

## **HPSP18 &WHS2**

### **Scientific Program**

**Monday, July 23**

**Registration & Museum Visit (15:00-19:00)**

**Tuesday, July 24**

**Registration (8:00-9:00)**

#### **Opening & Welcome**

(Àgora hall, CosmoCaixa Museum)

**Tu1.1 (9:00-9:05):** Opening (Goñi, Alejandro R.).

**Tu1.2 (9:05-9:15):** Welcome (Director of the Area of Scientific Disclosure and CosmoCaixa: Portabella, Jordi).

#### **Overview on High Pressure Physics of Semiconductors & Superconductors**

(Àgora hall, CosmoCaixa Museum. Chair: Weinstein, Bernard)

**Tu1.3 (9:15-10:00):** Plenary (Cohen, Marvin L.), *High Pressure Effects in Semiconductors, Metallization, and Superconductivity.*

#### **Pressure-Induced Metallization and/or Superconductivity-I**

(Àgora hall, CosmoCaixa Museum. Chair: Syassen, Karl)

**Tu1.4 (10:00-10:30):** Invited (Silvera, Isaac F.), *Two Pathways to Metallic Hydrogen and Deuterium.*

#### **Coffee Break (10:30-11:00)**

**Tu2.1 (11:00-11:30):** Invited (Eremets, Mikhail), *Molecular semimetallic hydrogen.*

**Tu2.2 (11:30-12:00):** Invited (Gregoryanz, Eugene), *Raman studies of deuterium and hydrogen high pressures and low temperatures.*

**Tu2.3 (12:00-12:30):** Invited (Souliou, Sofia-Michaela), *High-Tc cuprates under hydrostatic and uniaxial compression.*

**Tu2.4 (12:30-12:45):** Oral (Toulemonde, Pierre), *Pressure-Temperature phase diagram of superconducting FeSe single crystals probed by neutron and x-ray diffraction, x ray emission and absorption spectroscopies.*

**Tu2.5 (12:45-13:00):** Oral (Medvedev, Sergey), *Pressure-induced superconductivity in the pyrite phase of palladium diselenide.*

#### **Lunch (13:00-15:00)**

### **Electronic Structure & Optical Properties**

(Àgora hall, CosmoCaixa Museum. Chair: [Cohen, Marvin L.](#))

**Tu3.1 (15:00-15:15):** Oral ([Pravica, Michael](#)), *Fluorine chemistry at extreme conditions: possible synthesis of HgF<sub>4</sub>.*

**Tu3.2 (15:15-15:30):** Oral ([Sun, Baoquan](#)), *Influence of polar pressure transmission medium on the pressure coefficient of excitonic interband transitions in monolayer WSe<sub>2</sub>.*

**Tu3.3 (15:30-15:45):** Oral ([Lesniewski, Tadeusz](#)), *Inducing the luminescence of quenched Ce<sup>3+</sup> centres in gadolinium gallium garnet by high pressure.*

**Tu3.4 (15:45-16:00):** Oral ([Mahlik, Sebastian](#)), *Influence of high hydrostatic pressure on intraconfigurational transition in lanthanide ions doped inorganic hosts.*

#### **Impurity & Defect States**

(Àgora hall, CosmoCaixa Museum. Chair: [Cohen, Marvin L.](#))

**Tu3.5 (16:00-16:30):** Invited ([Kaminska, Agata](#)), *High Pressure Study of the Yellow Luminescence in Be-doped GaN.*

#### **Coffee Break (16:30-17:00)**

#### **Structural Studies Including Phase Transitions-I**

(Àgora hall, CosmoCaixa Museum. Chair: [Eremets, Mikhail](#))

**Tu4.1 (17:00-17:30)** Invited ([Krukowski, Stanislaw](#)), *Electronic aspects of adsorption at semiconductor surfaces: the equilibrium pressure, growth and doping.*

**Tu4.2 (17:30-18:00)** Invited ([Tse, John](#)), *Mechanisms for Structural Phase Transformations in High Pressure Solids.*

**Tu4.3 (18:00-18:15)** Oral ([Argaman, Uri](#)), *Prediction of the stability of the rhombohedral phase in IV–VI monochalcogenides and its origin.*

**Tu4.4 (18:15-18:30)** Oral ([Polian, Alain](#)), *SnI<sub>4</sub> and GeI<sub>4</sub> under high pressure: a combined X-ray absorption X-ray diffraction study.*

**Tu4.5 (18:30-18:45)** Oral ([Shirai, Koun](#)), *Order-Disorder Phase Transition from delta-O to alpha-T boron.*

#### **Gathering organized by the Women Under High Pressure Group**

(Àgora hall, CosmoCaixa Museum)

**Tu4.6 (18:45-19:15)** Oral ([Peña Álvarez, Miriam & Deemyad, Shanti](#)), *HPSP18&WHS2 Women under High Pressure.*

#### **Reception Cocktail (19:30-21:00)**

(Plaça de la Ciència, CosmoCaixa Museum)

**Wednesday, July 25**

**Registration (8:30-9:00)**

#### **Organic & Hybrid Materials**

(Àgora hall, CosmoCaixa Museum. Chair: [Campoy-Quiles, Mariano](#))

**We1.1 (9:00-9:30):** Invited ([Postorino, Paolo](#)), *Pressure-induced order-disorder transitions in hybrid perovskites.*

**We1.2 (9:30-10:00):** Invited ([Guha, Suchi](#)), *Blue-emitting organic semiconductors under pressure: new perspectives on intermolecular order.*

**We1.3 (10:00-10:15):** Oral ([Perevedentsev, Aleksandr](#)), *Unravelling the Interplay between Microstructure and Photophysics for Luminescent Magnus' Green Salt Derivatives using Pressure-Dependent Spectroscopy.*

### **Low-Dimensional, Layered & Nanostructured Materials**

(Àgora hall, CosmoCaixa Museum. Chair: [Alonso, Ma. Isabel/Garriga, Miquel](#))

**We1.4 (10:15-10:30):** Oral ([González, Jesús](#)), *Pressure dependence of multiphonon resonant Raman scattering on 2Hc-MoS<sub>2</sub> microcrystalline samples: the semiconductor to metal electronic phase transition.*

### **Coffee Break (10:30-11:00)**

**We2.1 (11:00-11:30):** Invited ([San Miguel, Alfonso](#)), *Tuning dimensionality in nanosystems under extreme conditions.*

**We2.2 (11:30-11:45):** Oral ([Santoro, Mario](#)), *Synthesis and Raman spectroscopy of a layered SiS<sub>2</sub> phase at high pressures.*

**We2.3 (11:45-12:00):** Oral ([Sánchez-Royo, Juan Francisco](#)), *Centrosymmetric MoS<sub>2</sub> under pressure: revealing spin-polarized nature of bulk electronic bands.*

**We2.4 (12:00-12:15):** Oral ([Livneh, Tsachi](#)), *High pressure and low temperature Raman scattering in Inorganic Fullerenes of MoS<sub>2</sub>.*

**We2.5 (12:15-12:30):** Oral ([Manjón, Francisco Javier](#)), *High-pressure study of high-mobility Bi<sub>2</sub>O<sub>2</sub>Se semiconductor.*

**We2.6(12:30-12:45):** Oral ([Forestier, Alexis](#)), *Partial strain transfer between layers in isotopically labeled bilayer graphene under high pressure.*

**We2.7 (12:45-13:00):** Oral ([Zhao, Yixuan](#)), *Application of high pressure and high temperature to produce a Bi nanowire/silica nanotube composite for thermoelectric applications.*

### **Lunch (13:00-15:00)**

### **Structural Studies Including Phase Transitions-II**

(Àgora hall, CosmoCaixa Museum. Chair: [Silvera, Isaac F.](#))

**We3.1 (15:00-15:30):** Invited ([Peña-Alvarez, Miriam](#)), *Temperature Dependence of Rotational Modes in Fluid Hydrogen and Deuterium.*

**We3.2 (15:30-15:45):** Oral (Liu, Xiao-Di), *Phase diagram of hydrogen, deuterium and hydrogen-deuterium mixtures at high pressures and low temperatures.*

**We3.3 (15:45-16:00):** Oral (Liarokapis, Efthymios), *Pressure induced lattice anomalies in La<sub>2-x</sub>Sr<sub>x</sub>CuO<sub>4</sub>.*

**We3.4 (16:00-16:15):** Oral (Andrada-Chacón, Adrián), *Pressure induced phase transition and metallization in 1T-HfSe<sub>2</sub>.*

**We3.5 (16:15-16:30):** Oral (Moreira, Sanclayton), *Phase Transition in Beta-Carotene Crystal under High Pressure.*

**Coffee Break (16:30-17:00)**

**Poster Session I – Odd Numbers (17:00-19:00)**

(Ambaixades, CosmoCaixa Museum)

**We4.1-P1 (17:00-19:00):** Poster (Dybala, Filip), *Determination of pressure coefficients in MoS<sub>2</sub>, MoSe<sub>2</sub>, WS<sub>2</sub>, and WSe<sub>2</sub> van der Waals crystals by optical studies at room temperature.*

**We4.2-P3 (17:00-19:00):** Poster (Ves, Sotirios), *High pressure response of the Raman modes of Dy<sub>3</sub>Ga<sub>5</sub>O<sub>12</sub>.*

**We4.3-P5 (17:00-19:00):** Poster (Muñoz, Alfonso), *CeScO<sub>3</sub> perovskite under pressure from ab initio simulations.*

**We4.4-P7 (17:00-19:00):** Poster (Pavlov, Sergei), *Stressed THz silicon lasers.*

**We4.5-P9 (17:00-19:00):** Poster (Wang, Yu), *Kinetic boundaries and phase transformations of ice I at high pressure.*

**We4.6-P11 (17:00-19:00):** Poster (Mujica, Andrés), *Study of the evolution of the vibrational and electronic properties of several tin chalcogenides under compression.*

**We4.7-P13 (17:00-19:00):** Poster (Syassen, Karl), *Structural pathways and lattice dynamics of ReO<sub>3</sub> under pressure.*

**We4.8-P15 (17:00-19:00):** Poster (Buga, Sergei), *Advanced Thermoelectrical Bi<sub>2</sub>-xSb<sub>x</sub>Te<sub>3</sub>-C<sub>60</sub> Nanocomposites.*

**We4.9-P17 (17:00-19:00):** Poster (Ovsyannikov, Sergei), *Thermoelectric properties of compressed germanium.*

**We4.10-P19 (17:00-19:00):** Poster (Arvanitidis, John), *Pressure evolution of the samarium valence in Sm<sub>2</sub>.75C<sub>60</sub>.*

**We4.11-P21 (17:00-19:00):** Poster (Han, Bo), *Excitonic properties of hBN/WSe<sub>2</sub> monolayer/hBN van der Waals heterostructures under hydrostatic pressure.*

**We4.12-P23 (17:00-19:00):** Poster (Jin, Meiling), *Superconductivity emerging from a Weyl semimetal NbIrTe<sub>4</sub> under pressure.*

**We4.13-P25 (17:00-19:00):** Poster (Campoy-Quiles, Mariano), *Elucidating the role of planarity and intermolecular distance on the optical properties of conjugated polymers.*

**We4.14-P27 (17:00-19:00):** Poster ([Weinstein, Bernard](#)), *Pressure-optical studies of band gap tuning, Raman phonons, and stability in BaZrS<sub>3</sub>.*

**We4.15-P29 (17:00-19:00):** Poster ([Uwatoko, Yoshiya](#)), *Development of Two-stage Multianvil Apparatus for High Pressure and Low Temperature Measurements.*

**Thursday, July 26**

**Registration (8:30-9:00)**

**Mechanical Properties, incl. Vibrational, Elastic & Piezoelectric Properties**

(Àgora hall, CosmoCaixa Museum. Chair: [Polian, Alain](#))

**Th1.1 (9:00-9:30):** Invited ([Pagès, Olivier](#)), *Pressure-induced phonon freezing in ZnSe-based mixed crystals: phonons, phonon-polaritons and ab initio calculations.*

**Th1.2 (9:30-10:00):** Invited ([Pellicer-Porres, Julio](#)), *BiVO<sub>4</sub> polymorphism studied by high pressure-high temperature Raman measurements and ab-initio calculations.*

**Th1.3 (10:00-10:30):** Invited ([Wagner, Markus R.](#)), *Strain engineering as a tool to tune the acoustic phonon dynamics of suspended nanostructures.*

**Coffee Break (10:30-11:00)**

**Novel Materials, Structures & Devices**

(Àgora hall, CosmoCaixa Museum. Chair: [Kaminska, Agata](#))

**Th2.1 (11:00-11:30):** Invited ([Ovsyannikov, Sergei](#)), *High-pressure high-temperature synthesis and phase transitions in simple oxides.*

**Th2.2 (11:30-12:00):** Invited ([Liu, Bingbing](#)), *New ordered Structure of Amorphous Carbon Clusters from Compressing C<sub>8</sub>H<sub>8</sub>/C<sub>60</sub>.*

**Th2.3 (12:00-12:15):** Oral ([Sung, Ha-Jun](#)), *Prediction of a novel superconducting Si allotrope and its high-pressure Na-Si precursor.*

**Th2.4 (12:15-12:30):** Oral ([Montesdeoca, Denise](#)), *Open Circuit Voltage Increase of GaSb/GaAs Quantum Ring Solar Cells under High Hydrostatic Pressure.*

**Th2.5(12:30-12:45):** Oral ([Eales, Timothy](#)), *Evidence for Disorder Induced Band Mixing Effects in Ge<sub>1-x</sub>Sn<sub>x</sub> Alloys using Hydrostatic Pressure.*

**Th2.6 (12:45-13:00):** Oral ([Deng, Zheng](#)), *Pressure effect on diluted magnetic semiconductors with independently controllable charge and spin.*

**Lunch (13:00-15:00)**

**Structural Studies Including Phase Transitions-III**

(Àgora hall, CosmoCaixa Museum. Chair: [Gregoryanz, Eugene](#))

**Th3.1 (15:00-15:30):** Invited (Loa, Ingo), *Complex Alloy Phases in Bismuth Tellurides at High Pressure.*

**Th3.2 (15:30-16:00):** Invited (Deemyad, Shanti), *Unstable, Metastable and Ground State Structures of Lithium.*

**Th3.3 (16:00-16:30):** Invited (Solozhenko, Vladimir), *Equilibrium p-T phase diagram of zinc oxide.*

**Coffee Break (16:30-17:00)**

**Poster Session II – Even Numbers (17:00-19:00)**

(Ambaixades, CosmoCaixa Museum)

**Th4.1-P2 (17:00-19:00):** Poster (Jara-Martínez, Enrique), *Structural correlations in Cs<sub>2</sub>CuCl<sub>4</sub>: pressure dependence of electronic and vibrational structures.*

**Th4.2-P4 (17:00-19:00):** Poster (Rodríguez-Hernández, Plácida), *High-pressure elastic, vibrational and structural study of monazite-type GdPO<sub>4</sub> from ab initio simulations.*

**Th4.3-P6 (17:00-19:00):** Poster (Porras-Montenegro, Nelson), *Transmittance of 1D superconductor-semiconductor photonic crystal as a function of pressure, temperature, and thickness of the component layers.*

**Th4.4-P8 (17:00-19:00):** Poster (Akahama, Yuichi), *Reentrant structure transition of indium at 130 GPa.*

**Th4.5-P10 (17:00-19:00):** Poster (Freire, Paulo), *High pressure on the orthorhombic phase of nanostructured MoO<sub>3</sub>.*

**Th4.6-P12 (17:00-19:00):** Poster (Syassen, Karl), *Phases of LaTiO<sub>3</sub> under pressure.*

**Th4.7-P14 (17:00-19:00):** Poster (Pravica, Michael), *Synthesis of a novel structure of cesium superoxide via x-rays and high pressure.*

**Th4.8-P16 (17:00-19:00):** Poster (Korobeynikov, Igor), *Thermoelectric properties of TX<sub>3</sub> (M – Ti, Zr, X – S, Se, Te) under high pressure.*

**Th4.9-P18 (17:00-19:00):** Poster (Takarabe, Kenichi), *High Pressure Study of Hall Effect in Thermoelectric Mg<sub>2</sub>Si Semiconductor.*

**Th4.10-P20 (17:00-19:00):** Poster (Bogdanov, Evgeny), *2D Electrons Concentration and Mobility in n-GaAs/AlGaAs:Si under Uniaxial Stress.*

**Th4.11-P22 (17:00-19:00):** Poster (Buga, Sergei), *Metastable Superconductive Phase of Topological Insulator Sb<sub>2</sub>Te<sub>3</sub> Obtained by High-Pressure-High-Temperature Treatment.*

**Th4.12-P24 (17:00-19:00):** Poster (Francisco-López, Adrián), *High pressure study of optical and vibrational properties of methylammonium lead iodide perovskites.*

**Th4.13-P26 (17:00-19:00):** Poster (Yang, Wenge), *Pressure enhanced performance in perovskite photovoltaic materials.*

**Th4.14-P28 (17:00-19:00):** Poster ([Min, Byeong-Hun](#)), Installation of a laser drilling system and diamond anvil cell for transport measurements up to 60 GPa.

**Th4.15-P30 (17:00-19:00):** Poster ([Xiao, Hong](#)), Pressure-tuned superconductivity and normal-state behavior in  $\text{Ba}(\text{Fe}_{0.943}\text{Co}_{0.057})_2\text{As}_2$  near the antiferromagnetic boundary.

**Banquet (20:00-23:00)**

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**Friday, July 27**

**Registration (8:30-9:00)**

**Pressure-Induced Metallization and/or Superconductivity-II**

(Àgora hall, CosmoCaixa Museum. Chair: [Deemyad, Shanti](#))

**Fr1.1 (9:30-10:00):** Invited ([Bergara, Aitor](#)), *Anharmonic effects and optical spectra in superconducting hydrogen.*

**Fr1.2 (10:00-10:15):** Oral ([Li, Bin](#)), *Superconductivity in Titanium Hydrides at High Pressures.*

**Fr1.3 (10:15-10:30):** Oral ([Zhu, Jinlong](#)), *Superconductivity emerging from a Weyl semimetal  $\text{NbIrTe}_4$  under pressure.*

**Coffee Break (10:30-11:00)**

**New Experimental or Computational Techniques**

(Àgora hall, CosmoCaixa Museum. Chair: [Reparaz, J. Sebastián](#))

**Fr2.1 (11:00-11:15):** Oral ([Matsumoto, Ryo](#)), *Diamond Anvil Cell with Boron-doped Metallic Diamond Electrodes for Resistivity Measurement under High Pressure.*

**Fr2.2 (11:15-11:45):** Invited ([Mori, Yoshihisa](#)), *Development of Thermoelectric Measurement at High-temperature and High-pressure using Six-axis Multi-Anvil Press.*

**Electrical Transport Phenomena in Semiconductors & Superconductors**

(Àgora hall, CosmoCaixa Museum. Chair: [Reparaz, J. Sebastián](#))

**Fr2.3 (11:45-12:00):** Oral ([Yahniuk, Ivan](#)), *Pressure-driven topological phase transitions in  $\text{HgTe}/(\text{Cd,Hg})\text{Te}$  quantum wells.*

**Fr2.4 (12:00-12:30):** Invited ([Núñez-Regueiro, Manuel](#)), *The pressure evolution of the basal electrical resistivity of cold pressed single crystal graphite.*

**Strongly Correlated Electron Systems**

(Àgora hall, CosmoCaixa Museum. Chair: [Muñoz, Alfonso](#))

**Fr2.5(12:30-13:00):** Invited ([Watanabe, Shinji](#)), *Grüneisen Parameter in Quantum Critical Yb-Based Quasicrystal.*

**Lunch (13:00-15:00)**

**Fr3.1(15:00-15:30):** Invited (Matsubayashi, Kazuyuki), *Pressure-induced novel superconductivity and quantum critical phenomena in nonmagnetic systems.*

**Fr3.2 (15:30-15:45):** Oral (Kuwayama, Takanori), *Relationship between superconductivity and magnetism on FeSe<sub>1-x</sub>S<sub>x</sub> (x = 0.12) studied by <sup>77</sup>Se-NMR under pressure.*

**Fr3.3 (15:45-16:00):** Oral (Fujiwara, Naoki), *Quantum Critical behavior of LaFeAsO<sub>1-x</sub>H<sub>x</sub> under pressure.*

**Closing**

**Fr3.4 (16:00-16:15):** Summary (Rodríguez, Fernando).

**Fr3.5 (16:15-16:30):** Closing (Goñi, Alejandro R.).