

Tipo di tesi: Laurea Magistrale

Corso di Laurea: Fisica

Tipologia: Analisi Dati/Modellistica

Titolo della tesi: Investigation of intrinsic error fields in MAST-U device

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Relatore Accademico: Lidia Piron

Capogruppo: David Terranova

Argomento della tesi:

- ☐ Motivation: the presence of spurious magnetic fields, due to imperfections or misalignment of coils, coil current feeds, eddy currents associated with 3D wall structures and ferritic material located in the vicinity of the plasma, as known as error fields, are responsible of locked MHD modes, and thus plasma disruptions.
The characterization of the intrinsic error field sources and the development of active control strategies, which aim at their minimization, are of vital importance in fusion devices. Studies carried out in present fusion devices can allow extrapolations towards ITER operation.
- ☐ Strategy:
 1. Investigate the intrinsic error fields in MAST-U device (United Kingdom Atomic Energy Agency, Culham) by using multiple set of plasma diagnostics: magnetics, interferometer (density), Thomson scattering (Temperature) and infrared cameras.
 2. Compare intrinsic error field source with modelling predictions
 3. Test experimentally error field control
- ☐ Methodology:
 1. Data analyses of a wide database of discharges
 2. Deduce the error field correction currents
 3. Compare the results with modelling predictions
- ☐ Framework of the study: EUROfusion Work Package tokamak exploitation RT01: ITER baseline scenarios towards detachment and low collisionality

Competenze richieste (se necessarie):

Ambienti Python, IDL, Matlab.

Conoscenza degli argomenti trattati nei seguenti corsi della Laurea Magistrale in Fisica:

- Physics of fluids and plasmas
- Physics of nuclear fusion and plasma applications

Data della proposta: 15/09/2021

Stato: non assegnata

Laureando/a: