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S=-2 Systems

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At J-PARC, we are conducting spectroscopic studies of strangeness -2 systems, such as Ξ- and double-Λ hypernuclei. The experimental information on these systems is so far
limited with several emulsion events; the "Nagara"event for ΛΛ6He and the "Kiso"event for a strong candidate of a Ξ hypernucleus. In this talk, I will introduce a preliminary result on Ξ12Be obtained in the pilot run of E05 experiment in 2015, and the status of E07 experiment, a hybrid-emulsion measurement, taking the data just recently in 2017.
In the E05 experiment, we are going to measure the Ξ12Be spectrum with an energy resolution of better than 2 MeV(FWHM) by constructing a new spectrometer S-2S. Before the completion of the S-2S, we measured an excitation energy spectrum of the 12C(K-,K+)X reaction at 1.8 GeV/c with an energy resolution of 6 MeV, which is the best energy resolution ever achieved in studying this reaction. The measurement was performed at the K1.8 beam line of the J-PARC hadron experimental hall by using the SKS spectrometer. The K- beam intensity at the primary proton beam power of 39 kW was typically 6x105/ spill with 5.5-sec. beam cycle. The energy resolution was estimated from the peak observed in the p(K-,K+)Ξ- reaction from a 9.54-g/cm2 CH2 target. We took the data on the 12C(K-,K+)X reaction with a 9.4-g/cm2 C target for about 10 days. We have observed about 60k events of quasi-free Ξ- production, and several tens of events in the bound region. Although the analysis is still preliminary, we could see clear enhancements in the bound region above a flat background. The up-to-date analysis result will be presented.
In June, 2017, we have successfully completed the E07 data taking exposing a lot of stacks of emulsions. We estimate the number of stopped Ξ events would be an order of magnitude larger than ever. The data taking conditions and prospect of the data analysis will be reported.

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