

International Conference on

# Atomic and Nuclear Physics

November 17-18, 2016 Atlanta, USA

## Design, R&D of the proposed eRHIC accelerator and its impact on nuclear physics

**Nicholaos Tsoupas**

Brookhaven National Laboratory, USA

The proposed eRHIC accelerator will collide 20 GeV polarized electrons with 250 GeV polarized protons, 100 GeV/n polarized  $^3\text{He}$  ions, or other unpolarized hadron ions. The electron accelerator of the eRHIC will be based on a 1.665 GeV Energy Recovery Linac (ERL) placed in the RHIC tunnel and of two FFAG recirculating rings placed alongside the RHIC accelerator. The electron bunches reach the 20 GeV energy after passing 12-times through the ERL while they recirculate in the FFAG rings. We will present the principle of the operation of the accelerator; the various design studies that are currently in process, and the impact of the accelerators in the field of nuclear physics.

tsoupas@bnl.gov

## New approach in calculating the potential energy of colliding nuclei

**Ramil Kurmanov**

Omsk State Transport University, Russia

As proposed earlier, differential method of reduction of double volume integrals to double surface integrals in the calculations of the potential energy of the compound nucleus is generalized to the case of two interacting nuclei. The orientation of the nuclei relative to the line connecting the centers of mass of the colliding nuclei is arbitrary. Coulomb interaction energy has obtained for the cases of a sharp and a diffuse boundary of nuclei. The nuclear interaction energy was obtained for nuclei with a sharp boundary, and the finiteness of the nuclear-force range being taken into account. We investigate various cases and the density of the potential energy of the colliding nuclei and analyzed barriers to fusion-fission, depending on the relative orientation of nuclei.

kurmanovrs@mail.ru