

Recoil-decay correlations with beta particles at the MARA focal plane

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The recoil-decay correlation technique is a powerful tool to perform spectroscopic studies of exotic nuclei produced with very low cross sections. The characteristic alpha or proton decays (or decay chains) observed at the focal plane of a recoil separator provide a straightforward way to identify the produced nuclei and allows to “tag” the prompt or delayed gamma-rays emitted by the nucleus of interest. However, nuclei around the $N=Z$ line in the $A=50-80$ mass region are beta+ emitters, which make the spectroscopic studies of these systems particularly challenging when employing the recoil-decay correlation technique. The complications arise for example from the continuous energy distributions, longish decay half-lives, and extended ranges of beta particles in the detector material.

In this presentation, the recent experimental advances in the instrumentation and methodologies, achieved at the Accelerator Laboratory of the University of Jyväskylä, to enable the spectroscopic studies of beta-decaying $N\approx Z$ nuclei will be discussed together with some examples of fresh spectroscopic data, e.g., on ^{62}Ge , ^{66}As and ^{78}Zr nuclei.

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