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RESEARCH INTEREST

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

PROFESSIONAL EXPERIENCE

10/2010 - present Researcher, Department of Energy, Unit of Modelling and Combustion Process, Centro de Investigaciones Energéticas Mediambientales y Tecnológicas (CIEMAT), Madrid, Spain.

01/2019 - present Associate Professor, Department of Thermal Engineering and Fluid Mechanics, Universidad Carlos III de Madrid, Leganés, 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 Assitant 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.

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 (21)

J. Bosch, D. Fernández-Galisteo, C. Jiménez, and V.N. Kurdyumov. Smalll-scale superadiabatic combustors with a two-step chain-branching chemistry model: asymptotic models and the effect of two dimensionality on lean mixtures burning. Combustion and Flame 259, 113127 (2024).

J. Carpio, B. Li, D. Fernández-Galisteo, A.L. Sánchez, and F.A. Williams. Systematically derived one-step kinetics for hydrogen-air gas-turbine combustion, Combustion and Flame 250, 112663 (2023).

D. Fernández-Galisteo, A. Dejoan, J. Melguizo-Gavilanes, and V.N. Kurdyumov. A three-dimensional study of the influence of momentum loss on hydrodynamically unstable premixed flames. Proceedings of the Combustion Institute 39, 1545-1554 (2023).

J. Bosch, D. Fernández-Galisteo, C. Jiménez, and V.N. Kurdyumov. Superadiabatic small-scale combustors: asymptotic analysis of a two-step chain-branching combustion model. Proceedings of the Combustion Institute 39, 1927-1935 (2023).

V.N. Kurdyumov, D. Fernández-Galisteo, and C. Jiménez. Asymptotic study of premixed flames in inert porous media layers of finite width: parametric analysis of heat recirculation phenomena. Combustion and Flame 241, 112109 (2022).

J. Bosch, D. Fernández-Galisteo, C. Jiménez, and V.N. Kurdyumov. Analytical study of superadiabatic small-scale combustors with a two-step chain-branching chemistry model: lean burning below the flammability limit. Combustion and Flame 235, 111731 (2022).

V.N. Kurdyumov, D. Fernández-Galisteo and C. Jiménez. Premixed flames in a narrow slot with a step-wise wall temperature: linear stability analysis and dynamics. Combustion, Theory and Modelling 25, 1132-1157 (2021).

C. Jiménez, D. Fernández-Galisteo and V.N. Kurdyumov. Flame-acoustics interaction for symmetric and non-symmetric flames propagating in a narrow duct from an open to a closed end. Combustion and Flame 225, 499-512 (2021).

V.N. Kurdyumov, D. Fernández-Galisteo and C. Jiménez. Superadiabatic small-scale combustor with counter-flow heat exchange: Flame structure and limits to narrow-channel approximation. Combustion and Flame 222, 233-241 (2020).

D. Fernández-Galisteo, E. Fernández-Tarrazo, C. Jiménez and V.N. Kurdyumov. Analysis of an idealized counter-current microchannel-based reactor to produce hydrogen-rich syngas from methanol. International Journal of Hydrogen Energy 44, 23807-23820 (2019).

D. Martínez-Ruiz, F. Veiga-López, D. Fernández-Galisteo, M. Sánchez-Sanz and V.N. Kurdyumov. The role of conductive heat losses on the formation of isolated flame cells in Hele-Shaw chambers. Combustion and Flame 209, 187-199 (2019).

D. Fernández-Galisteo, A. Weiss, A.L. Sánchez and F.A. Williams. A one-step reduced mechanism for near-limit hydrogen combustion with general stoichiometry. Combustion and Flame 208, 1-4 (2019).

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 37, 1937-1943 (2019).

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).

Oral Presentations (23)

C. Jiménez, D. Fernández-Galisteo, and V.N. Kurdyumov, Premixed flames in narrow heated channels of circular cross-section: steady-state solutions, their linear stability analysis and dynamics, 29th International Colloquium on the Dynamics of Explosions and Reactive Systems, July 23rd - 28th, 2023, Seoul, Korea.

A. Dejoan, D. Fernández-Galisteo, and V.N. Kurdyumov, Numerical study of propagation patterns of lean hydrogen-air flames under confinement, 29th International Colloquium on the Dynamics of Explosions and Reactive Systems, July 23rd - 28th, 2023, Seoul, Korea.

A. Dejoan, D. Fernández-Galisteo, and V.N. Kurdyumov, Numerical study of propagation patterns of lean hydrogen-air flames under confinement, 2nd Spanish Fluid Mechanics Conference, July 2nd - 5th, 2023, Barcelona, Spain.

D. Fernández-Galisteo, C. Jiménez, A.L. Sánchez, and V.N. Kurdyumov, Combustion of ultra-lean hydrogen-air mixtures in an excess-enthalpy burner, 15th International Conference on Combustion Technologies for a Clean Environment, June 25th - 29th, 2023, Lisbon, Portugal.

D. Fernández-Galisteo, A. Dejoan, J. Melguizo-Gavilanes, and V.N. Kurdyumov, Influence of momentum loss on hydrodynamically unstable premixed flames, Conference on Non-Linear Phenomena and Dynamics of Flame Propagation, September 25th - 29th, 2022, Burabay, Kazakhstan.

D. Fernández-Galisteo, A. Dejoan, J. Melguizo-Gavilanes, and V.N. Kurdyumov, A three-dimensional study of the influence of momentum loss on hydrodynamically unstable premixed flames, 39th International Symposium on Combustion, July 24th - 29th, 2022, Vancouver, Canada.

D. Fernández-Galisteo, A. Dejoan, J. Melguizo-Gavilanes, and V.N. Kurdyumov, Influence of momentum loss on hydrodynamically unstable premixed flames, 1st Spanish Fluid Mechanics Conference, June 19th - 22nd, 2022, Cádiz, Spain.

D. Fernández-Galisteo, E. Fernández-Tarrazo, C. Jiménez, and V.N. Kurdyumov, Numerical simulation of ethanol partial oxidation in a mesochannel-based reactor to produce hydrogen-rich syngas, European Hydrogen Energy Conference 2022, May 18th - 20th, 2022, Madrid, Spain.

J. Melguizo-Gavilanes, D. Fernández-Galisteo, A. Dejoan, M. Sánchez-Sanz, and V.N. Kurdyumov, Numerical simulation of lean H_2-air premixed flames in narrow gaps, European Hydrogen Energy Conference 2022, May 18th - 20th, 2022, Madrid, Spain.

D. Fernández-Galisteo, C. Jiménez, V.N. Kurdyumov, and A.L. Sánchez, Combustion of ultra-lean hydrogen-air mixtures in a small-scale heat-recirculating burner: comparison of complete and reduced kinetics, 18th International Conference on Numerical Combustion, May 8th - 11th, 2022, San Diego, CA, USA.

D. Fernández-Galisteo, A. Dejoan, J. Melguizo-Gavilanes, and V.N. Kurdyumov, Numerical simulations of hydrodynamically unstable flames in Hele-Shaw cells, 3rd Spanish High Performance Computing Combustion Workshop, July 2nd, 2021, Barcelona, Spain.

A. Dejoan, J. Melguizo-Gavilanes, D. Fernández-Galisteo, C. Jiménez, and V.N. Kurdyumov, Numerical simulations of flame dynamics in narrow gaps, 2nd Spanish High Performance Computing Combustion Workshop, September 27th, 2019, Barcelona, Spain.

D. Fernández-Galisteo, E. Fernández-Tarrazo, C. Jiménez, and V.N. Kurdyumov, Very rich methanol-air combustion in microchannel-based reactors to produce hydrogen-rich syngas, 27th International Colloquium on the Dynamics of Explosions and Reactive Systems, July 28th - August 2nd, 2019, Beijing, China.

D. Fernández-Galisteo, E. Fernández-Tarrazo, C. Jiménez, and V.N. Kurdyumov, Methanol and ethanol thermal partial oxidation in microchannel-based reactors to produce hydrogen-rich syngas, 11th Mediterranean Symposium Combustion, June 16th - 20th, 2019, Tenerife, Spain.

D. Fernández-Galisteo and V.N. Kurdyumov, Impact of the gravity field on stability of pre-

mixed flames propagating between two closely spaced parallel plates, 37th International Symposium on Combustion, July 29th - August 3rd, 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 30th - August 4th, 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 2nd, 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 12th - 13rd, 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 3rd - 7th, 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 19th - 21st, 2014, 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 28th - August 2nd, 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 21st - 22nd, 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 8th - 9th, 2008, Valencia, Spain.

Technical Poster Presentations (14)

D. Fernández-Galisteo, C. Jiménez, A.L. Sánchez, and V.N. Kurdyumov, Ultra-lean hydrogen-air combustion in an excess-enthalpy burner, 11th European Combustion Meeting, April 26th - 28th, 2023, Rouen, France.

V.N Kurdyumov, D. Fernández-Galisteo, and C. Jiménez, Premixed flames in narrow heated channels of circular cross-section: steady-state solutions, their linear stability analysis and dynamics, 11th European Combustion Meeting, April 26th - 28th, 2023, Rouen, France.

V.N. Kurdyumov, D. Fernández-Galisteo, and C. Jiménez, Premixed flames in narrow heated channels of circular cross section, Workshop CFD for Combustion Safety, March 21st 2023, CERFACS, Tolouse, France.

J. Melguizo-Gavilanes, A. Dejoan, D. Fernández-Galisteo, and V.N. Kurdyumov, Numerical study of the propagation of lean hydrogen-air flames in Hele-Shaw cells, 27th International Colloquium on the Dynamics of Explosions and Reactive Systems, July 28th - August 2nd, 2019,

Beijing, China.

A. Dejoan, J. Melguizo-Gavilanes, D. Fernández-Galisteo, and V.N. Kurdyumov, Legitimacy of the narrow-channel approximation for the study of flames propagating between two closely-spaced parallel plates, 11th Mediterranean Symposium Combustion, June 16th - 20th, 2019, Tenerife, Spain.

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 29th - August 3rd, 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 30th - August 4th, 2017, Boston, USA.

D. Fernández-Galisteo, C. Jiménez, M. Sánchez-Sanz and V.N. Kurdyumov, Effects of stoichiometry on premixed flames propagating in planar microchannels, 36th International Symposium on Combustion, July 31st - August 8th, 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 3rd - 8th, 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 3rd - 8th, 2014, San Francisco, USA.

D. Fernández-Galisteo. Premixed flames in narrow adiabatic channels for a chain-branching kinetics, 34th International Symposium on Combustion, July 29th - August 3rd, 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 14th - 17th, 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 4th - 8th, 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 11th - 13rd, 2007, Chania, Crete, Greece.

STAYS IN FOREING INSTITUTIONS

University of California, San Diego. La Jolla, CA. USA, 2023, 3 months. Topic: Reduced chemical kinetic mechanisms for hydrogen-ammonia combustion at high pressures.

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

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 of Thermofluids Processes (Mech. Eng. Degree) – Fall 2005.

Laboratory sessions of Fluidmechanics Engineering (Mech. Eng. Degree, Energy Eng. Degree, and Industrial Tech. Eng. Degree) – Fall 2005, Spring 2019, Fall 2019, Spring 2020, Fall 2020, Spring 2021, Fall 2021, Fall 2022.

Laboratory Technologies I (Mech. Eng. Degree) – Spring 2005, Spring 2007, Spring 2008.

Laboratory sessions of Combustion and Pollutants (Mech. Eng. Degree) – Fall 2007, Fall 2008.

Laboratory of Acoustic (Mech. Eng. Degree) – Fall 2007.

Laboratory of Fluid Transport and Hydraulic Machinery (Energy Eng. Degree) – Fall 2022.

Engineering Fluidmechanics (Electronic and Automatic Eng. Degree and Mech. Eng. Degree) – Spring 2010, Spring 2012, Spring 2023.

Fluid Installations and Hydraulic Machinery (Mech. Eng. Degree) – Fall 2011, Fall 2012, Fall 2022.

Combustion (Interuniversity Master in Industrial Mathematics) – Spring 2019, Spring 2020, Spring 2021, Spring 2022, Spring 2023.

Industrial Facilities I (Master in Industrial Eng.) – Spring 2020, Spring 2021, Spring 2022, Spring 2023.

Universidad Pontificia Comillas, ICAI-ICADE

Principles of Combustion (Master in Fire Protection Eng.) – Fall 2010, Fall 2011, Fall 2012, Fall 2014.

Reviewer for manuscripts submitted to

Chemical Engineering Science

Combustion and Flame

Energy and Fuels

International Journal of Hydrogen Energy

Proceedings of the Combustion Institute