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 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 energy and varies from +2 degrees at $T_\pi = 200$ MeV to −2 degrees at $T_\pi = 450$ MeV changing a sign at $T_\pi = 350$ MeV. Fitting of this dependence made taking into account the Breit-Wigner resonance term and the nonresonance background has led to following values for the masses (M) and widths (Γ) of the P_{33} resonances:

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

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