Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

The effect of shaping on Reversed Field Pinch dynamics[1] ROBERT CHAHINE, LMFA, CNRS, Ecole Centrale de Lyon, Université de Lyon, Ecully, France, JORGE A. MORALES, CRPP, EPFL, Switzerland, KAI SCHNEIDER, I2M-CNRS, Centre de Mathématiques et d'Informatique, Aix-Marseille Université, Marseille, France, WOUTER J. T. BOS, LMFA, CNRS, Ecole Centrale de Lyon, Université de Lyon, Ecully, France — Reversed Field Pinch fusion devices (RFPs) are inevitably plagued by magnetohydrodynamic (MHD) instabilities. High resolution numerical simulations of fully nonlinear visco-resistive magnetohydrodynamics using a Fourier pseudo-spectral method with volume penalization [Morales et al. JCP, 2014] are performed. Results of RFP simulations in toroidal geometry were reported in [Morales et al. PPCF, 2014]. Here we consider a cylindrical domain with elliptical cross-section for different aspect ratios. The results illustrate a notable influence of the shape of the cross-section on the nonlinear dynamics of RFPs. The axial mode-spectrum is qualitatively changed in cylinders with elliptic cross-section. The results suggest that shaping could change, and possibly improve the confinement of RFPs. It is certainly possible that specific helical modes can be promoted, approaching thereby a QSH state.

[1]Support by the French Research Federation for Fusion Studies within the framework of the European Fusion Development Agreement (EFDA) is thankfully acknowledged.

Kai Schneider
I2M-CNRS, Aix-Marseille University

Date submitted: 15 Jul 2016 Electronic form version 1.4