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Study of the β decay of ^{133}In and ^{134}In

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Over the last years the advance in experimental techniques allowed to refine the experimental knowledge on ^{133}Sn, which is a key nucleus to deduce neutron single-particle (SP) energies above the doubly magic ^{132}Sn core. The different adopted techniques allowed to obtain mutually consistent information about SP energies for $\nu p_{3/2}$, $\nu p_{1/2}$, $\nu h_{9/2}$ and $\nu f_{5/2}$ neutron orbitals relative to the $\nu f_{7/2}$ ground state of ^{133}Sn [1-5]. Still, the knowledge about neutron SP states is not complete and the question of the position of the neutron-unbound $\nu i_{13/2}$ state remains open for investigation [6]. Moreover, information about other unbound states, corresponding to neutron-hole configurations, is also limited. The need to revise studies of ^{133}Sn via β decay of ^{133}In and ^{134}In emerges from the recently-reported significant role of γ ray emission from states at excitation energies more than 1 MeV above the neutron separation energy [1].

Our experiment was performed at the ISOLDE Decay Station, where excited states in ^{133}Sn were studied via the β decay of ^{133}In and complemented by studies of the βn decay branch of ^{134}In. Isomer-selective ionization using the ISOLDE RILIS ion source enabled the β decays of ^{133g}In ($I^{\pi}=9/2^{+}$) and ^{133m}In ($I^{\pi}=1/2^{-}$) to be studied independently for the first time [7]. Preliminary results on γ decay of unbound states in ^{133}Sn are presented and discussed.

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