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EXPERIMENTAL STUDY OF FAST DEUTERONS AND ELECTRONS IN DPF FUSION PLASMA

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The plasma with fusion parameters produced in tokamak, or at the interaction of powerful lasers with matter or z-pinch discharges deals with similar questions, mechanism of generation of high energy beams of charge particles similar to the plasma in solar flares1,2. The plasma generated in plasma focus discharges has some advantages in solving of this problem –convenient parameters for complementary interferometric, XUV, deuteron and neutron diagnostics with temporal, spatial and energy distribution. The presented experimental research of fusion DD reaction was provided on the dense plasma focus (DPF) device3 at the current above 1 MA and the total neutron yield at the level of 10E11. These diagnostics made possible to register the existence and evolution of organized structures and time and locality of acceleration of charge particles. The fast deuterons were recorded by pinhole camera and CR-39 detectors. They showed their origin in small regions in plasmoids and in rings with diameter above DPF dense column. We discuss also the distribution of internal magnetic fields, filamentary structure of the current, difference in acceleration of electrons and ions, and the possible model of the fast energy acceleration based on the magnetic reconnection, which can be inspiration as for tokamak and laser-fusion as for solar-flare communities.

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