

Munich experiments to detect short-lived proton emitters

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The talk will cover four topics:

1. The development of catcher techniques to detect shortlived particle radioactivities. With this setup proton emission from ^{113}Cs and ^{109}I has been observed for the first time (1983). Their slow decay rate has been realized and expressed in terms of a spectroscopic factor.
2. A discussion of various types of recoil separation schemes and experiments using an electrostatic deflector, which yielded improved decay data for ^{113}Cs and ^{109}I .
3. The production of proton rich nuclei by fragmentation of relativistic ^{124}Xe and ^{112}Sn ions at GSI and the determination of their decay properties. The beta-decay halflives of ^{105}Sb and ^{77}Y as well as of many other nuclei along the path of rp-process nucleosynthesis have been measured. In $T_z=-1/2$ nuclei proton decay has to compete with superallowed Fermi-decay, which is also observed for the $T_z=0$ odd-odd nuclei between ^{78}Y and ^{94}Ag .
4. A possible solution to the problem how to detect the proton decay of ^{39}Sc ($S_p = -0.602(24)$ MeV, $T_{1/2} \sim 0.2$ ps) and to measure its half-life.