— 第 947 回九大原子核セミナー —

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演題： Electromagnetic Production of Hyperons

日時： 4 月 20 日 (金) 16:30〜18:00

場所： ウェスト 1 号館 物理会議室 (W1-A-711)

概 要

The aim of this presentation is to provide an overview of the strangeness photo- and electroproduction reaction, especially $K^+\Lambda$ photo- and electroproduction off proton, and report on recent progress in this field. The kaon photoproduction on the proton is studied either in the resonance region, using an isobar model, or in the resonance region and beyond, exploiting a hybrid Regge-plus-resonace (RPR) framework. The higher-spin nucleon, spin-3/2 and spin-5/2, and hyperon, spin-3/2, resonances have been included in the model utilizing the consistent formalism by Pascalutsa and they were found to play an important role in data description. A further upgrade of our model was accomplished by implementing energy-dependent widths of nucleon resonances, which leads to a different choice of hadron form factor with much softer values of cutoff parameter for the resonant part. For a reliable description of electroproduction, the necessity of including longitudinal couplings of nucleon resonances to virtual photons was revealed. The free parameters of the models were fitted either solely to photoproduction data or to both photo- and electroproduction data from many collaborations, resulting in BS1 isobar model and RPR fit for photoproduction and a BS3 version of isobar model eligible also for electroproduction description. All models provide a reasonable overall description of the data in the kinematic regions where the free parameters were adjusted. Even though the kaon photoproduction takes place in the third-resonance region with many resonant states, the total number of included resonances, 15, 16, and 10 in the BS1, BS3, and RPR models, respectively, is quite moderate and it is comparable with amounts of resonances in other models. Moreover, the majority of nucleon resonances chosen in this analysis coincide with those selected in the Bayesian analysis with the RPR model as the states contributing to this process with the highest probability.

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