First results on hypernuclear spectroscopy from the FINUDA experiment at DAΦNE

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FINUDA is a nuclear physics experiment at DAΦNE, the e^+e^- Frascati Φ-factory. This machine is a unique source of low energy K^- to perform precise hypernuclear studies. FINUDA has a very ambitious hypernuclear physics program including high statistics hypernuclear spectroscopy, study of hypernuclear mesonic and non-mesonic decay modes, search for neutron-rich hypernuclei. The experimental apparatus consists of a magnetic spectrometer with cylindrical geometry optimized to provide high momentum resolution (0.3% FWHM) and large acceptance (3πsr) for the prompt π^- emitted in the Λ-hypernucleus formation from capture of K^- at rest in the target nuclei: $K^-_{stop} + {}^AZ \rightarrow {}^A_\Lambda Z + \pi^-$.

The same detector also has excellent detection capability for the products of the Λ decay. Up to now, this is a unique capability in the hypernuclear physics panorama.

FINUDA has recently completed the first data taking run collecting an integrated luminosity of about 220 pb^{-1}, about 10^6 events following hypernuclei formation on targets of ^6Li, ^7Li, ^{12}C, ^{27}Al, ^{51}V. Some of the above hypernuclei were studied by previous experiments with less statistics and worse resolution.

Preliminary analysis of the data shows very interesting results on hypernuclear spectroscopy that will be presented at the Conference.

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