

Charge symmetry breaking in $pn \rightarrow d\pi^0$

Arseniy Filin^{(b)(c)}, Vadim Baru^{(a)(b)}, Evgeny Epelbaum^{(a)(c)(d)}, Johann Haidenbauer^{(a)(e)},
Christoph Hanhart^{(a)(e)}, Alexander Kudryavtsev^(b), Ulf-G. Meißner^{(a)(c)(d)(e)}

^(a) Institut für Kernphysik (Theorie) and Jülich Center for Hadron Physics,
Forschungszentrum Jülich, D-52425 Jülich, Germany

^(b) Institute for Theoretical and Experimental Physics,
117218, B. Cheremushkinskaya 25, Moscow, Russia

^(c) Helmholtz-Institut für Strahlen- und Kernphysik (Theorie),
Universität Bonn, D-53115 Bonn, Germany

^(d) Bethe Center for Theoretical Physics, Universität Bonn, D-53115 Bonn, Germany

^(e) Institute for Advanced Simulation, Forschungszentrum Jülich, D-52425 Jülich, Germany

We study charge symmetry breaking (CSB) in the reaction $pn \rightarrow d\pi^0$. CSB manifests itself in a forward-backward asymmetry of the differential cross section measured recently at TRIUMF [1]. A complete calculation of CSB effects at leading order in chiral perturbation theory is performed. A new leading-order operator is included. This allowed us to extract the strong contribution to the neutron-proton mass difference [2]. The value obtained is consistent with the result of Gasser and Leutwyler based on the Cottingham sum rule [3] and with an extraction from lattice QCD [4].

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- [4] S. R. Beane, K. Orginos and M. J. Savage, “Strong-isospin violation in the neutron proton mass difference from fully-dynamical lattice QCD and PQQCD” Nucl. Phys. B **768** (2007) 38 [arXiv:hep-lat/0605014].

E-mail:

a.filin@fz-juelich.de