



IAEA FEC 2016

Contribution ID: 292

Type: Poster

An island-induced Alfvén eigenmode and effects of nonaxisymmetry on fast ions in the RFP

Thursday, 20 October 2016 08:30 (4 hours)

The existence of a magnetic-island induced gap in the shear Alfvén continuum was predicted numerically [Biancalani et al. PRL 2010], but only recently have experimental observations of the MIAE been made in stellarator [Sun et al. PPCF 2015] and RFP plasmas [Cook et al. submitted PPCF 2016]. As the role of 3D magnetic fields in tokamaks grows in prominence, associated changes in the Alfvénic spectral properties, including MIAEs, are anticipated. The core of the NBI-heated RFP plasma exhibits several unique variants of axisymmetry-breaking magnetic perturbations that impact fast ion confinement and stability.

The appearance of magnetic islands and associated magnetic stochasticity is controllable. A well-formed core-localized island is adjustable in size, ideal for study of the MIAE. While the RFP is nominally axisymmetric, in the quasi-single-helicity limit the dominant island envelops the magnetic axis, producing a stellarator-like three dimensional geometry. Here we present observations of fast ion transport in the presence of MIAEs in a RFP plasma. We further show a relative insensitivity of fast ion confinement to magnetic stochasticity, but a strong response to a coherent, 3D core perturbation.

Paper Number

EX/P5-16

Country or International Organization

U.S. A.

Primary author: Dr ANDERSON, Jay (University of Wisconsin)

Co-authors: IVANOV, A. (Budker Institute of Nuclear Physics); COOK, C. (University of Wisconsin-Madison); HEGNA, C. (University of Wisconsin-Madison); Dr SPONG, Donald (Oak Ridge National Laboratory); BOGUSKI, J. (University of Wisconsin-Madison); KIM, J. (University of Wisconsin-Madison); Prof. SARFF, John (University of Wisconsin-Madison); MCCOLLAM, K. (University of Wisconsin-Madison); BONOFILO, P. (University of Wisconsin-Madison); HIRSHMAN, S. (Oak Ridge National Laboratory); POLOSATKIN, S. (Budker Institute of Nuclear Physics); SEARS, S. (University of Wisconsin-Madison); BELYKH, V. (Bunker Institute of Nuclear Physics); DAVYDENKO, V. (Budker Institute of Nuclear Physics); CAPECCHI, W. (University of Wisconsin-Madison)

Presenter: Dr ANDERSON, Jay (University of Wisconsin)

Session Classification: Poster 5

Track Classification: EXD - Magnetic Confinement Experiments: Plasma-material interactions; divertors; limiters; scrape-off layer (SOL)