Contribution ID: **3054** Type: **not specified**

P1.1009 Feasibility study and physics performance of a fast-ion loss diagnostics for the JT-60SA tokamak

Monday, 8 July 2019 14:00 (2 hours)

See the full abstract here:
http://ocs.ciemat.es/EPS2019ABS/pdf/P1.1009.pdf

The JT-60SA tokamak will be able to operate in scenarios with large fraction of fast-ion pressure. The fast-ion population with supra-alfvenic velocities is expected to play an important role in the stability of magnetohydrodynamic (MHD) fluctuations, in particular of the Alfven Eigenmodes (AEs). Direct wave-particle interaction between fast-ions and AEs may lead to enhanced fast-ion transport and eventual losses. In this context, scintillator based fast-ion loss detectors (FILDs) are diagnostics with unique capabilities for the investigation of the mechanisms underlying the wave-particle interaction. FILDs are charged particle collectors that work as magnetic spectrometers making use of the magnetic field of the tokamak and a collimator to disperse the escaping ions onto a scintillator plate. The impinging position of the ions in the scintillator plate depends on their energy and pitch-angle, thus giving complete information on the velocity-space of the escaping ions. The use of fast scintillator materials provides high temporal resolution, making possible the identification of MHD fluctuations responsible for the fast-ion losses. In this work, relevant aspects regarding the conceptual design of a FILD detector for JT60SA are presented. According to the location of the diagnostic within the machine, full orbit simulations allow estimating the expected signal. Furthermore, finite element simulations are used to assess the structural integrity of the detector, considering different effects such as the plasma thermal load and the magnetic field variations during disruptions.

pppo

Presenter: AYLLON-GUEROLA, J. (EPS 2019)

Session Classification: Poster P1

Track Classification: MCF