Contribution ID: **55** Type: **poster**

Search for the η-mesic Helium in $pd \to pd\pi^0$ Reaction with WASA-at-COSY

Tuesday, 25 June 2019 13:30 (1h 30m)

The negatively charged pions and kaons can be trapped in the Coulomb potential of atomic nucleus forming so called mesonic atoms. It is also conceivable that a neutral meson could be bound to a nucleus. In this case the binding is exclusively due to the strong interaction and hence such object can be referred to as a mesic nucleus.
The most promising candidate for such state is the η-mesic nucleus since the η-nucleon interaction is strongly attractive. The existence of the mesic nuclear matter was postulated over thirty years ago [1], however, until now it has not been confirmed experimentally. Such system in the form of the η-mesic Helium may be created for example in the deuteron-deuteron or proton-deuteron fusions [2].
Three experiments dedicated to the search for η-mesic Helium were performer up to now using the WASA detector system installed at the Cooler Synchrotron COSY at the Forschungszentrum Jülich (Germany) [2-8].
The poster will be focused on the status and perspectives of the search for the η-mesic Helium in $pd \to ({}^3He\eta)_{bound} \to pd\pi^0 \to pd\gamma\gamma$ reaction.

Bibliography:

[1] Q. Haider, L. C. Liu, Phys. Lett. **B 172**, 1986, 257.
[2] M. Skurzok, W. Krzemien, O. Rundel and P. Moskal, Acta Phys.Polon. **B 47**, 2016, 503.
[3] P. Moskal, J. Smyrski, Acta Phys. Polon. **B 41**, 2010, 2281.
[4] P. Adlarson et al., Phys. Rev. **C 87**, 2013, 035204.
[5] P. Adlarson et al., Nucl. Phys. **A 959**, 2017, 102.
[6] P. Adlarson et al., Phys. Rev. Lett. **120**, 2018, 022002.
[7] M. Skurzok et al., Phys. Lett. **B 782**, 2018, 6.
[8] S. Bass, P. Moskal, Reviews of Modern Physics **91**, 2019, 015003.

Primary author: KHREPTAK, Aleksander (Jagiellonian University)

Co-authors: SKURZOK, Magdalena (INFN-LNF Frascati); MOSKAL, Pawel (Jagiellonian University)

Presenter: KHREPTAK, Aleksander (Jagiellonian University)

Session Classification: Poster session