${}^{19}_{\Lambda}$F hypernuclear production using the (K^-, π^-) reaction

Y. Sasaki[1], for the J-PARC E13 collaboration

[1]Department of physics, Tohoku University

We study spin-dependent ΛN interaction from structure of hypernuclei using Λ hypernuclear γ-ray spectroscopy. The strength of the ΛN spin-spin interaction in p-shell hypernuclei was determined from the energy spacing of their ground-state spin doublet. From the difference of the strength between the p-shell and sd-shell hypernulcei, the radial dependence of ΛN interaction can be studied. We can investigate the strength of the ΛN spin-spin interaction in sd-shell hypernuclei from the energy spacing of the ground-state doublet of ${}^{19}_{\Lambda}$F($3/2^+$, $1/2^+$) [1]. For this purpose, ${}^{19}_{\Lambda}$F γ-ray spectroscopy experiment (E13) is planned to be performed with a high efficiency Ge detector array, Hyperball-J, at the J-PARC Hadron Experimental Facility K1.8 beam line in June 2015.

In the E13 experiment, ${}^{19}_{\Lambda}$F hypernuclei are produced by the (K^-, π^-) reaction with $p_{K^-} = 1.8$ GeV/c. Production of the ${}^{19}_{\Lambda}$F is identified by reconstructing the mass of the hypernucleus obtained from measured momenta of incident and outgoing particles (Missing Mass Method). γ rays from excited states of the hypernuclei are detected by the Ge detector array in coincidence with the (K^-, π^-) reaction.

Two types of fluorine compound are used as ^{19}F target. The main target is a thick (∼20 g/cm^2) liquid CF_4 for γ-ray spectroscopy. The other is a thin teflon target (CF_2, ∼6.6 g/cm^2) for reaction spectroscopy, with which we estimate the yield of ${}^{19}_{\Lambda}$F and select the bound-state region of ${}^{19}_{\Lambda}$F in the mass spectrum.

In this contribution, I will report on preliminary results of the reaction spectroscopy for ${}^{19}_{\Lambda}$F using the CF_2 target.

[1] H. Tamura *et al.*, J-PARC proposal E13, "Gamma-ray spectroscopy of light hypernuclei" (2006).