Project name

Participation in the TCV Project

Project team

Name	Degree	% participation
Nuno Cruz	PhD Student	100%

Summary and highlights of research achievements

Optimization of the TCV Advanced Plasma Control System (APCS).

· Tests to the plasma vertical positionobserver were made with improved estimation of the plasma position using the new observer.

Plasma Vertical Stabilization Control

· Development of plasma models to test the control algorithms for the plasma vertical stabilization.

· Analysis of the use of optimal control theory to the controller under development and mathematical resolution of the application of minimum time control to a first and second-order system, applied to the plasma models.

· The full definition of the controller and the simulation result analysis is ongoing.

During the year of 2011 Nuno Cruz visited the “Centre de Recherches en Physique des Plasmas” to collaborate with the TCV Control Team and to participate in some TCV Scientific Campaigns.

Fig 1 – Schematic diagram of the feedback control loop and simulation path for the improvement of the vertical stabilization controller.

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Papers in international refereed scientific journals

Author(s)	Cruz N, J-M Moret, S Coda, JI Paley, BP Duval, AP Rodrigues, F Piras, F Felici, CMBA Correia, CAF Varandas
Paper title	Using APCS for plasma vertical control at TCV
Journal name	IEEE Transactions on Nuclear Science
Volume, page	58 Issue 4, 1570-1575
Year	2011

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Paper title	Progress and scientific results in the TCV tokamak
Journal name	Nuclear Fusion
Volume, page	51, 094017
Year	2011

Posters

Conference	2011 Joint Annual Meeting of SPS, ÖPG, SSAA and ÖGAA
Start-end date	June 15 -17, 2011
Location	EPFL, Lausanne, Switzerland
Author(s)	N Cruz, AP Rodrigues, J-M Moret,S Coda, F Felici, F Piras, CAF Varandas
Poster title	Integration and application of TCV Advanced Plasma Control System