

β -decay studies of very proton-rich isotopes in the mass A=40-70 region

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In recent experiment at the LISE3 separator of GANIL, we studied exotic nuclei close to the proton drip line in the mass A=40-70 region. These nuclei decay by β -delayed one- or two-proton emission. The study of these nuclei yields unique nuclear structure information on proton drip line nuclei not accessible by other means.

Our experiments in the titanium-to-nickel region allowed not only to observe the doubly-magic nucleus ^{48}Ni for the first time, but also to determine half-lives for almost all nuclei close to the proton drip line in this region. Beyond that proton- γ coincidences allowed to establish partial decay schemes for some of the nuclei. For the nuclei ^{42}Cr and ^{49}Ni , the data allow to distinguish between the two decay branches two-proton radioactivity and β -delayed decays.

In the nickel-to-krypton region, half-lives have been determined for nuclei of interest for the astrophysical rp process. In particular, more accurate half-lives have been determined for ^{61}Ga and ^{65}As and first half-lives values were obtained for ^{60}Ga and ^{64}As .