Study of the $\eta \to \pi^+\pi^-\pi^0$ decays in p-p interactions in view of the charge conjugation invariance*

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Charge conjugation is one of the fundamental symmetries in nature which transforms particles into antiparticles. Therefore, it is important to test the C symmetry accurately for a better understanding of the physics of the strong interaction and for the understanding of the significantly larger abundance of matter over antimatter in our Universe [1]. To this end WASA-at-COSY Collaboration [2] studies $\eta \to \pi^+\pi^-\pi^0$ decay, which violates isospin and its driven by the term of the QCD Lagrangian that depends on the $u - d$ quark mass difference [3]. Violation of C symmetry in this process could manifest it self as an asymmetry in energy spectrum of charged pions, and can be studied using Dalitz plot analysis.

In this talk we will present status of the data analysis and present preliminary results obtained by the WASA-at-COSY experiment in measurement of $pp \to pp\eta$.

[1] J. Smith, Phys. Rev. **166**, 1629 (1968)

[2] H. H. Adam et al. [WASA-at-COSY Collaboration], "Proposal for the Wide Angle Shower Apparatus (WASA) at COSY-Jülich", arXiv:nucl-ex/0411038.

[3] H. Leutwyler, Phys. Lett. **B 378** (1996) 313

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