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Excitation of Flute Mode Turbulence in High Beta Current-Carrying Z-Pinch Plasmas V.I. SOTNIKOV, V.V. IVANOV, T.E. COWAN, University of Nevada at Reno, NV 89557, J.N. LEBOEUF, University of California at Los Angeles, CA 90095, B.V. OLIVER, ATK-MRC, NM 87110, C. COVERDALE, B. JONES, C. DEENEY, T.A. MEHLHORN, Sandia National Laboratories, NM 87185, G.S. SARKISOV, P.D. LEPELL, Ktech Corp., NM 87123 — Recent experimental data obtained with laser probing and Faraday rotation diagnostics have shown that a significant part of the current is flowing through the central region. Intense turbulence of short wavelength oscillations as well as formation of vortices have also been observed in that region. The electromagnetic interchange mode instability is the most likely candidate to explain the experimentally observed wave turbulence. To study its linear excitation and nonlinear evolution, a nonlinear set of equations for electrostatic potential, magnetic field, and density has been derived from two-fluid macroscopic equations. This set of equations has enabled a study of the coupled dynamics of large-scale structures and small-scale turbulence which have been observed in the experiments. Work supported by the US Department of Energy under Grant No. DE-FC52-01NV14050 at UNR, Grant No. DE-FG02-04ER54740 at UCLA and Contract DE-AC04-94AL85000 at Sandia National Laboratories

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