Dr hab. Wojciech Pacuski, prof. UW (Associate professor)
University of Warsaw, Institute of Experimental Physics, Faculty of Physics,
Division of Solid State Physics, ul. Pasteura 5, 02-093 Warsaw, Poland
phone (+48) 22-55-32-702, e-mail Wojciech.Pacuski@fuw.edu.pl
Born in 1979, Warsaw, Poland, http://www.fuw.edu.pl/~wmpac/

Education and scientific activity:
1998 - 2003 Master of Science at University of Warsaw, Faculty of Physics.
2003- 2007 PhD at Université Joseph Fourier (Grenoble) and University of Warsaw (these en cotutelle)
2008 - 2009 Post-doc at University of Bremen. Scholarships of DAAD, Humboldt F., Marie Curie.
2009 - Faculty position at University of Warsaw,
2010 - Head of new Molecular Beam Epitaxy lab.
2017 - Habilitation
2022 - Associate professor

19 invited talks including:

- 2007, American Physical Society March Meeting, Denver, USA
- 2006 and 2014 Int. Conf. of Semiconducting Compounds, Jaszowiec, Poland.
- 2009 and 2017 and, European Materials Research Society Fall Meeting, Warsaw, Poland
- 2014, The international society for optics and photonics (SPIE), San Diego, USA
- 2015, The 17th International Conference on II-VI Compounds, Paris, France.
- 2017, New Frontiers in 2D materials: Approaches & Applications, Villard de Lans, France
- 2018, 11th International Conference on Nanophotonics, Wrocław, Poland
- 2020 Apropos 17, Vilnius, Lithuania
- 2023 PCSI-48, Los Angeles, USA
- 2023 EP2DS&MSS, Grenoble, France

Mentoring:
Tutor of 4 defended PhD thesis (two as a main tutor, two as a co-tutor)
Tutor of 8 master theses, Tutor of 8 baccalaureate theses.

Managing research projects:
2011 - 2014 NCBiR research project Leader *Microcavities for yellow optoelectronics*.
2016 - 2022 NCN research project Sonata Bis.
2022 - NCN research project Opus.

Research:

I am interested in nanotechnology and physics of condense matter. Most of my research is devoted to design, fabrication, and low temperature magneto-optical spectroscopy of excitons in novel semiconductor nanostructures and materials. During PhD study in Grenoble (advisors D. Ferrand and J. Cibert) and Warsaw (advisors P. Kossacki and J. A. Gaj) I measured for the first time excitonic giant Zeeman effect in wide gap diluted magnetic semiconductors[6] [(Zn,Co)O[10], (Zn,Mn)O[5], (Ga,Mn)N[9], (Ga,Fe)N[8]]. During post-doc stage in Bremen, I learned molecular beam epitaxy (MBE) growth from C. Kruse and D. Hommel and I proposed and grew the first distributed Bragg reflector (DBR) lattice matched to ZnTe[7], designed for study of microcavities with CdTe quantum dots embedded in ZnTe barrier[4,15]. When I started work at University of Warsaw I launched molecular beam epitaxy lab for II-VI semiconductors. Just a few weeks after start of MBE growth we fabricated and observed (together with my PhD student J. Kobak) for the first time a QD with individual cobalt ion[3]. This was very surprising because there was a common expectation that quenching in such systems precludes observation of excitonic emission, but later, by fabrication of CdSe QDs with individual Mn and Fe ions, we confirmed that quenching is negligible in case of single magnetic dopants, even if energetically allowed[2,3]. This opened possibility of several interesting experiments with my colleagues from Laboratory of Ultrafast Magneto-Spectroscopy (LUMS).

Important present activity originates from concept developed together with my PhD student J.G Rousset, namely semimagnetic microcavities, which we are studied now with B. Piętka and her co-workers.[11] Together with J. Suffczyński and his coworkers we are developing double microcavities.[12] Recently, I am growing not only II-VI but also III-V semiconductors and additionally transition metal dichalcogenides, which thanks to atomically flat hBN substrate are for the first time of high optical quality just after growth[1], without mechanical processing. Structures grown in my MBE lab are studied in various places[13], e.g. in Sheffield (E. Chekhovich and his co-workers), for the first direct observation of hyperfine shifts and radiofrequency manipulation of the nuclear spins in individual II-VI quantum dot[14]. Recently I started growth of new epitaxial topological semimetals.

Major publications as a corresponding author:

1. "Narrow excitonic lines and large-scale homogeneity of transition metal dichalcogenide monolayer grown by MBE on hBN", W. Pacuski, M. Grzeszczyk, K. Nogajewski, A. Bogucki, K. Oreszczuk, J. Kucharek, K.E. Połczyńska, B. Seredyński, A. Rodek, R. Bożek, T. Taniguchi, K. Watanabe, S. Kret, J. Sadowski, T. Kazimierczuk, M. Potemski, P. Kossacki, **Nano Letters** 20, 3058 (2020).
2. "Magnetic Ground State of an Individual Fe^{2+} Ion in Strained Semiconductor Nanostructure", T. Smoleński, T. Kazimierczuk, J. Kobak, M. Goryca, A. Golnik, P. Kossacki, W. Pacuski**, Nature Commun.** 7, 10484 (2016)
3. "Designing quantum dots for solotronics" J. Kobak, T. Smoleński, M. Goryca, M. Papaj, K. Gietka, A. Bogucki, M. Koperski, J.-G. Rousset, J. Suffczyński, E. Janik, M. Nawrocki, A. Golnik, P. Kossacki, W. Pacuski, **Nature Communications** 5, 3191 (2014).
4. „Micropillar cavity containing a CdTe quantum dot with a single manganese ion" W. Pacuski, T. Jakubczyk, C. Kruse, J. Kobak, T. Kazimierczuk, M. Goryca, A. Golnik, P. Kossacki, M. Wiater, P. Wojnar, G. Karczewski, T. Wojtowicz, D. Hommel, Crystal Growth & Design 14, 988 (2014).
5. "Influence of *s,p-d* and *s-p* exchange couplings on exciton splitting in (Zn,Mn)O", W. Pacuski, J. Suffczynski, P. Osewski, P. Kossacki, A. Golnik, J. A. Gaj, C. Deparis, C. Morhain, E. Chikoidze, Y. Dumont, D. Ferrand, J. Cibert, T. Dietl, Phys. Rev. B 84, 035214 (2011);
6. W. Pacuski (single author), "Optical Spectroscopy of Wide-Gap Diluted Magnetic Semiconductors", chapter in "Introduction to the Physics of Diluted Magnetic Semiconductors" edited by Jan A. Gaj and Jacek Kossut, Springer Series in Materials Science Vol. 144, p. 37-63 (2010).
7. "High-reflectivity broadband distributed Bragg reflector lattice matched to ZnTe", W. Pacuski, C. Kruse, S. Figge, and D. Hommel, Applied Physics Letters 94, 191108 (2009).
8. „Observation of strong-coupling effects in a diluted magnetic semiconductor $Ga_{1-x}Fe_xN$" W. Pacuski, P. Kossacki, D. Ferrand, A. Golnik, J. Cibert, M. Wegscheider, A. Navarro-Quezada, A. Bonanni, M. Kiecana, M. Sawicki, and T. Dietl, **Physical Review Letters** 100, 037204 (2008).
9. "Excitonic giant Zeeman effect in GaN:Mn^{3+}", W. Pacuski, D. Ferrand, J. Cibert, J. A. Gaj, A. Golnik, P. Kossacki, S. Marcet, E. Sarigiannidou, and H. Mariette, Physical Review B 76, 165304 (2007).
10. "Effect of the s,p-d exchange interaction on the excitons in (Zn,Co)O epilayers", W. Pacuski, D. Ferrand, J. Cibert, C. Deparis, J. A. Gaj, P. Kossacki, and C. Morhain; Physical Review B 73, 035214 (2006).

Other important publications:

11. "Neuromorphic binarized polariton networks", R. Mirek, A. Opala, P. Comaron, M. Furman, M. Król, K. Tyszka, B.j Seredyński, D. Ballarini, D. Sanvitto, T. C. H. Liew, W. Pacuski, J. Suffczyński, J. Szczytko, M. Matuszewski, B.Piętka, **Nano Letters** (2021).
12. "Polariton lasing and energy-degenerate parametric scattering in non-resonantly driven coupled planar microcavities", K. Sawicki, T. J. Sturges, M. Ściesiek, T. Kazimierczuk, K. Sobczak, A. Golnik, W. Pacuski, J. Suffczyński, **Nanophotonics** 10, 2421 (2021).
13. "Ultra-long-working-distance spectroscopy of single nanostructures with aspherical solid immersion microlenses", 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, **Light: Science & Applications** 9, 48 (2020).
14. "Direct measurement of hyperfine shifts and radiofrequency manipulation of the nuclear spins in individual CdTe/ZnTe quantum dots", G. Ragunathan, J. Kobak, G. Gillard, W. Pacuski, K. Sobczak, J. Borysiuk, M. S. Skolnick, E. A. Chekhovich, **Physical Review Letters**, 122, 096801 (2019),
15. "Inhibition and Enhancement of the Spontaneous Emission of Quantum Dots in Micropillar Cavities with Radial Distributed Bragg Reflectors", T. Jakubczyk, H. Franke, T. Smoleński, M. Ściesiek, W. Pacuski, A. Golnik, R. Schmidt-Grund, M. Grundmann, C. Kruse, D. Hommel, P. Kossacki, **ACS Nano** 8, 9970 (2014).
16. "Magnetization Dynamics Down to a Zero Field in Dilute (Cd,Mn)Te Quantum Wells", M. Goryca, D. Ferrand, P. Kossacki, M. Nawrocki, W. Pacuski, W. Maślana, J. A. Gaj, S. Tatarenko, J. Cibert, T. Wojtowicz, G. Karczewski, **Physical Review Letters** 102, 046408 (2009).