

Laboratory project: experimental techniques in plasmas, nuclear physics and materials

Curso Académico: (2019 / 2020)

Fecha de revisión: 05-05-2020

Departamento asignado a la asignatura:

Coordinador/a: CASTRO BERNAL, MARIA VANESSA DE

Tipo: Obligatoria Créditos ECTS : 6.0

Curso : 1 Cuatrimestre : 2

REQUISITOS (ASIGNATURAS O MATERIAS CUYO CONOCIMIENTO SE PRESUPONE)

Basic knowledge of Atomic Physics, Electrodynamics, Material Science and Solid State Physics (graduate level).

OBJETIVOS

Objectives

- Development of laboratory projects related to plasma diagnostic (microwave-based apparatus, radiation spectroscopy and probes)
- Development of laboratory projects on nuclear physics (particle detectors characterization, total absorption gamma-ray spectroscopy)
- Development of laboratory projects on mechanical properties of materials and microstructure (tensile properties, plastic deformation and application of PAS in microstructure investigation)

DESCRIPCIÓN DE CONTENIDOS: PROGRAMA

1. PLASMA DIAGNOSTICS. Interaction of lasers, microwave and infrared radiation, light atoms and heavy ions with plasmas: Thomson scattering, Laser induced fluorescence, reflectometry, interferometry, active charge-exchange spectroscopy and heavy ion beam probe diagnostics. VIS, VUV, soft and hard X-ray spectroscopies, electron cyclotron emission, magnetic and electrostatic probes. Measurement of fusion products.
2. NUCLEAR PHYSICS. Characteristics of detectors for alpha and gamma particles: Ionisation and scintillation detectors and photomultipliers. Neutron detectors. Signal transmission and electronics for pulse signal processing: amplifiers, analogical to digital converters.
3. MECHANICAL PROPERTIES. Structural Materials in Fusion Reactors. Mechanical Testing. Elastic Deformation. Materials Failure. Dislocations and Strengthening Mechanisms.

ACTIVIDADES FORMATIVAS, METODOLOGÍA A UTILIZAR Y RÉGIMEN DE TUTORÍAS

Laboratory sessions.

SISTEMA DE EVALUACIÓN

Attendance to the laboratory sessions is compulsory. Evaluation of the reports.

Peso porcentual del Examen Final:	0
Peso porcentual del resto de la evaluación:	100

BIBLIOGRAFÍA BÁSICA

- William Callister Introducción a la Ciencia e Ingeniería de los Materiales, Reverté.