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# Tokamak Magnetic Control Simulation: Applications for JT60-SA and ISTTOK Operation.


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Thesis specifically prepared to obtain the PhD Degree in

**Technological Physics Engineering**

**Month 2020**

## ABSTRACT

The characterisation of the interactions


**Keywords: Plasma-surface interactions, Liquid-metals, Tin, Deuterium retention, Spectroscopy**

# RESUMO

A caracterização das interações entre plasmas magneticamente

**Palavras-chave: Plasma, metais liquidos, estanho, retenção de deutério, espectroscopia**

# SOMMARIO

Il soggetto del presente lavoro di tesi è la caratterizzazione dell'interazione tra la superficie di metallo liquido

**Parole chiave:Interazione plasma-parete, Metalli liquidi, Stagno, Ritenzione del Deuterio, Spettroscopia**

# ACKNOWLEDGEMENTS

This work, supported by the European Communities and "Instituto Superior Técnico", has been carried out within the Contract of Association between EURATOM and IST. Financial support was also received from "Fundação para a Ciência e Tecnologia"

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# LIST OF ABBREVIATIONS

@TODO: Review variable lists as writing the thesis

- AC - Alternating Current
- ADC - Analog to Digital Converter
- ATCA - Advanced Telecommunications Computing Architecture
- CREATE - Consorzio di Ricerca per l'Energia, l'Automazione e le Tecnologie dell'Elettromagnetismo
- DAC - Digital to Analog Converter
- IST - Instituto Superior Técnico
- LQR - Linear Quadratic Regulator
- MARTe - Multi-threaded Application Real-Time executor
- MIMO - Multiple-Input Multiple-Output
- PF - Poloidal Field
- XSC - eXtreme Shape Controller
- WO - Wiring Offset

# LIST OF VARIABLES

@TODO: Review variable lists as writing the thesis

## VARIABLES:

- $I_p$ - Plasma current
- $B_p$ - Poloidal magnetic field
- $\mu_0$ - Vacuum permeability
- $n$ - density of the plasma
- $E_{breakdown}$ - electrical breakdown field
- $E$ - electrical field
- $e$ - electron charge
- $V_f$ - floating potential
- $\gamma$ - flow constant
- $d$ - gap distance
- $i_{sat}^{+}$ - ion saturation current
- $c_s$ - ion sound speed
- $m$ - mass
- $\Gamma$ - particle flux density
- $\epsilon_0$ permittivity of vacuum
- $V_p$ - plasma potential
- $p$ - pressure
- $V_s$ - probe voltage
- $v_{se}$ - speed at the sheath edge
- $A_s$ - surface of the probe
- $T$ - temperature
- $\alpha$ - Townsend parameter

## INDEXES:

- $e$ - electron
- $i$ - ion
- $l$ - left
- $lw$ - left wall
- $r$ - right
- $rw$ - right wall
- $se$ - sheath edge
- $sf$ - sheath floating

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## DEMONSTRATIONS