Abstract Submitted
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Acceleration of Deuterons to Multi-MeV Energies in Deuterium Gas-Puff Z-Pinch[1] D. KLIR, J. CIKHARDT, B. CIKHARDTOVA, J. KRAVARIK, P. KUBES, K. REZAC, O. SILA, Czech Technical University in Prague, A. SHISHLOV, R. CHERDIZOV, F. FURSOV, V. KOKSHENEV, B. KOVALCHUK, N. KURMAEV, A. LABETSKY, N. RATAKHIN, IHCE in Tomsk, J. KRASA, K. TUREK, Academy of Sciences of the Czech Republic — A novel configuration of a deuterium gas-puff z-pinch has been used to generate a short (approx. 20 ns) pulse of multi-MeV ions and neutrons. Even though ion acceleration in z-pinches has not been researched to such an extent as in laser-based sources, obtained results show that z-pinches can reach values comparable to those of state-of-the-art lasers. On the 3 MA GIT-12 generator, the peak neutron yield was 3.6×10^{12}. When a neutron-producing sample was placed onto the axis below a cathode mesh, the neutron yield was increased up to 10^{13}. The emission time of 20 ns implied the neutron production rate of 5×10^{20} n/s. Neutron energies reached the maximum value of 33 MeV. The comprehensive set of ion diagnostics provided unique information about ion acceleration mechanism. The ion emission was highly anisotropic. Deuterons were trapped in the radial direction whereas a lot of fast ions escaped the z-pinch along the axis. On the axis, the total number of >1 MeV and >25 MeV deuterons was 10^{16} and 5×10^{12}, respectively. Utilizing these ions offers a real possibility of various applications including the production of short-lived isotopes or fast neutron radiography.

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