TOWARDS DIGITAL SPECTROSCOPY OF PROTON EMITTERS*

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The proton radioactivity studies at HRIBF (Oak Ridge) will be presented, including recent observation of a fine structure in proton emission from an odd-odd nucleus ^{146}Tm. These experiments were performed by means of Recoil Mass Separator (RMS) [1] equipped with a Double-sided Silicon Strip Detector (DSSD) [2,3].

New method of digital signal processing applied to the proton radioactivity studies will be described. For the test case of a ^{113}Cs ($T_{1/2}$=18 μs), proton decays were observed a few hundred nanosecond after an implantation of recoiling ion. The implantation and decay signals were digitized just after the DSSD preamplifier using the DGF-4C module of XIA [4]. The energy threshold for particle detection as low as 150 keV has been achieved. This technique should allow us to expand the proton radioactivity studies, e.g. to a region around and below Z=50, where proton emitters are expected to have very short submicrosecond halflives and/or the energies of emitted protons are below 0.5 MeV. Possible applications to the decay studies with radioactive beams will be presented.

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