Plasma physics and applications

Component
École Nationale Supérieure d'Électrotechnique d'Électronique

In brief

- **Ametys Code:** N9EE14E
- **Open to exchange students:** Yes

Presentation

Objectives

1. Basic concepts of plasmas and their applications

- Debye length and plasma frequency

- Concepts of collisions, cross section, distribution function

- Calculation of the different moments of the Boltzmann equation

2. Magnetized plasmas

3. DC plasmas: ignition and breakdown of a continuous discharge

4. Generation of an RF plasma

5. High-pressure breakdowns: streamers, corona discharges, DBD

6. Main applications of non-equilibrium plasmas

- Focus on plasma propulsion

Description

This course presents the different aspects of plasmas: their definition, properties, conditions of generation, and main applications.

Pre-requisites

Electromagnetism: knowledge of fields and associated forces.

Statistical thermodynamics: ideal gas law;

Fundamental principle of dynamics