

Abstract Submitted  
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**Reversed Field Pinch helical self-organization studies with the volume preserving field line tracing code NEMATO** D. BONFIGLIO, M. VERANDA, S. CAPPELLO, Consorzio RFX, Italy, L. CHACON, ORNL-USA, D.F. ESCANDE, P. PIOVESAN, Consorzio RFX — The existence of a Reversed Field Pinch (RFP) dynamo as a (laminar) helical self-organization was anticipated by MHD numerical studies [1]. High current operation in RFX-mod experiment shows such a helical self-organization: strong internal electron transport barriers (ITB) appear and magnetic chaos healing is diagnosed when Single Helical Axis (SHAx) regimes are achieved [2]. We present results of the field line tracing code NEMATO [3] applied to study the magnetic topology resulting from 3D MHD simulations, with the aim of clarifying the conditions for chaos healing in SHAx states. First tests confirm the basic picture: the magnetic chaos due to island overlap is significantly reduced after the expulsion of the dominant mode separatrix. The possible synergy with the presence of magnetic and/or flow shear at the SHAx ITB will also be discussed [4].

- [1] S. Cappello, Plasma Phys. Control. Fusion (2004) & references therein
- [2] R. Lorenzini et al., Nature Phys. (2009)
- [3] J. M. Finn and L. Chacon, Phys. Plasmas (2005)
- [4] M.E. Puiatti et al invited presentation EPS 2009 conference, submitted to Plasma Phys. Control. Fusion

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