Nanotechnology and Next Generation High Efficiency Photovoltaics
International School and Workshop
Palma, Mallorca, Spain
September 12 – 15, 2017

Tuesday 12 September

	Institutional welcome
9:15 **10:00**	**Inaugural Lecture:** Gilles Dennler (IMRA, France) **Scientific innovation in the Anthropocene: Denials, good wishes and genuine efforts** Gilles Dennler
10:00 **10:30**	*coffee break*
	Advanced Si Concepts
10:30 **11:10**	**Keynote speaker:** Ivan Gordon (IMEC, Belgium) **Thin Epitaxial Silicon Foils Using Porous-Silicon-Based Lift-Off for Photovoltaic Application** Ivan Gordon
11:10 **11:30**	**Structural and optical properties of black silicon obtained by reactive ion etching (RIE) for crystalline silicon solar cells** F. Atteia, J. Le Rouzo, G. Berginc and L. Escoubas
11:30 **11:50**	**Suspended micro-photovoltaic and electrochemical cells for biological applications.** C. Vargas-Estevez, A. Blanquer, F. J. del Campo, M. Duch, G. Murillo, J. A. Plaza, C. Nogués, J. Esteve

11:50 **12:10**	**Visible Light Communication using Photovoltaic Solar Cells** N. Lorriere, M. Pasquinelli, G. Chabriel, J. Barrere, E. Bialic, L. Escoubas, J.-J. Simon
12:10 **12:30**	**Radiation stability of heterojunction α–Si:H/Si solar cells with an intrinsic thin-layer α-Si** V.N.Verbitsky, V.S. Kalinovsky, E.V. Kontrosh, E.I.Terukov, A.S.Titov
12:30 **14:00**	*Lunch*
	Thin film chalcogenides: New earth abundant materials and devices for PV
14:00 **14:40**	**Keynote speaker:** Teodor T. Todorov (IBM, USA) **New perspectives for high band gap selenium solar cells** T. T. Todorov
14:40 **15:10**	**Invited speaker:** Ji-Sang Park (ICL, UK) **Effect of symmetry on the electronic structure of $Cu_2ZnSnSe_4$ and related materials** J.-S. Park, S. Choi, S.-H. Wei, A. Walsh
15:10 **15:30**	**The influence of Ge on kesterite solar cells** L. de la Cueva, A. González, Y. Sánchez, J.M. Merino, M. León, R. Caballero
15:30 **15:50**	**Device Characterization of a 11.4% Cu2ZnSnSe4 Thin-film Solar Cell** T. Taskesen, V. Steininger, J. Neerken, J. Schoneberg, W. Chen, J. Ohland, U. Mikolajczak, L. Gütay
15:50 **16:20**	*Coffee break*

16:20 **17:00**	**Keynote speaker:** Bart Vermang (IMEC, Belgium) **Progress in (i) high band gap kesterite absorbers, and (ii) surface passivation schemes for thin film solar cells** B. Vermang, G. Brammertz, J. de Wild, S. Sahayaraj, M. Meuris, J. Poortmans
17:00 **17:30**	**Invited speaker:** J. Lauwaert (University Ghent, Belgium) **Towards a model for a wide band gap CZGSe solar cell with transparent back contact** S. Khelifi, J. Lauwaert
17:30 **17:50**	**A close look into the formation mechanisms of $Cu_2ZnSnSe_4$ using rapid thermal processes** A. Hernández-Martínez, M. Placidi, L. Arqués, S. Giraldo, Y. Sánchez, V. Izquierdo-Roca, Xavier Alcobé, Lorenzo Calvo-Barrio, P. Pistor, E. Saucedo
17:50 **18:10**	**Parameter Analysis of Spin Coated CZTS Thin Films** T. Özdal, H. Kavak
18:10 **18:30**	**CZTSe Solar Cells Developed On Alternative Substrates for Nextgen Applications** I. Becerril-Romero, S. Lopez-Marino, M. Placidi, M.Espíndola-Rodríguez1, F. Oliva, V. Izquierdo-Roca, Y. Sánchez, A. Pérez-Rodríguez, E. Saucedo, P. Pistor

Wednesday 13th September

	Thin Film Chalcogenides: Cost-efficient Thin Film PV technologies
9:00 **9:40**	**Keynote speaker:** Wolfram Witte (ZSW, Germany) **Measures to increase CIGS cell efficiency towards 25%** Wolfram Witte (ZSW, Germany)
9:40 **10:00**	**Decreasing doping and improving interface recombination in Cu-rich CIS by means of alkali-treatment** H. Elanzeery, F. Babbe, A. Zelenina, M. Melchiorre, S. Siebentritt
10:00 **10:30**	*coffee break*
10:30 **10:50**	**Rb alkali distribution in Cu(In,Ga)Se_2 solar cells on a nanometer scale** A. Vilalta-Clemente, C. Castro, S. Duguay, E. Cadel, P. Pareige, P. Jackson, R. Wuerz, D. Hariskos, W. Witte
10:50 **11:10**	**Influence of interference effects and alkali post-deposition treatment on the quasi-Fermi level splitting of Cu(In,Ga)Se_2 thin films** M. H. Wolter, B. Bissig, P. Reinhard, E. Avancini, R. Carron, S. Buecheler, W. Witte, P. Jackson, S. Siebentritt
11:10 **11:30**	**Influence of ZnO thickness on performance of Cu (In, Ga) Se_2 thin-film solar cells** J. Lorthioir, N. Barreau, L. Arzel
11:30 **11:50**	**Photoelectrochemical energy storage using chalcogenide light absorbers** T. Andreu, C. Ros, S. Girado, Y. Sánchez, S. Murcia-López, C. Flox, V. Izquierdo, E. Saucedo, A. Pérez-Rodríguez, J. R. Morante

11:50 14:00	*Lunch*
14:00 14:45	**European Projects in advanced chalcogenide technologies**
14:45 15: 15	**Round Table: Perspectives / challenges of PV technologies towards a massive PV deployment: Competing or complementing?**
15:15 16:00	**Poster session: Presentation of posters**
16:00 16:20	*Coffee break*
16:20 18:00	**Poster session**
	Influence of impurities from recycled electronics on the chalcopyrite solar cells E. Bailo, M. Placidi, M. Colina, Y. Sanchez, F. Oliva, V. Izquierdo, M. Blanes, B. Medina-Rodríguez,, F. Ramos, E. Saucedo, A. Pérez-Rodríguez
	Optical properties of PZN-PT nanoparticles thin layer on ITO glass for photovoltaic application R. Ndioukane, M. Touré, N. C. Y. Fall, D. Kobor, L. Motte, J. Solard
	Synthesis and Characterization of inorganic perovskites solar cells on p-type silicon substrate R. Ndioukane, D. Kobor, L. Motte, M. Tine, J. Solard
	Enhancement in the Short-Wavelength Response of CIGS Solar Cell Via Solar Spectrum Modulation Using Nitrogen Doped Graphene Quantum Dots F. Khan, J. H. Kim

	Effect of Sulfurization Temperature on Cu_2ZnSnS_4 on Flexible Titanium Substrates for Thin Film Solar Cells D. G. Buldu., A. Cantas, F. Turkoglu, E. Meric, L. Ozyuzer, M. Ozdemir, G. Aygun[1]
	Investigation of surface passivation by double layer SiN_x/SiO_2 of CZ silicon wafer A. M. Maoudj, D. Bouhafs, N. Bourouba, A. El Amrani, A. Hamida
	Superficial passivating oxides on CZTSe:Ge/CdS solar cells J. Andrade, L. Arques, V. Izquierdo-Roca, Y. Sánchez, A. Pérez-Rodríguez, E. Saucedo
	CZTGSe layers deposited by sequential thermal vacuum evaporation: influence of the Cu and Ge thickness and post thermal annealing on the properties of thin films and solar cells F.A. Pulgarín-Agudelo, O. Vigil-Galán, R. González, J. A. Andrade-Arvizu
	Investigation of $(ZnS)_x$-$(CdS)_y$ system as buffer layer for high efficiency kesterite solar cells Y. Sánchez, Markus Neuschitzer, Florian Oliva, S. Giraldo, V. Izquierdo-Roca, M. Placidi, T. Jawhari, A. Pérez-Rodríguez, E. Saucedo
	Back contact modification by adding transition metal oxides nanolayers as possible electron reflectors for CZTSe solar cells S. Giraldo, M. Espíndola-Rodríguez, F. Oliva, V. Izquierdo-Roca, A. Pérez-Rodríguez, E. Saucedo

Thursday 14th September

	Perovskites
9:00 **9:40**	**Keynote speaker:** Ayodhya Tiwari (EMPA; Switzerland) **Thin film tandem solar cells** Ayodhya Tiwari
9:40 **10:10**	**Invited speaker:** Robert Gehlhaar (IMEC Belgium) **Towards stable, large area perovskite modules** R. Gehlhaar, L. Rakocevic, T. Merckx, W. Qiu, M. Jaysankar, J. Bastos, H. Fledderus, U. W. Paetzold, A. Hadipour, T. Aernouts
10:10 **10:40**	*coffee break*
10:40 **11:10**	**Invited speaker:** Jordi Martorell (ICFO, Spain) **Effective crystal growth and optical management for high power conversion efficiency in perovskite solar cells** H. Zhang, J. Toudert, M. Kramarenko, S. Colodrero, J. Martorell
11:10 **11:40**	**Invited speaker:** Elena Mas-Marzá (UJI, Spain) **Alternative applications for lead halide perovskites** E. Mas-Marzá, J. Bisquert
11:40 **12:00**	**Observing crystal formation during spin casting of perovskite precursor solutions using in situ wide angle x-ray scattering** Alan D F Dunbar*[1], Noura E Alhazmi[1], Edwin A Pineda De La O[1]
12:00 **14:00**	*Lunch*

	New materials and 3rd generation concepts
14:00 **14:40**	**Keynote speaker:** S.H. Christiansen (HZB, Germany) **3D nano-architectures for opto-electronic device concepts such as solar cells, light emitting devices and sensors** S.H. Christiansen, G.Sarau, U. Mick
14:40 **15:00**	**Characteristics of down-shifting polymer based ZnO nanoparticle layers used to improve solar cells' efficiency** K. Znajdek, N. Szczecińska, P. Sędzicki, M. Sibiński, A. Apostoluk, G. Wiosna-Sałyga
15:00 **15:20**	**Developing new architectures for high-efficiency ultra-thin CIGS solar cells** L.Gouillart, F. Mollica, J. Goffard, A. Cattoni, M. Jubault, F. Donsanti, N. Naghavi, S. Collin
15:20 **15:40**	**Nanotexturing for enhanced thin film PV performance** Joop van Deelen[1], Marco Barink[2], Pieter Jan Bolt[1]
15:40 **16:10**	*Coffee break*
16:10 **16:30**	**Bismuth in photovoltaic solar cells** M. B. Johansson, H. Zhu, E. M. J. Johansson
16:30 **16:50**	**Heuristic Modeling of MJSC under Current Matching Condition: Genetic algorithm approach for > 50% efficiency** S. Cicić, S. Tomić
16:50 **17:10**	**Transparent back contacts for CZGSe top cells in a four terminal tandem cell configuration** P. Bolt, W. van Boekel[1], F. Grob, M. Simor, G. Brammertz, B. Vermang, M. Meuris, J. van Deelen

17:10 17:30	**Functionalized $Cu_2ZnSn(S,Se)_4$ transparent back contacts for tandem solar cell applications**; M. Espindola-Rodriguez, Y. Sánchez, D. Sylla, M. Neuschitzer, V. Izquierdo-Roca, A. Pérez-Rodríguez, E. Saucedo, M. Placidi
17:30: 18:00	**Invited speaker:** Jörg Ackermann (Aix-Marseille University, France) **Recent advances and challenges of solution processed organic solar cells** J. Ackermann

Friday 15th September

	Reliability, scalability and transfer to Industry. Niche application concepts
9:00 9:40	**Keynote speaker:** Cristina Fernández (Onyx Solar, Spain) **Towards new trends in the BIPV market** Teodosio del Caño, Elena Rico, Cristina Fernández
9:40 10:10	**Invited speaker:** Roberto Turconi (ArcelorMittal, France) **Life Cycle Assessment of PV systems** R. Turconi
10:10 10:40	**Invited speaker** Stéphane Cros (CEA-LITEN, France) **New encapsulation laterials and processes developed in the CEA-LITEN/Arkema joint laboratory** S. Cros, M. Hidalgo, M. Vite, V. Broha, D. Thil, F. Teyssier
10:40 11:10	*Coffee break*
11:10 12:00	**Workshop: Characterization for reliability in new device concepts** Coordinators: • Victor Izquierdo-Roca (IREC, Spain), • Paul Pistor (MLU, Germany), • Carmen Ruiz-Herrero (IM2NP, France)
12:00 13:30	**Young scientists: Building the Future of PV**