

Abstract Submitted
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Hybrid gas-puff z-pinch as a source of protons and deuterons up to 45 MeV¹ D. KLIR, J. CIKHARDT, B. CIKHARDTOVA, J. KRAVARIK, P. KUBES, V. MUNZAR, K. REZAC, Czech Technical University in Prague, A.V. SHISHLOV, R.K. CHERDIZOV, F.I. FURSOV, V.A. KOKSHENEV, N.E. KURMAEV, N.A. RATAKHIN, IHCE in Tomsk, S.L. JACKSON, J.T. ENGELBRECHT, Naval Research Laboratory, J. KRASA, K. TUREK, Academy of Sciences of the Czech Republic — Efficient acceleration of deuterons has been observed in z-pinches and dense plasma foci since the 1950s. In 2013, we tested a hybrid configuration of a deuterium gas-puff z-pinch on the 3 MA GIT-12 generator (IHCE, Tomsk). In this configuration, a hollow cylindrical plasma shell was injected around an inner deuterium gas puff to form a uniformly conducting layer before z-pinch implosion [1]. The stable implosion at the maximum velocity of 650 km/s was important to deliver more current onto the z-pinch axis. After the implosion, one 10-20 ns pulse of multi-MeV photons and neutrons was observed. The average neutron yield was 2×10^{12} . In the best shots, hydrogen ions were accelerated up to 45 MeV which is the highest energy observed in z-pinches and dense plasma foci. Detailed knowledge of the ion emission was used to increase neutron yields above 10^{13} with a neutron-producing catcher [2,3]. Recently, we have attempted to use accelerated deuterons to study magnetic fields in z-pinches via ion deflectometry. [1] D. Klir, et al., PRL 112, 095001 (2014). [2] D. Klir, et al., NJP 20, 053064 (2018). [3] D. Klir, et al., PPCF 61, 014018 (2019).

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