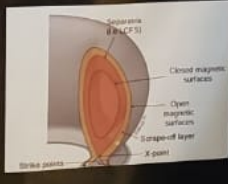


# STUDY OF HEAT DEPOSITION ON THE FIRST WALL OF TCABR

With the modernization of the TCABR tokamak, it was necessary to improve the first wall of this equipment. For the improvement, the MHD model will be used, which will still be adapted for the specific objectives of this project. Basically, around the Strike Points (SPs), which are the points where the plasma interacts with the tokamak wall, it is necessary to study the heat flux profile and optimize it with computational assistance, in which the PSD code will be used in order to create a set of synthetic kinetic MHD equilibria. In addition, the heat flux in all Strike Points for various magnetic configurations will also be calculated, all this in order to guarantee the best operating condition of the tokamak.



TCABR WILL BE IMPORTANT FOR THE DEVELOPMENT OF NUCLEAR FUSION, BECAUSE WITH IT WE WILL BE ABLE TO MORE EASILY STUDY CERTAIN CHARACTERISTICS OF THE PLASMA.

RESPONSIBLE: LUCAS PORTA  
ADVISOR: GUSTAVO CANAL



**JAS** OPTICA

## DEVELOPMENT OF AN ELECTRON SPECTROMETER FOR CHARACTERIZATION OF LASER PARTICLE ACCELERATION

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**OBJECTIVE**

The study purpose is the development and assembly of an electron spectrometer, which will be included in a laser electron acceleration system, to determine the kinetic energy of the electrons of MeV.

**LASER PARTICLE ACCELERATION**

The acceleration of electrons by ultrashort laser pulses was proposed in 1979 by Tajima and Dawson, who proposed to generate electrons by spatially modulating the charge density of the plasma created by the laser.

In this process, ultra-short pulses are focused on a gas target, ionization occurs and the ponderomotive force expels electrons in the laser axis, generating waves of charge density. In high charge gradient regions, the electrons are trapped and accelerated in the wake of the pulses, in a process called Laser Wakefield Acceleration (LWFA).

**ELECTRON SPECTROMETER**

To determine the electrons energy spectrum, a Thomson spectrometer is used. In its simplest form, this kind of spectrometer is composed by a region with constant magnetic field, with its field lines orthogonal to the direction of the electrons propagation, and a scintillator.

**ELECTRON PROPAGATION**

Resolution of the equation of motion of particles, charged in uniform magnetic fields to determine the parameters necessary for the assembly of the spectrometer:

$$\frac{d\mathbf{p}}{dt} = q(\mathbf{E} + \mathbf{v} \times \mathbf{B})$$

where:  $\mathbf{E}$  - Electric field (V/m),  $\mathbf{v}$  - Particle velocity (m/s),  $q$  - Particle charge (C),  $\mathbf{B}$  - Magnetic field (T)