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Gamma and fast-timing spectroscopy of the doubly-magic nucleus Sn-132

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During the last decades there has been a substantial effort to obtain information about the region around the neutron-rich ^{132}Sn, the most exotic doubly-magic nucleus presently at reach. The isotope ^{132}Sn is itself a very interesting case. The simplest excited levels correspond to particle-hole states where a particle is excited across the energy gap of the neutron or proton closed shell. The identification of the multiplets may provide information on the nuclear two-body matrix elements.

In this contribution we report on the fast-timing and gamma spectroscopy of ^{132}Sn carried out in the framework of the ISOLDE IS610 experiment. The excited states of Sn isotopes were populated in the beta-decay of In isomers, produced in a UC_x target unit equipped with a neutron converter. The In isomers were ionized using the ISOLDE Resonance Ionization Laser Ion Source (RILIS), which for the first time allowed isomer-selective ionization of indium. The measurements took place at the new ISOLDE Decay Station (IDS), equipped with four highly efficient clover-type Ge detectors, along with a compact fast-timing setup consisting of two $LaBr_3$(Ce) detectors and a fast beta detector. The setup incorporated a tape transport system to remove longer-lived activities.

Here we concentrate on the excited structure of ^{132}Sn, populated in the β-decay of ^{132}In, and also, owing to the RILIS isomer selectivity, separately from the β-n decay of the ^{133}In $1/2^-$ isomer and ^{133}In $9/2^+$ the ground state. We present results of the analysis that include an expanded level-scheme, which more than a dozen new levels and more than 40 new γ-transitions. These results are completed with new measurements of the lifetimes of ^{132}Sn excited states.

Primary authors: Mr BENITO, Jaime (Universidad Complutense de Madrid); Prof. FRAILE, Luis (Universidad Complutense de Madrid); Prof. KORGUL, Agnieszka (University of Warsaw (PL)); Ms PIERSA, Monika (University of Warsaw (PL))

Co-author: IS610 COLLABORATION

Presenter: Mr BENITO, Jaime (Universidad Complutense de Madrid)

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