While performing the phase shift analysis PNPI-94, the last experimental data obtained at PNPI and LAMPF were used. A principally new feature of this analysis was employing the generator of discrete ambiguities, which has made the search for a unique solution more effective. Another peculiarity was that the analysis did not imply the assumption of charge symmetry of πN partial amplitudes.

The phase shift analysis (PSA) PNPI-94 resulted in obtaining the most precise amplitudes for energies of the incident pions from 160 to 600 MeV (corresponding values of the centre-of-mass energy $\sqrt{s}$ =1210–1510 MeV). These amplitudes differ in many essential features from the amplitudes obtained in the "old" PSAs KH and CMU–LBL.

One of the most interesting results obtained in the PSA PNPI-94 is an observation of charge splitting in the P_{33} phase shifts; quantitatively this effect can be characterized by the difference $\delta_{33}^{++} - \delta_{33}^{0}$. This difference depends on the energy and varies from +2° at T_π = 200 MeV to –2° at T_π = 450 MeV changing a sign at T_π = 350 MeV. Fitting of this dependence made taking into account the Breit-Wigner resonance term and the non-resonance background has led to following values for the masses (M) and widths (Γ) of the P_{33} resonances.

$$M^0 = 1233.1 \pm 0.3 \text{ MeV}, \quad M^{++} = 1230.5 \pm 0.2 \text{ MeV},$$
$$M^0 - M^{++} = 2.6 \pm 0.4 \text{ MeV}, \quad \Gamma^0 - \Gamma^{++} = 5.1 \pm 1.0 \text{ MeV}.$$

These values are included in all last issues of the Review of Particle Physics.