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Study of double- Λ Hypernuclei at J-PARC (E07) experiment

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To study double strangeness system such as double- Λ hypernuclei and H-dibaryon, Hybrid-emulsion experiments with counter (E176) and scintillating-fiber (E373) have been performed for these twenty years. In the experiments, we have obtained nearly ten thousand events of Ξ^- hyperon capture at rest in nuclear emulsion, and observed 8 events of sequential decay of light double- Λ hypernuclei and 5 events of twin hypernuclei. Recently, we succeeded to measure two Λ binding energies of ${}_{\Lambda\Lambda}^6\text{He}$, ${}_{\Lambda\Lambda}^{11}\text{Be}$ and ${}_{\Lambda\Lambda}^{13}\text{B}$. However, very little is known for double-strangeness system. In this talk, we present a quite improved experiment (E07 at J-PARC) with ten times' statistics of the previous experiments. A new-generation hybrid-emulsion method is applied to search for double- Λ hypernuclei. In the experiment, we handle Double-sided Silicon Strip tracking Detector (DSSD) for precise detection of Ξ^- hyperon in the emulsion, and huge amount of emulsion gel (2.6 tons). We also develop speedy scanning system to complete scanning of 10^6 Ξ^- hyperons within a few years. It is expected that one million Ξ^- hyperons produce about 10^2 double- Λ hypernuclear events in the emulsion. We will make a nuclear chart with double strangeness.

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