

Alexandre Fil

*Plasma pedestal
modeller at UKAEA*

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Education

- 2012**
2015
PhD on plasma physics, *Aix-Marseille University, CEA Cadarache - IRFM.*
Modeling of disruption mitigation by massive gas injection on JET and ASDEX using the JOREK code
- 2009**
2012
Diplôme de l'Ecole Normale Supérieure, *Ecole Normale Supérieure de Paris, rue d'Ulm, Paris.*
Physics
- 2007**
2012
Master Recherche, *Paris VI University and Ecole Polytechnique, Paris.*
Fusion science and plasma physics
- 2006**
2009
Classe préparatoire aux grandes écoles, *Lycée Saint Louis, Paris, Physics and Chemistry.*
Preparatory school for the high-standard and competitive entrance exams for French engineering schools.

Experience

- 2019**
Plasma pedestal modeller, *UKAEA, Culham Science Center, Oxfordshire, UK.*
Working on the modeling of the effect of isotopes on JET ELMs with JOREK.
- 2017**
2019
Research Associate, *The University of York and MAST-U tokamak, York, UK.*
Detached in Oxford, UK.
Postdoctoral position, working on the modeling of plasma detachment on TCV and MAST-U with the codes BOUT++/SD1D and SOLPS-ITER
- 2015**
2017
Research Associate, *Princeton University and PPPL, Princeton, USA.*
Postdoctoral position, working on the modeling of ELMs triggered by pellet injections in tokamak plasmas with M3D-C1 as well as plasma control algorithms on EAST and NSTX-U
- 2012**
2015
PhD student, *CEA, Cadarache, France.*
3D non linear MHD modeling of tokamak disruptions with the JOREK code and modeling of gas penetration into the plasma with the IMAGINE code
- 2012**
6 months internship, *Ecole Polytechnique, Palaiseau, France, H. Lütjens.*
3D non linear simulations of plasma instabilities beyond the MHD model with the XTOR-2F code
- 2011**
6 months internship, *JET-EFDA, CCFE - Oxfordshire, UK, E. Joffrin, G. Sips.*
Modeling of the breakdown phase of the plasma discharge
- 2010**
6 weeks internship, *IRFM, CEA Cadarache, Ph. Moreau.*
Study of fibre optic sensors to measure plasma current
- 2008**
2012
Private teacher, *Compleitude, Paris.*
Maths, Physics teaching to small groups of students (High school to master degree)

2013

Author and translator, *Gallimard Jeunesse and Pearson*, Paris.

Minecraft official handbooks, more than 1 500 000 sales in France and Canada

2012

2013

Managing office of ASTHEC, *CEA Cadarache*.

Social and research events organization for CEA Cadarache PhD students, postdocs and interns

PhD thesis

title *Modeling of disruption mitigation by massive gas injection in JET and ASDEX with the JOREK and IMAGINE codes*

supervisors Eric Nardon, Peter Beyer

description Study of disruption mitigation with the 3D non-linear MHD code JOREK including fluid neutrals. The pre-thermal quench phase and the interaction between the massive gas injection and the plasma are studied, as well as the thermal quench phase and the magnetohydrodynamic events triggered by the gas injection. Development from scratch of the IMAGINE code studying the penetration of the massive gas injection into the plasma, including crucial processes such as charge-exchange.

Master thesis

title *3D non-linear simulations of plasma instabilities beyond the MHD model with the XTOR-2F code*

supervisors H. Lütjens, CPhT Ecole Polytechnique

description Toroidal Alfvén Eigenmodes (TAEs) are studied theoretically and are simulated with the XTOR code

Languages

French **Native**

Mother Tongue

English **Fluent**

Daily practice, all work performed in English

Skills

Development

Languages Fortran, C, PHP, Matlab, IDL, Javascript, HTML 5, CSS 3

Databases MySQL

Interests

Sport Football, Trail running, Climbing

Gaming Computer Games, Programming

Journal Publications ([link to Google scholar](#))

2019

A. Fil, et al. "Separating the roles of magnetic topology and neutral trapping in modifying the detachment threshold for TCV ". In: *Submitted to PPCF*.

- 2018
A. Fil, et al. "Identification of the primary processes that lead to the drop in divertor target ion current at detachment in TCV". In: *Contributions to Plasma Physics*.
- 2017
A. Fil, et al. "Modeling of Lithium Granule Injection in NSTX with M3D-C1". In: *Nuclear Fusion*.
- 2017
A. Kallenbach, et al. "Overview of ASDEX Upgrade results". In: *Nuclear Fusion*.
- 2017
H. Meyer, et al. "Overview of progress in European medium sized tokamaks towards an integrated plasma-edge/wall solution". In: *Nuclear Fusion*.
- 2017
X. Litaudon, et al. "Overview of the JET results in support to ITER". In: *Nuclear Fusion*.
- 2016
A. Fil E. Kolemen, et al. "Modeling of Lithium Granule Injection in NSTX with M3D-C1". In: *Nuclear Materials and Energy*.
- 2016
E. Nardon A. Fil, et al. "On the mechanisms governing gas penetration into a tokamak plasma during a massive gas injection". In: *Nuclear Fusion*.
- 2015
C. Reux, et al. "Runaway electron beam generation and mitigation during disruptions at JET-ILW". In: *Nuclear Fusion* 55, p. 093013.
- 2015
F. Orain M. Becoulet, G.T.A. Huijsmans et al. "Resistive Reduced MHD Modeling of Multi-Edge-Localized-Mode Cycles in Tokamak X-Point Plasmas". In: *Phys. Rev. Lett.* 114 (3), p. 035001.
- 2015
F. Orain, M. Becoulet et al. "Non-linear MHD modeling of edge localized mode cycles and mitigation by resonant magnetic perturbations". In: *Plasma Phys. Control. Fusion* 57.
- 2015
Fil, A., E. Nardon, M. Hoelzl, G. T. A Huijsmans, F. Orain, M. Becoulet, P. Beyer, G. Dif-Pradalier, R. Guirlet, H. R. Koslowski, M. Lehnen, J. Morales, S. Pamela, C. Passeron, C. Reux, F. Saint-Laurent, and JET Contributors. "Three-dimensional non-linear magnetohydrodynamic modeling of massive gas injection triggered disruptions in JET". In: *Physics of Plasmas* 22.6, 062509,
- 2014
M. Becoulet F. Orain, G.T.A. Huijsmans et al. "Mechanism of Edge Localized Mode Mitigation by Resonant Magnetic Perturbations". In: *Physical Review Letters* 113.11, p. 115001.

2014

M. Hoelzl, et al. "Non-Linear Simulations of MHD Instabilities in Tokamaks Including Eddy Current Effects and Perspectives for the Extension to Halo Currents". In: *Journal of Physics Conference Series* 561, p. 012011.

2013

F. Orain, et al. "Non-linear magnetohydrodynamic modeling of plasma response to resonant magnetic perturbations". In: *Physics of Plasmas* 20.10, p. 102510.

2011

Ph. Moreau B. Brichard, A. Fil et al. "Test of fiber optic based current sensors on the Tore Supra tokamak". In: *Fusion Engineering and Design* 6.

Conference Publications

2018

A. Fil, et al. "On the effect of total flux expansion in TCV detachment modeling with SOLPS-ITER". In: *23rd PSI conference*.

2017

A. Fil, et al. "Identification of the primary processes that lead to the drop in divertor target ion current at detachment in TCV". In: *Plasma Edge Theory 2017 conference proceedings*.

2016

A. Fil, E. Kolemen et al. "Modeling of Lithium Granule Injection in NSTX with M3D-C1". In: *22nd PSI conference proceedings*.

2016

A. Fil, E. Kolemen et al. "Modelling and Simulation of Pedestal Control Techniques for NSTX-U". In: *26th IAEA conference proceedings*.

2015

A. Fil, E. Kolemen et al. "Assessment of NSTX-U pedestal control and disruption avoidance". In: *57th APS conference proceedings*.

2015

A. Fil, E. Nardon et al. "Modeling of MGI-triggered-disruptions in tokamak plasmas with the JOREK and IMAGINE codes". In: *EPS 2015 conference proceedings*.

2014

A. Fil, E. Nardon et al. "Modeling of disruption mitigation by massive gas injection". In: *EPS 2014 conference proceedings*.

2014

C. Reux, et al. "Runaway Electron Generation with the ITER-like Wall and Efficiency of Massive Gas Injection at JET". In: *IAEA 2014 proceedings*.