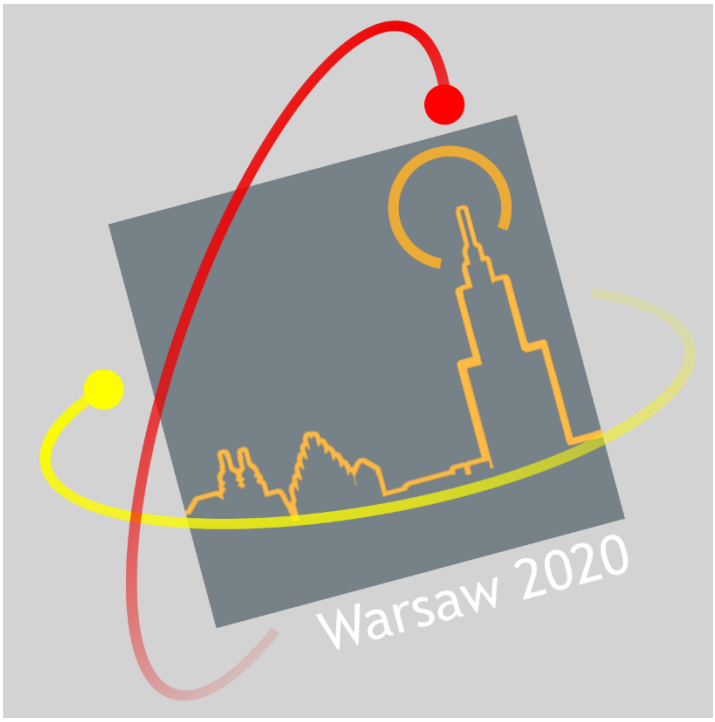
# 6TH INTERNATIONAL WORKSHOP ON THE OPTICAL PROPERTIES OF NANOSTRUCTURES

## OPON 2020

## Warsaw, 12.-14.02.2020

## Faculty of Physics, University of Warsaw, Pasteura St. 5

## PROGRAM




FACULTY OF PHYSICS
UNIVERSITY OF WARSAW

NLPQT
NATIONAL LABORATORY FOR PHOTONICS & QUANTUM TECHNOLOGIES

UMS

European Funds
Smart Growth

Republic of Poland

European Union
European Regional Development Fund

**Wednesday, 12.02.2020, lecture hall 0.03**

09:00 - 09:15 Opening (P. Kossacki - chairman, D. Wasik - dean of the Faculty of Physics)

Chairman: Tilmann Kuhn

09:15 - 09:45 P. Schnauber, J. Schall, S. Bounouar, T. Höhne, A. Singh, K. Sirinvasan, M. Davanco, J.-D. Song, S. Burger, S. Rodt, S. Reitzenstein
*Deterministically fabricated quantum dot - waveguide systems for on-chip quantum optics*

09:45 - 10:15 Doris Reiter
*Optical probe signals of quantum coherences in semiconductor quantum dots*

10:15 - 10:30 D. Kwiatkowski and Ł. Cywiński
*Dephasing of NV center spin qubits and what it tells us about their nuclear environment*

10:30 - 10:45 A. Mielnik-Pyszczorski, V. M. Axt, K. Gawarecki and P. Machnikowski
*Relaxation of electrons due to optical phonons in a quantum well-quantum dot system*

10:45 - 11:15 Coffee Break

Chairman: Jacek Kossut

11:15 - 11:45 K. Zawadzki, R. M. Serra, I. D'Amico
*Many-body correlations and work-distribution when crossing a quantum phase transition in finite time*

11:45 - 12:15 X. Lu, D. K. Mukherjee, and M. O. Görbig
*Surface spectroscopy of topological materials - beyond the chiral states*

12:15 - 12:30 F. Lengers, R. Rosati, T. Kuhn and D. E. Reiter
*Spatiotemporal Dynamics of Coulomb-correlated Carriers in Quantum Wires*

12:30 - 12:45 M. R. Molas, A. O. Slobodeniuk, K. Nogajewski, M. Bartos, Ł. Bala, A. Babiński, K. Watanabe, T. Taniguchi, C. Faugeras, M. Potemski
*Energy Spectrum of Two-Dimensional Excitons in a Nonuniform Dielectric Medium*

12:45 - 14:15 Lunch

Chairman: Marek Potemski

14:15 - 14:45 A.Knorr, F. Katsch, A. Carmele, M. Selig
*Exciton dynamics in atomically thin semiconductors: Coherent nonlinear dynamics, feedback and statistics*

14:45 - 15:15 T. Jakubczyk, C. Boule, D. Vaclavkova, M. Bartos, K. Nogajewski, G. Nayak, L. Scarpelli, G. Nogues, J. Coraux, J. Renard, V. Bouchiat, T. Taniguchi, K. Watanabe, W. Langbein, M. Potemski, J. Kasprzak
*Coherent dynamics and mapping of exciton states in layered semiconductors*

15:15 - 15:30 D. Christiansen, M. Selig, E. Malic, R. Ernstorfer, and A. Knorr
*Exciton dynamics in time and angle resolved photoemission spectroscopy*

15:30 - 15:45 J. Jadczak, J.Kutrowska-Girzycka, T. Smoleński, P. Kossacki, Y. S. Huang. L. Bryja
*Optical properties of $ReS_2$ as a function of a number of layers*

15:45 - 16:00 K. Rechcińska, M. Król, R. Mirek, R. Mazur, P. Morawiak, P. Kula, W. Piecek, M. Matuszewski, W. Bardyszewski, P. G. Lagoudakis, B. Piętka, J. Szczytko
*Rashba-Dresselhaus spin-orbit coupling orbit in tunable birefringent microcavity*

16:00 - 16:30 Coffee Break

16:30 - 18:00 Posters (see the list on page 5 & 6)

**Thursday, 13.02.2020, lecture hall 0.03**

Chairman: Paweł Machnikowski

09:00 - 09:30 H. Krenner
*Nonlinear Quantum Dot Optomechanics*

09:30 - 10:00 M. Świderski, P. Różański, M. Patera, and M. Zieliński
*Excitonic fine structure in alloyed nanowire quantum dots and quantum dot molecules*

10:00 - 10:15 D. Wigger, M. Weiß, M. Nägele, K. Müller, J. J. Finley, C. Schneider, M. Kamp, S. Höfling, J. Kasprzak, H. Krenner, T. Kuhn, P. Machnikowski
*Phonon induced dephasing and phonon control of excitons in single quantum dots*

10:15 - 10:30 Ł. Kłopotowski, J. Mikulski, M. Szymura, M. Parlińska-Wojtan, R. Minikayev, T. Kazimierczuk, J. Kossut
*Spin Relaxation in Cu-doped CdSe Colloidal Quantum Dots Is Exceptionally Slow*

10:30 - 10:45 A. Bogucki, Ł. Zinkiewicz, M. Grzeszczyk, W. Pacuski, K. Nogajewski, T. Kazimierczuk, A. Rodek, J. Suffczyński, K. Watanabe, T. Taniguchi, P. Wasylczyk, M. Potemski, P. Kossacki
*Ultra-long-working-distance spectroscopy of single nanostructures with aspherical solid immersion micro-lenses*

10:45 - 11:15 Coffee Break

Chairman: Stephan Reitzenstein

11:15 - 11:45 A. Vagov, M. Cosacchi, T. Seidelmann, F. Ungar, M. Cygorek, and V. M. Axt
*How photonic properties of dot-cavity systems can benefit from phonons*

11:45 - 12:15 M. Bayer
*Twisting magnetization by coherent phonons*

12:15 - 12:30 P. Karwat, P. Karwat, Y. Lai, G. Pasławski, D.E. Reiter, T. Kuhn, O. Hess
*Possible ways of phonon lasing generation in thermal quantum nanomachines*

12:30 - 12:45 E.D.S. Nysten, Yong Heng Huo, Hailong Yu, Guo Feng Song, A. Rastelli, H. J. Krenner
*Fused $LiNbO_3$-(Al)GaAs hybrids for quantum dots optomechanics*

12:45 - 14:15 Lunch

Chairman: Rudolf Bratschitsch

14:15 - 14:45 J. Jadczak
*Excitonic complexes and upconversion photoluminescence in atomically thin $WS_2$*

14:45 - 15:15 W. Pacuski, M. Grzeszczyk, K. Nogajewski, A. Bogucki, K. Oreszczuk, A. Rodek, J. Kucharek, K. E. Połczyńska, B. Seredyński, R. Bożek, S. Kret, T. Taniguchi, K. Watanabe, J. Sadowski, T. Kazimierczuk, M. Potemski, P. Kossacki
*MBE growth of $MoSe_2$ with well resolved excitonic transitions*

15:15 - 15:30 A. Arora, N. K. Wessling, T. Deilmann, T. Reichenauer, P. Steeger, P. Kossacki, M. Potemski, S. Michaelis de Vasconcellos, M. Rohlfing, and R. Bratschitsch
*Role of dark trions in the optical response of doped van der Waals semiconductors*

15:30 - 15:45 C. Boule, D. Vaclavkova, M. Bartos, K. Nogajewski, L. Zdrazil, T. Taniguchi, K. Watanabe, M. Potemski, J. Kasprzak
*Coherent microscopy of a $MoSe_2$ van der Waals heterostructure*

15:45 - 16:00 M. Król, K. Rechcińska, K. Nogajewski, M. Grzeszczyk, K. Łempicka, R. Mirek, S. Piotrowska, T. Taniguchi, K. Watanabe, M. R. Molas, M. Potemski, J. Szczytko, B. Piętka,
*Strong coupling regime in planar dielectric cavities incorporating multilayer $WSe_2$*

16:00 - 16:30 Coffee Break

16:30 - 18:00 Lab Tour: LUMS, Polariton, MBE/Visit to the Old Town and the Museum of Maria Skłodowska-Curie

19:30 Dinner at “Pod Gigantami” restaurant, Ujazdowskie 24 St.

**Friday, 14.02.2020, lecture hall 0.03**

Chairman: Andreas Knorr

09:00 - 09:30 R. Bratschitsch
*Ultrafast spintronic THz emitters*

09:30 - 10:00 M. Cygorek, M. Otten, M. Korkusinski, P. Hawrylak
Atomistic simulations of interacting carriers in semiconductor nanostructure using selected-state configuration-interaction

10:00 - 10:15 W. Rudno-Rudziński, P. Holewa, P. Wyborski, M. Burakowski, A. Musiał, M. Syperek, A. Kors, J. P. Reithmaier, G. Sęk, M. Benyoucef
*Excitons in new generation of symmetric InAs/InP quantum dots: single photon emission and influence of external magnetic field*

10:15 - 10:30 M. Patera, P. T. Różanski, M. Zieliński
*Crystal phase quantum dots: external electric field and self-consistent calculation*

10:30 - 10:45 S. Bounouar, G.Rein, J. Schneibler, K. Barkemeyer, A. Carmele, P. Schnauber, M. Gschrey, J.-H. Schulze, A. Strittmatter, S. Rodt, A. Knorr, S. Reitzenstein
*Entanglement robustness to excitonic spin precession in a quantum dot*

10:45 - 11:15 Coffee Break

Chairman: Jacek Majewski

11:15 - 11:30 M. Kobecki, A. Akimov, A. Scherbakov, M. Bayer
*Miniaturized lasers for picosecond ultrasonics*

11:30 - 11:45 M. Cosacchi, F. Ungar, M. Cygorek, V. M. Axt
*Direct access to many-body correlation energies in diluted magnetic semiconductors*

11:45- 12:00 J. Suffczyński, M. Ściesiek, W. Pacuski, K. Sawicki, K. Sobczak, T. Kazimierczuk, A. Golnik
*Interaction of distant quantum emitters in magnetically controlled coupled microcavities*

12:00 - 12:30 C. Schörner, M. Lippitz
*Single molecule nonlinearity in a plasmonic waveguide*

12:30 - 12:45 Closing

12:45 - 14:15 Lunch

**Posters:**

P01 D. Groll, D. Wigger, J. Kasprzak, and T. Kuhn
*Four-Wave Mixing Spectroscopy of a Quantum Dot-Microcavity System at Large Pulse Areas*

P02 M. Cosacchi, T. Seidelmann, F. Ungar, M. Cygorek, A. Vagov, A. M. Barth, T. Kuhn, and V. M. Axt
*Entanglement of two photons in the biexciton cascade inside a cavity: phonon effects in four different dot-cavity configurations*

P03 M. Cosacchi, F. Ungar, M. Cygorek, and V. M. Axt
*Exciton spin dynamics in diluted magnetic semiconductors: magnetic and non-magnetic carrier-impurity correlations, overshoots and ratchet behaviour*

P04 T. Seidelmann, M. Cygorek, F. Ungar, A. M. Barth, A. Vagov, V. M. Axt, and T. Kuhn
*Non-equivalence of photon-pair concurrences detected in different time-windows after emission from the biexciton cascade in a microcavity*

P05 T. Bracht, F. Lengers, D. E. Reiter
*Chirped pulses for the optical preparation of excitons in bulk semiconductors*

P06 K. Kawa, P. Machnikowski
*Spin-Orbit-Induced Hole Spin Relaxation in a Quantum Dot Molecule: the Effect of s-p Coupling*

P07 M. Krzykowski, K. Gawarecki, and P. Machnikowski
*Phonon-induced Hole Spin-Flip Relaxation in a Self-assembled Quantum Dot*

P08 A. Mielnik-Pyszczorski, K. Gawarecki, M. Gawełczyk, and P. Machnikowski
*Dominant role of shear-strain-induced admixture in spin-flip processes in self-assembled quantum dots*

P09 M. M. Sonner, A. Sitek, L. Janker, D. Rudolph, D. Ruhstorfer, M. Döblinger, A. Manolescu, G. Abstreiter, J. J. Finley, A. Wixforth, G. Koblmüller, H. J. Krenner
*Break-down of corner states and carrier localization by monolayer fluctuation in radial nanowire quantum wells*

P10 M. Neumann, D. E. Reiter
*Preparation of the dark exciton in a quantum dot using the optical Stark shift*

P11 I. Niehues, A. Blob, T. Stiehm, S. Michaelis de Vasconcellos, R. Bratschitsch
*Interlayer excitons in bilayer $MoS_2$ under mechanical strain*

P12 T. Hahn, D. Wigger, T. Kuhn
*Simulating the in uence of spectral jitter and phonons on heterodyne four-wave mixing signals of a single quantum dot*

P13 A. Völker, F. Lengers, and D. E. Reiter
*Simulation of coupled light field and carrier dynamics using the example of pump-probe spectroscopy in quantum wires*

P14 M. Bieniek, L. Szulakowska, and P. Hawrylak

*Effect of valley, spin, and band nesting on the electronic properties of gated quantum dots in a single layer of transition metal dichalcogenides*

P15 M. Selig, F. Katsch, D. Christiansen, E. Malic, and A. Knorr
*Valley and Spin Dynamics in TMDCs: The Interplay of Bright and Dark Excitons*

P16 K. Jürgens, F. Lengers, T. Kuhn, and D. E. Reiter
*Semiclassical Modelling of Coupled Quantum Dot-Cavity Systems: From Polariton-Like Dynamics to Rabi Oscillations*

P17 T. Heuser, J. Große, D. Brunner and S. Reitzenstein
*Developement of spectrally homogeneous microlaser arrays as a nanophotonic hardware platform for reservoir computing*

P18 R. Bogaczewicz, P. Machnikowski
*Resonance fluorescence on a single quantum dot in fluctuating environment*

P19 J. Rosiński, P. Karwat, K. Tarnowski and P. Machnikowski
*Unidirectional emission from quantum dot embedded in photonic crystal waveguide*

P20 G. Pasławski, P. Karwat
*Generation of phonon lasing in a thermal nanoscopic system*

P21 M. Gawełczyk and K. Gawarecki
*Tunneling-related electron spin relaxation in quantum-dot molecules*

P22 P. Wyborski, M. Gawełczyk, P. Podemski, J.P. Reithmaier, S. Höfling, G. Sęk
*Excited exciton states in single strongly asymmetric InP-based nanostructures emitting in C band*

P23 D. Vaclavkova, A. Delhomme, J. Dzian, C. Faugeras, A. Saul, A.R. Wildes, A. Bogucki, J. Suffczyński, P. Kossacki and M. Potemski
*Magnetic ordering in the transition-metal phosphorous trichalcogenides probed via Raman scattering*

P24 C. Rodríguez-Fernández, M. Almokhtar, W. Ibarra-Hernández, M. Morais de Lima Jr., A. H Romero, H. Asahi, A. Cantarero
*Crop up of the $B_{1l}$ mode in ultra narrow GaN nanowires due to isotopic disorder*

P25 P. T. Różanski, M. Patera, G. W. Bryant, and M. Zieliński
*Machine Learning approach to the inverse problem in STM*

P26 Y. Lai, P. Karwat, and O. Hess
*Generation of two mode phonon lasing in a four-level quantum system*

P27 J. Kierdaszuk, M. Tokarczyk, K. M. Czajkowski, A. Krajewska, Z. R. Żytkiewicz, G. Kowalski, T. J. Antosiewicz, M. Kamińska, A. Wysmołek, A. Drabińska
*Surface-enhanced Raman scattering in graphene deposited on AlxGa1-xN/GaN axial heterostructure nanowires*

P28 T. Fąs, M. Ściesiek, W. Pacuski, A. Golnik, J. Suffczyński
*Exciton Tunnelling Between Quantum Wells in Optical Microcavity*

P29 P. Stawicki, R. Mirek, M. Król, M. Furman, K. Tyszka, B. Seredyński, W. Pacuski, J. Suffczyński, J. Szczytko and B. Piętka
*Time dynamics of spin polarized exciton-polariton condensate*

P30 M. Muszyński, W. Pacuski, R. Mazur, W. Piecek, J. Suffczyński
*Large surface layers of $MoSe_2$ grown on $Si0_2$ /$Ti0_2$ Bragg mirrors by Molecular Beam Epitaxy*

P31 A. Łopion, A. Bogucki, W. Pacuski, T. Kazimierczuk, A. Golnik and P. Kossacki
*Charged exciton dissociation energy in (Cd,Mn)Te quantum wells with variable disorder and carrier density*