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Production of Double-Λ Hypernuclei via Ξ-Hypernuclear Decay at J-PARC

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The investigation of hypernuclei with strangeness -2 is one of the hot topics in hypernuclear physics, and the advent of an intense kaon beam at J-PARC has enabled us to explore them in detail. We have proposed a new experiment to produce probably the lightest double-Λ hypernucleus, ${}^{5}_{\Lambda\Lambda}\mathrm{H}$. A substantial fraction of a Ξ-hypernucleus, ${}^{7}_{\Xi}\mathrm{H}$, which can be produced in the ${}^{7}\mathrm{Li}(K^-, K^+)$ reaction, is expected to decay into ${}^{5}_{\Lambda\Lambda}\mathrm{H}+2n$. The mass of ${}^{5}_{\Lambda\Lambda}\mathrm{H}$ will be determined by "decay pion spectroscopy", which was successfully applied for a single Λ hypernucleus at MAMI.

In this contribution, we will review the current situation of the strangeness -2 sector in hypernuclear physics and outline the concept of the proposed experiment.

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