

Study of non-mesonic weak decay of ${}^5_{\Lambda}\text{He}$ and ${}^7_{\Lambda}\text{Li}$ with FINUDA

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In free space, a Λ particle decays dominantly associated with a pion in $N\pi$. In the case of Λ bound in a nucleus, a Λ hypernucleus, Λ decays as in the free space (mesonic weak decay), but is also able to induce the four-baryon weak reaction with a nucleon of the nucleus $\Lambda N \rightarrow nN$ (non-mesonic weak decay, NMWD).

The NMWD gives a unique opportunity to study the weak interaction between baryons, because this strangeness non-conserving process is purely due to the weak interaction.

The FINUDA experiment is running at the DAΦNE ϕ -factory in Frascati and is mostly dedicated to the high resolution spectroscopy of Λ hypernuclei and to the study of their non-mesonic decay. These studies are performed using the low energy (16 MeV) K^- , coming from the ϕ decay, to produce Λ -hypernuclei through the $K_{stop}^- + {}^A Z \rightarrow {}^A_{\Lambda} Z + \pi^-$ reaction.

The aim of this work is to present the latest experimental results obtained from the study of the NMWD for ${}^6\text{Li}$ and ${}^7\text{Li}$ targets. In particular the ${}^6\text{Li}$ target is really useful for the observation of hyperfragments. In fact the ${}^6_{\Lambda}\text{Li}$ is unstable for proton emission and it decays in 10^{-22} s into ${}^5_{\Lambda}\text{He}+p$ via the Coulomb assisted mechanism.

Proton spectra and nucleon-nucleon coincidence spectra will be presented for the ${}^5_{\Lambda}\text{He}$ and ${}^7_{\Lambda}\text{Li}$ hypernuclei and the results discussed in the framework of present theoretical models. The data analysis is performed using the data collected during this second FINUDA data taking started on October 2006.