

Abstract Submitted
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Splitting of force-free EMHD current rings¹ R.L. STENZEL, J.M. URRUTIA, K.D. STROHMAIER, Physics & Astronomy, UCLA — Tilting of boundary-free field-reversed configurations has been observed in a laboratory plasma in the regime of electron magnetohydrodynamics (EMHD) [R. L. Stenzel, J. M. Urrutia, K. D. Strohmaier, and M. C. Griskey, Experiments on nonlinear EMHD fields, *Physica Scripta* **T107**, 163 (2004)]. Further investigations have revealed that the tilting is **not** due to magnetic forces, i.e., the torque on a magnetic dipole in an external field, because the magnetic force is balanced by the electric force in EMHD. The force-free current ring splits and moves slowly apart. Transverse gradients cause differences in propagation speed leading to an apparent tilt of the expanding current layer. The gradients are created in the early phase of the FRC creation. The propagation of EMHD fields depends primarily on magnetic field and density both of which are nonlinearly modified. The initially symmetric FRC relaxes into a spatially highly nonuniform field with multiple 3-D null points. Similar phenomena are seen during the interaction of two FRCs and also may occur in strong EMHD turbulence.

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