Abstract Submitted for the HAW09 Meeting of The American Physical Society

Photoproduction of $\Lambda(1405)$ and $\Sigma^0(1385)$ on the proton at $E\gamma = 1.5 - 3.0$ GeV at SPring-8/LEPS YOHEI NAKATSUGAWA, RIKEN. LEPS COLLABORATION — The $\Lambda(1405)$ is assigned as a p-wave q3 baryon in a quark model. However, it is also suggested that $\Lambda(1405)$ has a non-q3 structure such as a meson-baryon molecular state. On the other hand, $\Sigma^0(1385)$ is firmly established as a q3 state baryon. The difference of the internal structure of $\Lambda(1405)$ and $\Sigma^0(1385)$ may appear in the photoproduction cross sections and/or photon beam asymmetries of these two hyperons. Recently, differential cross sections for $\gamma p \rightarrow \gamma$ $K^+\Lambda(1405)$ and $\gamma p \to K^+\Sigma^0(1385)$ reactions were measured by LEPS collaboration. However, the statistics were limited because the contribution of free protons in the CH₂ target was extracted by subtracting carbon contributions which were dominant. A new experiment was carried out with liquid hydrogen target and linearly polarized photon beam. In order to detect decay products of hadrons, a time projection chamber surrounding the liquid target was used together with the LEPS spectrometer. The integrated luminosity is about 3 times larger than that of the previous experiment in the photon energy range $E\gamma = 1.5 - 2.4$ GeV. In addition, we can access higher photon energy region because the maximum $E\gamma$ of 2.97 GeV was achieved. The more detailed information of differential cross sections of $\gamma p \to K^+ \Lambda(1405)$ and $\gamma p \to K^+ \Sigma^0(1385)$ and line shapes of $\Lambda(1405)$ will be obtained from new data. The photon beam asymmetry will be also investigated.

> Yohei Nakatsugawa RIKEN

Date submitted: 30 Jun 2009

Electronic form version 1.4