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Ion Acceleration in Megaampere Deuterium Gas-Puff Z-Pinch[1] D, KLIR, J. CIKHARDT, B. CIKHARDTOVA, J. KRAVARIK, P. KUBES, V. MUNZAR, 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, G. DUDKIN, V. PADALKO, National Research Tomsk Polytechnic University, J. KRASA, K. TUREK, Academy of Sciences of the Czech Republic — Acceleration of ions to high energies was observed in deuterium z-pinches already at the beginning of the fusion research in the 1950s. Even though the ion acceleration mechanism in z-pinches and dense plasma foci has been studied for decades, it is still a source of controversy which has not been resolved. Recently, the ion emission has been researched at a 3 MA current on the GIT-12 generator (IHCE in Tomsk). When an outer hollow cylindrical plasma shell was injected around an inner deuterium gas puff, a larger amount of current was assembled on the z-pinch axis at stagnation. After the disruptive development of m=0 necks, hydrogen ions were accelerated up to 40 MeV energies. Comprehensive diagnostics of multi-MeV protons and deuterons provided unique information about the ion acceleration in z-pinches. The better knowledge of the ion emission was used to increase the neutron yield above 10^{13}. A large amount of experimental data from various ion diagnostic instruments is also useful for validation of numerical codes and verification of various hypotheses about the ion acceleration mechanism in z-pinches.

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