Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

SXR Diagnosis of Electron Temperature Dynamics in Reversed-Field Pinches[1] P. FRANZ, M. GOBBIN, L. MARRELLI, A. RUZZON, F. BONOMO, A. FASSINA, E. MARTINES, Consorzio RFX, Padova, Italy, M.B. MCGARRY, D.J. DEN HARTOG, J.A. GOETZ, J. JOHNSON, University of Wisconsin, Madison and CMSO — Sophisticated multi-chord diagnostics have been developed on RFX-Mod and MST for soft x-ray (SXR) emissivity and electron temperature (Te) profile measurements. Quasi Single Helicity (QSH) plasmas, where a single m=1 tearing mode dominates the MHD magnetic spectrum, have been analyzed. To improve the SXR and Te profile reconstructions in the presence of QSH, algorithms that reproduce the magnetic topology have been developed to map the measurements on flux surfaces. In RFX-Mod the analysis shows a strong correlation between magnetic QSH and the appearance of a SXR structure in the emissivity distribution. The SXR structure corresponds to a thermal structure in the Te profile. Differences in the temperature gradient between the rising phase and the flattop phase of QSH have been analyzed. In the rising phase the gradient increases and the thermal structure grows in size. During the flattop phase, where the dominant mode amplitude is constant, the structure is intermittent, with several crashes that make the Te profile flatter. Similar measurements at MST confirm the correspondence between QSH and SXR structure. The analysis shows that this structure can be correlated with a thermal structure but that also impurity could play an important role.

[1]This work was supported by the U.S. Department of Energy and National Science Foundation

Paolo Franz
Consorzio RFX, Padova, Italy

Date submitted: 12 Jul 2013 Electronic form version 1.4