Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Thermal Dynamics of QSH Regimes in RFX-Mod PAOLO FRANZ, MARCO GOBBIN, LIONELLO MARRELLI, ALBERTO RUZZON, ALESSANDRO FASSINA, Consorzio RFX, EURATOM-ENEA Association, Padova, Italy, RFX TEAM — A statistical analysis of the electron temperature gradient Te in helical plasmas from the reversed field pinch RFX-mod will be presented. Self-organization of the plasma when a magnetic tearing mode dominates the m=1 spectrum (QSH regimes) is observed when the plasma current is increased above 1 MA. When the dominant mode amplitude is sufficiently large the plasma becomes helical (Single Helical Axis state, or SHAx) and an internal transport barrier appears. The evolution of electron temperature profiles from the soft-x-ray (SXR) tomography of RFX-Mod has been analyzed in time. Te is calculated along 19 sight lines using the two-foil technique. In order to locate the Te data point in the plasma cross-section the temperature profiles have been remapped on reconstructed magnetic surfaces. QSH cycles have been divided in two phases, rising (dominant mode increasing) and flattop (dominant mode amplitude saturated). The Te gradient exhibits different behavior in these two intervals: during the rising phase it reaches higher values, and the size of the barrier tends to increase with the amplitude of the dominant mode; smaller secondary modes (residual m=1 tearing modes) also helps to achieve high values of the gradient. During the flattop phase the Te gradient shows an oscillating pattern and the barrier in the profile often disappear, so that the thermal helical configuration in general does not last as the magnetic one.

Paolo Franz
Consorzio RFX, EURATOM-ENEA Association, Padova, Italy

Date submitted: 18 Jul 2012 Electronic form version 1.4