Abstract Submitted
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Development of a water Cherenkov counter for the spectroscopy of Ξ hypernucleus KOHEI TAKENAKA, Kyoto University, J-PARC E05 COLLABORATION — We plan to obtain the spectroscopic information of Ξ hypernucleus through the $^{12}\mathrm{C}(K^-, K^+)$ reaction by using the high intensity K^- beam at J-PARC. When K^- hit the target, not only K^+ but also protons are scattered. The rate of protons is estimated three orders of magnitude higher than that of K^+. These protons are trigger backgrounds and make DAQ efficiency worse. Thus protons have to be suppressed by at least 10% in the trigger level. In order to fulfill this requirement, we use a water ($n = 1.33$) Cherenkov counter. The momentum region of K^+ and protons is around 1.3 GeV/c, both of which generate Cherenkov light. However, because high-velocity K^+ generate 2.5 times as many photons as protons, K^+ and protons can be discriminated by the number of photoelectrons. We estimated that at least 50 photoelectrons are required for K^+ at 1.3 GeV/c in order to reject 90% protons. We made and have developed a prototype of a water Cherenkov counter. We examined how proton rejection efficiency depends on reflective sheets and radiator by using cosmic ray. In addition, we investigated incident beam position and angle dependence of proton rejection efficiency at ELPH. I will report results of these experiments.

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