**Fusion Burning in Magnetically Confined Toroidal Plasmas***

**R. Gatto[1], B. Coppi[2], R. Spigler[3], V. Ricci[3], A. Cardinali[3] and B. Basu[2]**

*[1]Uniroma1 (Italy), [2]MIT, [3]C.N.R (Italy)*

The thermonuclear instability in a toroidal fusion burning plasma [1] is shown to manifest itself as a driving factor of modes that are radially localized around closed field lines on rational magnetic surfaces. The radial profile of the electron temperature perturbations can be of two parities: even and odd. In the first case the effective longitudinal thermal conductivity can be reduced by the effects of modes involving magnetic reconnection that have a radial transverse reconnected field with a odd (radial) profile. In the second case magnetic reconnection is shown to have a stronger effect and is characterized by reconnected transverse fields that have an even radial profile. A class of this kind of mode can be a localized within the electron thermal layer [1] as a comprehensive analysis has shown. *Sponsored in part by the U.S. Department of Energy and by C.N.R of Italy.

[1] B. Coppi and the Ignitor Program Members, *Nucl. Fus*., **55**, 053011 (2015).