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Centro de Investigaciones Energéticas Medioambientales y Tecnológicas (CIEMAT)

Department of Energy

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RESEARCH INTEREST

Hydrogen chemistry, chemical kinetics reduction, flame stability analysis, combustion at microscale, high performance computing.

PROFESSIONAL EXPERIENCE

10/2010 - present Post-doc Researcher, Department of Energy, Unit of Modelling and Processes, Centro de Investigaciones Energéticas Medioambientales y Tecnológicas (CIEMAT), Madrid, Spain.

10/2014 - 08/2015 Lecturer, Universidad Pontificia Comillas of Madrid, Spain.

10/2010 - 08/2013 Lecturer, Universidad Pontificia Comillas of Madrid, Spain.

09/2011 - 09/2013 Associate Professor, Department of Thermal Engineering and Fluid Mechanics, Universidad Carlos III de Madrid, Leganés, Madrid, Spain.

01/2010 - 10/2010 Assistant Professor, Department of Thermal Engineering and Fluid Mechanics, Universidad Carlos III de Madrid, Leganés, Madrid, Spain.

09/2006 - 06/2009 Teaching Assistant, Department of Thermal Engineering and Fluid Mechanics, Universidad Carlos III de Madrid, Leganés, Madrid, Spain.

AWARDS AND FELLOWSHIPS

Postgraduate scholarship FPU (AP2005-0446) awarded by the Spanish Ministry of Education (2006 - 2009).

Award of the Universidad Carlos III de Madrid for best doctorate studies 2009-2010.

3rd Award of the "Escuela Oficial de Ingenieros Industriales de Madrid" for best PhD studies (2010).

Undergrad research grant in the Department of Thermal Engineering and Fluid Mechanics, Universidad Carlos III de Madrid by the Spanish Ministry of Education and Science (09/2004 - 06/2005).

EDUCATION

- 09/2007 - 12/2009 Universidad Carlos III de Madrid, Leganés, Spain
Ph.D. in Mathematical Engineering, Dec. 2009.
Dissertation title: Numerical and asymptotic analyses of lean hydrogen-air deflagrations.
- 09/2005 - 06/2007 Universidad Carlos III de Madrid, Leganés, Spain
M.S. in Mathematical Engineering: Fluid Mechanics, June 2007.
- 09/2003 - 06/2005 Universidad Carlos III de Madrid, Leganés, Spain
B.S. in Mechanical Engineering: Energy.
- 09/1998 - 06/2003 Universidad Carlos III de Madrid, Leganés, Spain
B.Tech. in Mechanical Engineering.
- 09/1996 - 06/1998 School of Technical Studies G.M. Jovellanos, Madrid
Technical studies in Automobile Engineering.

CONFERENCE & PUBLICATIONS

Refereed Journal Publications (9)

- D. Fernández-Galisteo and V.N. Kurdyumov. Impact of the gravity field on stability of premixed flames propagating between two closely spaced parallel plates. Proceedings of the Combustion Institute, In Press (2018).
- D. Fernández-Galisteo, V.N. Kurdyumov and P.D. Ronney. Analysis of premixed flame propagation between two closely-spaced parallel plates. *Combustion and Flame* 190, 133-145 (2018).
- D. Fernández-Galisteo, C. Jiménez, M. Sánchez-Sanz and V.N. Kurdyumov. Effects of stoichiometry on premixed flames propagating in narrow channels: symmetry-breaking bifurcations, *Combustion Theory and Modelling* 21, 1050-1065 (2017).
- C. Jiménez, D. Fernández-Galisteo and V.N. Kurdyumov. DNS study of the propagation and flashback conditions of lean hydrogen-air flames in narrow channels. *International Journal of Hydrogen Energy* 40, 12541-12549 (2015).
- D. Fernández-Galisteo, C. Jiménez, M. Sánchez-Sanz and V.N. Kurdyumov. The differential diffusion effect of the intermediate species on the stability of premixed flames propagating in microchannels. *Combustion Theory and Modelling* 18, 582-605 (2014).
- M. Sánchez-Sanz, D. Fernández-Galisteo and V.N. Kurdyumov. Effect of the equivalence ratio, Damköhler number, Lewis number and heat release on the stability of laminar premixed flames in microchannels. *Combustion and Flame* 161, 1282-1293 (2013).
- V.N. Kurdyumov and D. Fernández-Galisteo. Asymptotic structure of premixed flames for a simple chain-branching chemistry model with finite activation energy near the flammability limit. *Combustion and Flame* 159, 3110-3118 (2012).
- D. Fernández-Galisteo, A.L. Sánchez, A. Liñán, and F.A. Williams. The hydrogen-air burning rate near the lean flammability limit. *Combustion Theory and Modelling*, 13:4, 741-761 (2009).
- D. Fernández-Galisteo, A.L. Sánchez, A. Liñán, and F.A. Williams. One-step reduced kinetics for lean hydrogen-air deflagration. *Combustion and Flame* 156, 985-996 (2009).

Conference Proceedings (1)

D. Fernández-Galisteo, G. del Alamo, A.L. Sánchez, A. Liñán. Zeldovich analysis of hydrogen-air premixed flames. Proc. of the Third European Combustion Meeting, 6-19 (2007).

Oral Presentations (9)

D. Fernández-Galisteo and V.N. Kurdyumov, Impact of the gravity field on stability of premixed flames propagating between two closely spaced parallel plates, 37th International Symposium on Combustion, July 29 - August 3, 2018, Dublin, Ireland.

D. Fernández-Galisteo, C. Jiménez, M. Sánchez-Sanz, and V.N. Kurdyumov, Effects of stoichiometry on premixed flames propagating in planar microchannels, 26th International Colloquium on the Dynamics of Explosions and Reactive Systems, July 30 - August 4, 2017, Boston, USA.

D. Fernández-Galisteo, C. Jiménez, A. Dejoan, and V.N. Kurdyumov, Intrinsic flame instabilities in microchannels, 1st Spanish High Performance Computing Combustion Workshop, June 2, 2017, Barcelona, Spain.

D. Fernández-Galisteo, C. Jiménez, M. Sánchez-Sanz, and V.N. Kurdyumov, Effects of stoichiometry on premixed flames propagating in planar microchannels, Joint Meeting of the British, Spanish and Portuguese Section of the Combustion Institute, April 12 - 13, 2016, Cambridge, U.K.

D. Fernández-Galisteo, J. Gross, V. Kurdyumov, and P.D. Ronney, Premixed flame propagation between two closely spaced parallel plates, 25th International Colloquium on the Dynamics of Explosions and Reactive Systems, August 3 - 7, 2015, Leeds, U.K.

D. Fernández-Galisteo, J. Gross, V.N. Kurdyumov, and P.D. Ronney, Premixed flame propagation between two closely spaced parallel plates. Reunión de la Sección Española y Portuguesa del Instituto de Combustión, November 19 - 21, 2015, Lisbon, Portugal.

D. Fernández-Galisteo, C. Jiménez and V.N. Kurdyumov, Symmetry-breaking bifurcation on the propagation of premixed flames in narrow adiabatic channels for a simple chain-branching kinetics, 24th International Colloquium on the Dynamics of Explosions and Reactive Systems, July 28 - August 2, 2013, Taipei, Taiwan.

D. Fernández-Galisteo, A.L. Sánchez, A. Liñán, and F.A. Williams, The hydrogen-air burning rate near the lean flammability limit, Third Meeting of the Spanish Section of the Combustion Institute, May 21 - 22, 2009, Valladolid, Spain.

D. Fernández-Galisteo, A.L. Sánchez, A. Liñán, and F.A. Williams, Hydrogen-air reduced kinetics and burning rate near the lean flammability limit, Second Meeting of the Spanish Section of the Combustion Institute, May 8 - 9, 2008, Valencia, Spain.

Technical Poster Presentations (9)

D. Fernández-Galisteo, E. Fernández-Tarrazo, C. Jiménez, and V.N. Kurdyumov, Rich methanol combustion in small-scale counter-flow burners to produce hydrogen-rich syngas, 37th International Symposium on Combustion, July 29 - August 3, 2018, Dublin, Ireland.

D. Fernández-Galisteo and V.N. Kurdyumov, Stability of premixed gaseous flames propagating in Hele-Shaw cells, 26th International Colloquium on the Dynamics of Explosions and Reactive Systems, July 30 - August 4, 2017, Boston, USA.

D. Fernández-Galisteo, C. Jiménez, M. Sánchez-Sanz and V.N. Kurdyumov, Effects of stoi-

chiometry on premixed flames propagating in planar microchannels, 36th International Symposium on Combustion, July 31 - August 8, 2016, Seoul, Korea.

J. Gross, X. Pan, D. Fernández-Galisteo, and P.D. Ronney, Low Lewis number flame propagation in narrow channels, 35th International Symposium on Combustion, August 3 - 8, 2014, San Francisco, USA.

D. Fernández-Galisteo, J. Gross, and P.D. Ronney. Premixed Flame propagation between two closely spaced parallel plates, 35th International Symposium on Combustion, August 3 - 8, 2014, San Francisco, USA.

D. Fernández-Galisteo. Premixed flames in narrow adiabatic channels for a chain-branching kinetics, 34th International Symposium on Combustion, July 29 - August 3, 2012, Warsaw, Poland.

D. Fernández-Galisteo, A.L. Sánchez, A. Liñán, and F.A. Williams, The hydrogen-air burning rate near the lean flammability limit, Fourth European Combustion Meeting, ECM2009, April 14 - 17, 2009, Vienna, Austria.

D. Fernández-Galisteo, A.L. Sánchez, A. Liñán, and F.A. Williams, Hydrogen-air reduced kinetics and burning rate near the lean flammability limit, 32nd International Symposium on Combustion, August 4 - 8, 2008, Montreal, Canada.

D. Fernández-Galisteo, G. del Álamo, A. L. Sánchez, and A. Liñán, Zeldovich analysis of hydrogen-air premixed flames, Third European Combustion Meeting, ECM2007, April 11 - 13, 2007, Chania, Crete, Greece.

STAYS IN FOREIGN INSTITUTIONS

University of Southern California, Los Angeles, CA. USA, 2013, 1.5 months. Topic: Numerical modeling of flame instabilities in Hele-Shaw cell.

University of California, San Diego. La Jolla, CA. USA, 2009, 2 months. Topic: Flame structure of stoichiometric hydrogen-air mixtures.

University of California, San Diego. La Jolla, CA. USA, 2008, 3 months. Topic: Reduced mechanisms for lean premixed hydrogen-air flames.

University of California, San Diego. La Jolla, CA. USA, 2007, 2.5 months. Topic: Lean premixed hydrogen-air flames.

UNIVERSITY AND PROFESSIONAL SERVICE

Courses taught

Universidad Carlos III de Madrid

Laboratory sessions Thermofluids Processes (mech. eng. degree) – Fall 2005.

Laboratory sessions Fluidmechanics Engineering (mech. eng. degree) – Fall 2005.

Laboratory Technologies I (mech. eng. degree) – Spring 2005, Spring 2007, Spring 2008.

Laboratory sessions Combustion and Pollutants (mech. eng. degree) – Fall 2007, Fall 2008.

Laboratory of Acoustic (mech. eng. degree) – Fall 2007.

Fluidmechanics Engineering (electronic and automatic eng. degree and mech. eng. degree) – Spring 2010, Spring 2012.

Fluid Installations and Hydraulic Machinery (mech. eng. degree) – Fall 2011, Fall 2012.

Universidad Pontificia Comillas, ICAI-ICADE

Principles of Combustion (fire protection engineering master course) – Fall 2010, Fall 2011, Fall 2012, Fall 2014.

Reviewer for manuscripts submitted to

International Journal of Hydrogen Energy