

HTPP 2018 – Scientific Program

ORAL PRESENTATIONS:

From Fundamental...

Tuesday 3, 9:15: Special session (ITER)

9h15 – 10h: Plenary (40 minutes): Tim LUCE (CEA Cadarache, ITER's Chief Scientist): Overview of the ITER Research Plan and the Challenges Ahead

10h – 10h30: Topical (25 minutes): Gwenaël FUBIANI, Jean-Pierre Boeuf, Laurent Garrigues (Laplace, University of Toulouse): Modelling of the Negative Ion Source and Accelerator of the ITER Neutral Beam Injector

Tuesday 3, 11:00: Plasma sources and discharges (plasma generation)

11h – 11h30: Topical (25 minutes): Luc STAFFORD (University of Montréal): Analysis of the electron population in non-equilibrium plasmas sustained by low-frequency, RF, and microwave electric fields

Oral Presentations (15 minutes):

11h30 – 11h50: Experimental and Numerical Approaches on 2D Rapid Surface Oxidation of Si/SiC Substrate by Exposure of Loop-type of Induction Thermal Plasmas, *Yasunori Tanaka, Takumi Tsuchiya, Atsushi Fujita, Tatsuo Ishijima, Uesugi Yoshihiko, Tetsuya Yukimoto, Hiroshi Kawaura*

11h50 – 12h10: Characterization of a Helicon Plasma System for Deposition of Thin Film Coatings and for Surface Modification, *German Cota, Daniel Turgeon, John Wills*

Tuesday 3, 15:30: Plasma sources and discharges (plasma generation)

15h30 – 16h15: Plenary (40 minutes): Jochen SCHEIN, Stefan Kirner, Guenter Forster, Michal Szulc, Karsten Hartz-Behrend (University of Munich): Phenomena during wire arc spray applications

Oral Presentations (15 minutes):

16h15 – 16h35: High-Speed Visualization of Temperature Field in Diode-Rectified Multiphase AC Arc with Bipolar Electrode, *Manabu Tanaka, Tsugio Matsuura, Takayuki Watanabe*

16h35 – 16h55: Model of the cathode region of plasma photoelectric converter of concentrated solar radiation, *Nikolay Gorbunov, Gilles Flamant*

16h55 – 17h15: Simulation of pre-breakdown discharges in air in a wide range of conditions, *Nuno G. C. Ferreira, Diego Santos, Pedro G. C. Almeida, George Naidis, Mikhail Benilov*

17h15 – 17h35: Treatment of graphene films in the early and late afterglows of N₂ plasmas: comparison of the defect generation and N-incorporation dynamics, *Germain Robert Bigras, Xavier Glad, Richard Martel, Andranik Sarkissian, Luc Stafford*

17h35 – 17h55: Densities of active species in R/N₂ and R/N₂-x%H₂ (R = Ar or He) microwave early afterglows, *André Ricard*

17h55 – 18h15: Effect of an external magnetic field on a DC plasma spray torch with a cascaded anode, *Rodion Zhukovskii, Christophe Chazelas, Armelle Vardelle, Vincent Rat*

18h15 – 18h35: Parameters of the atmospheric pressure CW microwave discharge sustained by focused gyrotron radiation, *Sergey Sintsov, Alexander Vodopyanov, Mikhail Viktorov, Dmitry Mansfeld*

Wednesday 4, 8:30: Advances and challenges in plasma diagnostics

8h30 – 9h15: Plenary (40 minutes): Stéphane MAZOUFFRE (University of Orléans): Laser-aided diagnostics applied to ion thrusters

9h15 – 9h45: Topical (25 minutes): Arnaud BULTEL, Aurélien Favre, Vincent Morel, Gilles Godard (University of Rouen): Characterization of laser-induced plasmas

Oral Presentations (15 minutes):

9h45 – 10h05: Understanding chemical kinetics of CH₄ and C₂H₂ dissociation by optical emission spectroscopy during graphene nano-flakes production in an inductively coupled plasma reactor, *Antaryami Mohanta, Briac Lanfant, Marc Leparoux*

Wednesday 4, 10:35: Advances and challenges in plasma modeling and simulation

10h35 – 11h20: Plenary (40 minutes): Juan Pablo TRELLES (Lowell University): Advances and Challenges in Modeling and Simulation of Thermal Plasma Flows

11h20 – 11h50: Topical (25 minutes): He Ping LI, Heng Guo, Wen Zhou, Jian Chen, Jing Li, Zeng-Yao Li (Tsinghua University): Challenges in modelling of non-equilibrium transport processes in high-pressure thermal plasmas

Oral Presentations (15 minutes):

11h50 – 12h10: A Hybrid Finite-Element-Finite-Volume Mixed Method for Thermal Arc Simulations, *YOUSSEF ABDO, Laurent Fulcheri, Vandad Rohani*

Thursday 5, 8:30: Plasma-material interactions: liquid/solid

8h30 – 9h15: Plenary (40 minutes): Mikhail BENOLOV (University of Madeira): Recent advances in the modelling of plasma-electrode interaction and electrode erosion in high- to low-pressure to vacuum arcs

9h15 – 9h45: Topical (25 minutes): Khaled HASSOUNI, Karim Ouaras, Catalina Quiros-Lara, Armelle Michau, Guillaume Lombardi, Michael Redolfi, Jonathan Mougnot, Swaminathan Prasanna, Thierry Chauveau, Ovidiu Brinza (Paris 13 University): Dust particle formation and bulk material alteration through the interactions between non equilibrium hydrogen/argon plasmas and carbon and metal samples

Oral Presentations (15 minutes):

9h45 – 10h05: Study of GMAW regime transition in Ar-CO₂/O₂ shielding gases, *Quentin Castillon, Nadia PELLERIN, Stéphane PELLERIN, François Faubert, Maxime Wartel, Jean-Pierre Planckaert, Francis BRIAND*

To applications...

Thursday 5, 10:35: Powders and additive manufacturing

10h35 – 11h20: Plenary (40 minutes): Filomeno MARTINA, Philippe Bridgeman, Gianrocco Marinelli, Jialuo Ding, Supriyo Ganguly, Stewart Williams (Cranfield University): Use of plasma-arc source in large-scale additive-manufacturing, also for the deposition of materials of interest in plasma-confinement applications for fusion

11h20 – 11h50: Topical (25 minutes): Romain VERT and Alexandre Vassa (TEKNA): Spherical powders manufacturing by Induction Plasma technology

Oral Presentations (15 minutes):

11h50 – 12h10: Two-dimensional estimation of number density distribution of precursor molecules during TiO₂ nanopowder synthesis using induction thermal plasmas, *Naoto Kodama, Yasunori Tanaka, Kazuki Onda, Kotaro Shimizu, Yoshihiko Uesugi, Tatsuo Ishijima, Sueyasu Sueyasu, Shu Watanabe, Keitaro Nakamura*

Thursday 5, 15:30: Material and Surface processing

15h30 – 16h15: Plenary (40 minutes): Dirk UHRLANDT (INP Greifswald): Arc-electrode interaction in thermal plasma applications

16h15 – 16h45: Topical (25 minutes): Christian MOREAU (Concordia University): Suspension Plasma Spraying

Oral Presentations (15 minutes):

16h45 – 17h05: Supersonic Plasma Deposition of Zinc Oxide Nanostructured Thin Films, *Elisa Dell'Orto, Silvia Freti, Claudia Riccardi*

17h05 – 17h25: Anisotropic plasma etching of Silicon in gas chopping process by alternating steps of oxidation and etching, *Andrey Miakonkikh, Sergey Averkin, Konstantin Rudenko*

Friday 6, 8:30: Energy and transport applications

8h30 – 9h15: Plenary (40 minutes): Christophe LAUX (Ecole Centrale Paris): Control and Stabilization of Flames with Plasma Assistance

9h15 – 9h45: Topical (25 minutes): Alexander BARTH, Malko Gindrat, Richard Schmid (Oerlikon Metco AG, Wohlen): Vapor Phase deposition using a plasma spray process

Oral Presentations (15 minutes):

9h45 – 10h05: Plasma spraying at very low pressure (VLPPS): Model development and experimental validation beyond continuum conditions, *Georg Mauer, Dmitrii Ivchenko, Gilles Mariaux, Armelle Vardelle, Simon Goutier, Tatiana Itina, Cong Zhao, Robert Vassen*

Friday 6, 10:35: Aeronautics and aerospace applications

10h35 – 11h20: Plenary (40 minutes): Roland CAUSSE and David ROUSSET (AIRBUS): HVDC Networks and the Aircraft Electrical Installation

11h20 – 11h50: Topical (25 minutes): Frank FLOURENS (AIRBUS): Lightning: a constraining environment for aviation

Oral Presentations (15 minutes):

11h50 – 12h10: Experimental investigation of the repeatability of direct damage induced by lightning strikes on metallic panels, *Christine ESPINOSA, Iman Alhossen, Anis Hor, Estelle Pierré, Stéphane Vilcocq, Rémy Chieragatti, Thomas Montel, Oscar Gnanon*

12h10 – 12h30: Novel Distributed Air-Breathing Plasma Jet Propulsion Concept for All-Electric High-Altitude Flying Wings, *Berkant Goeksel*

Friday 6, 13:50: Environmental applications

13h50 – 14h35: Plenary (40 minutes): Jaco VAN DER WALT (NECSA): Musical Chairs with Waste-to-Energy Technologies

14h35 – 15h05: Topical (25 minutes): Laurent FULCHER (Mines ParisTech): Direct decarbonization of methane by thermal plasma for the co-production of hydrogen and carbon nanostructures

Oral Presentations (15 minutes):

15h05 – 15h25: Co-gasification of lignite and used car tires by H₂O/air thermal plasma, *Viktor Popov, Dmitry Subbotin, Alexander Surov, Sergey Popov, Evgeny Serba*

POSTER SESSIONS 1: Tuesday 3, 13h30 – 15h30

1 - Plasma sources and discharges (plasma generation)

- 1-1** - Development of distributed ferromagnetic enhanced inductively coupled plasma source for plasma processing, *Gennadiy Sukhinin, Mikhail Isupov, Ivan Yudin, Alexander Fedoseev*
- 1-2** - Microwave Plasma Reactor for Atmospheric-Pressure Carbon Dioxide Decomposition, *Sina Mohsenian, Juan Trelles*
- 1-3** - Influence of current modulation on arc instabilities in dc plasma spray torch, *Fabrice Mavier, Fadi Zoubian, Vincent Rat*
- 1-4** - Contribution to the study of the electric arc displacement, *Mohamed BOUKHLIFA, Romaric Landfried, Thierry Leblanc, Philippe Testé*
- 1-5** - Experimental Study on insulation properties of C4F7N/N2 mixture substituting SF6 in insulation, *tian shuangshaung, Cressault Yann, Zhang Xiaoxing, Xiao Song, Li Yi, Zhang Ji, Chen Qi*
- 1-6** - Development and characterization of a 3D-printed compact atmospheric plasma reactor, *Fadi Zoubian, Hervé Rabat, Olivier Aubry, Nicolas Dumuis, Sebastien Dozias, Dunpin Hong*
- 1-7** - Electric arc conductivity in a three-phase AC plasma torch operating on a mixture of air and methane, *Viktor Popov, Sergey Popov, Alexander Surov, Dmitry Subbotin, Eugeny Serba, Nikita Obratsov*
- 1-8** - Temporal analysis of DC- and Microwave-driven plasma micro-discharges, *Antoine SIMON, Th. Callegari, Romain PASCAUD, Laurent LIARD, Olivier PASCAL*
- 1-9** - Study of emitted radiations in High Intensity Discharge (HID) Lamps, *Antoine SAHAB, Mohamad Hamady, Georges Zissis, Yann Cressault*

2 - Advances and challenges in plasma diagnostics

- 2-1** - Effect of plasma torch operating parameters on plasma jet velocity at torch nozzle exit, *Jérôme Betoulle, Simon Goutier, Michel Vardelle*
- 2-2** - Investigations of Stark Profiles of Argon Lines using Laser-Induced Plasma, Thomson Scattering and Optical Emission Spectroscopy, *Mamadou Sankhe, Tomek Pieta, Stéphane Pellerin, Krzysztof Dzierzega, Maxime Wartel*
- 2-3** - Experimental characterization of double pulse laser-induced plasmas, *AURELIEN FAVRE, Vincent Morel, Gilles Godard, Arnaud Bultel*
- 2-4** - Experimental characterization of a surface-wave sustained Argon-N2-H2 mixture plasma column at atmospheric pressure, *Jong Hern MUN, Mathieu Masquère, Philippe TEULET, Yann Cressault*
- 2-5** - Impact of the substrate on the discharge characteristics in an atmospheric-pressure helium plasma jet: Optical diagnostics, *Julien Cosimi, Frédéric Marchal, Nofel Merbahi, Mohammed Yousfi*
- 2-6** - Synthesis of N-B substituted single wall carbon nanotubes by electric arc: plasma diagnostic, *Soumaya Ben Nasr, Gourari Djamel Eddine, Valensi Flavien, Yann Cressault, Lotfi Beji, Riadh Hannachi, Manitra Razafinimanana, Sébastien JOULIE, Marc MONTHIOUX*
- 2-7** - Measurement of the gas temperature of neutrals in reactive plasmas by moderate-resolution OES, *Andrey Miakonkikh, Konstantin Rudenko*

3 - Advances and challenges in plasma modeling and simulation

- 3-1** - An electric arc upon opening contacts of a low-voltage switch model, *Jessica Almurr, David Rochette, William Bussière*
- 3-2** - 3D simulation of a point to plane air corona discharge, *Olivier Eichwald, Olivier Ducasse, Joseph Marie PLEWA*
- 3-3** - Nonequilibrium effects in the arc in crossflow, *Vyasaraj Bhigamudre, Juan Trelles*
- 3-4** - Modelling of the plasma parameters of an arc discharge with sputtered metal-graphite anode, *Alexander Fedoseev, Nikon Demin, Salavat Sakhapov, Alexey Zaikovskii, Dmitriy Smovzh*
- 3-5** - Energy and momentum transport in thermal arcs: a simple method for modelling, *YOUSSEF ABDO, Laurent Fulcheri, Vandad Rohani*
- 3-6** - Calculation of electron-impact excitation and ionisation cross sections and reaction rate coefficients for C, N and O atoms, *ALI HLELI, Philippe TEULET, Yann Cressault, Riahi Riadh, Ghalila Hassen*
- 3-7** - H2020 NanoDome project: a comprehensive multiscale approach to the modelling of nanoparticle synthesis in gas phase, *Francesco Strappaveccia, Francesco Galleni, Emanuele Ghedini*
- 3-8** - A novel approach for the estimation of nanoparticle evaporation through the Method of Moments, *Francesco Galleni, Francesco Strappaveccia, Emanuele Ghedini*
- 3-9** - Numerical Simulation of Triple DC Plasma Torch System, *LEE YONG HEE, Kim Tae-Hee, Choi Sooseok*
- 3-10** - Numerical optimization of Mean Absorption Coefficient in Air using Planck Modified Mean Function, *narjisse kabbaj, Yann Cressault, Philippe TEULET, Frank Reichert*
- 3-11** - Numerical Analysis of SF6 Decomposition Process in a Cement Kiln Reactor Combined with Thermal Plasma, *Juyoung Ko, Sooseok Choi, Tae-Hee Kim*
- 3-12** - A robust method to compute the 2T reactive thermal conductivity of SF6 plasma, *Gabriel Vanhulle, Yann Cressault, Ph Teulet*
- 3-13** - A Multi-Stage approach for DBD modelling, *Andrea Cristofolini, Arturo Popoli*
- 3-14** - Theoretical study of molecular spectra in nitrogen, *Abdel Majid Kassir, Yann Cressault, Mathieu Masquère, Philippe TEULET*

POSTER SESSIONS 2: Thursday 5, 13h30 – 15h30

4 - Plasma-material interactions: liquid/solid

4-1 - Interaction between electric arc and Ag-SnO₂ electrodes, *Aurélien Fouque*

4-2 - Chemical analysis of Plasma Activated Water using Gliding Arc Discharge at atmospheric pressure: influence of the water content on the activation process, *Maxime Wartel, William Desdions, François Faubert, Nadia PELLERIN, Stéphane PELLERIN, Catherine Stride*

4-3 - Setting for defined fume particle generation and observation using a TIG welding torch, *Stefan Eichler, Erwan Siewert, Jochen Schein*

4-4 - Study of underwater pulsed electric discharge plasma for synthesis of metal colloidal solutions, *Tetiana Tmenova, Yann Cressault, Valensi Flavien, Anatoly Veklich, Viatcheslav Boretskij, Konstantin Lopatko*

5 - Powders and additive manufacturing

5-1 - Trial Synthesis of Silicon Nanoparticles using a Newly Developed Tandem Type of Modulated Induction Thermal Plasma with Lower Coil Current Modulation, *Kazuki Onda, Naoto Kodama, Yosuke Ishisaka, Kotaro Shimizu, Yasunori Tanaka, Uesugi Yoshihiko, Tatsuo Ishijima, Shiori Sueyasu, Shu Watanabe, Keitaro Nakamura*

5-2 - Aluminum oxynitride nanopowders synthesis in a reactor with a confined plasma jet, *Aleksey Astashov, Andrey Samokhin, Nikolay Alekseev, Mikhail Sinayskiy, Inessa Pahilo-Daryal*

5-3 - Atmospheric pressure plasma modification of powder dispersions using RF jet and RF slit nozzle, *Barbora Pijáková, Jozef Ráhel'*

5-4 - In-liquid synthesis of CuO nanoparticles by bipolar pulsed microplasma, *Dong-Wook Kim, Dong-Wha Park*

5-5 - Synthesis of Metal Boride Nanoparticles in Triple Thermal Plasma Jet System, *Minseok Kim, Jeong-Hwan Oh, Tae-Hee Kim, Yong Hee Lee, Seung-Hyun Hong, Sooseok Choi*

5-6 - Synthesis of Tungsten Carbide Nanoparticles using Triple Thermal Plasma Jet System, *Jeong-Hwan Oh, Minseok Kim, Young Hee Lee, Seung-Hyun Hong, Tae-Hee Kim, Sooseok Choi*

5-7 - Reproduction of cosmic dust by non-equilibrium condensation in triple thermal plasma jet system, *Tae-Hee Kim, Jeong-Hwan Oh, Minseok Kim, Yong Hee Lee, Akira Tsuchiyama, Junya Matsuno, Aki Takigawa, Sooseok Choi*

6 - Material and Surface processing

6-1 - Determination of residual stress by X-ray diffraction in a weld cordon, *Driss Dergham*

6-2 - Tribological investigations of YSZ-CuAg composite coating, *Yan WANG, Yongli ZHAO, Geoffrey DARUT, Thierry POIRIER, Jorge STELLA, Hanlin LIAO, Marie-Pierre PLANCHE*

6-3 - Reactive magnetron sputter deposition of titanium oxynitride TiN_xO_y coatings: influence of substrate bias voltage on the structure, composition, and properties, *nadia saoula, Farroudja Lamdani, Larbi Bait, noureddine madaoui, Hanane Mechri, Mourad azibi, samira sali, Abdelkader Hammouche*

6-4 - Decomposition of ceramic inks by an arc plasma jet operating in a pulsed mode and coating deposition, *Fabrice Mavier, Fadi Zoubian, Pascal André, Marguerite BIENIA, Martine Lejeune, Vincent Rat*

6-5 - In situ measurement of Silicon surface oxidation in low temperature oxygen plasma, *Audrey Miakonkikh, Iosif Clemente, Konstantin Rudenko, Sergey Averkin*

7 - Aeronautics and aerospace applications

7-1 - Experimental arc root sweeping simulation and motion tracking for aeronautics applications, *clement zaepffel, Rafael Sousa Martins*

7-2 - Study of electric arc extinction in aeronautical environment, *Loïc HERMETTE, Guillaume Belijar, Gaëtan Chanaud, Emeric Boliga, Yann Cressault, Philippe TEULET*

7-3 - Introduction of Molecular Dynamics (MD) as a tool for the investigation of gridded ion thrusters, *Karsten Hartz-Behrend, Jochen Schein*

7-4 - Determination of faults arc energy ignited between aeronautic cables, *Thomas Vazquez, Philippe TEULET, Flavien Valensi, Aurore RISACHER, Loïc HERMETTE, Vincent Casanovas*

7-5 - Cold Atmospheric Pressure Plasma applied for Aeronautical Polyurethane surface activation: preliminaries characterizations, *Audrey SANCHOT, Vivien MURAT, Nicolas NAUDE, Bertrand RIVES, Laurent GUERRE-CHALEY, Thomas DELSOL*

7-6 - Lightning arc interaction with complex structure, *Audrey BIGAND, Jean-Marc Bauchire, Christine Espinosa, Hervé Rabat*

7-7 - Lightning strike protection explosion and overpressure profile, *Audrey BIGAND, Christine Espinosa, Jean-Marc Bauchire, Hervé Rabat*

7-8 - LDA Electric Wind Velocity Measurements Behind Single Dielectric Barrier, Multi Dielectric Barrier and Sliding Discharge Plasma Actuators, *Berkant Goeksel*

8 - Energy and transport applications

8-1 - Study on reaction rates for 2T SF6 plasma: application to chemical kinetics of a decaying arc in high voltage circuit breakers, *Xavier BAUMANN, Philippe TEULET, Yann Cressault, Arnaud Bultel*

9 - Environmental applications

9-1 - Effects of discharge voltage and current on PFCs treatment process in an elongated arc reactor, *K-T Kim, D. H. Cho, D. R. Lee, S. K. Jo, D. H. Lee, Y-H Song*

9-2 - Matrix Impact On Bacterial Biofilms Response and Resistance To Cold Plasma Treatments, *Frédéric Marchal, Maritxu Labadie, Elisabeth GIRBAL-NEUHAUSER, Catherine Fontagné-Faucher, Nofel Merbahi, Claire-Emmanuelle Marcato-Romain*

9-3 - Reduction in size and quantity of by-product particles using a low-pressure plasma reactor in SiO₂ thin film deposition, *Jae-Ok Lee, Jin-Young Lee, Seok Jun Suh, Dae Woong Kim, Woo Seok Kang, Min Hur*

9-4 - Degradation of phenol aqueous solution using submerged arc plasma, *Eun Seo Jo, Dong-Wook Kim, Dong-Wha Park*