

Abstract Submitted
for the APR17 Meeting of
The American Physical Society

The saga of the tetra-neutron ROMAN YA. KEZERASHVILI, New York City College of Technology, City University of New York — In light of a new experiment for the double-charge-exchange reaction ${}^4\text{He}({}^8\text{He}, {}^8\text{Be})$ at 186 MeV/u [1], which claims an identification of a resonant tetra-neutron state we review results of experimental search and theoretical studies within methods of few body physics for a tetra-neutron. Particularly, we discuss searches of the tetra-neutron using the pion double charge exchange reaction ${}^4\text{He}(\pi^-, \pi^+){}^4\text{n}$, heavy-ion transfer reactions such as ${}^7\text{Li}({}^{11}\text{B}, {}^{14}\text{O}){}^4\text{n}$ and ${}^7\text{Li}({}^7\text{Li}, {}^{10}\text{C}){}^4\text{n}$, as well as search of the tetra-neutron and multi-neutrons in fission reactions. We present and review theoretical analyses of the tetra-neutron in the framework of various theoretical approaches such as variational methods, the method of Faddeev-Yakubovsky equations, and the method of hyper-spherical harmonics within the existing modern two- and three-nucleon interactions. Today there is no unambiguous answer for the existence of the trineutron as a bound or resonance state. This issue will be addressed. [1] K. Kisamori, et al., Phys Rev. Lett. 116, 052501 (2016).

Roman Kezerashvili
New York City College of Technology, City University of New York

Date submitted: 30 Sep 2016

Electronic form version 1.4