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Spectroscopy of N~Z Nuclei: 100Sn and Neighbours

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We have produced 100Sn and nuclei in its neighbourhood by fragmentation of 124Xe ions from the SIS at GSI, Darmstadt. The fragments of interest were separated and identified in the FRS. In addition to 259 nuclei of 100Sn we observed for the first time the N=Z-1 nuclei 93Ag, 95Cd, 97In and 99Sn. Because of the reduced yield of 103Sb we conclude that proton radioactivity with a half life below 100ns is its dominant decay channel. The fragments were stopped in a stack of DSSDs for the correlation of implantation with subsequent decays. Ten Si detectors in front and behind this implantation zone served as calorimeter for betas. The implantation detector was surrounded by the 105 Ge detectors of the RISING array. A number of isomeric states was observed. In 102Sn we find a new isomeric gamma-line which we attribute to the 6+-4+ transition. In 98Cd we also observe an unknown transition, shedding light on core excited states. For the decay of 100Sn we deduce a precise value of the half-life and of the decay energy to the lowest 1+ state in 100In. That gives us the GT strength of the decay which is the largest ever seen. For the first time we observe the gamma-cascade depopulating that 1+ state. It appears that the description of 100Sn and 100In in the truncated model space for protons (p1/2, g9/2) and neutrons (d5/2, g7/2, d3/2, s1/2, h11/2) works remarkably well.

Summary

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