

Abstract Submitted
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Deuterium Gas-Puff Experiments on the S-300 Z-pinch¹ DANIEL KLIR, JOZEF KRAVARIK, PAVEL KUBES, KAREL REZAC, FEE CTU in Prague, S 300 TEAM — The neutron production from a deuterium gas-puff Z-pinch has been studied on the S-300 Z-pinch (Kurchatov Institute, Moscow). Neutron time-of-flight diagnostics was used to give an insight into the acceleration of fast deuterons. The emphasis was put on the finding of (i) the energy distribution of deuterons which produced fusion neutrons, (ii) the anisotropy of neutron emission, and (iii) the time and duration of neutron production with respect to the general Z-pinch dynamics. The peak neutron yield above 10^{10} was achieved on the current level of 2 MA. The fusion neutrons were generated for 30 ns during the stagnation and at the beginning of the expansion of a plasma column. The side-on neutron energy spectra peaked at 2.42 ± 0.04 MeV with about 400 keV FWHM. In the downstream direction (i.e. the direction of the current flow from the anode towards the cathode), the peak neutron energy was 2.6 ± 0.1 MeV. The average kinetic energy of reacting deuterons was about 100 keV. The broad width of radial neutron spectra implied a high radial component of deuteron velocity. On the basis of these experimental data, it is possible to discuss acceleration of deuterons and fusion neutron production.

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