

Tests of C parity conservation in $\eta \rightarrow \pi^+\pi^-\pi^0$ decay with WASA-at-COSY detector

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The η meson has a very small width comparing to other mesons because the strong decays into two and three pions are suppressed by the P and G parity conservation. Therefore, the η meson decays can be used for precise tests of various symmetries. One of the main decay channels is $\eta \rightarrow \pi^+\pi^-\pi^0$. Since the electromagnetic contribution to this decay is very small [1], it proceeds predominantly via isospin violating processes resulting from the difference of the u and d quark masses. Study of the $\eta \rightarrow \pi^+\pi^-\pi^0$ decay is also of high interest for precise tests of the C parity conservation [2][3][4] and for a verification of predictions of the Chiral Perturbation Theory (ChPT) [5]. This decay was measured with high statistics (Dalitz Plot comprising $1.3 \cdot 10^6$ events) by the KLOE collaboration [2]. Their results show a deviation from the ChPT predictions and no evidence for C parity violation. The WASA-at-COSY collaboration conducts analogical studies in experimental runs with η -meson produced in $p-d$ [6] and $p-p$ [7] collisions. In the first half of 2010 the WASA@COSY detector collected a very large data sample of more than 10^8 η mesons produced in the proton-proton collisions. The poster will present status and preliminary results of the ongoing analysis of these experimental data.

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