Part A. PERSONAL INFORMATION

CV date	Dec. 5, 2017

First and Family name	Daniel Carralero Ortiz		
ID number	50754168E	Age	34
Researcher numbers	Researcher ID	K-4173-2017	
	Orcid code		

A.1. Current position

Name of University/Institution	CIEMAT (Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas)			
Department	Laboratorio Nacional de Fusión			
Address and Country	Av. Complutense 40, 28040 Madrid, Spain			
Phone number	+34 680358794	E-mail	Daniel.carralero@ipp.mpg.de	
Current position	Research fellow (Investigador contratado)		From	01.07.2015
Espec. cód. UNESCO	2207.21, 2204.10			
Palabras clave	Fusion energy, plasma physics, turbulent transport, scrape-off layer			

A.2. Education

Academic Degree	University	Year
Ingeniero Aeronáutico	Universidad Politécnica de Madrid	2007
Doctor Ingeniero Aeronáutico	Universidad Politécnica de Madrid	2012

A.3. JCR articles, h Index

57 articles in journals included in Journal Citation Reports.
877 citations in Google Scholar (GS) - 737 in Web of Science (WoS). Average citations per year over the last five years**:** 135 in GS (121 in WoS).
h-index: 16 in GS and 14 WoS.

Part B. CV SUMMARY

I studied aerospace engineering at the Universidad Politécnica de Madrid. During my last two years, I received a undergraduate grant and carried out tutored research at the Mathematical Fundamentals Department. This work was centered on the analysis the sheath entrance condition using fluid numerical simulations of plasma channels between dielectric walls in the SOL of tokamaks. After graduation, I started my PhD research in the Experimental Physics Group of the Laboratorio Nacional de Fusión. My work focused on the experimental operation of fast camera and probe diagnostics for the study of edge turbulence and plasma-wall interaction phenomena in the TJ-II stellarator, including diagnostic operation, data analysis and the design, construction and commission of an electromagnetic vorticity probe in TJ-II for the study of EM effects in edge turbulence in collaboration with Consorzio RFX (Padova, Italy). During that time, I also carried out research stays at the JET tokamak (12 weeks) and LHD stellarator (14 weeks) in which I carried out experiments on edge turbulence using a fast camera. My PhD dissertation was awarded the “Premio Extraordinario de Doctorado” award.

From August 2012, I began to work as a postdoc researcher in the Max-Planck-Institut für Plasma Physik (IPP) in Garching, Germany. I focused on the operation of probe diagnostics installed in the midplane manipulator of ASDEX Upgrade tokamak (AUG). On May 2013, my proposal “Investigation of Turbulent Transport in the Scrape-Off Layer of ASDEX-Upgrade” was granted an EFDA Fellowship (equivalent to a Marie Curie grant). From July 2015 I was appointed to a permanent position as a senior researcher at IPP. Since then, I have been in charge of AUG probe diagnostics, including midplane manipulator, divertor flush mounted probes and auxiliary systems. During this time, I’ve specialized on SOL turbulent transport and the role of filamentary structures in it. In particular, I published the seminal paper “An experimental investigation on the high density transition of the Scrape-off Layer transport in ASDEX Upgrade” in which, for the first time, I linked divertor conditions with midplane transport in L-mode tokamak plasmas by experimentally demonstrating how divertor collisionality determines the formation of the SOL density profile flattening known “shoulder”. Later, I

validated the analytical models predicting this effect (this work was published in Physical Review Letters in 2015). After these results I began to coordinate the research on tokamak filamentary far-SOL transport on an international level: in 2015 I became Scientific Coordinator of the "Filamentary transport in the SOL" experiment of the Medium Size Tokamak EUROFusion Work Program, and of the International Tokamak Physics Activity task "Validation of the SOL density width scaling with divertor collisionality". During these years, I developed these fundamental results into more ITER/DEMO-relevant physics (including H-mode plasmas), used EMC3-EIRENE simulations to include the role of neutrals on shoulder formation and developed a quantitative description of the thermal transport associated to filaments.

Since September 2017, I work as a senior researcher at the Experimental Physics Group of the Laboratorio Nacional de Fusión, where I have combined my research activity on SOL transport with the study of transport and turbulence on the edge of stellarators, including TJ-II and W7-X. As a result of this, I have been appointed as a member of the ITPA Scrape-off Layer and Divertor Topical Group, where I take the role of stellarator representative.

I have published 59 papers in peer-reviewed journals; 9 of them as first author. Two of them where published in Physical Review Letters; 1 of them as first author. I have been invited speaker at several international conferences, including the International Plasma-Surface Interaction Conference, and chaired the "Far-SOL fluxes and link to detachment" session on the 23rd ITPA Meeting on SOL/divertor physics, Naka, Japan, 2016.

Part C. RELEVANT MERITS

C.1. Selected Publications

1. **D. Carralero**, M. Siccinio, M. Komm, S. A. Artene, F. A. D'Isa, J. Adamek, L. Aho-Mantila, G. Birkenmeier, M. Brix, G. Fuchert, M. Groth, T. Lunt, P. Manz, J. Madsen, S. Marsen, H. W. Müller, U. Stroth, H. J. Sun, N. Vianello, M. Wischmeier, E. Wolfrum, ASDEX Upgrade Team, COMPASS Team, JET Contributors and the EUROfusion MST team. Recent progress towards a quantitative description of filamentary SOL transport. Nuclear Fusion, **57**, 056044 (2017).

2. **D. Carralero**, P. Manz, L. Aho-Mantila, G. Birkenmeier, M. Brix, M. Groth, H.W. Müller, U. Stroth, N. Vianello, E. Wolfrum, ASDEX Upgrade team, and JET Contributors. Experimental validation of a filament transport model in turbulent magnetized plasmas. Physical Review Letters, **115**, 215002 (2015).

3. M. Bernert, T. Eich, A. Kallenbach, **D. Carralero**, A. Huber, P.T. Lang, S. Potzel, F. Reimold, J. Schweinzer, E. Viezzer, H. Zohm The H-mode density limit in the full tungsten ASDEX Upgrade tokamak. Plasma Physics and Controlled Fusion, **57**, 014038 (2015).

4. M. Spolaore, N. Vianello, I. Furno, **D. Carralero**, M. Agostini, J. A. Alonso, F. Avino, R. Cavazzana, G. De Masi, A. Fasoli, C. Hidalgo, E. Martines, B. Momo, A. Scaggion, P. Scarin, S. Spagnolo, G. Spizzo, C. Theiler and M. Zuin. Electromagnetic turbulent structures: an ubiquitous feature of the edge region of toroidal plasma configurations. Physics of Plasmas, **22**, 012310 (2015).

5. P. Manz, G. Birkenmeier, **D. Carralero**, G. Fuchert, H. W. Müller, S. Müller, B. Scott, T. Ribeiro, U. Stroth and E. Wolfrum. Influence of finite ion temperature on plasma blob dynamics. Plasma Physics and Controlled Fusion, **57**, 014012 (2015).

6. **D. Carralero**, G. Birkenmeier, H.W. Müller, P. Manz, P. deMarne, S.H. Müller, F. Reimold, U. Stroth, M. Wischmeier, E. Wolfrum and the ASDEX Upgrade team. An experimental investigation on the high density transition of the Scrape-off Layer transport in ASDEX Upgrade. Nuclear Fusion, **54**, 123005 (2014).

7. **D. Carralero**, I. Calvo, S. da Graça, B. A. Carreras, T. Estrada, M. A. Pedrosa and C. Hidalgo. Shear-flow susceptibility near the low density transition in TJ-II. Plasma Physics and Controlled Fusion, **54**, 065006 (2012).

8. **D. Carralero**, I. Calvo, M.Shoji, B. A. Carreras, K. Ida, S. Ohdachi, S. Sakakibara, H. Yamada and C. Hidalgo. Influence of β on the self-similarity properties of LHD edge fluctuations. Plasma Physics and Controlled Fusion, **53**, 095010 (2011).

9. C. Hidalgo, M.A. Pedrosa, C. Silva, **D. Carralero**, E. Ascasibar, B.A. Carreras, T. Estrada, F. Tabares, D. Tafalla, J. Guasp, M. Liniers, A. López-Fraguas, B. van Milliguen and M. A. Ochando. Multi-scale physics mechanisms and spontaneous edge transport bifurcations in fusion plasmas. Europhysics Letters, **87**, 5, 55002 (2009).

10. M. A. Pedrosa, C. Silva, C. Hidalgo, B. A. Carreras, R. O. Orozco, **D. Carralero** and the TJ-II team. Evidence of long-distance correlation of fluctuations during edge transitions to improved confinement regimes in the TJ-II stellarator. Physical Review Letters **100**, 215003 (2008).

C.2. Research projects and grants

Projects in which I was the **Activity Manager:**

"Characterization of edge transport in an optimized stellarator", Ayuda del Programa de Atracción del Talento Investigador, Comunidad de Madrid. (2018-2022), 95 k€/year.

"Filamentary transport in the SOL", *EUROFusion MST1 Work Programme experiment AUG15-2.2-3,* (2015-2016). 137 k€/year.

"Investigation of Turbulent Transport in the Scrape-Off Layer of ASDEX-Upgrade", *EFDA 2013 Work Programme Fusion Researcher Fellowships, WP13-FRF-IPP/Carralero,* 30 April 2013 - 30 April 2015. 65 k€/year.

Projects in which I was a member of the research team:

"Magnetic reconnection in fusion plasmas", *EUROfusion Enabling Research Project*. P.I.: E. Martines (2013-2014). 179 k€.

"Understanding of turbulent edge/SOL transport and structure formation by joint experiment and modelling approach", *EUROfusion Enabling Research Project*. P.I.: A. Kendl, Experimental Coordinator: **D. Carralero** (2013-2014). 274 k€.

"Estudio y Control del Transporte de Naturaleza Turbulenta en Plasmas Confinados Magnéticamente", *Plan Nacional de I+D+i, Programa Nacional de Proyectos de Investigación Fundamental, Ministerio de Ciencia e Innovación, ENE2012-38620-C02-01*. P.I.: C. Hidalgo (2013-2015). 143 k€.

"Physical Mechanisms on Plasma Transport and Confinement Transitions", *Plan Nacional de I+D+i, Programa Nacional de Proyectos de Investigación Fundamental, Ministerio de Ciencia e Innovación, ENE2009-12213-C03-01*.vP.I.: M.A. Pedrosa (2009-2011)

C.3. Academic service & institutional responsibilities

Member of the ITPA Scrape-off Layer and Divertor Topical Group as stellarator representative (2017-today).

Scientific coordinator of the ITPA task *"Validation of the SOL density width scaling with divertor collisionality"* (2015-today)

Referee for Journal of Nuclear Materials (2014 – today), Nuclear Fusion (2015-today), Plasma Physics and Controlled Fusion (2015-today), Nuclear Materials and Energy (2016- today), Review of Scientific Instruments (2017) and Europhysics Letters (2017 - today).

C.4 Invited talks at internacional conferences

1. Chairman of the *"Far-SOL fluxes and link to detachment"* session at the 23rd ITPA Meeting on SOL/divertor physics. Contributed the talk *Report on DSOL-34 new results from AUG.* Naka, Japan, October 25th 2016.
2. *Filamentary transport: Multi-machine experiments.* 8th COMPASS Programmatic Conference, Prague, Czech Republic, September 22nd 2016.
3. *Far SOL Plasma Fluxes.* 21st ITPA meeting on SOL/divertor physics, PPPL, Princeton, USA, June 9th 2015.
4. *First wall flux distribution in DEMO size devices*. 22th European Fusion Program Workshop, Split, Croatia, December 2nd 2014.
5. *Implications of high density operation on SOL transport.* 21st International Plasma-Surface Interaction Conference, Kanazawa, Japan, May 29th 2014.

C.5 Additional education

Winter school on *Turbulence, magnetic fields and self organization in laboratory and astrophysical plasmas (*March-April 2015), **École de Physique des Houches**, Centre National de la Recherche Scientifique, Université Joseph Fourier of Grenoble.

C.6 Teaching experience

Directed the following Master Thesis:

- Sergiu Adrian Artene, *"A study on the transport of particles and heat of plasma filaments in the scrape-off layer of ASDEX Upgrade*", Technischen Universität München, November 2016.
- Federico D'Isa Master thesis *"Evolution of the scrape-off layer plasma background at density shoulder formation"*, Universit'a degli Studi di MILANO - BICOCCA, October 2016. Rated "cum Laude".

C.7 Awards

Nominated for the 2017 Nuclear Fusion Award, for the paper "An experimental investigation on the high density transition of the Scrape-off Layer transport in ASDEX Upgrade".

Premio Extraordinario de Doctorado, Extraordinary PhD Prize awarded by the Universidad Politécnica de Madrid. (January, 2014).

Itoh Project Prize accesit, *Poster "Recent Results on the Search of Self Organization of Plasma Edge Fluctuations" awarded "Highly Commended Work" mention by the Itoh Project Prize in Plasma Turbulence Committee*, 38th EPS Conference, Strasbourg. (July, 2011).

Pegasus award, granted by the PEGASUS consortium in recognition of academic international experience and excellence (December, 2007).

Master Thesis Project (Proyecto final de carrera) *"Interaction between Magnetized Plasmas and Walls"* awarded First Class Honors (Matrícula de honor). (April 2007)

C.8 Other grants

Beca de Formación de Personal Investigador (FPI), Spanish Ministerio de Ciencia y Tecnología, (February 2008 – February 2012).

Beca de Colaboración Universitaria, Spanish Ministerio de Ciencia y Tecnología, Mathematical Fundamentals Department, Universidad Politécnica de Madrid. (September 2005 - April 2007).