PHOTOREACTIONS WITH TENSOR-POLARIZED DEUTERIUM TARGET AT VEPP–3

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The physical program of the Novosibirsk Electron-Deuteron collaboration is focused on the study of tensor effects in electro– and photo–reactions on the deuteron. The facility is based on a tensor-polarized deuterium gas target, internal to VEPP–3 electron storage ring, and a set of wide-aperture non-magnetic detectors.

Photoprocesses under study include two-body photodisintegration $\gamma d \to pn$, coherent neutral pion production $\gamma d \to d'\pi^0$ and charge pion production $\gamma d \to pp\pi$. Measurements covered the photon energy up to 500 MeV. The experimental approach consisted in selecting those events of electron-induced reaction in which electron is scattered at a very small angle. Electron is not detected, its scattering angle is reconstructed from kinematic parameters of reaction products.

Recent results on accurate measurement of tensor analyzing power components T_{20}, T_{21} and T_{22} in deuteron photodisintegration will be presented [1], as well as the results on the first measurement of T_{2M} in coherent π^0 production on deuteron [2].

Future plans in this activity will be discussed. Further progress is connected with a development of the Photon Tagging System (PTS). The PTS is based on detecting the scattered electron, thus allowing to reconstruct energy, emission angle and linear polarization of the quasi-real photon. The introduction of the PTS will permit to extend the photon energy domain up to 1.5 GeV and enable double–polarization experiments.

[1] I.Rachek *et al.*, Phys. Rev. Lett. 98 (2007) 182303.

[2] D.M.Nikolenko *et al.*, Pisma Zh.Eksp.Teor.Fiz. 89 (2009) 518.