



International Conference on Perovskite Thin Film Photovoltaics and Perovskite Photonics and Optoelectronics (NIPHO20)

Sevilla, Spain, 2020 February 23rd - 25th

Conference Chairs: Hernán Míguez, Maria Antonietta Loi and Anders Hagfeldt

Conference Program

February 23rd - Day 1 (Sunday) 1	
15:30 - 18:15	Registration
17:00 - 18:00	Workshop Editors
17:45 - 18:15	Welcome Drink
February 24th - Day 2 (Monday) 2	
08:00 - 08:45	Registration
08:45 - 09:00	Announcement of the day
	Session 1 IS Chair: Hernán Míguez
09:00 - 09:30	<u>Samuel Stranks</u> (<i>University of Cambridge - UK</i>)
IS-I1	Multi-Modal Approaches to Understand the Nature of Halide Perovskite Defects
09:30 - 10:00	<u>Laura Herz</u> (<i>University of Oxford, Department of Physics, Clarendon Laboratory, Parks Road, Oxford, OX13PU, UK</i>)
IS-I2	Radiative Recombination and Photon Recycling in Bulk and Quasi-2D Metal Halide Perovskites
10:00 - 10:30	
10:30 - 11:00	Coffee break
	Session 2 IS Chair: Maria Antonietta Loi
11:00 - 11:30	<u>Hugh Hillhouse</u> (<i>University of Washington, US</i>), Ryan Stoddard, Wiley Dunlap-Shohl
IS-I1	Quantitative Prediction of Perovskite Degradation over a Broad Range of Humidity, Oxygen, and Temperature Using Machine Learning and Training Data from Photoluminescence, Photoconductivity, and Optical Properties
11:30 - 12:00	<u>Omer Yaffe</u> (<i>Department of Materials and Interfaces, Weizmann Institute of Science, Rehovoth 76100, Israel.</i>)
IS-I2	Anharmonic Semiconductors - Lessons Learned from Halide Perovskites
12:00 - 12:30	<u>Biwu Ma</u> (<i>Department of Chemistry and Biochemistry, Florida State University, Tallahassee, 32306 Florida, United States</i>)
IS-I3	Low Dimensional Metal Halide Perovskites and Hybrids
	Session A Chair: Laura Herz
12:30 - 12:45	Adrián Francisco-López, Bethan Charles, Ma. Isabel Alonso, Miquel Garriga, Mariano Campoy-Quiles, Mark T. Weller, <u>Alejandro R. Goñi</u> (<i>Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus UAB, 08193 Bellaterra, Spain</i>)
A-O1	Understanding the Temperature Dependence of Hybrid Lead Halide Perovskite Band Gaps in Terms of the Effects of Thermal Expansion and Electron-Phonon Interaction
12:45 - 13:00	<u>Alex Barker</u> (<i>Istituto Italiano di Tecnologia - IIT</i>)
A-O2	Anomalously slow coherent phonon dephasing in mixed-cation halide perovskites
	Session B Chair: Michael Saliba



- 12:30 - 12:45 **B-O1** Juan P. Martínez-Pastor (*UMDO, Instituto de Ciencia de los Materiales, Universidad de Valencia*), Juan Navarro Arenas, Isaac Suárez, Vladimir Chyrvony, Andrés F. Gualdrón-Reyes, Iván Mora Seró
Single-Exciton Amplified Spontaneous Emission in CsPbX₃ (X = Br, I) Perovskite Nanocrystals
- 12:45 - 13:00 **B-O2** Paul Bouteyre (*Laboratoire Aimé Cotton, CNRS, Univ. Paris-Sud, ENS Paris-Saclay, Université Paris-Saclay, 91405 Orsay Cedex, France*), Hai Son Nguyen, Jean-Sébastien Lauret, Gaëlle Trippé-Allard, Géraud Delport, Ferdinand Lédée, Hiba Diab, Ali Belarouci, Christian Seassal, Damien Garrot, Fabien Bretenaker, Emmanuelle Deleporte
Directing Random Lasing Emission Using Cavity Exciton-Polaritons

13:00 - 15:00 **Lunch time****Session C**

Chair: Laura Herz

- 15:00 - 15:15 **C-O1** Ana Flavia Nogueira (*Laboratory of Nanotechnology and Solar Energy, Institute of Chemistry, University of Campinas – UNICAMP*), Raphael F. Moral, Luiz Gustavo Bonato, José Carlos Germino, Willian Xerxes de Oliveira Coelho, §Rupini Kamat, Junwei Xu, Christopher J. Tassone, Michael F. Toney, Rupini Kamat, Samuel D. Stranks
Synthesis of Polycrystalline Ruddlesden-Popper Organic Lead Halides and Their Growth Dynamics
- 15:15 - 15:30 **C-O2** Juan F. Galisteo-López (*Instituto de Ciencia de Materiales de Sevilla (CSIC-US), 41092, Seville, Spain*), David O. Tiede, Mauricio E. Calvo, Hernán Míguez
Local study on the role of defects in the photophysics of mixed halide perovskites
- 15:30 - 15:45 **C-O3** Karunakara Moorthy Boopathi, Beatriz Martin-Garcia, Aniruddha Ray, Liberato Manna, Ahmed Abdelhady (*Istituto Italiano di Tecnologia - IIT*)
Irreversible Lattice Compression Lights Up Perovskites
- 15:45 - 16:00 **C-O4** Mojtaba Abdi Jalebi (*Institute for Materials Discovery, University College London, Torrington Place, London WC1E 7JE, UK*)
Highly Luminescent and Stable Metal Halide Perovskite Optoelectronic Devices via Chemical Modifications and Passivation Approaches
- 16:00 - 16:15 **C-O5** Simon Kahmann (*University of Groningen - NL*), Eelco K. Tekelenburg, Herman Duim, Maria A. Loi
Self-Trapped Excitons in Low-Dimensional Perovskites - Do They Exist?
- 16:15 - 16:30 **C-O6** Stuart Macpherson (*Optoelectronics Group, Cavendish Laboratory, University of Cambridge, UK.*), Andrew Winchester, Tiarnan Doherty, Krzysztof Galkowski, Duncan Johnstone, Kyle Frohna, Miguel Anaya, Michael Man, Paul Midgely, Keshav Dani, Samuel Stranks
Control of Nanoscale Surface Defects and the Relation to Local Structural Properties in Halide Perovskite Films
- 16:30 - 16:45 **C-O7** Géraud Delport (*Optoelectronics Group, Cavendish Laboratory, University of Cambridge, UK.*), Samuel D Stranks
Probing the diffusion of excitons in 2D perovskites using optical microscopy.
- 16:45 - 17:00 **C-O8** Alicia de Andrés (*Instituto de Ciencia de Materiales de Madrid, Consejo Superior de Investigaciones Científicas*), Carlos Redondo-Obispo, Esteban Climent-Pascual, Javier Bartolomé-Vilchez, Carlos Zaldo, Carmen Coya
Light Induced Ion Migration in Bi-Doped MAPbI₃ for Enhanced Photo-Stability

Session D

Chair: Michael Saliba

- 15:00 - 15:15 **D-O1** Miguel Anaya (*Optoelectronics Group, Cavendish Laboratory, University of Cambridge, UK.*), Kyle Frohna, Linsong Cui, Javad Shamsi, Sam Stranks
Probing local photophysical properties in perovskite based light-emitting devices
- 15:15 - 15:30 **D-O2** Changsoon Cho (*Optoelectronics Group, Cavendish Laboratory, University of Cambridge, UK.*), Baodan Zhao, Gregory Tainter, Frederik Nehm, Karl Leo, Jung-Yong Lee, Richard Friend, Dawei Di, Felix Deschler, Neil Greenham
Quantification of Photon Recycling Effect in Perovskite Light-Emitting Diodes



15:30 - 15:45 D-03	<u>Nadja Giesbrecht</u> (<i>Department Chemie, Ludwig-Maximilians-Universität München, Butenandtstr. 5 – 13, 81377 München, Germany</i>), Andreas Weis, Thomas Bein Perovskite-Inspired 2D Antimony-Based Absorber Layers for Optoelectronic Applications
15:45 - 16:00 D-04	<u>Sergey Makarov</u> (<i>ITMO University, St. Petersburg, Russia</i>) Halide perovskites based nanophotonics: from fundamentals to applications
16:00 - 16:15 D-05	<u>Mauricio Calvo</u> (<i>Instituto de Ciencia de Materiales de Sevilla, Consejo Superior de Investigaciones Científicas (CSIC), Universidad de Sevilla</i>), Laura Calìò, Andrea Rubino, Hernán Míguez Porous metal oxide matrices as templating host of ABX ₃ perovskite nanocrystals
16:15 - 16:30 D-06	<u>Juan Jesús Gallardo</u> (<i>Department of Physical Chemistry. Faculty of Science. University of Cádiz. Spain.</i>), María Isabel Rodríguez, Eduardo Blanco, Javier Navas Study of the Photoluminescent Emission of Perovskites Quantum Dots with Complex Cation in A-Site.
16:30 - 16:45 D-07	<u>Sarthak Jariwala</u> (<i>University of Washington, US</i>), Hongyu Sun, Gede W.P. Adhyaksa, Andries Lof, Loreta Muscarella, Bruno Ehrler, Erik C. Garnett, David S. Ginger Local Crystal Misorientation Influences Non-radiative Recombination in Halide Perovskites
16:45 - 17:00 D-08	Andrea Rubino, <u>Gabriel Lozano</u> (<i>Instituto de Ciencia de Materiales de Sevilla (CSIC-Universidad de Sevilla), C/ Americo Vespucio 49, Seville, E-41092, Spain.</i>), Mauricio E. Calvo, Hernán Míguez Determination of the optical constants of metal-halide perovskite nanocrystals
17:00 - 19:00	Poster session
20:15 - 22:00	Social Dinner

**February 25th - Day 3 (Tuesday) 3**08:45 - 09:00 **Announcement of the day****Session 3 IS**

Chair: Anders Hagfeldt

09:00 - 09:30 Michael Graetzel (*Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland*)

IS-I2 High Performance Perovskite Solar Cells Based on Amphiphilic Spacer Molecules

09:30 - 10:00 Filippo De Angelis (*University of Perugia*), Damiano Ricciarelli, Daniele Meggiolaro

IS-I1 Stabilizing Tin-Iodide Perovskites: A Desperate Case?

10:00 - 10:30 Monica Lira-Cantu (*Catalan Institute of Nanoscience and Nanotechnology (ICN2), CSIC and The Barcelona*IS-I3 *Institute of Science and Technology (BIST), Campus UAB, Bellaterra, 08193 Barcelona, Catalonia, Spain*)

Defect passivation in halide perovskite materials for highly efficient and highly stable perovskite solar cells

10:30 - 11:00 **Coffe break****Session 4 IS**

Chair: Sam Stranks

11:00 - 11:30 Michael Saliba (*TU Darmstadt, Optoelectronics*)

IS-I1 Polyelemental, Multicomponent Perovskite Semiconductor Libraries through Combinatorial Screening

11:30 - 12:00 Giulia Grancini (*University of Pavia, Italy*)

IS-I2 2D/3D Hybrid Perovskite Interfaces and Physics therein for Stable and Efficient Solar Cells

12:00 - 12:30 Marina Leite (*University of Maryland*)

IS-I3 Dynamics of Perovskites: from the Nano to the Macroscale

Industry12:30 - 12:45 Asger Jensen (*NKT Photonics*)

Industry-S1 Supercontinuum lightsources in optical characterisation of perovskites

Session E

Chair: Giulia Grancini

12:45 - 13:00 Juan Bisquert (*Universitat Jaume I, Institute of Advanced Materials (INAM) - Spain*)

E-O1 Understanding the physical response of perovskite solar cells by frequency domain and time transient decay methods

13:00 - 13:15 Alessio Gagliardi (*Dept. Electrical and Computer Eng., Technische Universitaet Muenchen*), Felix Mayr

E-O2 Machine learning based screening of mixed lead-free double-perovskites

Session F

Chair: Marina Leite

12:45 - 13:00 Alexander Davis Jodlowski (*University of Pavia, Italy*), Cristina Roldán-Carmona, Giulia Grancini, Manuel Salado, Maryline Ralairisoa, Shahzada Ahmad, Norbert Koch, Luis Camacho, Gustavo de Miguel, Mohammad Khaja Nazeeruddin

Large guanidinium cation mixed with methylammonium in lead iodide perovskites for 19% efficient solar cells.

13:00 - 13:15 Jia li, Wang Hao, Herilna Dewi, Nripan Mathews, Subodh Mhaisalkar, Annalisa Bruno (*Energy Research Institute @ NTU (ERI@N), Research Techno Plaza, X-Frontier Block, Level 5, 50 Nanyang Drive 637553, Singapore*)

F-O1 Large Area Perovskite Solar Cells and Mini-Modules by Thermal Co-Evaporation

13:15 - 15:00 **Lunch Time****Session G**

Chair: Giulia Grancini

15:00 - 15:15 Selina Olthof (*University of Cologne, Institute for Physical Chemistry*), Shuxia Tao, Geert Brocks

G-O1 Tuning the Electronic Structure of Perovskites via Composition - A Combined Theoretical and Experimental Approach



- 15:15 - 15:30 **Giles Richardson** (*Department of Mathematical Sciences, University of Southampton*), Nicola Courtier, Laurence G-02 Bennett, Juan Anta, Antonio Exposito
Using Drift-Diffusion Models as a Tool to Probe the Physics of Perovskite Solar Cells
- 15:30 - 15:45 **Shuxia Tao** (*Center for Computational Energy Research, Applied Physics, Eindhoven University of Technology, The Netherlands*)
G-03
The Role of Additives in Efficient and Stable Perovskite Solar Cells: Atomistic Insights from Both Experiments and DFT Simulations
- 15:45 - 16:00 **Kimberley Savill** (*Clarendon Laboratory, Department of Physics, University of Oxford, Parks Road, Oxford, OX1 G-04 3PU, United Kingdom*), Matthew Klug, Rebecca Milot, Henry Snaith, Laura Herz
Charge-Carrier Cooling and Polarization Memory Loss in Formamidinium Tin Triiodide
- 16:00 - 16:15 **Gustavo de Miquel** (*Departamento de Química Física y Termodinámica Aplicada, Instituto Universitario de Investigación en Química Fina y Nanoquímica IUNAN, Universidad de Córdoba, Campus de Rabanales, Edificio G-05 Marie Curie, Córdoba, Spain*)
Incorporation of the Guanidinium Cation into Two-dimensional Hybrid Perovskites
- 16:15 - 16:30 **Svetlana Sirovinskaya** (*University of Duisburg-Essen, Faculty of Engineering, Institute of Technology for Nanostructures (NST), Germany*), Karsten Rojeck, Roland Schmechel, Niels Benson
G-06
Defect State Investigations in Methylammonium Lead Iodide Using the MIS-TSC Method
- 16:30 - 16:45 **Maryam Sajedi** (*HELMHOLTZ - ZENTRUM BERLIN FÜR MATERIALIEN UND ENERGIE GMBH*), Maxim G-07 Krivenkov, Dmitry Marchenko, Andrei Varykhalov, Anoop Chandran, Irene Aguilera, Jaime Sanchez-Barriga, Oliver Rader
Absence of giant Rashba effect in the valence band of CsPbBr₃
- 16:45 - 17:00 **Iván Mora-Seró** (*Universitat Jaume I, Institute of Advanced Materials (INAM) - Spain*)
G-08
Perovskite Crystalline Phase Stability Beyond the Goldschmidt Tolerance Factor
- 17:00 - 17:15 **Michele Sessolo** (*Instituto de Ciencia Molecular, Universitat de València*)
G-09
Vacuum deposition of perovskite films and solar cells

Session H

Chair: Marina Leite

- 15:00 - 15:15 **Narges Yaghoobi Nia** (*1 CHOSE. (Centre for Hybrid and Organic Solar Energy), University of Rome "Tor H-01 Vergata", via del Politecnico 1, Rome 00133, Italy.*), Mahmoud Zendejdel, Luigi Angelo Catriotta, Zhaoxiang Zheng, Aldo Di Carlo
Boosting Efficiency and Thermal stability of Large Area Perovskite Solar Modules Beyond 16.5%: The case of Polymeric and Small Molecule Hole Transport Layer
- 15:15 - 15:30 **Andrés Fabián Gualdrón-Reyes** (*Universitat Jaume I, Institute of Advanced Materials (INAM) - Spain*), Jhonatan H-02 Rodríguez-Pereira, Eliseo Amado-González, Jorge-Enrique Rueda-P, Rogelio Ospina, Sofia Masi, Seog Joon Yoon, Juan Tirado, Franklin Jaramillo, Said Agouram, Vicente Muñoz-Sanjosed, Sixto Giménez, Iván Mora-Seró
The role of surface chemical states on the photocatalytic behavior of all-inorganic mixed halide perovskite nanocrystals
- 15:30 - 15:45 **Rafael Abarques** (*UMDO, Instituto de Ciencia de los Materiales, Universidad de Valencia*), Iván Sánchez- H-03 Alarcón, Jaime Noguera, Vladimir Chirvony, Juan F. Sánchez- Royo, Pedro J. Rodríguez-Canto, M. Aguilar-Frutos, G. Alarcón-Flores, Juan P. Martínez- Pastor
Spray-driven Solid-State Halide Exchange in CsPbX₃ Nanocrystal Films
- 15:45 - 16:00 Jesus Idigoras, Francisco J. Aparicio, Lidia Contreras-Bernal, Susana Ramos-Terron, Maria Alcaire, Juan R. H-04 Sanchez-Valencia, Ana Borrás, Juan A. Anta, **Angel Barranco** (*Instituto de Ciencia de Materiales de Sevilla (CSIC-Universidad de Sevilla), Spain.*)
Ultrathin Plasma Polymers: a new family of encapsulants to achieve waterproof perovskite solar cells.
- 16:00 - 16:15 **Konrad Domanski** (*Fluxim AG, Winterthur, Switzerland*), Brian Carlsen, Essa Alharbi, Michael Gratzel, Anders H-05 Hagfeldt, Wolfgang Tress
Performance of Perovskite Solar Cells under Real-World Temperature-Illumination Variations in the Lab



- 16:15 - 16:30
H-06 Angel Barranco, Carmen Lopez-Santos, Jesus Idigoras, Francisco J. Aparicio, Jose Obrero, Javier Castillo-Seoane, Victor Lopez-Flores, Lidia Contreras-Bernal, Victor Rico, Javier Ferrer, Juan P. Espinos, Ana Borrás, Juan A. Anta, Juan R. Sanchez-Valencia (*Instituto de Ciencia de Materiales de Sevilla (CSIC-Universidad de Sevilla), C/ Americo Vespucio 49, Seville, E-41092, Spain.*)
Vacuum sublimation of Dopant-Free Crystalline Spiro-OMeTAD films to enhance the Stability of Perovskite Solar Cells
- 16:30 - 16:45
H-07 Lidia Contreras-Bernal (*Pablo de Olavide University, Sevilla, Spain*), Antonio Riquelme, Juan Jesús Gallardo, Javier Navas, Jesús Idígoras, Juan Antonio Anta
Water Vapour Pressure as Main Lab Parameter to Fabricate High Efficiency Perovskite Solar Cells at Ambient Conditions
- 16:45 - 17:00
H-08 Sandy Sanchez (*Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland*), Anders Hagfeldt
Rapid Processing for Perovskite Solar Cells: Control of the Perovskite Intermediate Phases from Solution to Crystal Growth
- 17:00 - 17:15
H-09 Aldo Di Carlo (*CHOSE - Centre for Hybrid and Organic Solar Energy, University of Rome "Tor Vergata"*), Antonio Agresti, Sara Pescetelli, Anna Pazniak, Danila Saranin, Daniele Rossi, Matthias Auf der Maur, Alessia Di Vito, Alessandro Pecchia, Andrea Liedl, Rosanna Larciprete
Two-dimensional MXenes for interface engineering in Perovskite solar cells