Abstract Submitted
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Development of laser-based diagnostics for 1-MA z-pinch plasmas[1] V.V. IVANOV, P. HAKEL, R.C. MANCINI, P. WIEWIOR, R. PRESURA, J.M. KINDEL, University of Nevada, Reno, A.P. SHEVELKO, Brigham Young University, Provo, O. CHALYY, A. ASTANOVITSKIY, A. HABOUB, S.D. ALTEMARA, D. PAPP, T. DURMAZ, University of Nevada, Reno — The 50 TW Leopard laser coupled with the 1-MA Zebra generator was used for development of new diagnostics of z-pinch plasmas. Two plasma diagnostics are presented: an x-ray broadband backlighting for z-pinch absorption spectroscopy and parametric two-plasmon decay of the laser beam in dense z-pinch plasma. Implementation of new diagnostics on the Zebra generator and the first results are discussed. The absorption spectroscopy is based on backlighting of z-pinch plasma with a broadband x-ray radiation from a Sm laser plasma. Detailed analysis of the absorption spectra yields the electron temperature and density of z-pinch plasma at the non-radiative stage. The parametric two-plasmon decay of intensive laser radiation generates $3/2\omega$ and $1/2\omega$ harmonics. These harmonics can be used to derive a temperature of z-pinch plasma with the electron density near the quarter of critical plasma density.

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