Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Experimental Characterization of Microtearing Modes in the RFX-mod Reversed-Field Pinch Plasmas MATTEO ZUIN, SILVIA SPAGNOLO, ITALO PREDEBON, FABIO SATTIN, FULVIO AURIEMMA, BARBARA MOMO, ROBERTO CAVAZZANA, ALESSANDRO FASSINA, MARCO GOBBIN, EMILIO MARTINES, ROBERTO PACCAGNELLA, MONICA SPOLAORE, NICOLA VIANELLO, Consorzio RFX, Padova, Italy — We present direct experimental observations in a laboratory fusion plasma of microtearing modes, obtained in the RFX-mod reversed-field pinch (RFP) plasma. The so-called Quasi Single Helicity magnetic equilibrium features in RFX-mod a central plasma volume with good magnetic surfaces and transport barriers with reduced heat transport. Recently, a theoretical stability analysis performed with the gyrokinetic GS2 code revealed the QSH states to be prone to microtearing modes. Measurements are carried out with a system of in-vessel probes located at the wall, capable of detecting magnetic fluctuations with high time and space resolution. Small-scale electromagnetic modes are revealed during the helical states of the plasma: their amplitude is correlated to the electron temperature gradient strength in the core. The identification in terms of microtearing modes derives from the comparison of experimental data with linear gyrokinetic simulations. The relation between the spectral properties of microtearing modes and the magnetic topology, mainly in terms of the helical safety factor profile, is investigated. The effects on the time evolution of the temperature profiles and on heat transport in RFP plasma are also discussed.

Matteo Zuin
Consorzio RFX, Padova, Italy

Date submitted: 12 Jul 2013 Electronic form version 1.4