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MHD Simulation with Insulated Conducting Boundaries and Circuit Interactions G.J. MARKLIN, T.R. JARBOE, Plasma Science and Innovation Center, University of Washington, Seattle WA 98195 — The advantages of insulating plasma from its surrounding conductors have been known since the early days of theta pinch research. In a theta pinch, this insulation allows flux to enter and spread out uniformly over the surface of the plasma, producing a symmetrical pinch. Modern ICC experiments, such as those using inductive helicity injection and rotating field current drive, use insulation to allow flux from multiple circuits to enter and form complex patterns of rotating E&M fields over the surface. The insulating layer between the plasma and the conducting wall allows magnetic flux to move along the surface at the speed of light, which is considered to be infinite. It will move until it finds an equilibrium configuration consistent with the plasma and circuit conditions it encounters on each time step. The solution to this 2D surface equilibrium problem determines how the field will distribute itself throughout the insulator and provides local boundary conditions for the 3D MHD solution in the plasma. The surface equilibrium equations and progress towards solving them will be presented.

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