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

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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

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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
- PCS - Plasma Control System
- 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
- μ_0 - Vacuum permeability

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INTRODUCTION

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PLASMA CONTROL SYSTEMS

2.1 OVERVIEW OF CONTROL SYSTEMS

The control of plasma position, shape and current among other parameters is one of the crucial engineering problems for present and future tokamaks. The Plasma Control Systems (PCS) lead with the overall control of the fusion devices being responsible also for the plasma configuration and scenarios algorithms [1, Chapter 8].

2.2 MARTE FRAMEWORK

The Multi-threaded Application Real-Time executor (MARTe) is a framework developed in order to standardize general real-time control systems for the execution of control algorithms. [2]

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DEMONSTRATIONS