

Aguiam, Diogo

PhD Student – APPLAuSE [Técnico Lisboa]

diogo.aguiam@tecnico.ulisboa.pt

PhD Thesis Abstract

Implementation of a X-mode multichannel edge density profile reflectometer for the new ICRH antenna on ASDEX Upgrade

Ion Cyclotron Resonance Frequency waves can be used as a heating mechanism to reach fusion temperatures in plasmas. However, the operation of these ICRF antennas in magnetic fusion reactors is associated with increased impurities due to sputtering of the vessel wall components. A new three-strap antenna design to reduce the ICRF induced sputtering has been installed in ASDEX Upgrade in Garching, Germany. An X-mode multichannel reflectometer to measure the edge density profile of the plasma at different points in front of the antenna will provide additional information to understand the coupling between ICRF power and the plasma. This project consists in implementing and commissioning the density profile reflectometer and participate in the scientific exploration of the new ICRH antenna at ASDEX Upgrade. This reflectometer will allow for the first consistent study and direct measurement of the plasma layers in front of the ICRH antennas. The specifications required to use the reflectometer density profile data for the dynamic matching of the ICRH antenna are also to be assessed in a feasibility study of the real-time control of the ICRF heating system.