$\rho\pi$–states in the Antiproton–Neutron Annihilation into $\pi^- 3\pi^\circ$

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The results of the analysis of $\bar{p}n \to \pi^- 3\pi^\circ$ annihilation at rest are presented. 200.000 events were taken with the Crystal Barrel Detector with a liquid deuterium target. A full four–body partial wave analysis with the maximum likelihood method was applied to this sample. The dominant intermediate states in the data consist of a ρ–meson combined with the $(\pi\pi)$ S–wave or with the D–wave ($f_2(1270)$). A free fit of the $(\pi\pi)$ S–wave K–matrix gives small but significant modifications as compared to established parametrisations. In addition the partial wave analysis yields evidence for broad resonant structure in the exotic $(\rho\pi)$ P–wave at about $1500 MeV/c^2$, which is probably a complex structure containing $\pi_1(1400)$ and $\pi_1(1600)$. The $(\rho\pi)$–system is also found in the $a_1(1260)$, $a_1(1640)$, $a_2(1320)$, $\pi(1300)$ and $\pi(1800)$ states. For both radially excited mesons, $a_1(1640)$ and $\pi(1300)$, $\rho\pi$ dominates over $\sigma\pi$.