

## 先端エネルギー理工セミナーのお知らせ

下記のとおり、プラズマ科学セミナーを開催致します。通常通り単位取得の一環になりますので、奮って参加いただきますよう、ご案内申し上げます。

### 記

**対象:** 大学院学生(修士、博士)

**For master students and Ph.D. students**

**日時:** 2018年7月27日(金)10:30-12:00 (案)

**場所:** 応用力学研究所 2階大会議室

Meeting Room on 2F in RIAM building

**講演者:** Benjamin Chapman

University of Warwick, UK

**講演題目:** ICE bursts during ELM in KSTAR tokamak

Abstract:

During edge localised mode (ELM) crashes in KSTAR deuterium plasmas, bursts of spectrally structured ion cyclotron emission (ICE) are detected. Usually the ICE spectrum chirps downwards during an ELM crash, on sub-microsecond timescales. For KSTAR ICE where the separation of spectral peak frequencies is close to the proton cyclotron frequency at the outer plasma edge, we show that the driving population of energetic ions is likely to be a subset of the 3 MeV fusion protons, born centrally on deeply passing orbits which drift from the core to the edge plasma. We report first principles modelling of this scenario using a particle-in-cell code, which evolves the full orbit dynamics of large numbers of energetic protons, thermal deuterons, and electrons self-consistently with the electric and magnetic fields. The Fourier transform of the excited fields in the nonlinear saturated regime of the simulations is the theoretical counterpart to the measured ICE spectra. Multiple simulation runs for different, adjacent, values of the plasma density under KSTAR edge conditions enable us to infer the theoretical dependence of ICE spectral structure on the local electron number density. By matching this density dependence to the observed time-dependence of chirping ICE spectra in KSTAR, we obtain sub-microsecond time resolution of the evolving local electron number density during the ELM crash.

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