Baryon Resonance Dynamics in Vector Meson and Dielectron Production in πN Reactions

B.L. Reznik[a], B. Kämpfer[b], A.I. Titov[c,d]

[a] *Far-Eastern State University, Sukhanova 9, Vladivostok 690095, Russia*
[b] *Forschungszentrum Rossendorf, PF 510119, 01314 Dresden, Germany*
[c] *Advanced Science Research Center, JAERI, Tokai, Ibaraki, 319-1195 Japan*
[d] *Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna 141980, Russia*

The first part of our contribution is devoted to combined analysis of the production of ω and ϕ mesons in πN reactions in order to study manifestation of the baryon resonance dynamics and check the status of OZI-rule in near-threshold region. For this aim we use conventional "non-strange" description, based on such processes which are allowed by the non-ideal $\omega - \phi$ mixing. We show that the interference of the meson exchange and nucleon and nucleon resonance channels differs significantly for the ω and ϕ production amplitudes. This leads to a decrease of the relative yields in comparison with expectations based on a one-component amplitude with standard $\omega - \phi$ mixing. We find a strong and non-trivial difference between observables in ω and ϕ production reactions caused by the different role of the nucleon and nucleon resonance amplitudes. A series of predictions for the experimental study of this effect is presented[1].

In the second part, we discuss the exciting isoscalar-isovector $(\rho - \omega)$ interference in $\pi^- p \to n e^+ e^-$ and $\pi^+ n \to p e^+ e^-$ reactions, near the ω threshold. This interference leads to a distinct difference of the dielectron invariant mass distributions in $\pi^- p \to n e^+ e^-$ and $\pi^+ n \to p e^+ e^-$ reactions, depending on the beam energy[2,3]. The strength of this effect is determined by the coupling of resonances to the nucleon - vector-meson channels and other resonance properties. Therefore, a combined analysis of these reactions can be used as a tool for determining the baryon resonance dynamics.

References

[1] A.I. Titov, B. Kämpfer, B.L. Reznik, Phys. Rev. **C66** (2002); nucl-th/0102032.
[2]A.I. Titov, B. Kämpfer, Eur.Phys.J.A12, (2001) 217.
[3] M. F.M. Lutz, B. Friman, M. Soyeur, nucl-th/0202049.