

**Cycle of studies:** Master LM

**Degree course:** Physics

**Title of the thesis:** Density limit in the RFXmod tokamak

**Type:** data analysis, modelling

**RFX Supervisor:** Paolo Zanca, Fulvio Auriemma

**Academic supervisor:** Lidia Piron

**Head of the RFX research group:** David Terranova

**Leader of the RFX research program:** Lionello Marrelli

**Description of the thesis:**

In magnetic confinement fusion devices it is important to operate at high plasma density, since the fusion reaction rate scales with the square of this quantity. However, a general feature of magnetic confinement devices is the existence of a limit in the possibility of raising the plasma density (density limit). Many mechanisms have been proposed to explain this phenomenon, but no general consensus has been obtained so far. We propose to investigate the density operative space of RFXmod in the tokamak configuration. In particular, the dependence of the maximum attained densities on the main plasma parameters will be investigated, with the aim of characterizing an empirical scaling law for the density limit in the RFXmod tokamak. Then, a comparison with present different models of the density limit will be carried out.

**Previous experience (if necessary):**

**Date:**

**Status:** (assigned/available)

**Name of the student:** (when assigned)