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Investigation of Heating Mechanisms in the ZaP Flow Z-Pinch S.D. KNECHT, U. SHUMLAK, B.A. NELSON, R.P. GOLINGO, University of Washington — The ZaP Flow Z-Pinch at the University of Washington is a basic plasma physics experiment that investigates stabilizing a Z-pinch with a radially-varying axial flow, dv_z/dr. ZaP consists of a coaxial accelerator region coupled to a pinch assembly region. It is hypothesized that the primary means of heating in ZaP is through adiabatic compression during pinch formation. The 10 cm inner electrode of ZaP is replaced with a 16 cm inner electrode to investigate this hypothesis. A four-chord HeNe interferometer is used to determine a pinch density profile as a function of time, and radial force balance and conservation of energy equations are used to determine temperature and magnetic field profiles. Temperature measurements are made with a 20-chord imaging spectrometer (T_i) and a Thomson-scattering system (T_e) and compared to the calculated temperatures. The profiles are investigated for a range of accelerator densities and pinch currents for both electrode configurations. The possible effects of adiabatic compression, Ohmic heating and shock heating will be evaluated and reported.

S.D. Knecht
University of Washington

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