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GRANADA (SPAIN)
24-27 SEPTEMBER 2019

**26TH ELGRA BIENNIAL SYMPOSIUM
AND GENERAL ASSEMBLY**

**14TH INTERNATIONAL CONFERENCE
ON TWO-PHASE SYSTEMS
FOR SPACE AND GROUND
APPLICATIONS**

& ESA TOPICAL TEAMS MEETINGS



OVERVIEW

Tuesday 24th		
Schedule		Registration Desk
9:00 - 13:00	ELGRA Management Committee (per invitation) Chinese/European Two-Phase Heat Transfer meeting (per invitation) Student activity: The ten most beautiful experiments in Physics (per invitation) <i>Califa room, p. 5</i>	Registration
17:00 - 18:00	Opening	
18:00 - 19:15	Space agencies talks Chair: R. González-Cinca	
19:30 - 21:00	POSTER SESSION & WELCOME RECEPTION	

Wednesday 25th						
Schedule	Physical Sciences 1 <i>Reyes room pp. 6</i>	Physical Sciences 2 <i>Torre de las Picos room, pp. 9</i>	Life Sciences / Education <i>Room Mocarabes room I & II, pp. 12</i>	ITTW <i>Visir room, pp. 15</i>		
8:30 - 8:45	Diffusion in non-metallic mixtures Chair: F. Croccolo	Geophysical fluids flow Chair: C. Egbers	Plant Biology Chair: J. Medina	Keynote Chair: M. Dreyer		
8:45 - 9:00					Drops and emulsions Chair: T. Karapantsios	Films, interfaces and contact line phenomena Chairs: P. Stephan, J.L. Davalos Orozco
9:00 - 9:15						
9:15 - 9:30						
9:30 - 9:45						
9:45 - 10:00	Diffusion and Convection phenomena Chair: M. Bouali Saidi	Granular media Chair: E. Falcon	Human Physiology and Medicine Chair: M. Egli	Keynote Chair: D. Del Col		
10:00 - 10:15					Condensation Chairs: S. Dehaeck, T. Karapantsios	
10:15 - 10:30						
10:30 - 11:00		COFFEE BREAK				
11:00 - 11:15		Marangoni convection Chair: V. Shevtsova	Thermophysical properties Chair: M. Mohr	Plant Biology group meeting		
11:15 - 11:30	Special session: What is the Perfect Ground-Based Facility for Microgravity Simulations in Life Science?					Experiments in micro-g Chairs: O. Kawanami, J. Kim
11:30 - 11:45						
11:45 - 12:00						
12:00 - 12:15						
12:15 - 12:30	Technology Chair: C. Lockowandt					
12:30 - 12:45						
12:45 - 13:00						
13:00 - 13:15						
13:15 - 13:30						
13:30 - 14:15	LUNCH					
14:15 - 14:30						
14:30 - 14:45						
14:45 - 15:00						
15:00 - 15:15						
15:15 - 15:30						
15:30 - 16:00	COFFEE BREAK					
16:00 - 16:15						
16:15 - 16:30						
16:30 - 16:45						
16:45 - 17:00						
17:15 - 21:00					VISIT TO LA ALHAMBRA	

OVERVIEW

Thursday 26th					
Schedule	<i>Califa room p. 18</i>				
	Chairs: R. González-Cinca, P. di Marco				
8:30 - 9:40	ELGRA Medalists				
9:40 - 10:15	ITTW Plenary talk				
10:15 - 10:45	COFFEE BREAK				
10:45 - 11:55	ELGRA-ASGR				
11:55 - 12:55	ELGRA Presidents panel				
12:55 - 13:20	ELGRA goes Suborbital				
13:20 - 14:30	LUNCH				
Schedule		Schedule	<i>Room Mocarabes I, p. 19</i>	Schedule	<i>Room Visir, pp. 19</i>
14:30 - 14:50	Workshop "Seedling Growth"	14:30 - 16:00	TT meeting: Diffusion in non-metallic mixtures	14:30 - 14:45	Thermocapillary Flows Chairs: D. Mangini, J. Wei
14:50 - 15:10				14:45 - 15:00	
15:10 - 15:30				15:00 - 15:15	
15:30 - 15:50				15:15 - 15:30	
15:50 - 16:10				15:30 - 15:45	
16:00 - 16:30	COFFEE BREAK				
16:30 - 17:30	SELGRA Assembly	16:00 - 17:30	TT meeting: Space Grains	16:30 - 18:00	ITTW Scientific committee meeting
17:30 - 19:15	ELGRA General Assembly	17:30 - 19:00	TT meeting: Non-equilibrium phenomena in soft matter and complex fluids		
20:00 - 0:00	GALA DINNER				

Friday 27th					
Schedule	Physical Sciences /Technology <i>Reyes room, pp. 21</i>	Life Sciences <i>Mocarabes room I & II, p. 23</i>	ITTW <i>Visir room, pp. 24</i>		
8:30 - 8:45	Vibrations in fluids Chair: J. Porter	Cell Biology Chair: A. Sundaresan	Keynote Chair: D. Zaitsev		
8:45 - 9:00				Drops Chairs: A. Robinson, C. Colin	
9:00 - 9:15					
9:15 - 9:30					
9:30 - 9:45					
9:45 - 10:00	Technology Chair: C. Lockowandt	Special session: What is the Perfect Ground-Based Facility for Microgravity Simulations in Life Science?	Experiments in micro-g Chairs: O. Kawanami, J. Kim		
10:00 - 10:15					
10:15 - 10:30					
10:30 - 11:00				COFFEE BREAK	
11:00 - 11:15					
11:15 - 11:30	FAREWELL LUNCH				
11:30 - 11:45					
11:45 - 12:00					
12:00 - 12:15					
12:15 - 12:30					
12:30 - 12:45					
12:45 - 13:00					
13:00 - 13:15					
13:15 - 13:30					
13:30 - 14:45					
14:45 - 18:00	ITTW meeting				



PROGRAMME

Tuesday 24th

09:00-21:00 REGISTRATION

09:00-13:00 **ELGRA MANAGEMENT COMMITTEE** (Per invitation)
CHINESE/EUROPEAN TWO-PHASE HEAT TRANSFER MEETING (Per invitation)
STUDENT ACTIVITY: THE TEN MOST BEAUTIFUL EXPERIMENTS IN PHYSICS
(Per invitation)

(Califa room)

17:00-18:00 **OPENING**

Ricard González-Cinca. *ELGRA-26 Chair*
Paolo di Marco. *ITTW-14 Chair*
Luis Miguel Salvador García. *Mayor of Granada*
Emilio Vez Rodríguez. *Head of the Space Programmes Area (CDTI)*

18:00-19:15 **SPACE AGENCIES TALKS**

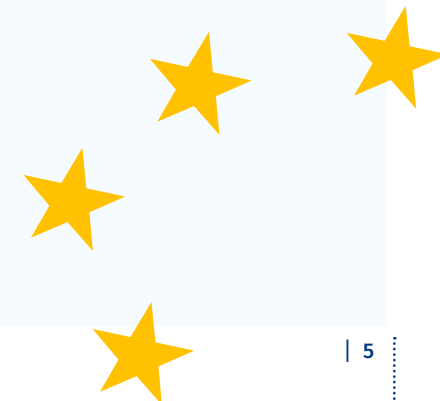
Chair: R. González-Cinca

202 ESA's SciSpacE programme - Opportunities for Research and Applications
Sébastien Vicent-Bonnieu (ESA)

198 CNES program of physical science in microgravity
Christophe Delaroche (CNES)

201 The German microgravity science program
Tobias Saltzmann (DLR)

19:30-21:00 **POSTER SESSION & WELCOME RECEPTION**



Wednesday 25th Physical Sciences 1 (Reyes room)

08:30-11:45 DIFFUSION IN NON-METALLIC MIXTURES

Chair: F. Croccolo

- 08:30-08:45 **13** On the monitoring of the vibratory environment of DCMIX4 campaign. Preliminary results
Xavier Ruiz, Diana Dubert, Marc Marín-Genescà, Maria José Simón, José Miguel Ezquerro, Fina Gavaldà, Valentina Shevtsova
- 08:45-09:00 **30** Interplay of diffusion and thermodiffusion fluxes during transport of a binary mixture from free liquid to a porous medium
Valentina Shevtsova, Viktor Yasnou, Denis Melnikov, Aliaksandr Mialdun
- 09:00-09:15 **34** DCMIX-4 experiment as continuation and extension of DCMIX project
Aliaksandr Mialdun, Yuri Gaponenko, Valentina Shevtsova
- 09:15-09:30 **107** Transport diffusion in the critical region
René Spencer Chatwell, Gabriela Guevara-Carrion, Valentina Shevtsova, Jadran Vrabec
- 09:30-09:45 **123** Soret induced convection of ternary fluid with small value of the net separation ratio in closed cavity
Tatyana Lyubimova, Sergey Prokopev, Valentina Shevtsova
- 09:45-10:00 **135** Introduction of frame-invariant diffusion matrices in multi-component systems by rewriting Fick's law
Jose Ortiz de Zarate
- 10:00-10:15 **129** Preliminary analysis of Diffusion Coefficient Measurements in ternary mixtures 4 (DCMIX4) experiment on-board the International Space Station
Fabrizio Croccolo, Henri Bataller, M. Mounir Bou-Ali, Marco Braibanti, Ana Errarte, J.M. Ezquerro, J.J. Fernández, Yuri Gaponenko, Loreto García-Fernández, A. Mialdun, J. Rodríguez, Valentina Shevtsova
- 10:15-10:30 **158** Experimental analysis of ternary mixture with Soret effect at the border of hydrodynamic stability
Aliaksandr Mialdun, Ane Errarte, Mounir Bou-Ali, Valentina Shevtsova

10:30-11:00 COFFEE BREAK

- 11:00-11:15 **14** Determination of transport properties of nanofluid C60-THN-Tol in binary mixtures
Ane Errate, Maialen Aginagalde, M. Mounir Bou-Ali
- 11:15-11:30 **54** A robust treatment of the DCMIX microgravity data
Werner Köhler, Daniel Sommermann, Thomas Triller, Marcel Schraml

- 11:30-11:45 **103** Steady-state measurements of ternary mixtures in thermogravitational microcolumn
Berin Šeta, Josefina Gavaldà, M. Mounir Bou-Ali, Xavier Ruiz
- 11:45-12:00 **127** Diffusion and Soret coefficients measurement of the triethylene glycol and water binary mixture by dynamic Shadowgraphy
Ange Tatiana Ndjaka, Matthieu Burtin, Paul Fruton, Loreto García-Fernández, Fabrizio Croccolo, Henri Bataller

12:00-13:00 DIFFUSION AND CONVECTION PHENOMENA

Chair: M. Bouali Saidi

- 12:00-12:15 **151** Giant Fluctuations induced by thermal diffusion in complex liquids
Alberto Vailati, Philipp Baaske, Henri Bataller, Marco Braibanti, Marina Carpineti, Roberto Cerbino, Fabrizio Croccolo, Aleksandar Donev, Loreto García Fernández, Fabio Giavazzi, Werner Köhler, José M. Ortiz de Zárate, Shenghua Xu, Daniel Zapf
- 12:15-12:30 **147** Onset of Non-Equilibrium Fluctuations induced by thermophoretic diffusion
Marina Carpineti, Matteo Sabato, Fabrizio Croccolo, Alberto Vailati
- 12:30-12:45 **109** Coupled non-equilibrium fluctuations in a polymeric ternary mixture involved in the GIANT FLUCTUATIONS space project
Loreto García-Fernández, Paul Fruton, Henri Bataller, José María Ortiz de Zárate, Fabrizio Croccolo
- 12:45-13:00 **74** External forcing of columnar vortices in thermoelectric convection: a theoretical approach
Mutabazi Innocent, Meyer Antoine, Kang Changwoo, Yoshikawa Harunori

13:00-14:15 LUNCH

14:15-16:30 MARANGONI CONVECTION

Chair: V. Shevtsova

- 14:15-14:30 **29** Evolution of Marangoni-driven instabilities with temperature variation of countercurrent gas flow
Yury Gaponenko, Viktor Yasnou, Aliaksandr Mialdun, Valentina Shevtsova
- 14:30-14:45 **35** Stabilization of hydrothermal oscillatory flow due to heat transfer from moving gas parallel to the interface
Viktor Yasnou, Yuri Gaponenko, Aliaksandr Mialdun, Valentina Shevtsova
- 14:45-15:00 **7** The Thermocapillary Effects in Phase Change Materials in Microgravity experiment
Pablo Salgado Sánchez, José Miguel Ezquerro, Álvaro Bello, José Fernández, Jacobo Rodríguez, Ignacio Tinao

- 15:00-15:15 **93** Space experimental study on the geometric effect of thermo-capillary convection in the liquid bridge
Qi Kang, Li Duan, Di Wu, Liang Hu, Jia Wang, Pu Zhang, Wenrui Hu
- 15:15-15:30 **174** Thermocapillary stability of a thin viscoelastic film with deformable surface coating a thick wall: competition between stationary and oscillatory convection
L. A. Davalos-Orozco
- 15:30-16:00 COFFEE BREAK**
- 16:00-16:15 **21** Linear stability analysis of high-Prandtl-number liquid bridges exposed to an ambient gas stream
Mario Stojanovic, Hendrik C. Kuhlmann
- 16:15-16:30 **23** Coherent particle structures in high-Prandtl-number liquid bridges
Ilya Barmak, Francesco Romanò, Hendrik C. Kuhlmann
- 17:15-21:00 VISIT TO LA ALHAMBRA**

Wednesday 25th

Physical Sciences 2 (Torre de los Picos room)

08:30-09:45 **GEOPHYSICAL FLUIDS FLOW**

Chair: C. Egbers

- 08:30-08:45 **108** Intermittency and flow reversals in the spherical Rayleigh-Bénard convection
Philippe Beltrame
- 08:45-09:00 **117** Bifurcations in rotating spherical shell convection under the influence of a weak differential rotation between the inner and outer spheres
Fred Feudel, Norbert Seehafer
- 09:00-09:15 **19** AtmoFlow – Investigation of atmospheric-like fluid flows under micro-gravity conditions
Florian Zaussinger, Christoph Egbers, Peter Haun, Vadim Travnikov, Peter Canfield, Martin Meyer, Antoine Meyer
- 09:15-09:30 **20** The GeoFlow experiment on the ISS: A Review
Christoph Egbers, Florian Zaussinger, Peter Haun, Vadim Travnikov
- 09:30-09:45 **66** Thermo-electro-hydrodynamic instability of a dielectric fluid in a vertical cylindrical annulus: Earth's gravity and weightless condition
Antoine Meyer, Torsten Seelig, Martin Meier, Innocent Mutabazi, Christoph Egbers

09:45-11:45 **DROPS AND EMULSIONS**

Chair: T. Karapantsios

- 09:45-10:00 **81** The MAP project EDDI: Understanding the Role of Droplet Interfaces in Emulsion Dynamics
Liberio Liggieri, Francesca Ravera, Eva Santini, Giuseppe Loglio, Thodoris Karapantsios, Margaritis Kostoglou, Angeliki Chondrou, Reinhard Miller, Luigi Cristofolini, Fabrizia Salerni, Davide Orsi, Mickael Antoni, Kazutami Sakamoto, Yuji Yamashita, Takeshi Misono, Satoru Hashimoto, Boris Noskov, James K. Ferri
- 10:00-10:15 **86** Simulation of three phase systems in the frame of MAP EDDI
Mickael Antoni, Sergey Semenov, Liberio Liggieri
- 10:15-10:30 **106** Emulsion Dynamics by Diffusing Wave Spectroscopy
Luigi Cristofolini, Fabrizia Salerni, Davide Orsi, Eva Santini, Francesca Ravera, Liberio Liggieri

10:30-11:00 **COFFEE BREAK**

- 11:00-11:15 **139** Evaporation across a planar vapor-liquid interface and droplet coalescence investigated by large scale molecular dynamics simulation
Matthias Heinen, Jadran Vrabec
- 11:15-11:30 **144** Automated control system for aerosol cloud levitation in microgravity
Danilyar Balapanov, Andrei Vedernikov, Raffaele Romagnoli, Emanuele Garone
- 11:30-11:45 **42** Bubbles forming under hypergravity accelerations due to degassing of a liquid jet
Thodoris Karapantsios, Ourania Oikonomidou, Sotiris Evgenidis, Christian Schwarz, Jack Van Loon, Margaritis Kostoglou
- 11:45-12:45 GRANULAR MEDIA**
Chair: E. Falcon
- 11:45-12:00 **94** Dynamical Clustering of granular materials in microgravity
Vandewalle Nicolas
- 12:00-12:15 **105** Granular gases of rod-like particles: 3D experiments and automatic particle tracking
Dmitry Puzyrev, Kirsten Harth, Torsten Trittel, Ralf Stannarius
- 12:15-12:30 **149** Photoelastic Granular Materials as a Tool for Experimental Studies on Impacts and Interaction with Regolith Covered Surfaces in Low Gravity
Jonathan Kollmer, Corinna Krause, Tabea Bogdan, Maximilian Kruss, Jens Teiser, Joshua Colwell, Karen Daniels, Gerhard Wurm
- 12:30-12:45 **50** Packing grains by shearing
Diego Maza
- 13:00-14:15 LUNCH**
- 14:15-17:00 THERMOPHYSICAL PROPERTIES**
Chair: M. Mohr
- 14:15-14:30 **37** On convective stability of a binary mixture with negative Soret effect in a cylindrical thermogravitational column
Sofia Vladimirovna Kozlova, Ilya Igorevich Ryzhkov, Mohammed Mounir Bou-Ali
- 14:30-14:45 **46** Interfacial tension measurements using electrostatic levitation furnace (ELF) in ISS
Masahito Watanabe

- 14:45-15:00 **120** Flexible single loop PHP preliminar studies
Van Vaerenbergh Stefan, Gabrielsoni Yann, Galand Quentin, Maré Thierry
- 15:00-15:15 **146** Experimental Study on the Nanofluids Thermal Performance for Ethanol Condensation
Stefan Van Vaerenbergh, Alireza Banisharif, Patrice Estellé
- 15:15-15:30 **15** The Electromagnetic Levitator (ISS-EML) on the International Space Station – Containerless Electromagnetic Processing on the International Space Station ISS – The ThermoProp/ThermoLab Project
Markus Mohr, Yue Dong, Rainer Wunderlich, Hans-Jörg Fecht
- 15:30-16:00 COFFEE BREAK**
- 16:00-16:15 **16** The Electromagnetic Levitator (ISS-EML) on the International Space Station – Thermophysical properties of Ni-based superalloys MC2, LEK94, CMSX-10
Markus Mohr, Yue Dong, Rainer Wunderlich, Hans-Jörg Fecht
- 16:15-16:30 **38** Correlation of viscosity with atomic packing in Cu50Zr50 melt
Qingping Cao, Liangyuan Chen, Markus Mohr, Rainer Wunderlich, Hans Fecht, Xiaodong Wang, Dongxian Zhang, Yang Yang, Jianzhong Jiang
- 16:30-16:45 **48** Crystallization of a transparent model alloy under reduced gravity conditions – the MEDI-2 experiment aboard TEXUS-55 sounding rocket
Sturz Laszlo, Hamacher Martin, Zimmermann Laszlo
- 16:45-17:00 **131** Solidification of Metals during Microgravity Conditions
Hasse Fredriksson
- 17:15-21:00 VISIT TO LA ALHAMBRA**

Wednesday 25th

Life Sciences / Education (Mocarabes I and II room)

08:30-10:30

PLANT BIOLOGY

Chair: J. Medina

- 8:30-09:00 **26** Phototropism: Lessons Learned from the Seedling Growth (SG) Spaceflight Project on the International Space Station
John Z. Kiss, Joshua P. Vandenbrink, F. Javier Medina
- 09:00-09:15 **36** Growing Plants in Space
Karl H. Hasenstein, Susan John
- 09:15-09:30 **71** Simple closed ecosystem development of for PlantSat nano-satellite mission
Vasyl Brykov
- 09:30-09:45 **150** Plant-on-a-Chip Platform for Secondary Metabolites
Münire Ekmekçigil, Erdal Bedir, Sinan Güven
- 09:45-10:00 **79** Comparison of the effect of vertical and horizontal fast and slow clinorotation on *A. thaliana* seedlings
Alicia Villacampa, Ludovico Sora, Francisco Javier Medina, Malgorzata Ciska
- 10:00-10:15 **80** Statolith displacement in root statocytes in real and simulated microgravity
Elizabeth Kordyum
- 10:15-10:30 **84** Impact of clinorotation on microtubule regulation by tubulin-associated proteins in plants
Galina Shevchenko

10:30-11:00

COFFEE BREAK

11:00-12:00

EDUCATION

Chair: P. Carvil

- 11:00-11:15 **77** Gravity-Related Experiment Programmes for University Students
Nigel DI Savage, E. Lageweg, N. Callens, G. Galeone
- 11:15-11:30 **183** ESA/ELGRA Gravity-Related Research Summer School
Philip Carvil, Ricard González-Cinca, Natacha Callens
- 11:30-11:45 **73** Space Transport Efficiency In Nearly Every Regime
Ester Velázquez, Pablo Clemente, Sergio Cuevas, Daniel Martínez, Alondra Solá

11:45-12:00

155

5 Years of SELGRA: Past, Present and Future
Tânia Ribeiro, Miguel Ferreira, Jérémy Rabineau, Julia Attias, Luis Luque Álvarez

12:00-15:30

HUMAN PHYSIOLOGY AND MEDICINE

Chair: M. Egli

12:00-12:15

128

Spaceflight-Associated Alterations in Drug Metabolism Gene Expression: Implications for Personalized Medicine
Virginia Wotring

12:15-12:30

88

Cardiac Response to Sympathetic Activation is altered by long-term microgravity exposure
Saul Palacios, Enrico G. Caiani, Juan Pablo Martinez, Esther Pueyo

12:30-12:45

130

Comparison of wearable monitoring based on ballistocardiography with MRI to evaluate cardiovascular changes during two months of bed rest

Jeremy Rabineau, Amin Hossein, Federica Landreani, Roberta Egoriti, Enrico Caiani, Jens Tank, Philippe van de Borne, Pierre-François Migeotte

12:45-13:00

164

Testing of a Capillary Device to Separate Blood and Air for Future Spaceflight Medical Care
Steven Collicott, Marsh Cuttino

13:00-14:15

LUNCH

14:15-14:30

179

The effect of a seven day period of whole body unloading with hyper-bouyancy floatation (HBF) on the spine and intervertebral disc height

Philip Carvil, Tess Morris-Paterson, Eleanor Jones, Thomas Gkouvinas, C-C Tsai, H Hasegawa, Susan Halson-Brown, Zudin Puthuchear, David Green, Susanna Zanello, Ivana Rosenzweig, Steven Harridge

14:30-14:45

180

Tolerability of plyometric exercises on a short-arm centrifuge

Timo Frett, David Andrew Green, Jens Jordan, Alexandra Noppe, Michael Arz, Guido Petrat, Uwe Tegtbur

14:45-15:00

156

Understanding the Effectiveness of Countermeasure Exercise in Human Spaceflight: Individual Variation

Jonathan Scott, Vincent Yip, Leonardo Surdo, Mario Cypko, Virginia Wotring, Judith-Irina Buchheim, Alexander Chouker, Sarah Baatout, Marjan Moreels, Julia Stingl, Cinzia Dellorusso, Dimitri Gagliardi, Lucia Morbidelli, Brigitte Godard, Monica Monici, Tiziano Bandiera, Greg Atkinson, Alan Batterham

- 15:00-15:15 **8** Music as a countermeasure in human spaceflights: Music psychophysiological effects under hypergravity stressors
Luis Luque Álvarez, Tamás Nagy, Loic Treffel
- 15:15-15:30 **82** Characterization of Three-Dimensional Bone Constructs Derived From Human Fetal Osteoblasts Exposed To the Rotary Cell Culture System
Vivek Mann, Alamelu Sundaresan, Maitreyi Chaganti, Elvis Okoro, Janne E. Reseland
- 15:30-16:00 COFFEE BREAK**
- 16:00-17:00 PLANT BIOLOGY GROUP MEETING (Per invitation)**
- 17:15-21:00 VISIT TO LA ALHAMBRA**

Wednesday 25th ITTW (Visir room)

08:30-09:00 KEYNOTE

Chair: M. Dreyer

- 143** Liquid film structure of annular flows under microgravity - Results of TPF experiments onboard International Space Station
Hitoshi Asano, Hiroyuki Nakase, Osamu Kawanami, Koichi Inoue, Koichi Suzuki, Ryoji Imai, Satoshi Matsumoto, Haruhiko Ohta

09:00-10:30 FILMS, INTERFACES AND CONTACT LINE PHENOMENA

Chairs: P. Stephan, J.L. Davalos Orozco

- 09:00-09:15 **172** Evaporation, boiling and dry spots dynamic in shear-driven thin liquid films under intense heating
Oleg Kabov, Egor Tkachenko, Valentin Belosludtsev, Dmitry Zaitsev
- 09:15-09:30 **2** Thermocapillary stability of a thin film coating the inside of a cylinder with a thick wall with finite thermal conductivity
Luis Antonio Davalos
- 09:30-09:45 **78** 2C2D-LIF temperature measurements in a micrometric evaporating film
Alessia Simonini, Domenico Fiorini, Laura Peveroni, Jean-Baptiste Gouriet, Sebastian Soller, Johan Steelant
- 09:45-10:00 **168** Sloshing of propellant in partially filled storage tank under reduced gravity
Kai Li, Ji-Cheng Li, Jian-Fu Zhao, Hai Lin, Wen-Rui Hu
- 10:00-10:15 **132** Nature-Inspired, Multi-Functional Surface Coatings for Space Applications
Malica Schmidt, Marcos Cruz, Marc-Olivier Coppens
- 10:15-10:30 **4** Numerical study of droplet transporting on chemically heterogeneous surfaces
Xin Wang, Zhenqian Chen

10:30-11:00 COFFEE BREAK

11:00-11:30 KEYNOTE

Chair: D. Del Col

- 76** vgBoiling: Study on Gravity Scaling Law of Pool Boiling Phenomena Utilizing VGR of CSS
Jiang- Fu Zhao, W. F Du, X.Li, Z.H Qiao, F. Ye, H. Guo, H.X Li, J.J Wei

11:30-13:00

CONDENSATION

Chairs: S. Dehaeck, T. Karapantsios

- 11:30-11:45 **165** Effect of carbon-based coatings on film-wise condensation
Andrey Glushchuk, Ella Barakhovskaia, Simone Fiore, Christophe Minetti, Carlo Iorio
- 11:45-12:00 **177** Droplet population during dropwise condensation of steam
Davide Del Col, Stefano Bortolin, Matteo Mirafiori, Riccardo Parin
- 12:00-12:15 **59** New measurement technique of liquid film thickness distribution with high spatial and temporal resolution: application to convective condensation in microgravity
Pascal Lavieille, Marco Azzolin, Arianna Berto, Patrick Queeckers, Andrey Glushchuk, Benoit Schlegel, Stefano Bortolin, Marc Miscevic, Carlo Saverio Iorio, Davide Del Col
- 12:15-12:30 **3** Molecular dynamics study of condensation on vertical and horizontal V-shaped surface with different gravity in nanoscale
Bo Xu
- 12:30-12:45 **169** A method of condensation length measurement with Fiber Bragg gratings
Zhen-Hui He, Yun-Sheng Chen, Li-Ping Huang, Shi-Zhe Wen
- 12:45-13:00 **52** Gravity Effect on Gas Entity Patterns in a Co-Current Two-Phase Flow in a Mini-Tube
Salim Zeguai, Salah Chikh, Lounès Tadrast

13:00-14:15

LUNCH

14:15-16:30

BOILING AND BUBBLES

Chairs: L. Tadrast, Z. Chen

- 14:15-14:30 **171** Asymptotic model of bubble growth in pool boiling: further developments
Rednikov Alexey, Colinet Pierre
- 14:30-14:45 **173** Isolated bubble growth and detachment in a shear flow
Colin Catherine, Layouni Ines, Lebon Michel, Sebilleau Julien
- 14:45-15:00 **83** Prediction of Microgravity Flow Boiling Heat Transfer in the Bubbly Flow Regime
Caleb Hammer, Michel Lebon, Jungho Kim
- 15:00-15:15 **12** A method for simulating subcooled flowing boiling CHF in microgravity on the ground based on heat flux partitioning model
Bin Liu, Bo Yuan, Yonghai Zhang, Jinjia Wei, Jianfu Zhao, Yang Yang, Qian Cao

15:15-15:30

- 25** Measurement of the controlled transition between contact line and microlayer evaporation regimes
Kai Schweiker, Axel Sielaff, Peter Stephan

15:30-16:00

COFFEE BREAK

16:00-16:15

- 11** Experimental research on heat transfer enhancement and associated bubble characteristics under high frequency reciprocating flow
Bo Yuan, Yonghai Zhang, Lei Liu, Yang Yang, Qian Cao, Jinjia Wei

16:15-16:30

- 70** Results of Microgravity Zero-Boil-Off Tank (ZBOT) Experiment & CFD Model Validation
Mohammad Kassemi, Sonya Hylton, Olga Karuzova

16:30-16:45

- 111** Contactless manipulation of droplet in reduced gravity condition by counter-faced ultrasonic phased array
Koji Hasegawa, Takumi Ito, Yutaka Abe

17:15-21:00

VISIT TO LA ALHAMBRA

Thursday 26th

(Califa room)

08:30-09:40 **ELGRA MEDALISTS**

09:40-10:15 **ITTW PLENARY TALK**

- 200** Shapes and dynamics of confined liquid-vapor interfaces in two-phase systems in microgravity
V.S. Ajaev, J.A. Barret

10:15-10:45 **COFFEE BREAK**

10:45-11:55 **ELGRA-ASGSR**

- 199** Advocating Microgravity Research .An example: Microgravity Colloids. An International Research Program
William Meyer, Anna-Lisa Paul
- 203** Mission Space Research - Where Life Sciences meet Physical Sciences to Bring Humanity Together: A Perspective on Immune Function and Bone Loss in the Realms of Low Gravity
Alamelu Sundaresan

11:55-12:55 **ELGRA PRESIDENTS PANEL**

12:55-13:20 **ELGRA GOES SUBORBITAL**

13:20-14:30 **LUNCH**

(Reyes room)

Chairs: R. González-Cinca, P. di Marco

14:30-16:10 **WORKSHOP "SEEDLING GROWTH"**

- 14:30-14:50** **114** The Seedling Growth (SG) spaceflight project on the International Space Station (ISS): Red light contributes to a better adaptation of plants to the space environment
F. Javier Medina, Aránzazu Manzano, Alicia Villacampa, Miguel A. Valbuena, Josh P. Vandenbrink, Eugénie Carnero-Díaz, Julio Sáez-Vásquez, Malgorzata Ciska, Raúl Herranz, John Z. Kiss
- 14:50-15:10** **138** Nuts & Bolts: Bringing Science and Hardware Together for Spaceflight
Richard E. Edelman, John Z. Kiss, Joshua P. Vandenbrink, F. Javier Medina

- 15:10-15:30** **152** Effects of red light stimulation on plant growth and on auxin polar transport under microgravity condition in Arabidopsis thaliana. A morphometric study
Eugenie Carnero Díaz, Miguel A. Valbuena, Isabel Le Disquet, F. Javier Medina, Aránzazu Manzano, Alicia Villacampa, Josh Vandenbrink, Julio Sáez-Vásquez, Malgorzata Ciska, Raúl Herranz, John Z. Kiss

- 15:30-15:50** **64** Dissection of the gene expression profile by RNA-seq of the plant response to partial gravity (Moon and Mars levels on board ISS SEEDLING GROWTH experiment)
Raúl Herranz, Alicia Villacampa, Arancha Manzano, Christel Llauro-Berger, Joshua P Vandenbrink, John Z Kiss, F Javier Medina

- 15:50-16:10** **97** NUCLEOLIN: Similar and Antagonistic Roles in Arabidopsis thaliana
Julio Sáez-Vásquez, Nathalie Durut, Mohamed Abou-Ellail, Pascale Comella, Edouard Jobet, Anne De Bures

16:10-16:30 **COFFEE BREAK**

16:30-17:30 **SELGRA ASSEMBLY**

17:30-19:15 **ELGRA GENERAL ASSEMBLY**

(Mocarabes I room)

14:30-16:00 **TT MEETING: DIFFUSION IN NON-METALLIC MIXTURES** (Per invitation)

16:00-17:30 **TT MEETING; SPACE GRAINS** (Per invitation)

17:30-19:00 **TT MEETING: NON-EQUILIBRIUM PHENOMENA IN SOFT MATTER AND COMPLEX FLUIDS** (Per invitation)

(Visir room)

14:30-16:00 **THERMOCAPILLARY FLOWS**

Chairs: D. Mangini, J. Wei

- 14:30-14:45** **5** Formation of thermocapillary structures in heated liquid film
Evgeny Chinnov

- 14:45-15:00** **22** Sensitivity of Marangoni convection in a high-Prandtl-number liquid bridge to the radiative heat transfer under reduced gravity
Taishi Yano, Junya Arinobu, Koichi Nishino

- 15:00-15:15 **49** Marangoni instabilities in evaporating sessile droplet on liquid-infused slippery surface
 Ji-Long Zhu, Wan-Yuan Shi, Tian-Shi Wang
- 15:15-15:30 **67** Frequency jump and associated velocity field of oscillatory thermocapillary flow in a high-Prandtl-number liquid bridge
 Yuki Mabuchi, Taishi Yano, Koichi Nishino
- 15:30-15:45 **153** Total internal reflection high speed imaging of a liquid nitrogen droplet impact on a sapphire prism
 Srinivas Vanapalli, Michiel van Limbeek
- 15:45-16:00 **160** Selective particle transport in a microgravity environment via ratchet effect
 Philippe Beltrame
- 16:00-16:30 COFFEE BREAK**
- 16:30-18:00 ITTW SCIENTIFIC COMMITTEE MEETING (Per invitation)**
- 20:00-00:00 GALA DINNER**

Friday 27th Physical Sciences / Technology (Reyes room)

- 08:30-11:45 VIBRATIONS IN FLUIDS**
Chair: J. Porter
- 08:30-08:45 **6** Vibrational instabilities at the interface separating two immiscible liquids in microgravity
 Pablo Salgado Sanchez, Viktor Yasnou, Yuri Gaponenko, Aliaksandr Mialdun, Jeff Porter, Valentina Shevtsova
- 08:45-09:00 **56** Surface oscillation of viscous droplet under microgravity and on ground
 Masahito Watanabe, Hiromichi Hasome, Kosuke Uchida
- 09:00-09:15 **57** Finite-size effects on frozen wave pattern selection in microgravity
 Jeff Porter, Pablo Salgado Sanchez, Yuri Gaponenko, Valentina Shevtsova
- 09:15-09:30 **133** Acoustic propulsion of metallic nano-cylinders: contribution of the local vertical acceleration from micro to hyper gravity
 Gabriel Dumy, Xavier Benoit-Gonin, Mauricio Hoyos, Jean-Luc Aider
- 09:30-09:45 **154** Faraday waves under weightlessness on liquid-vapor bands
 Daniel Beysens, T. Lyubimova, A. Ivantsov, Y. Garrabos, C. Lecoutre
- 09:45-10:00 **121** Phase-field modelling of the influence of high-frequency vibrations on heterogeneous mixtures. Frozen waves
 Tatyana Lyubimova, Anatoly Vorobev
- 10:00-10:15 **134** Stability of steady flow excited by inner core oscillation in a rotating cavity
 Victor Kozlov, Stanislav Subbotin, Maria Shiryaeva
- 10:15-10:30 **145** Effect of the Ekman number on mean flow excited by inertial modes in liquid filled vibrating cylinder
 Stanislav Subbotin
- 10:30-11:00 COFFEE BREAK**
- 11:00-11:15 **159** Two-liquid system in a rotating cylindrical cavity under the transverse vibrations
 Nikolai Kozlov, Ivan Karpunin
- 11:15-11:30 **162** Fluid mixing by steady streaming in an annulus with deflectors
 Nikolai Kozlov

- 11:30-11:45 **32** Axial Sloshing of Liquid Hydrogen at low Bond Numbers with Superheated Walls
Michael Dreyer
- 12:00-13:30** **TECHNOLOGY**
Chair: C. Lockowandt
- 12:00-12:15 **1** From Ground-Based Microgravity Facilities To Suborbital Flights
Thorben Könemann
- 12:15-12:30 **60** SubOrbital Express – the new frequent and shared ride flight concept
Gunnar Florin, Christian Lockowandt
- 12:30-12:45 **58** The scientific payload on MASER 14 shared flight
Gunnar Florin, Christian Lockowandt
- 12:45-13:00 **44** Aerobatic parabolic flights in Barcelona. Review of research and educational activities
Antoni Perez-Poch, Daniel V. González
- 13:00-13:15 **99** Brief on SJ-10 microgravity recoverable satellite mission
Wenrui Hu, Qi Kang
- 13:30-14:45** **FAREWELL LUNCH**

Friday 27th Life Sciences (Mocarabes I & II room)

- 08:30-10:30** **CELL BIOLOGY**
Chair: A. Sundaresan
- 08:30-08:45 **91** Pyrocystis noctiluca represents an excellent bioassay for demonstration of
Jens Hauslage, Ruth Hemmersbach
- 08:45-09:00 **116** Cytoskeleton, a major player in endothelial performance in simulated microgravity
Laura Locatelli, Alessandra Cazzaniga, Valentina Romeo, Roberta Scrimieri, Monica Zocchi, Giorgia Fedele, Sara Castiglioni, Jeanette A.M. Maier
- 09:00-09:15 **110** Immune-cell responses under microgravity
Mian Long, Ning Li, Chengzhi Wang, Shujin Sun, Yuxin Gao, Juan Chen
- 09:15-09:30 **39** Effects of Environmental Endotoxins and Microgravity on Normal Human Lymphocytes: Role of ETAS as an Immunomodulation Therapy : Implications for Moon and Mars missions
Alamelu Sundaresan, Maitreyi Chaganti, Elvis Okoro, Vivek Mann, Marie-Francoise Doursout, Kritina Curry, Diana Risin
- 09:30-09:45 **69** Effect of Alternating Gravity during a Parabolic Flight on Articular Chondrocytes
Simon Wuest, Jaro Arnold, Sarah Gander, Christoph Zumbühl, Christina Giger, Geraldine Cerretti, Martina Caliò, Gerhard Székely, Fabian Ille, Marcel Egli
- 09:45-10:00 **181** Diminished Glial Scar Formation at Hypergravity
Christian Liemersdorf, Y Lichterfeld, Tino Frett, R Hemmersbach
- 10:00-10:15 **89** Cell Traction Forces Changes at Hypergravity
Jack van Loon, Julia Eckert, Lukas Eng, Thomas Schmidt
- 10:15-10:30 **148** The ESA Topical Team on: "Tissue Healing in Space: Techniques for Promoting and Monitoring Tissue Repair and Regeneration"
Monica Monici, Carlo Saverio Iorio
- 10:30-11:00** **COFFEE BREAK**
- 11:00-12:30** **SPECIAL SESSION: What is the Perfect Ground-Based Facility for Microgravity Simulations in Life Science?**
- 13:30-14:45** **FAREWELL LUNCH**

Friday 27th
ITTW (Visir room)

08:30-09:00

KEYNOTE

Chair: D. Zaitsev

- 186** PIV - IMI experimental study and PIM simulation of breaking up and evaporation of water droplets in subsonic ($M=0.2-0.6$) turbulent air flows
Eduard Son, A. Saveliev, K Son

09:00-11:30

DROPS

Chairs: A. Robinson, C. Colin

- 09:00-09:15 **161** Dynamics of a deformable cylindrical drop in a density-stratified liquid subjected to vibrations
Tatyana Lyubimova, Andrey Ivantsov
- 09:15-09:30 **92** Study on thermocapillary migration of drops by digital holographic interferometry
Li Duan, Shuoting Zhang, Qi Kang
- 09:30-09:45 **176** Numerical investigations on droplet shapes with electric field
Vishwa K. Rajan, Alekos Ioannis Garivalis, Paolo Di Marco
- 09:45-10:00 **178** Structured 2D droplet arrays levitating over liquid and solid surfaces
Dmitry Zaitsev, Dmitry Kirichenko, Almira Shatekova, Vladimir Ajaev, Oleg Kabov
- 10:00-10:15 **189** Heat transfer in the drop during evaporation
V.V. Cheverda, T.G. Ponomarenko

10:30-11:00

COFFEE BREAK

- 11:00-11:15 **18** Bénard-Marangoni patterns induced by evaporation in well-defined non-spherical sessile droplet
Tian-Shi Wang, Wan-Yuan Shi, Ji-Long Zhu
- 11:15-11:30 **115** Impact of liquid droplets on substrates with high temperature
Zhizhao Che, Song Rong, Longlong Wang, Shiquan Shen, Tianyou Wang

11:30-13:30

EXPERIMENTS IN MICRO-G

Chairs: O. Kawanami, J. Kim

- 11:30-11:45 **102** Future ESA experiments in Two-phase Heat and Mass Transfer Research on-board the International Space Station
Daniele Mangini, Luigi Castiglione, Ana Frutos Pastor, Balazs Toth, Liesbeth De Smeth, Hans Ranebo, Alessandro De Simone
- 11:45-12:00 **113** Preliminary results from vapour cloud measurements in the ARLES sounding rocket experiment
Sam Dehaeck, Alexey Rednikov, Pierre Colinet
- 12:00-12:15 **47** Thermoconvective instabilities during droplet evaporation in microgravity: infrared experimental observations in PF & MA-SER-14 and numerical modelling
Brutin David, Kumar Sanjeev, Medale Marc
- 12:15-12:30 **100** Experimental study of subcooling mixing jet for thermal vent system
Osamu Kawanami, Tenkaro Takeda, Ryoma Naguchi, Ryoji Imai, Yutaka Umemura, Takehiro Himeno
- 12:30-12:45 **166** Stabilization of condensate flow from curvilinear surface by means of porous media
Ella Barakhovskaia, Patrick Queekers, Carlo Saverio Iorio, Andrey Glushchuk
- 12:45-13:00 **27** Phase Separation in Porous Media Integrated Capillary Channels
Kamal Singh Bisht, Michael Dreyer
- 13:00-13:15 **43** Passive Phase Separation of Hydrogen under Microgravity Conditions
André Pingel, Michael Dreyer
- 13:15-13:30 **141** Autonomous vision-based tracking via fusion of multimodal imaging techniques
Helia Sharif, Michael Suppa

13:30-14:45

FAREWELL LUNCH

14:45-18:00

ITTW MEETING

SOCIAL PROGRAMME

Wednesday 25th

VISIT TO LA ALHAMBRA:

Guided tour of the Alhambra where you will discover the best preserved muslim medieval city in the world. Visit the Nasrid Palaces: Mexuar, Comares, Lions and Generalife.



Meeting point : Venue Hotel Barceló Granada Congress (main entrance)

Time of departure : 17:15h.

Duration: 3 hours aprox.

Important information: Please do not forget your Alhambra ticket and your passport or ID.

Transport: BUS

Thursday 26th

GALA DINNER AT CARMEN DE LOS MÁRTIRES

Carmen de Los Mártires, situated on the Alhambra Hill, is a palace that combines the architecture of the 19th-century with magnificent romantic gardens and fountains.



Meeting point: Venue Hotel Barceló Granada Congress (main entrance)

Time of departure: 20:00 h.

Duration: 4 hours aprox.

Transport: BUS

NOTES

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GRANADA (SPAIN)
24-27 SEPTEMBER 2019

**26TH ELGRA BIENNIAL SYMPOSIUM
AND GENERAL ASSEMBLY**

**14TH INTERNATIONAL CONFERENCE
ON TWO-PHASE SYSTEMS
FOR SPACE AND GROUND
APPLICATIONS**

& ESA TOPICAL TEAMS MEETINGS



ELGRA26 & ITTW14
Password: granada2019

VIAJES El Corte Inglés

CONGRESOS

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