



HOWDI Annual Meeting 2022

May 9-13

Dourdan, France

Topics

Fabrication and advanced characterization of hetero-structures

Electronic transport and its interfaces

Optical, excitonic and photonic properties

Properties related to spin and electronic correlations

The meeting is dedicated to the memory of François Ducastelle

<https://howdi2022.sciencesconf.org/>

The organizing committee is pleased to welcome you to the first annual meeting of the HOWDI GDR and IRN in Dourdan, near Paris. After 2 years of absence, we are renewing a long tradition of residential meetings covering the topics of carbon and related nanomaterials, which gather an vast community including French, European and overseas researchers. We tried our best to propose a scientific program covering the latest developments in the science and applications of graphene, related 2D and low-dimensional materials and their heterostructures.

Like in earlier meetings, we put a special emphasis on the poster presentations, with two dedicated sessions and a plenary poster clip session for poster introduction. We hope the scheduled free time will allow informal discussions in view of promoting the development of existing collaborations or the fostering of new ones. We strongly encourage the participation of students and young researchers to the debates.

This meeting is dedicated to François Ducastelle, who passed away last summer. A special session is organized to honour his memory on Tuesday afternoon.

Finally we hope you will enjoy the walking tour on Wednesday afternoon through the historical city of Dourdan, a small town in Île-de-France which combines the advantages of the city with the charms of the countryside.

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- Felicien SCHOPFER
- Pierre SENEOR
- Bernhard URBACZEK
- Dominique VIGNAUD

Monday, May 9, 2022

Program

TIME	EVENT
13:30 - 14:50	Arrival - Coffee
14:50 - 15:00	Opening - Julien Barjon
15:00 - 16:20	Nanophotonics - Jean-Sébastien Lauret
15:00 - 16:00	› QUANTUM OPTICS WITH VAN DER WAALS HETEROSTRUCTURES - <i>TUTORIAL: Martin Kroner, Swiss Federal Institute of Technology in Zurich - ETHZ</i>
16:00 - 16:20	› QUANTUM NANOPHOTONICS WITH 2D MATERIALS - <i>Antoine Réserbat-Plantey, Centre de recherche sur l'hétéroépitaxie et ses applications</i>
16:20 - 16:40	Break
16:40 - 17:30	Spin coupling - Clément Faugeras
16:40 - 17:10	› STRAIN CONTROL OF CHARGE-, VALLEY-, AND SPIN DEGREES OF FREEDOM IN TMDS - <i>INVITED: Kirill Bolotin, Freie Universität Berlin</i>
17:10 - 17:30	› HIGH MAGNETIC FIELD SPIN-VALLEY SPLIT SHUBNIKOV-DE HAAS OSCILLATIONS IN A WSE2 MONOLAYER - <i>Walter Escoffier, Laboratoire national des champs magnétiques intenses - Toulouse</i>
17:30 - 17:50	Break
17:50 - 18:40	Strain engineering - Clément Faugeras
17:50 - 18:20	› Strain switching in van der Waals heterostructures by incorporating spin-crossover materials - <i>INVITED: Carla Boix Constant, Institute of Molecular Science (ICMol), Universitat de València</i>
18:20 - 18:40	› Electronic transport in corrugated graphene - <i>Romaine Kerjouan, Laboratoire de Physique de l'ENS - ENS Paris</i>
19:30 - 21:00	Dinner

Tuesday, May 10, 2022

TIME	EVENT
07:00 - 08:30	Breakfast
08:30 - 10:00	Material growth - Amandine Andrieux
08:30 - 09:00	› BN GROWTH ON NICKEL UNDER ULTRA-HIGH VACUUM CONDITIONS FROM BORAZINE - <i>INVITED: Dominique Vignaud, Univ. Lille, CNRS, Centrale Lille, Univ. Polytech. Hauts-de-France - IEMN - Institut d'Electronique, de Microélectronique et de Nanotechnologie</i>
09:00 - 09:20	› Advances in selfstanding hBN crystal synthesis via the PDC route - <i>Camille Maestre, Laboratoire Multimatiériaux et Interfaces, Mateis, Lyon</i>
09:20 - 09:40	› Conception d'un réacteur CVD chauffé par induction pour la synthèse de nitrure de bore hexagonal - <i>Wafa Alimi, Laboratoire des Sciences des Procédés et des Matériaux, Villeneuve</i>
09:40 - 10:00	› CROISSANCE D'HETEROSTRUCTURES VAN DER WAALS PAR ABLATION LASER PULSE - <i>Florian Godel, Unité mixte de physique CNRS/Thalès, Palaiseau</i>
10:00 - 10:30	Coffee break

TIME	EVENT
10:30 - 12:00	Functionalization and molecular assembly - Stéphane Campidelli
10:30 - 11:00	› Novel Non-Benzenoid Graphene Isomers by On-Surface Synthesis - <i>INVITED: Michael Gottfried, Department of Chemistry, University of Marburg</i>
11:00 - 11:20	› Synthesis and optical properties of rod-shaped graphene nanoparticles - <i>Daniel Medina Lopez, Laboratoire Innovation en Chimie des Surfaces et NanoSciences, Gif-sur-Yvette</i>
11:20 - 11:40	› HYDROGENATION OF GRAPHENES FROM H RADICALS - <i>Pascal Puech - CEMES, UPR-8011, CNRS, Université de Toulouse, Toulouse</i>
11:40 - 12:00	› Structure, chemistry and charge density in MBE grown TMDs investigated by 4D-STEM - <i>Hanako Okuno, Univ. Grenoble Alpes, CEA, IRIG-MEM</i>
12:30 - 14:00	Lunch
14:30 - 16:10	Tribute to François Ducastelle - Stephan Roche
14:50 - 15:10	› Twisted Bilayers of Hexagonal Boron Nitride - <i>Sylvain Latil - Institut Rayonnement Matière de Saclay</i>
15:10 - 15:30	› Influence of bias voltage on the observed Moiré patterns of MoTe ₂ /graphene heterostructure grown by molecular beam epitaxy - <i>Thanh Trung PHAM - Namur Institute of Structured Matter (NISM), Department of Physics, University of Namur</i>
15:30 - 15:50	› Unfolding the electronic bands of twisted 2D materials - <i>Alberto Zobelli - Laboratoire de Physique des Solides</i>
15:50 - 16:10	› RADIATIVE LIFETIME OF FREE EXCITONS IN HEXAGONAL BORON NITRIDE - <i>Sébastien ROUX, Groupe d'Etude de la Matière Condensée, UVSQ-CNRS, Versailles & Laboratoire d'Etude des Microstructures (LEM), ONERA, Université Paris-Saclay, CNRS, Châtillon</i>
16:10 - 16:40	Coffee break
16:40 - 17:40	Optics of 2D and layered materials - Guillaume Cassabois
16:40 - 17:00	› Optical signatures of the strong 3D anisotropy in black phosphorus - <i>Léonard Schué, Université de Montréal</i>
17:00 - 17:20	› Semiconducting thin layers of transition metal dichalcogenides under pressure - <i>Thomas Pelini, LNCMI, CNRS, EMFL, Université Grenoble Alpes</i>
17:20 - 17:40	› 2D MoS ₂ capacitors and transistors studied by excitonic reflection microscopy - <i>Nathan Ullberg, Laboratoire d'Innovation en Chimie des Surfaces et Nanosciences, Université Paris-Saclay, CEA, CNRS, NIMBE, LICSEN, Gif-sur-Yvette</i>
17:40 - 18:20	Poster clips I
19:30 - 21:00	Dinner
21:00 - 23:00	Poster session I - Poster session I

Wednesday, May 11, 2022

TIME	EVENT
07:00 - 08:30	Breakfast
08:30 - 10:10	Strong correlation and topological effects - Jean-Christophe Charlier
08:30 - 09:30	› A glimpse into the world of topological phases in two dimensions - <i>TUTORIAL - David Carpentier, Laboratoire de Physique de l'ENS Lyon</i>

TIME	EVENT
09:30 - 09:50	› METAL-INSULATOR TRANSITION IN ANNEALED MOS ₂ DEVICES - <i>Sébastien Nanot, Laboratoire Charles Coulomb, Montpellier</i>
09:50 - 10:10	› A graphene-based voltage-tunable Josephson parametric amplifier - <i>Julien Renard, Institut Néel, Grenoble</i>
10:10 - 10:40	Coffee break
10:40 - 12:10	Magnetism - Kirill Bolotin
10:40 - 11:00	› Qnami ProteusQ: A commercial solution unlocking magnetic field measurements in 2D materials - <i>Peter Rickhaus - Qnami AG</i>
11:00 - 11:30	› Scanning Nitrogen-Vacancy Magnetometry of van der Waals Magnets - <i>INVITED - Märta Tschudin - University of Basel</i>
11:30 - 11:50	› MAGNETIC ORDERING IN WEAKLY COUPLED VAN DER WAALS SYSTEMS, WITH APPLICATION TO VI ₃ - <i>Karel Carva, Charles University Prague</i>
11:50 - 12:10	› Structural, magnetic and transport properties of van der Waals Cr ₂ Te ₃ based heterostructures - <i>Quentin Guillet - CEA, IRIG-Spintec</i>
12:30 - 14:00	Lunch
14:30 - 17:00	Social event - Visiting
17:30 - 18:30	Applications and devices - Aurélie Pierret
17:30 - 17:50	› A SCALING LAW FOR CHARGE TRANSPORT IN LAYERED 2D MATERIALS AND ITS APPLICATION TO REDUCED GRAPHENE OXIDE - <i>Haldun Sevincli, Izmir Institute of Technology</i>
17:50 - 18:10	› 2D SWITCHES FOR RF APPLICATION - <i>Simon SKRZYPCZAK, Carbon - IEMN</i>
18:10 - 18:30	› A van der Waals Heterojunction Based on Monolayers of MoS ₂ and WSe ₂ for Solar Water Splitting - <i>Paul Dalla Valle, Institut des Matériaux, de Microélectronique et des Nanosciences de Provence</i>
18:30 - 19:10	Poster clips II
19:30 - 21:00	Dinner
21:00 - 23:00	Poster session II

Thursday, May 12, 2022

TIME	EVENT
07:00 - 08:30	Breakfast
08:50 - 10:00	Spin transport - Cyrille Barreteau
08:50 - 09:20	› Proximity-induced spin-orbit phenomena in graphene-based devices - <i>INVITED - Williams Fernando Savero Torres - Néel Institute</i>
09:20 - 09:40	› Spin Current in van der Waals Ferromagnet Fe ₃ GeTe ₂ - <i>Jiaqi Zhou, Université Catholique de Louvain</i>
09:40 - 10:00	› OPTICAL DETECTION OF LONG ELECTRON SPIN TRANSPORT LENGTHS IN A MONOLAYER SEMICONDUCTOR - <i>Lei Ren, Université de Toulouse, INSA-CNRS-UPS, LPCNO</i>

TIME	EVENT
10:00 - 10:30	Coffee break
10:30 - 12:00	VdW optics - Cédric Robert
10:30 - 11:00	› THEORETICAL INVESTIGATIONS OF OPTICAL PROPERTIES OF 2D SEMICONDUCTORS IN VAN DER WAALS HETEROSTRUCTURES - <i>INVITED: Iann Gerber, Laboratoire de physique et chimie des nano-objets</i>
11:00 - 11:20	› Interlayer excitons of MoSe ₂ -WSe ₂ hetero-bilayers - <i>Lucille Caussou, Institut des NanoSciences de Paris</i>
11:20 - 11:40	› Dielectric screening in van der Waals materials probed through Raman spectroscopy - <i>Loïc Moczko, Institut de Physique et Chimie des Matériaux de Strasbourg</i>
11:40 - 12:00	› AB INITIO STUDY OF GRAPHENE/BN VAN DER WAALS HETEROSTRUCTURE: EFFECT OF ELECTRIC FIELD, TWIST ANGLES AND P-N DOPING ON THE ELECTRONIC PROPERTIES - <i>Simone Brozzesi, University of Roma Tor Vergata</i>
12:30 - 14:00	Lunch
14:30 - 16:00	Nanotubes - Annick Loiseau
14:30 - 15:00	› 1D HETEROSTRUCTURES BASED ON NANOTUBE TEMPLATES: CONFINEMENT OF 6T MOLECULES INSIDE BNNT FOR POLARIZED LIGHT EMISSION. - <i>INVITED - Etienne Gaufrès, Laboratoire Photonique, Numérique et Nanosciences, Université de Bordeaux, Centre National de la Recherche Scientifique</i>
15:00 - 15:20	› Diameter-dependent single- and double-file stacking of squarylium dyes inside single-wall carbon nanotubes - <i>Salomé Forel, Nanostructured and Organic Optical and Electronic Materials, University of Antwerp, Laboratoire des Multimatériaux et Interfaces, Université Claude Bernard Lyon 1</i>
15:20 - 15:40	› SINGLE-WALLED CARBON NANOTUBES CHARGE MANAGEMENT BY CONTROLLED FUNCTIONALIZATION - <i>Antonio Setaro, Free University Berlin</i>
15:40 - 16:00	› ULTRAFAST GENERATION OF ACOUSTIC WAVES IN WATER MEDIATED BY A CARBON NANOTUBE - <i>Fabien Violla, Institut Lumière Matière</i>
16:00 - 16:30	Coffee break
16:30 - 18:00	hBN optics - Julien Barjon
16:30 - 17:00	› Optical properties of h-BN: from bulk to monolayer - <i>INVITED: Christine Elias, Laboratoire Lumière, Matière et Interfaces, Laboratoire Charles Coulomb</i>
17:00 - 17:20	› Optical characterization of exfoliated monolayer boron nitride by means of hyperspectral microscopy in the deep-UV - <i>Adrien Rousseau, Laboratoire Charles Coulomb</i>
17:20 - 17:40	› Exciton-phonon coupling and optical properties in hexagonal-BN - <i>Claudio Attaccalite, CNRS, Aix-Marseille Université, CINaM</i>
17:40 - 18:00	› Atomic Scale Mapping of the Electric Field in 1D and 2D BN Nano-Structures By 4D-STEM - <i>Laura Susana, Laboratoire de Physique des Solides</i>
18:30 - 19:30	General assembly
19:30 - 21:00	Gala dinner
21:00 - 23:00	Party

Friday, May 13, 2022

TIME	EVENT
07:00 - 08:50	Breakfast
08:50 - 10:20	Electronic transport
08:50 - 09:20	› COHERENT JETTING FROM A GATE-DEFINED CHANNEL IN BILAYER GRAPHENE - <i>INVITED: Carolin Gold, Laboratory for Solid State Physics, ETH Zürich</i>
09:20 - 09:40	› Pinch-off resistance and Schwinger effect in hBN-encapsulated GFETs - <i>Aurélien Schmitt, Laboratoire de physique de l'ENS - ENS Paris</i>
09:40 - 10:00	› ELECTRONIC WHISPERING-GALLERY RESONANT TRANSPORT IN GRAPHENE P-N JUNCTION - <i>Viet Hung Nguyen, Institute of Condensed Matter and Nanosciences, Université catholique de Louvain</i>
10:00 - 10:20	› AB-INITIO SIMULATION OF PHONON-ASSISTED ELECTRON TRANSPORT IN VAN DER WAALS HETEROSTRUCTURES - <i>Adel M'foukh, Centre de Nanosciences et de Nanotechnologie, CNRS, Université Paris-Saclay</i>
10:20 - 10:50	Coffee break
10:50 - 12:00	Quantum emitters - Stéphane Berciaud
10:50 - 11:20	› Single photon emitters in hexagonal boron nitride for scalable quantum photonics - <i>INVITED: Aymeric Delteil, Groupe d'Étude de la Matière Condensée</i>
11:20 - 11:40	› Optical signals of qubits in defected 2D TMDs - <i>Pedro Melo, Condensed Matter and Interfaces group, Debye Institute for Nanomaterials Science, Utrecht University</i>
11:40 - 12:00	› Optical Investigation of C96 Graphene quantum dots - <i>Thomas Liu, Laboratoire Lumière, Matière et Interfaces</i>
12:00 - 12:10	Closing - Julien Barjon
12:30 - 14:00	Lunch
14:00 - 15:00	Departure

Posters session I – Tuesday, May 10

1. Andrieux-Ledier A. *CVD synthesis of sp²-hybridized multilayer boron nitride films*
2. Baux D. *Optical properties of metallic carbon nanotubes*
3. Berciaud S. *Exciton dynamics in atomically thin heterostructures made from graphene and transition metal dichalcogenides*
4. Beret D. *Effective negative diffusion of charged exciton in WSe₂ monolayer*
5. Canonico L. *Nonlocal signals of orbital angular momentum transport in graphene*
6. Caputo L. *First-principles electronic and structural properties of bnc nanomaterials*
7. Chapuis N. & Wallart X. *GaP(111)B-Se surface for TMD epitaxial growth*
8. Chiout A. *Straintronics in 2D semiconductors*
9. Costanza M. *Electrical properties of graphene transferred on lithium niobate substrate*
10. Cummings A. *Design and optimization of graphene photothermoelectric detectors*
11. Dieng M. *Wet-chemical non-covalent functionalization of CVD-graphene: molecular doping and its effect on electrolyte-gated graphene field-effect transistor characteristics*
12. Elias C. *Optical spectroscopy of nonplanar graphene nanoribbons with fjord edges*
13. Fiebor A. *Photoswitching molecular conjugation on single-walled carbon nanotubes*
14. Fournier C. *Electrical control of deterministically-positionned quantum emitters in hBN*
15. Galafassi R. *Novel spectroscopic detection of reversible collapse of single walled carbon nanotubes at high pressure*
16. Gautam S. *Exciton dynamics study of hBN by time-resolved cathodoluminescence*
17. Gloppe A. *Magnon-exciton proximity coupling at a van der Waals heterointerface*
18. Grillo S. *Ab-initio investigation on the evolution of the electronic and optical properties of meta-stable allotropic forms of 2D tellurium of increasing number of layers*
19. Hemmat M. *Ultrafast terahertz photocurrents in semi-metal and semiconductor few layer PtSe₂*
20. Henrard L. *Optical response of corrugated 2D materials and heterostructures*
21. Lizee M. *Phonon drag-electric current generation at the liquid-graphene interface*
22. Marceau J.-B. *Highly polarised fluorescent pattern of encapsulated dyes in BNNT: from nanoscale to thin film*
23. Marty L. *Laser heating of suspended graphene*
46. Zhao M. *Nanoscale wetting films on 2D materials*

Poster session II – Wednesday, May 11

24. Mastropasqua C. *Uniform cvd of graphene on 2" SiC wafer*
25. Matsoso J. *Role of heteroatom domains on VOCs recognition on B/N co-doped graphene*
26. Medina Dueñas J. *Copropagating edge states produced by the interaction between electrons and chiral phonons in two-dimensional materials*
27. Milton K. *Towards modelling realistic WS₂/H₂O/SiO₂ interfaces*
29. Pashayev S. *Experimental methods for nanofluidics: focus on sealing technology for delicate nanomaterials*
30. Pawbake A. *High pressure tuning of the magnon-polaron resonance in the layered antiferromagnet FePS₃*
31. Pierret A. *Dielectric permittivity, conductivity and breakdown field of hexagonal boron nitride`*
32. Rajaji V *Phonon signatures of graphene based systems under high-pressure conditions: suspended versus supported geometries*
33. Rousseau A. *First observation of bernal boron nitride single crystals*
34. Roux S. *Self-trapped excitons in twisted hBN heterostructures*
35. Saïd Hassani S. *Growth of hBN single crystals at atmospheric pressure*
36. Schraeder C. *CVD-graphene based transistor microarrays for biodetection of nucleic acid sequences*
37. Serrano Richaud E. *Modelling electronic and optical properties of graphene and boron-nitride nanoribbons*
38. Sohier T. *Mobility of gated TMDs as a function of valley profile*
39. Susana L. *X-ray excited optical luminescence of boron nitride materials*
40. Tharrault M. *Ultra wide-band NIR-VIS micro-absorption characterization of PtSe₂ thin films*
41. Tailpied L. *CVD synthesis of sp²-hybridized multilayer boron nitride films*
42. Vu V. B. *Theoretical studies of novel graphene based nanostructures*
43. Wolff J. *Nano-optomechanics of a few-layer FePS₃ suspended membrane*
44. Wu N. *Revealing low frequency magnetic moment fluctuations of TbPc₂ single-molecule magnets grafted on graphene*
45. Yahia A. *Thermodynamic calculations of CVD graphene growth from solid and gaseous precursors*
47. Soliman M. *Van der Waals heterostructure ferroelectric synapse*
48. Brochard C. *Heat transport in h-BN*

	<u>Mon. 09</u>	<u>Tue. 10</u>	<u>Wed. 11</u>	<u>Thu. 12</u>	<u>Fri. 13</u>
07:00		Breakfast	Breakfast	Breakfast	Breakfast
08:00					
09:00		Material growth	Strong correlation and topological effects	Spin transport	Electronic transport
10:00		Coffee break	Coffee break	Coffee break	Coffee break
11:00		Functionalization and molecular assembly	Magnetism	VdW optics	Quantum emitters
12:00					Closing
13:00		Lunch	Lunch	Lunch	Lunch
14:00	Arrival - Coffee				Departure
15:00	Opening Nanophotonics	Tribute to François Ducastelle	Social event	Nanotubes	
16:00	Break	Coffee break		Coffee break	
17:00	Spin coupling	Optics of 2D and layered materials		hBN optics	
18:00	Break	Poster clips I	Applications and devices		
19:00	Strain engineering		Poster clips II	General assembly	
20:00	Dinner	Dinner	Dinner	Gala dinner	
21:00		Poster session I	Poster session II	Party	
22:00					
23:00					