Production of ϕ Mesons on Protons near Threshold by Linearly Polarized Photon at SPring-8/LEPS

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Diffractive photo-production of ϕ mesons on nucleons at high energies is well described by the Pomeron exchange within the framework of Regge theory and Vector Dominance Model. At low energies region near the production threshold, others reaction channels like meson (π, η) exchange, scaler (0^{++} glueball) exchange and $s\bar{s}$ knock-out are likely to show up. In contrast to the fact that the meson-exchange mechanism becomes significant in the photo-production of vector mesons like ρ and ω at low energies, the meson-exchange mechanism is strongly suppressed for ϕ production due to the intrinsic $s\bar{s}$ constituent quark structure. Thus, the measurements of ϕ mesons near the production threshold provide an effective way to reveal any exotic channel(s) other than the well-known ones of Pomeron and meson exchanges. Furthermore, with a linearly polarized photon beam one can obtain information on the naturality of t-channel exchanges.
So far, experimental data for photo-production of ϕ mesons at low energies has been rather scarce with no measurement of polarization variables at all. The LEPS experiment have measured the reaction of $\gamma p \to \phi p$ at photon energies from 1.5 to 2.4 GeV in the period of Dec 2000 - June 2001 at SPring-8, Japan. The GeV photons are produced by backward-Compton scattering of Ar laser photons from 8 GeV electrons circulating at the SPring-8. Produced with highly linearly-polarized (>50%) tagged photons, events of ϕ mesons are identified by measuring K^+K^- mesons in coincidence at forward angles.
In this talk the measurement of the differential production cross section of ϕ mesons and the angular distributions of decayed kaons relative to the polarization direction of photon beam will be presented.