Beta decay of ^{95}Ag

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Proton-rich nuclei in the vicinity of the doubly-magic nucleus ^{100}Sn provide a proper testing ground for the nuclear shell model. Due to the core-closing at Z=N=50, large scale shell model calculations are feasible, thus enabling a detailed comparison of theoretical predictions with experimental data. By using β-delayed γ-ray data the decay of ^{95}Ag (Z=47, N=48) has been previously investigated by Schmidt *et al.* [1] who have established a level scheme consisting of 4 excited states up to ≈2 MeV for the ^{95}Pd daughter-nucleus. The present contribution reports on a recent investigation of the β decay of ^{95}Ag. It was carried out by using a array of a β detector and 13 Ge crystals [2-4], the γ-ray efficiency being considerably higher compared to [1].

The measurements were carried out at the GSI on-line mass separator. The ^{95}Ag nuclei were produced by means of the ^{58}Ni(^{40}Ca,2pn) reaction using a ^{40}Ca beam of 3.94 MeV/u and 80 particle-nA from the UNILAC accelerator. A 2.7 mg/cm^2 thick niobium foil was used as beam degrader in front of the ^{58}Ni target which was 2.8 mg/cm^2 thick. The reaction products were stopped in a hot carbon catcher inside a FEBIAD-B2C ion source. After ionization and extraction from the source, the mass-95 secondary beam was separated by a magnetic field and implanted into a transport tape. The decay of the mass-95 activity was measured during implantation cycles of 4.8 s, the total measuring time amounting to 7.5 h. Singles as well as coincidence events were stored on a magnetic tape for off-line analysis. Examples of the singles γ-ray spectra and the β–γ–γ data are displayed in Fig. 1. The resulting ^{95}Pd level-scheme, shown in Fig. 2, considerably extends that reported in [1]. An interesting feature of the level scheme is the existence of a 13/2$^+$ state at 1351.0 keV that is depopulated by a direct γ-ray transition to the 9/2$^+$ ground-state. This line was identified [5] to form a doublet with the 1351 keV γ-ray depopulating a

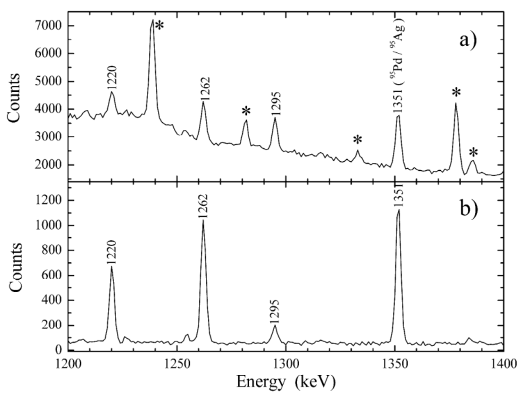

Figure 1: a) Part of the singles γ-ray spectrum showing the strongest γ rays of ^{95}Pd (energies given in keV) and background lines (marked by asterisks). b) Corresponding part of the projection of the β-gated γ-γ matrix.

13/2$^+$ level in ^{95}Rh. The 1351.0 keV level is populated by a strong 1220 keV γ ray and a weaker 622 keV transition [6].

The level scheme deduced here is compared in fig. 2 with the predictions of 2 different models. In model-1, ^{100}Sn is assumed to be the core and the valence proton and neutron holes are placed in the $g_{9/2}$ and $p_{1/2}$ orbitals [7], whereas in model-2, the breaking of the ^{100}Sn core is allowed, assuming particle-hole excitations to occur from the $g_{9/2}$ and $p_{1/2}$ orbits to higher shells ($g_{7/2}$, $d_{5/2}$, $d_{3/2}$, and $s_{1/2}$).

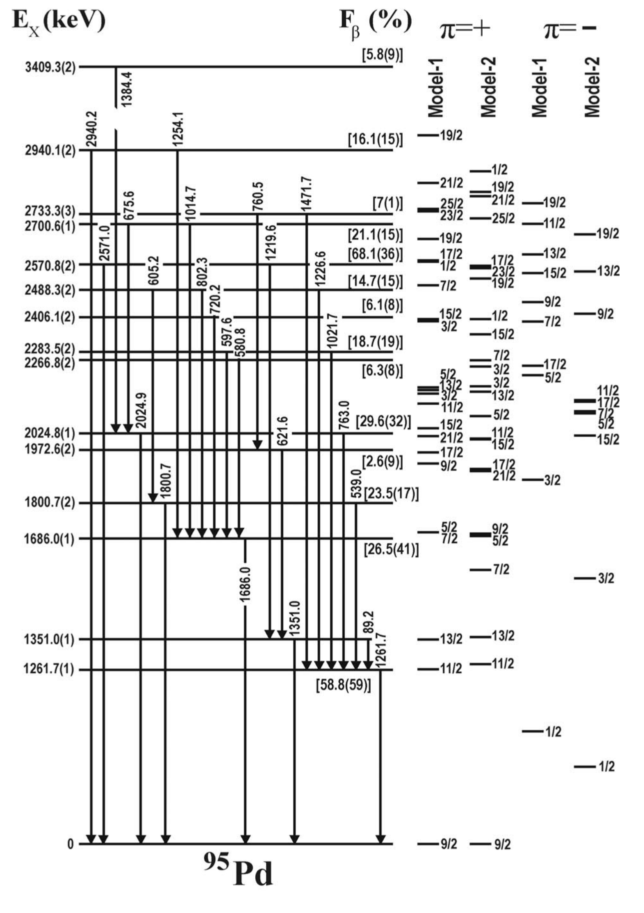

Figure 2: Comparison of the level scheme of ^{95}Pd deduced in the present work, with the theoretical predictions (see text). The apparent β-feeding F_β (in %) is given in brackets for each level, except of the 1351 keV state.

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