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Fusion Based on the Inductively-Driven Lithium Liner Compression of an FRC Plasmoid JOHN SLOUGH, DAVID KIRTLEY, MSNW LLC, RICHARD MILROY, University of Washington — A method for achieving the compressional heating required to reach fusion gain conditions based on the compression of a Field Reversed Configuration plasmoid (FRC) is described. An inductive technique is employed to accelerate an array of thin, lithium metal bands radially inward to create a three dimensional compression of the target FRC. The FRC is formed inside the vacuum vessel using a rotating magnetic field generated by antennas located outside the reactor vessel. No ports or opening of the reactor is required during fusion burn. The metal bands can be located several meters from the target implosion site, and with inductive drive the driver coils are physically positioned outside the reactor vacuum wall. The speed and direction of the shells for convergent motion is controlled by appropriately shaped flux concentrators inside the vacuum vessel that also serve as cooling conduits and breeding blankets. An effective fusion blanket is formed with shell convergence absorbing the fusion energy as well as the radiated plasma energy during the brief fusion burn. The resultant vaporized and ionized blanket shell expands compressing the external magnetic field providing for direct energy conversion. Several aspects of the process have been explored experimentally and numerically and a description of a sub megajoule experiment for obtaining fusion breakeven with the FRC will be presented.

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