Prospects for development of a pulsed source with a yield of 1014 DT-neutrons based on the spherical DPF chamber

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Presented are study results, aimed at development of a high-intense neutron source based on a spherical gas-discharge chamber with a dense plasma focus (DPF).

At present, as a result of studies of physical processes, specifying plasma formations dynamics in spherical DPF chambers, VNIIEF has developed a neutron radiation source facility with half-height pulse duration 75–80 ns and integral yield 1013 DT-neutrons [1].

When using information, obtained during experiments on the developed source, a capability for acquiring a yield of 1014 DT-neutrons is studied when raising the stored energy up to 350 kJ and the current amplitude up to 2.4 МА. To approach the mentioned parameters one should enhance the capacitance of capacitor bank up to 600 µF and the chamber anode diameter up to 200 mm. Conducted MHD calculations with above-indicated parameters prove the possibility for neutron yield increase. The neutron yield is calculated taking into account accelerative mechanism of neutron generation described in paper [2].

Refercences

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