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Two-fluid simulation of field-reversed configuration and application to conical implosion ZHENGQUAN YANG, CHENG LI, Peking Univ — Field-reversed configurations (FRC) compression is one candidate for conical imploding magnetic target fusion (MTF). In the scenario, the density of initial plasma is much higher ($10^{20\sim21}$ cc) than that of liner imploding FRC compression. As the characteristic spatial scales are in the order of ion gyroradius, two-fluid effects become important. In two-fluid MHD simulation, we use full sets of Euler equations for both ions and electrons, and a full set of Maxwell's equations for electromagnetic field. The fluid and field are coupled. Simulation starts with a uniform plasma and a set of 3 current coils. Field of current coils is solved by Maxwell's equations. The current in the middle coil is reversed, and results in magnetic reconnection and FRC formation. The simulation is then applied to a conical implosion, with a liquid metal drive. During the compression, the coil fires to form a FRC which is compressed at high ratio within several microseconds. The final pressure and temperature achieved are significantly improved comparing with compressions with no FRC.

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