

RF plasma heating in the PFRC-2 device*

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Under an ARRA grant, the vessel size, internal magnets and RF power of the Princeton Field-reversed Configuration device have been upgraded to enable exploration of the creation of stable FRC plasmas with keV ion and electron temperatures. The RF plasma heating method is odd-parity rotating magnetic fields (RMF_o). Particle acceleration is predicted to result predominantly from the time-varying azimuthal electric field generated by the RMF_o near the magnetic null on the midplane of the FRC. Ion heating will only occur if the RMF frequency is within a factor of ~ 3 of the ion cyclotron frequency at the FRC's center and if the RMF_o field exceeds a threshold determined by plasma radius, axial magnetic field strength, and axial wave number. Methods to achieve the required conditions and the expected particle energies and confinement qualities will be discussed.

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