

$K^0\Lambda$ Photoproduction Studied with An Electromagnetic Calorimeter FOREST

Yusuke TSUCHIKAWA¹, Hisako FUJIMURA^{1,7}, Hiroshi FUKASAWA¹, Ryo HASHIMOTO^{2,8}, Qinghua HE¹, Yuki HONDA¹, Takatsugu ISHIKAWA¹, Takahiro IWATA², Shun KAIDA¹, Jirohta KASAGI¹, Atsushi KAWANO³, Shuzo KUWASAKI¹, Kazushige MAEDA⁴, Shin'ichi MASUMOTO⁵, Manabu MIYABE¹, Fusashi MIYAHARA^{1,9}, Kei'ichi MOCHIZUKI¹, Norihito MURAMATSU¹, Akihiko NAKAMURA¹, Ken'ichi NAWA¹, Shoei OGUSHI¹, Yasuyuki OKADA¹, Yoshihito ONODERA¹, Kyoichiro OZAWA⁶, Yasunobu SAKAMOTO³, Mamoru SATO¹, Hajime SHIMIZU¹, Hiroyuki SUGAI^{1,10}, Koutaku SUZUKI^{1,11}, Yasuhisa TAJIMA², Shin'ichiro TAKAHASHI¹, Yusuke TANIGUCHI¹, Hirohito YAMAZAKI^{1,12}, Ryuji YAMAZAKI¹, and Hiroshi Y. YOSHIDA² (the FOREST collaboration)

¹ Research Center for Electron Photon Science (ELPH), Tohoku University, Sendai 982-0826, Japan

² Department of Physics, Yamagata University, Yamagata 990-8560, Japan

³ Department of Information Science, Tohoku Gakuin University, Sendai 981-3193, Japan

⁴ Department of Physics, Tohoku University, Sendai 980-8578, Japan

⁵ Department of Physics, University of Tokyo, Tokyo 113-0033, Japan

⁶ Institute of Particle and Nuclear Studies (IPNS), High Energy Accelerator Research Organization (KEK), Tsukuba 305-0801, Japan

⁷ Department of Physics, Wakayama Medical University, Wakayama 641-8509, Japan

⁸ Institute of Materials Structure Science (IMSS), High Energy Accelerator Research Organization (KEK), Tsukuba 305-0801, Japan

⁹ Accelerator Laboratory, High Energy Accelerator Research Organization (KEK), Tsukuba 305-0801, Japan

¹⁰ Department of Quantum Science and Energy Engineering, Tohoku University, Sendai 980-8579, Japan

¹¹ The Wakasa Wan Energy Research Center, Tsuruga 914-0192, Japan

¹² Radiation Science Center, High Energy Accelerator Research Organization (KEK), Tsukuba 305-0801, Japan

E-mail: tsuchikawa@lms.tohoku.ac.jp

(Received February 3, 2016)

Simultaneous photoproduction of K^0 and Λ has been studied at the Research Center for Electron Photon Science, Tohoku University, Japan with the electromagnetic calorimeter complex FOREST. The $\gamma d \rightarrow K^0 \Lambda p$ events were detected with the entire range for the K^0 emission angle in the γn center-of-mass frame. The measured differential cross sections show flat shapes at the near-threshold region and backward-peaking structures in the higher energy region up to $E_\gamma = 1.15$ GeV.

KEYWORDS: $K^0\Lambda$, photoproduction, baryon spectroscopy, ...

1. Introduction

Kaon photoproduction is an excellent tool for studying highly excited baryons, which hardly couple with the πN channel. Recently, many experimental groups have investigated the $\gamma p \rightarrow K^+ \Lambda$ reaction (*e.g.*, [1–4]). The large t -channel contributions in this reaction make it complicated to extract the s -channel resonance (N^*) contributions. The well-studied reaction $\pi^- p \rightarrow K^0 \Lambda$ also exhibits