Experimental studies on the weak decay of Λ-hypernuclei

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The systematic study of weak decay process of p-shell Λ-hypernuclei was one of the major commitments of the FINUDA experiment. This effort was motivated by the strong intrinsic interest of the subject, due to its sizeable impact on several aspects of both experimental and theoretical hypernuclear physics. The special characteristics of the apparatus permitted the observation of both the mesonic and the non-mesonic decay modes.

After the initial analysis targeted on the mesonic decay channel, in the last few years the attention was focused on non-mesonic decay modes. Such activity led to the important achievement of the experimental determination of the decay width of the two-nucleon induced process. Very recently, by gathering all the available experimental information, it was possible to determine for the first time the width of the one-proton induced decay for several p-shell Λ-hypernuclei [1]. Results are reported in Fig. 1 and compared with a recent theoretical calculation.

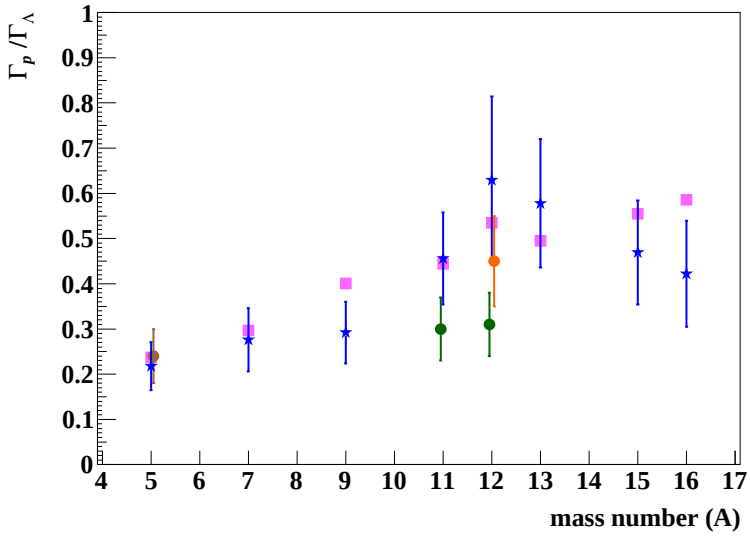

Figure 1: Γ_p/Γ_Λ experimental values as a function of A for ${}^{5}_{\Lambda}$He, ${}^{7}_{\Lambda}$Li, ${}^{9}_{\Lambda}$Be, ${}^{11}_{\Lambda}$B, ${}^{12}_{\Lambda}$C, ${}^{13}_{\Lambda}$C, ${}^{15}_{\Lambda}$N and ${}^{16}_{\Lambda}$O from the present analysis (blue stars). Theoretical predictions for Γ_p/Γ_Λ [2] (violet squares) are shown for comparison. Measurements of Γ_p/Γ_Λ for ${}^{5}_{\Lambda}$He [3] (brown full circle), for ${}^{11}_{\Lambda}$B and ${}^{12}_{\Lambda}$C [4] (green full circles) and for ${}^{12}_{\Lambda}$C [5] (orange full circle) are plotted as well. (from Ref. [1])

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