1036-76-29 **Tianshi Lu*** (tlu@bnl.gov), Computational Science Center, Building 463B, Brookhaven National Laboratory, Upton, NY, **Jian Du**, Department of Mathematics, 155 South 1400 East, Room 233, Salt Lake City, UT 84112-0090, and **Roman Samulyak**, Dept. of Applied Mathematics and Statistics, Math Tower, Stony Brook, NY 11794-3600. *Multiphase MHD at low magnetic Reynolds numbers.*

A numerical algorithm for the simulation of magnetohydrodynamics in conducting liquids and partially ionized gases is presented. For the hydro part, the nonlinear hyperbolic conservation laws with electromagnetic terms are solved using Godunov-type Riemann solvers and techniques developed for free surface flows; for the electromagnetic part, the electrostatic approximation is applied and an elliptic equation for electric potential is solved. The algorithm has been implemented in the frame of front tracking, which explicitly tracks geometrically complex evolving interfaces. An elliptic solver based on the embedded boundary method were implemented for both two- and three- dimensional simulations. The code has been applied to simulations of the pellet ablation in a magnetically confined plasma, the expansion/distortion of a mercury jet in magnetic fields, and magnetically controlled plasma plume expansion. (Received December 07, 2007)