AAPPS-DPP2020, 26-31,10.2020, Remote e-conference

AAPPS-DPP2020 Invited/Plenary Nomination Form

0. **Recommender's name, E-mail and affiliation**
   Name: Patrick. H. Diamond
   E-mail: diamondph@gmail.com
   Affiliation: University of California San Diego, USA

1. **Session category:**
   Joint MF-Fundamental session

2. **Type:** Invited

3. **Speaker: Name:** Min Jiang
   E-mail; jiangm@swip.ac.cn
   Affiliation; Southwestern Institute of Physics

4. **Rationale**:
Jiang Min is working on MHD-turbulence interaction in tokamaks. This is an interesting piece of work on multi-scale interaction. It is perfect for this session.

5. Short abstract for 4th Asia-Pacific Conference on Plasma Physics
Authors: M. Jiang, Y. Xu, W.L. Zhong, Z.B. Shi, J.Q. Li, H. Li, X.L. Zou, W. Chen, Z.C. Yang, P.W. Shi, J.Wen, A.S. Liang, K.R. Fang, X.Q. Ji, Z.X.Wang, Yi Liu, M. Xu and HL-2A team
Title: Modulation of the trapped electron driven turbulence by m/n = 2/1 tearing mode in the core of HL-2A plasmas

Abstract:
Previous theoretical work [1], simulations [2,3] and experimental results [4,5] show that the classical/neoclassical tearing mode (TM) can impact the micro-turbulence and turbulent transport significantly by modulating equilibrium plasma parameters, such as electron temperature (T_e), electron density (n_e), radial electric field (E_r) and so on. In this work, turbulent fluctuations within a quasi-coherent frequency range (peak frequency of ~130 kHz, $\Delta f \approx$ tens of kHz) are modulated by the rotation of low frequency tearing modes in the core of HL-2A ohmic plasmas [6]. The quasi-coherent modes (QCMs) emerge outside the island boundary as the island O-point passes by in the large island cases (W> 4.5 cm), where the local electron temperature profile is steepened. Statistical analysis shows that for the QCM excitation, a threshold value of temperature gradient is identified and the QCM is solely observed in low density discharges, consistent with the linear ohmic confinement regime. These experimental evidence suggests that the observed QCMs are driven by the trapped electron mode, in agreement with linear stability calculations. Cross-correlation analysis reveals that the QCMs have long-range poloidal correlations and radially propagate outwards. Besides, the bispectral analysis indicates: (i) there exists non-linear coupling between the tearing mode and micro-turbulence, most significantly in the QCM frequency range; (ii) the QCMs nonlinearly couple by themselves to excite the second harmonic, whereas no non-linear interaction is observed between the QCMs and ambient turbulence.

References
[1] Wilson H.R. and Connor J.W. 2009 Plasma Phys. Control. Fusion 51 115007
[2] Poli E. et al 2009 Nucl. Fusion 49 075010
[3] Zarzoso D. et al 2015 Nucl. Fusion 55 113018
[4] Bardoczi L. et al 2016 Phys. Rev. Lett. 116 215001
[5] Jiang M. et al 2019 Nucl. Fusion 59 066019
[6] Jiang M. et al 2020 Nucl. Fusion 60 066006