1] *Gesellschaft fr Schwerionenforschung mbH, Planckstr. 1, 64291 Darmstadt, Germany*

Properties of excited states in the doubly magic nucleus of ^{100}Sn are not known from direct measurements. Thus there is a strong interest in nuclei in close vicinity to ^{100}Sn as they provide indirect evidence on the structure properties of the doubly magic system. Of particular importance are excitations of the core, which in principle should reflect the stability of the shell closures. The nuclei along N=50 below ^{100}Sn, have protons in the $g_{9/2}$ shell, and thus states at low excitation energy should be easily calculated as multiproton systems with several protons in the high-j orbit. The transition matrix elements are very sensitive probes of the admixtures to the wave functions. Our recent lifetime results for the 6^+, 4^+ and 2^+ states in ^{94}Ru and ^{96}Pd have shown strong departure from the simple picture mentioned above. These deviations can be explained only by admixtures of neutron excitations to the low-lying states in these N=50 nuclei. Our lifetime measurements in the subnanosecond region (ps to ns) were performed at the LISE facility at GANIL via isomer-delayed gamma-gamma time-delayed coincidences. The nuclei in the region of N=Z close to ^{100}Sn were produced in the fragmentation reaction of ^{112}Sn. They were identified on an event-by-event basis and implanted into a Si detector at the point of measurement. Using the array of Studsvik-designed BaF_2 detectors we have obtained high quality results even for very weakly produced exotic nuclei at the rate of 1 decay per second. The new results include the lifetime of the 1936 keV level in ^{93}Ru, which shows a very slow B(E2) value for the $17/2^+$ to $13/2^+$ transition, which is related to the B(E2) pattern observed for ^{94}Ru and ^{96}Pd. Results of shell model calculations will be presented.