Study of the $\eta \to \pi^+\pi^-\pi^0$ decay in $p-p$ collisions with the WASA-at-COSY

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The $\eta \to \pi^+\pi^-\pi^0$ decay, being one of the main η-meson decay channels, is forbidden by the G parity conservation. Since the electromagnetic contribution to this decay is very small [1], it proceeds predominantly via isospin violating processes resulting from the difference between the u and d quark masses. Therefore, study of this decay makes it possible to set constraints on the u and d as well as s and d quark mass ratios. Study of the $\eta \to \pi^+\pi^-\pi^0$ decay is also of high interest for precise tests of the C parity conservation [2][3][4]. It can be also used for a verification of the predictions of the Chiral Perturbation Theory (ChPT)[5]. The $\eta \to \pi^+\pi^-\pi^0$ 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 ChPT predictions and no evidence for C parity viotation. The WASA-at-COSY collaboration conducts analogical studies in experimental runs with η-meson produced in $p-d$ and $p-p$ collisions with even higher statistics. The poster will present preliminary results of the ongoing analysis of the $\eta \to \pi^+\pi^-\pi^0$ decay from $p-p$ data which were collected during 8 weeks of the COSY beam time in 2010 with more than 10^8 η's produced.

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