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Photoproduction of $\pi^-\Delta^{++}$ and $\pi^+\Delta^0$ on the proton for the comparison of $\bar{u}u$ and $\bar{d}d$ productions

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We carry out hadron photoproduction experiments at Eγ=1.5-3.0 GeV at SPring-8/LEPS. We took charged pion data on the proton at forward angles for the first time and the data were analyzed recently. The differential cross sections for the $\pi^-\Delta^{++}$ and $\pi^+\Delta^0$ reactions are compared. In the $\pi^-\Delta^{++}$ reaction $\bar{u}u$ is produced, while in the $\pi^+\Delta^0$ reaction $\bar{d}d$ is produced. If the isospin=1 exchange in the t-channel is dominant, the cross section ratio $\sigma(\pi^+\Delta^0)/\sigma(\pi^-\Delta^{++})$ becomes 1/3. Preliminary experimental cross section ratios are close to 1/3 at small π angles, while they are larger than 1/3 at large π angles. Larger ratios suggest that the $\bar{d}d$ production is enhanced compared with the $\bar{u}u$ production. This result might be a hint to clarify the pion photoproduction reactions.
We also report recent physics results in our group.
We are developing a polarized HD target and large acceptance spectrometer for near future experiments. The present status of these developments is also reported.

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