## Abstract Submitted for the DPP12 Meeting of The American Physical Society

MHD instabilities in non-circular Reversed Field Pinch plasmas

S.C. GUO, Z.R. WANG, X.Y. XU, Consorzio RFX, Associazione Euratom ENEA sulla Fusione, Padova, Italy, Y.Q. LIU, Euratom/CCFE, Culham Science Centre, UK — The toroidal hybrid MHD-kinetic code MARS-K has been modified and applied to non-circular Reversed Field Pinch (RFP) plasmas where both the plasma elongation and the triangularity are taken into account. For the Resistive Wall Mode (RWM), in comparison with the circular RFP, the elongation leads to a rather strong poloidal mode coupling, and causing many growing higher m harmonics. As a consequence, the critical ideal wall position for the ideal kink instability becomes closer to the plasma surface than the circular case. On the other hand, kinetic effects become more significant and result in a lower  $\beta_p$  value for the kinetic stabilization by transit thermal ions. Due to the strong poloidal magnetic field in RFPs, the shaping effect causes a significant variation of the field strength along the poloidal angle, resulting in an occurrence of multiple trapping regions. The kinetic effects of these multiple trapping fractions will be discussed. The shaping effect on the resistive tearing mode in RFP will also be discussed and compared with the circular case.

S.C. Guo Consorzio RFX, Associazione Euratom ENEA sulla Fusione, Padova

Date submitted: 12 Jul 2012 Electronic form version 1.4