It is proposed to measure the polarization parameter (asymmetry) P in $\pi^- p$ and $\pi^+ p$ elastic scattering to the backward angles ($\Theta_{cm} = 165°$–$178°$ in the energy range from 700 to 2000 MeV. This energy range corresponds to the second resonance region of πN interaction. Till now the asymmetry P has not been measured for the indicated angular range. At the same time, the predictions of the solution SM01 of partial-wave analysis (PWA) of GWU group (former VPI group) led to rather curious results. For example, at the energy of positive pions $T_{\pi^+} = 665$ MeV this analysis predict $P = 0.97$ for $\Theta_{cm} = 178°$, although the P value must be exactly zero for $\Theta_{cm} = 180°$. Differencies between the predictions for the asymmetry P given by the recent PWA SM01 and by "old" PWAs KH-80 and CMU-LBL exceeds 1.0 in the energy range of incident pions 700–900 MeV and for $\Theta_{cm} = 175°$. Similar discrepancies exist and in some other energy and angle regions.

Systematic measurements of the asymmetry P for $\pi^+ p$ elastic scattering to the backward angles in the energy range from 700 to 2000 MeV will be performed for the first time in the world and will be used – together with data published earlier – for performing a new PWA with the global aim to reconstruct the πN amplitude in the resonance region of pion-nucleon interaction.

Experiment is carried out using the polarized proton target having been used previously in ITEP for measuring the spin rotation parameters A and R. The target was reconstructed, and now the polarization vector is oriented in the vertical direction. Array of wire chambers are used to determine trajectories of the incident pions, scattered pions and recoil protons. Preliminary run was made in 2002, it has shown that a new experimental setup have met all requirements formulated at the stage of its designing.