Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Magnetic topology change induced by reconnection events in RFP plasmas BARBARA MOMO, EMILIO MARTINES, PAOLO INNOCENTE, RITA LORENZINI, CRISTINA REA, PAOLO ZANCA, MATTEO ZUIN, Consorzio RFX (CNR, ENEA, INFN, Università di Padova, Acciaierie Venete SpA) Corso Stati Uniti 4 - 35127 Padova (Italy) — Magnetic reconnection is a phenomena observed in various plasmas across the Universe, where a conversion of magnetic to kinetic energy of plasma particles is consequent to a change in the global magnetic topology. In laboratory plasmas magnetic reconnections are associated to relaxation processes, like sawtooth crashes in Tokamak dynamics and the so-called dynamo effect in Reversed Filed Pinches (RFPs). In this work we propose the study of magnetic crashes in RFP dynamics, where the recursive transition from a more ordered helical state to a chaotic one is associated with rapid magnetic reconnection events. More into details, we propose to analyse RFX-mod discharges reconstructing the magnetic topology in the whole plasma volume at fixed time snapshots. Times are chosen in a window around the crashes, and the magnetic topology is reconstructed by using the solutions of a Newcomb-type equation, solved consistently with experimental boundary conditions. New boundary conditions are given by internal magnetic measurements coming from the ISIS probe system, in order to detect high frequency dynamics. Poincaré plots are used as a tool for the visualization of magnetic topology changes.

Barbara Momo
Consorzio RFX (CNR, ENEA, INFN, Università di Padova,
Acciaierie Venete SpA) Corso Stati Uniti 4 - 35127 Padova (Italy)

Date submitted: 11 Jul 2014 Electronic form version 1.4