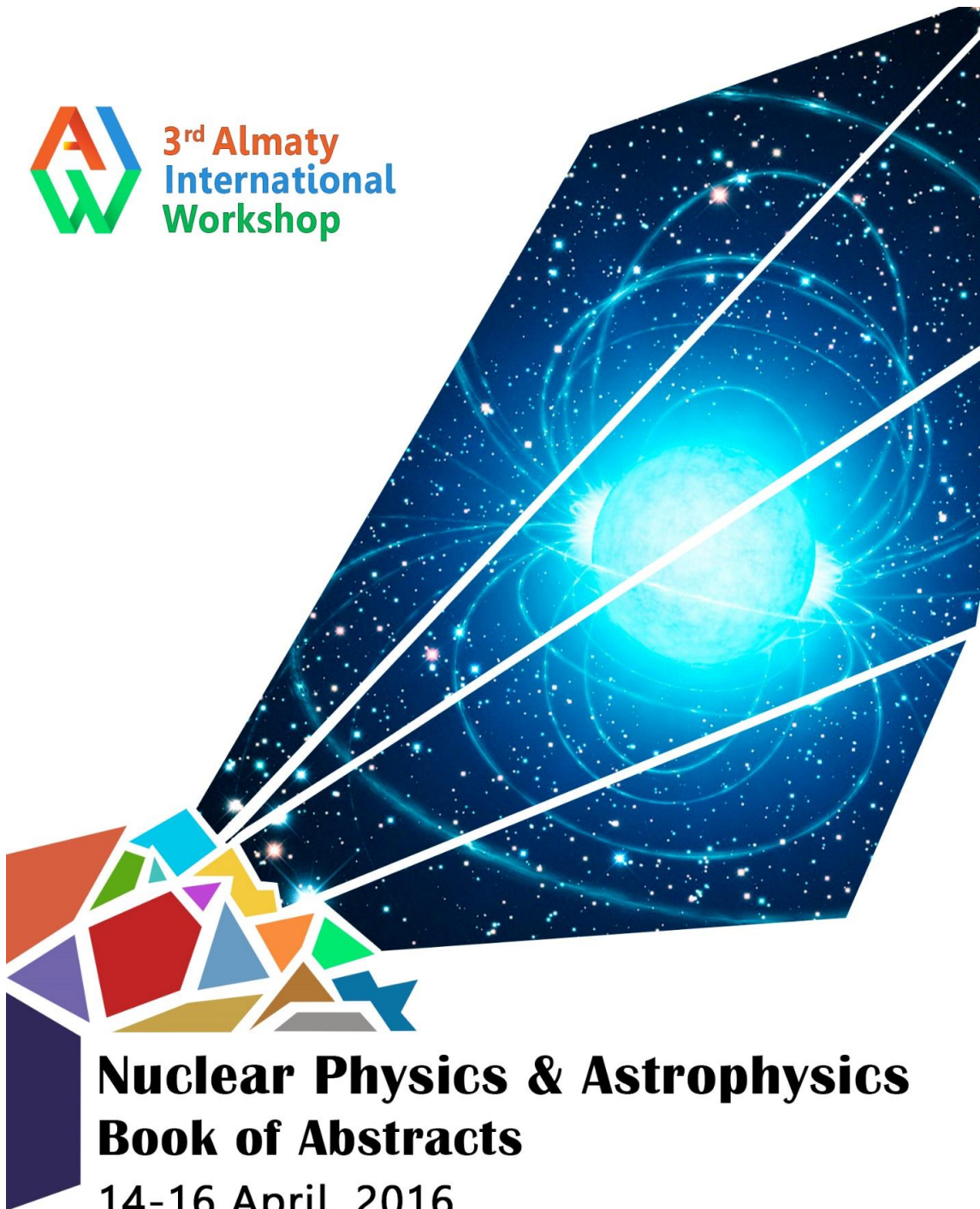




**3rd Almaty
International
Workshop**



Nuclear Physics & Astrophysics Book of Abstracts

14-16 April, 2016

al-Farabi KazNU

Program and abstracts

The 3rd International Workshop
“Nuclear Physics and Astrophysics”
14-16 April, 2016
al-Farabi Kazakh National University
Almaty, Kazakhstan

Organizers

al-Farabi Kazakh National University
Physical-Technical Faculty
Institute of Experimental and Theoretical Physics

Phonon-nuclear interactions in the crystalline structures of neutron stars and white dwarfs

Zh. Omar, N. Takibayev, V. Kurmangalieva

al-Farabi Kazakh National University; jadyra-07@mail.ru

Visible compact stars such as white dwarfs and neutron stars, are of great interest to researchers due to an extremely high density and unusual reactions and processes that take place in the stellar matter. Usually assume that the matter in the center of white dwarf has a crystalline structure formed with bare nuclei, which loaded into electron Fermi-liquid [1]. The neutron stars have more huge density therefore the crystalline structures are formed already at envelopes of these stars. We investigated the interactions that can happen in the crystalline structures, particularly between phonons in the crystal and Fermi-electrons and nuclei [2].

It is remarkable that photons can create a group of electron-hole pairs near Fermi energy surface and lead to the excitation of nuclei. In this case, the nonlinear interactions become very important. Our estimations and calculations demonstrated the dependence of the velocity of processes from the element composition of stellar matter.

References:

[1] S. L. Shapiro., S. A. Tyukolski, "Black holes, white dwarfs and neutron Star", 1985

[2] Brandt N.B., Kulbaçhinski V.A., "Quasiparticles in condensed matter physics".