

PERSONAL INFORMATION

Family name: KNAP First name: Wojciech
 Researcher unique identifier: <https://orcid.org/0000-0003-4537-8712>
 Date of birth: 26.01.1955 Nationality: Polish and French
 URL for web site: https://centera.eu/en/zespol_pracownicy/wojciech-knap-2/

EDUCATION

2013 Professor – National Nomination, Poland
 2012 1st Class Research Director, Laboratory Charles Coulomb, CNRS and University of Montpellier, France
 2010 Habilitation Solid State Physics, Physics Department University of Warsaw, Poland
 2005 Research Director, Laboratory Charles Coulomb, CNRS & University of Montpellier, France
 1992 1st Class Charge de Recherche, Laboratory Charles Coulomb, CNRS & University Montpellier France
 1992 Habilitation Solid State Physics, Physics Department, University of Montpellier, France
 1985 PhD in Physics, Solid State Department, University of Warsaw, Poland
 1979 Master of Sciences in Physics, Solid State Department, University of Warsaw, Poland

CURRENT POSITIONS

2016 - 2021 Director International Research Agenda CENTERA, Polish Academy of Sciences, Warsaw, Poland
 2013 - 2021 Director of the Terahertz Science and Technology Research Group
 at Institute of High Pressure Physics Institute of the Polish Academy of Sciences (PAS), Warsaw, Poland
 1992 - 2021 Research Director, Laboratory Charles Coulomb, CNRS and University , Montpellier France

PREVIOUS POSITIONS

2007-2008: Associated Professor Tohoku University – Sendai, Japan
 1999-2001: Associated Professor at Rensselaer Polytechnic Institute, Troy-New York, USA
 1991-1992: Professor, Paul Sabatier University, Toulouse, France
 1989-1990: Researcher, CNRS-SNCI Grenoble, Grenoble, France
 1987-1989: Lecturer, University of Montpellier II, Montpellier, France
 1983-1987: Assistant Professor, Solid State Department, University of Warsaw, Poland
 1979-1983: Faculty Assistant, Solid State Department, University of Warsaw, Poland

FELLOWSHIPS

2017, 2018, 2019 Tohoku University Scientific Council Fellowship Short Stay (1-3months) - Sendai, Japan
 2016: Foreign Guest Researcher Fellowship (3 months) - Terahertz Institute – RIKEN – Sendai, Japan
 2007-2008: Tohoku University Scientific Council Fellowship long stay – one year - Tohoku University – Sendai, Japan
 1999-2001: Foreign Guest Researcher Fellowship - Rensselaer Polytechnic Institute, Troy-New York, USA

AWARDS and HONORABLE ACHIEVEMENTS

ERC Advanced Grant Towards On-Chip Plasmonics Amplifiers Of THz Radiation (TERAPLASM) 2022

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

Direction and co - Direction	Master	PhD	Post Docs
2001-2022 Institute of High Pressure Physics Polish Academy of Sciences, Warsaw, Poland	1	6	6
1987 -2019 L2C CNRS &University of Montpellier France	-	6	12
2006 - 2017 RIEC, Tohoku University, Sendai, Japan	-	1	1
1990 - 1992 High Magnetic Field Laboratory CNRS, Toulouse, France	2	-	-
1999 - 2001 Rensselaer Polytechnic Institute, Troy, NY, USA	-	1	-
1979 - 1987 Physics Department, University of Warsaw, Poland	2	2	-

TEACHING ACTIVITIES

1987 - 1990: Assistant Lecturer Physics and Electronics/University of Montpellier/France
 1981 - 1987: Assistant Lecturer Electronics /University of Warsaw/ Poland
 1980: : Assistant Lecturer Solid State Physics/University of Warsaw/ Poland
 1979: : Assistant Lecturer Physics /University of Warsaw/ Poland.

ORGANISATION OF SCIENTIFIC MEETINGS

2019 Member of Scientific Committee of 23rd International Conference on Infrared, Millimetre and Terahertz Waves, Paris, France

2013 Chairman – Terahertz Technology Workshop – at Materials Research Society, International Conference – MRS-2013, Warsaw ,Poland
 2008 Chairman –Terahertz Workshop – Conference PIERS Marrakesh, Morocco
 2005-2020 Chairman of Annual Workshops of International Research Network – Terahertz Science and Technology, Montpellier, France and Warsaw, Poland
 1998 co-Chairman of “ 8th International Conference on Shallow Level Centres in Semiconductors” , satellite of International Conference on Physics of Semiconductor Montpellier, France
 1993 - 1998- Head organizer of Internal Seminars “Semiconductor Research Group – GES” University of Montpellier, France.

INSTITUTIONAL RESPONSIBILITIES

2018 - 2023 Principle Investigator, International Research Agenda, Institute of High Pressure Physics – Polish Academy of Sciences, Poland
 2017 - 2020 Principle Investigator, International Polish -French Laboratory – Institute of High Pressure Physics – Polish Academy of Sciences, Poland & National Research Center (CNRS) Montpellier, France
 2003 -2021 Founder and Principle Investigator of - Terahertz Laboratory (NL11), Institute of High Pressure Physics, Polish Academy of Sciences, Poland
 2001 – 2021 Principal Investigator of Terahertz Science and Technology group, Physics Department of the University of Montpellier, France

REVIEWING ACTIVITIES

2015 - 2021 Member of Editorial Board European Physical Journal - Applied Physics, France
 2021 - 2025 Member of Editorial Board Electronics MDPI, Switzerland
 2000 - 2021 Reviewer for Nature, PRB, Sensors, Applied Physics Letters, Journal of Applied Physics
 2019 –Scientific Evaluation, National Terahertz Institute at RIKEN, Sendai, Japan
 2017 Scientific Evaluation of National Institute of Terahertz Science and Technology, Beijing, China

MEMBERSHIPS OF SCIENTIFIC SOCIETIES / RESEARCH NETWORKS / RESEARCH GROUPS and SPIN-OFFs

2004 - 2012 Founder and PI of National Research Network (GDR) “*Solid State based Terahertz Emitters and Detectors*”, France
 2012 - 2015 Co-Founder and PI on French side - COST ACTION MP1204: “*TERA-MIR Radiation: Materials, Generation, Detection and Applications*” also member of Management Committee, France
 2013 - 2018 Founder and PI of International Research Network “*Semiconductor based Terahertz Emitters and detectors*”
 2017 - 2020 Founder and PI of International Research Laboratory “*Terahertz and Mid-Infrared Collective Phenomena in Semiconductor Nanostructures*” - TERAMIR France-Poland-Russia
 2002 2021 Founding Member Terahertz Science and Technology Group, Physics Department of the University of Montpellier, France
 2004 -2021 Founding Member Terahertz Laboratory, Institute of High Pressure Physics, Polish Academy of Sciences, Poland
 2014 - 2021 Founding Member, Spin off Enterprise “Terakalis” web page... <https://www.terakalis.com/>
 Faculty of Physics University of Montpellier, France

MAJOR COLLABORATIONS

1. Prof. M.Shur, Plasma Wave Terahertz Excitations in Nanostructures Faculty of Electronics, Rensselaer Polytechnic Institute, Troy NY, USA
2. Prof. Taichi Otsuji, Terahertz Excitations and Plasma Waves in 2D materials Research Institute of Electrical Communication (RIEC), Tohoku University, Japan
3. Prof. V. Gavrilenko, Topological Properties of Mercury Cadmium Telluride Heterojunctions Institute of Physics of Microstructures of the Russian Academy of Sciences, Nizhniy Novgorod, Russia
4. Prof. H. Roskos Plasma waves in graphene and other 2D materials, Department of Physics, Goethe University Frankfurt, Germany
5. Prof. N. Averkiev and Prof. V Kachorovskii, Terahertz Spin and Plasmonic Excitations in Solids, Theoretical Physics Department, Ioffe Physical Technical Institute, St. Petersburg, Russia
6. Prof S. Ganichev, Terahertz Ratchet and other Plasmonic Detection Mechanisms in 2D Materials, Physics Department University of Regensburg, Germany
7. Prof. M. Orlita and Prof. M. Potemski, High Field Magnetic Field Properties of Dirac Matter High Magnetic Field Laboratory, National Research Centre (CNRS) Grenoble, France

10 years track record

10 Main papers from total 530 papers cited 12 518 times (<https://orcid.org/0000-0003-4537-8712>), with the citation number growing steadily to 900 per year, producing h-index of 55 (Scopus Dec 12, 2002):

- 1) Sakowicz, M., Lifshits, M., Klimenko, O., Schuster, F., Coquillat, D., Teppe, F. and Knap, W. *Terahertz responsivity of field effect transistors versus their static channel conductivity and loading effects*, **Journal of Applied Physics** 110, 2011, pp. 4512. [DOI:10.1063]
- 2) Schuster F, Coquillat D, Videlier H, Sakowicz M, Teppe F, Dussopt L, Giffard B, Skotnicki T, Knap W: *Broadband terahertz imaging with highly sensitive silicon CMOS detectors*. **Opt Express** 2011, 19 (8), 7827-7832. [DOI: [10.1364/OE.19.007827](https://doi.org/10.1364/OE.19.007827) (open access)] [IF'2011=3.669]
- 3) Zholudev M, Teppe F, Orlita M, Consejo C, Torres J, Dyakonova N, Czapkiewicz M, Wróbel J, Grabecki G, Mikhailov N, Dvoretzskii S, Ikonnikov A, Spirin K, Aleshkin V, Gavrilenko V, Knap W: *Magneto spectroscopy of two-dimensional HgTe-based topological insulators around the critical thickness*. **Phys Rev B** 2012; 86(20): 205420 [DOI: [10.1103/PhysRevB.86.205420](https://doi.org/10.1103/PhysRevB.86.205420) (access also [Res. Gate](#))] [IF'2012=3.575]
- 4) Knap W, Rummyantsev S, Vitiello MS, Coquillat D, Blin S, Dyakonova N, Shur M, Teppe F, Tredicucci A, Nagatsuma T : *Nanometer size field effect transistors for terahertz detectors*. **Nanotechnology** 2013, 24 (21). [DOI: [10.1088/0957-4484/24/21/214002](https://doi.org/10.1088/0957-4484/24/21/214002) (also [Res. Gate](#))] [IF'2013=3.672]
- 5) Coquillat D, Marczewski J, Kopyt P, Dyakonova N, Giffard B, Knap W: *Improvement of terahertz field effect transistor detectors by substrate thinning and radiation losses reduction*. **Opt Express** 2016; 24(1):272-281 [DOI: [10.1364/OE.24.000272](https://doi.org/10.1364/OE.24.000272) (OA)] [IF'2016=2.849]
- 6) Szkudlarek K, Sypek M, Cywiński G, Suszek J, Zagrajek P, Feduniewicz-Żmuda A, Yahniuk I, Yatsunenkov S, Nowakowska-Siwińska A, Coquillat D, But DB, Rachoń M, Węgrzyńska K, Skierbiszewski C, Knap W: *Terahertz 3D printed diffractive lens matrices for field-effect transistor detector focal plane arrays*. **Opt Express** 2016; 24(18): 20119–31. [DOI: [10.1364/OE.24.020119](https://doi.org/10.1364/OE.24.020119) (OA)] [IF'2016=2.849].
- 7) Yahniuk I, Krishtopenko SS, Grabecki G, Jouault B, Consejo C, Desrat W, Majewicz M, Kadykov AM, Spirin Kirill E., Gavrilenko VI, Mikhailov NN, Dvoretzskii SA, But DB, Teppe F, Wróbel J, Cywiński G, Kret S, Dietl T, Knap W: *Magneto-transport in inverted HgTe quantum wells*. **NPJ Quant Materials** 2019; 4: 13-18 [DOI: [10.1038/s41535-019-0154-3](https://doi.org/10.1038/s41535-019-0154-3) (OA)] [IF'2019=6.562]
- 8) But DB, Mittendorff M, Consejo C, Teppe F, Mikhailov NN, Dvoretzskii SA, Faugeras C, Winnerl S, Helm M, Knap W, Potemski M, Orlita M: *Suppressed Auger scattering and tunable light emission of Landau-quantized massless Kane electrons*. **Nat Photonics** 2019; 13(11): 783–7. [DOI: [10.1038/s41566-019-0496-1](https://doi.org/10.1038/s41566-019-0496-1) (also [arxiv](#))] [IF'2019=31.241]
- 9) Boubanga-Tombet S, Knap W, Yadav D, Satou A, But DB, Popov VV, Gorbenko IV, Kachorovskii V, Otsuji T: *Room-Temperature Amplification of THz Radiation by Grating-Gate Graphene Structures*. **Phys Rev X** 2020; 10(3): 031004. [DOI: [10.1103/PhysRevX.10.031004](https://doi.org/10.1103/PhysRevX.10.031004) (OA)] [IF'2019=12.189]
- 10) Vainshtein S, Duan G, Rahkonen T, Taylor Z, Zemlyakov V, Egorkin V, Smolyanskaya O, Skotnicki T, Knap W: *Self-damping of the relaxation oscillations in miniature pulsed transmitter for sub-ns-precision, long-distance LIDAR*. **Results Phys** 2020; 19:103509; [DOI: [10.1016/j.rinp.2020.103509](https://doi.org/10.1016/j.rinp.2020.103509)] [IF'2020=4.019]

Book Chapters

- 1) Knap W, Dyakonov MI: *Field effect transistors for terahertz applications*. Handbook of THz Technology for Imaging, Sensing and Communications, Woodhead Publishing Series in Electronic and Optical Materials 2013, 121-155 [DOI: [10.1533/9780857096494.1.121](https://doi.org/10.1533/9780857096494.1.121)]
- 2) N. Ahter N; Pala, W.Knap, M.Shur: *Terahertz Plasma Field Effect Transistors Detectors* , Fundamentals of Terahertz Devices and Applications, John Wiley & Sons Ltd., 2021, 285-322 [DOI: [10.1002/9781119460749](https://doi.org/10.1002/9781119460749)]

Conferences - Invited Keynote Tutorial Talks (10 selected from over of 50 presented in last ten years)

- 1) Knap W, Rummyantsev S: *Physical limitations of Terahertz Detectors based on FETs (Invited)*. **International Workshop on Terahertz Science and Technology OTST**, April 2013 Kyoto, Japan
- 2) Knap W: *Overview on physical limits of Terahertz Field Effect Transistors (Keynote)*, **38th Intl. Conf. on IR, mm & THz Waves**, 1-6 Sept 2013, Mainz, Germany [DOI: [10.1109/IRMMW-THz.2013.6665397](https://doi.org/10.1109/IRMMW-THz.2013.6665397)]
This is a keynote on FET on a major conference in the field, held yearly since 1974.
- 3) Knap W et al: *Terahertz Plasma FETs - First Imaging Applications (Plenary)*, International Conference on Emerging Technologies ETMOS, 25–27 May 2016, Montreal, Canada

- 4) Knap W, But D, Teppe F, Suszek J, Siemion AM, Sypek M, Cywinski G: *Terahertz Plasma Field Effect Transistors: From Basic Physics to First Postal Scanners Imaging Applications (Invited)*, **46th European Microwave Conference**, 3-7 October **2016**, London, UK
- 5) Knap W: *Plasma Field Effect Transistor Arrays For Imaging In Sub-THz Atmospheric Windows (Invited/Plenary)*”, Symposium on Fundamental and Applied Problems of Terahertz Devices and Technologists **RJUSE TeraTech**, 31 Oct – 1 Nov **2016**, Sendai, Japan, [[5th RJUSE-TeraTech 2016](#)]
- 6) Knap W et al: *THz Imaging and Wireless Communication with Nanometer Field Effect Transistor Arrays (Plenary)*; **17th Intl Conf on Emerging Technologies ETMOS** , 28-30 May **2017**, Warsaw
- 7) Knap W et al: *Terahertz imaging and wireless communication with nanometer field effect transistor arrays (Invited)*. **International Symposium on Photonics and Optical Communications (ISPOC 2017)** November 2017, Katahira – Sendai, Japan
- 8) Knap W, Zaborowski M, Marczewski J, Tomaszewski D, Zagrajek P, But D, Sai P, Yahniuk I, Dyakonova N, Coquillat D, Teppe F, Cywiński G: *Field Effect Transistors Based Terahertz Detectors 25 Years History, State of the Art and Future Directions (Keynote)*; **43rd Intl Conf Infrared, Millimeter, and THz Waves (IRMMW-THz) 9-14 Sept 2018**, Nagoya, Japan [DOI: [10.1109/IRMMW-THz42161.2018](https://doi.org/10.1109/IRMMW-THz42161.2018); see [IRMMW](#)] (also a member of the Technical Program Committee)
- 9) Knap et al: *THz plasma oscillations in Nanotransistors-Basic Science and Applications (Invited Tutorial)*, **XXIII Intl Symposium Nanophysics Nanoelectronics**, 10–14 March **2019**, Nizhny Novgorod, Russia
- 10) Knap W: *THz Plasma Excitations in Graphene and GaN nanostructures – comparative studies (Invited)*; **Terahertz Technologies & Applications Summer School, 12-16 July 2021**, Eindhoven, Netherlands

Patents

- 1) *Laser device for emitting waves in the THz range* – patented in France (FR1153384 issued 2014-03-28), in EU (EP12717094 issued 2015-10-14) and US (US14/112,435 issued 2014-07-01) – all in force
- 2) *Device for measuring the state of polarization of an incident wave of frequency 10 GHz to 30 THz* – patented in France (FR1161615 issued 2013-12-27), in EU (EP12794736 issued 2015-10-21) and in US (US14/365,395 issued 2017-08-08) - all three in force
- 3) *FET Terahertz detector with large bandwidth and large dynamic range* - patented only in GB (GB201313912 issued 2017-01-04), in force
- 4) *Impedance adaptation in a THz detector* – patented in GB (GB201410640 issued 2016-08-10, in force) and in US (US14/735,372 issued 2017-04-04, expired)

Notably, first two patents are now licensed to TERAKALIS, a spinoff of CNRS with myself as a co-founder, (<https://www.terakalis.com/en/company/founders-team/>) that has been actively pursuing their commercialization in recent years and grew to employ over 20 people . The last two are owned and exploited exclusively by Canon under the terms of the original grant agreement between Canon and CNRS. Our recent work at CENTERA has also led to a series of patent applications in THz domain (pending). Thus the ‘basic’ research I am conducting easily leads to patentable commercial solutions.

Organizational achievements

- 1) **COST TERA-MIR** action (2013-2016) – I was the official national French coordinator for this COST action to advance novel materials, concepts and device designs for generating and detecting THz (0.3 THz to 10 THz) and Mid-IR (10 THz to 100 THz) radiation, involving 23 countries.
- 2) **LIA TeraMIR** – in 2013 CNRS funded an international laboratory under my supervision, coordinating efforts of 8 research groups from France, Poland and Russia. It got extended for 2019-2023.
- 3) **CENTERA Laboratories** In 2018 I obtained nearly 8 million € through the IRAP Program of Foundation of Polish Science (financed from SGOP of EU) and created CENTERA Labs, an autonomous THz research unit of the Polish Academy of Sciences.
- 4) **RJUSE International Conference** –(Russia-Japan-US-Europe) – is an initiative aiming at connecting major centers and scientists working in the field of THz. I am a member of its International Steering Committee since 2016 and I managed to expand the original Russia-Japan-US concept to include Europe – the first RJUSE (with myself as a Chair) was held in Warsaw in 2018.

Scientific grades : Master of Sciences 1979/PhD 1985/Habilitation 2010/Professor 2013

Awards and honorable achievements

ERC Advanced Grant Towards On-Chip Plasmonics Amplifiers Of THz Radiation (TERAPLASM) 2022