

# Proton–boron fusion in a compact scheme of plasma oscillatory confinement

Kurilenkov Yu K<sup>1,2,®</sup>, Oginov A V<sup>2</sup>, Tarakanov V P<sup>1</sup>,  
Samoylov I S<sup>1</sup> and Gus'kov S Yu<sup>2</sup>

<sup>1</sup> Joint Institute for High Temperatures of the Russian Academy of Sciences, Izhorskaya 13 Bldg 2, Moscow 125412, Russia

<sup>2</sup> Lebedev Physical Institute of the Russian Academy of Sciences, Leninsky Avenue 53, Moscow 119991, Russia

® kurilenkovyuri@gmail.com

We present the results of first experiments on the aneutronic fusion of proton-boron (pB) in a single miniature device with electrodynamic (oscillatory) plasma confinement ( $p+^{11}\text{B} \rightarrow \alpha+^8\text{Be}^* \rightarrow 3\alpha+8.7 \text{ MeV}$  [1,2]). Device is based on a low energy (1–2 J) nanosecond vacuum discharge with a virtual cathode [3], the field of which accelerates protons and boron ions to the energies required for pB synthesis (100–300 keV) under oscillating ions head-on collisions. The yield of  $\alpha$ -particles registered are presented and discussed in detail. The experiment was preceded by PiC modeling of main processes accompanying pB reaction within the framework of the full electromagnetic code KARAT [4]. Further studies are to show the prospects for the creation of a practical compact reactor on aneutronic pB synthesis with non-Maxwellian plasma [5] based on the oscillatory confinement.

- [1] Belyaev V, Matafonov A, Vinogradov V, Krainov V, Lisitsa V, Roussetski A, Ignatyev G and Andrianov V 2005 *Phys. Rev. E* **72** 026406
- [2] Giuffrida L, Belloni F, Margarone D, Petringa G, Milluzzo G, Scuderi V, Velyhan A, Rosinski M, Picciotto A, Kucharik M *et al* 2020 *Phys. Rev. E* **101** 013204
- [3] Kurilenkov Y K, Tarakanov V, Gus'kov S Y, Oginov A and Karpukhin V 2018 *Contrib. Plasma Phys.* **58** 952–960
- [4] Kurilenkov Y K, Tarakanov V and Gus'kov S Y 2016 *J. Phys.: Conf. Ser.* **774** 012133
- [5] Hirsch R L 2012 Where to look for practical fusion power *14th U.S.-Japan IECF Workshop October 16, Maryland USA, March 18–22* URL <http://www.aero.umd.edu/sedwick/posters.html>