SYSTEMS AND METHODS FOR FORMING AND MAINTAINING A HIGH PERFORMANCE FRC

Abstract of the Disclosure

A high performance field reversed configuration (FRC) system includes a central confinement vessel, two diametrically opposed reversed-field-theta-pinch formation sections coupled to the vessel, and two divertor chambers coupled to the formation sections. A magnetic system includes quasi-dc coils axially positioned along the FRC system components, quasi-dc mirror coils between the confinement chamber and the formation sections, and mirror plugs between the formation sections and the divertors. The formation sections include modular pulsed power formation systems enabling static and dynamic formation and acceleration of the FRCs. The FRC system further includes neutral atom beam injectors, pellet injectors, gettering systems, axial plasma guns and flux surface biasing electrodes. The beam injectors are preferably angled toward the midplane of the chamber. In operation, FRC plasma parameters including plasma thermal energy, total particle numbers, radius and trapped magnetic flux, are sustainable at or about a constant value without decay during neutral beam injection.

[FIGURE 3A]