

## List of publications

### Books

- [1] S. Preu, G. H. Döhler, S. Malzer, A. Stöhr, V. Rymanov, T. Göbel, E. R. Brown, M. Feiginov, R. Gonzalo, M. Beruete, and M. Navarro-Cía, "Principles of thz generation," in *Semiconductor Terahertz Technology* (John Wiley & Sons, Ltd, 2015) pp. 3–68.
- [2] M. Feiginov, R. Gonzalo, I. Maestrojuán, O. Cojocari, M. Hoefle, and E. Limiti, "Thz electronics," in *Semiconductor Terahertz Technology* (John Wiley & Sons, Ltd, 2015) pp. 254–303.

### Journal publications

- [1] M. Feiginov, "Sub-THz and THz microstrip resonant-tunneling-diode oscillators," *Appl. Phys. Lett.* **107**, 123504 (2015).
- [2] M. Feiginov, H. Kanaya, S. Suzuki, and M. Asada, "Operation of resonant-tunneling diodes with strong back injection from the collector at frequencies up to 1.46 THz," *Appl. Phys. Lett.* **104**, 243509 (2014).
- [3] M. Feiginov, C. Sydlo, O. Cojocari, and P. Meissner, "Resonant-tunnelling diodes for thz applications," *Proc. SPIE* **8496**, 84960A–10 (2012).
- [4] M. Feiginov, C. Sydlo, O. Cojocari, and P. Meissner, "Operation of resonant-tunnelling-diode oscillators beyond tunnel-lifetime limit at 564 GHz," *EPL* **97**, 58006 (2012).
- [5] M. Feiginov, C. Sydlo, O. Cojocari, and P. Meissner, "Resonant-tunnelling-diode oscillators operating at frequencies above 1.1 THz," *Appl. Phys. Lett.* (selected as a research highlight) **99**, 233506 (2011).
- [6] M. Feiginov, C. Sydlo, O. Cojocari, and P. Meissner, "High-frequency nonlinear characteristics of resonant-tunnelling diodes," *Appl. Phys. Lett.* **99**, 133501 (2011).
- [7] T. Göbel, D. Schoenherr, C. Sydlo, M. Feiginov, P. Meissner, and H. L. Hartnagel, "Reliability investigation of photoconductive continuous-wave terahertz emitters," *IEEE Transactions on Microwave Theory and Techniques* **59**, 2001–2007 (2011).
- [8] M. Feiginov, C. Sydlo, O. Cojocari, and P. Meissner, "Operation of resonant-tunnelling oscillators beyond tunnel-lifetime limit," *EPL* **94**, 48007 (2011).
- [9] M. Feiginov, I. N. Kotelnikov, and N. A. Mordovets, "Strong inhomogeneity of the tunnel Schottky structures with  $\delta$ -doped two-dimensional channels at large bias," *Phys. Rev. B* **82**, 075318 (2010).
- [10] M. Feiginov and D. Roy Chowdhury, "Experimental demonstration of resonant-tunneling-diode operation beyond quasibound-state-lifetime limit," *Journal of Physics: Conference Series* **193**, 012016 (2009).
- [11] T. Göbel, D. Schoenherr, C. Sydlo, M. Feiginov, P. Meissner, and H.L. Hartnagel, "Continuous-wave single-sampling-point characterisation of optoelectronic on-chip terahertz transceiver," *Electron. Lett.* **45**, 1171–1172 (2009).
- [12] M. Feiginov and I. N. Kotelnikov, "Attainability of negative differential conductance in tunnel schottky structures with 2d channels: theory and experiment," *Proc. SPIE* **7364**, 73640C–9 (2009).
- [13] T. Göbel, D. Schoenherr, C. Sydlo, M. Feiginov, P. Meissner, and H.L. Hartnagel, "Single-sampling-point coherent detection in continuous-wave photomixing terahertz systems," *Electron. Lett.* **45**, 65–66 (2009).
- [14] J. Sigmund, J.-F. Lampin, V. Ivannikov, C. Sydlo, M. Feiginov, D. Pavlidis, P. Meissner, and H. L. Hartnagel, "Low-temperature grown gaassb with sub-picosecond photocarrier lifetime for continuous-wave terahertz measurements," *IEICE Transactions on Electronics* **E91.C**, 1058–1062 (2008).
- [15] T. Göbel, D. Schoenherr, C. Sydlo, M. Feiginov, P. Meissner, and H.L. Hartnagel, "Continuous-wave terahertz system with electro-optical terahertz phase control," *Electron. Lett.* **44**, 863–864 (2008).
- [16] M. Feiginov and D. Roy Chowdhury, "Resonant-tunnelling diodes beyond quasi-bound-state lifetime limit," *Proc. SPIE* **6892**, 68920D–10 (2008).
- [17] A. Lisauskas, M. Dias, S. Belz, R. Sachs, M. Feiginov, and H. G. Roskos, "Concept of internal mixing in semiconductor lasers and optical amplifiers for room-temperature generation of tunable continuous terahertz waves," *Physica E: Low-dimensional Systems and Nanostructures* **40**, 1968 – 1970 (2008).
- [18] M. Feiginov and D. Roy Chowdhury, "Operation of resonant-tunneling diodes beyond resonant-state-lifetime limit," *Appl. Phys. Lett.* (at the journal cover) **91**, 203501 (2007).
- [19] M. Feiginov, "Analysis of limitations of terahertz p-i-n uni-traveling-carrier photodiodes," *J. Appl. Phys.* **102**, 084510 (2007).
- [20] M. Feiginov and I. N. Kotelnikov, "Evidence for attainability of negative differential conductance in tunnel Schottky structures with two-dimensional channels," *Appl. Phys. Lett.* **91**, 083510 (2007).
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- [22] I. N. Kotelnikov, S. E. Dizhur, M. Feiginov N., and N. A. Mordovets, "The effect of photon energy and temperature on the persistent tunneling photoconductivity effect in  $\text{Al}/\delta(\text{Si})$ -GaAs structures," *Semiconductors* **40**, 818–824 (2006).
- [23] R. Mendis, C. Sydlo, J. Sigmund, M. Feiginov, P. Meissner, and H.L. Hartnagel, "Spectral characterization of broadband THz antennas by photoconductive mixing: toward optimal antenna design," *Ant. and Wireless Prop. Lett., IEEE* **4**, 85 – 88 (2005).

- [24] R. Mendis, C. Sydlo, J. Sigmund, **M. Feiginov**, P. Meissner, and H. L. Hartnagel, "Coherent generation and detection of continuous terahertz waves using two photomixers driven by laser diodes," *International Journal of Infrared and Millimeter Waves* **26**, 201–207 (2005).
- [25] R. Mendis, C. Sydlo, J. Sigmund, **M. Feiginov**, P. Meissner, and H. L. Hartnagel, "Tunable cw-thz system with a log-periodic photoconductive emitter," *Solid-State Electronics* **48**, 2041 – 2045 (2004).
- [26] V. Krozer, B. Leone, H. G. Roskos, T. Löffler, G. Loata, G. H. Dohler, F. Renner, S. Eckardt, S. Malzer, A. SchwanhauBer, T. O. Klaassen, A. Adam, P. Lugli, A. Di Carlo, M. Manenti, G. Scamarcio, M. S. Vitiello, and **M. Feiginov**, "Optical far-ir wave generation - state-of-the-art and advanced device structures," *Proc. SPIE* **5466**, 178–192 (2004).
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- [28] E.M. Dizhur, A.N. Voronovsky, I.N. Kotelnikov, S.E. Dizhur, and **M. Feiginov**, "Experimental study of pressure influence on tunnel transport into 2deg," *physica status solidi (b)* **235**, 531–535 (2003).
- [29] **M. Feiginov**, "Negative differential conductance in the tunnel Schottky contact with two-dimensional channel," *Appl. Phys. Lett.* **81**, 930–932 (2002).
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- [31] **M. Feiginov**, "Displacement currents and the real part of high-frequency conductance of the resonant-tunneling diode," *Appl. Phys. Lett.* **78**, 3301–3303 (2001).
- [32] **M. Feiginov**, "Effect of the Coulomb interaction on the response time and impedance of the resonant-tunneling diodes," *Appl. Phys. Lett.* **76**, 2904–2906 (2000).
- [33] **M. Feiginov**, "Does the quasibound-state lifetime restrict the high-frequency operation of resonant-tunneling diodes?" *Nanotechnology* **11**, 359 (2000).
- [34] **M. Feiginov** and V. A. Volkov, "Skin effect and response of semiconductor barrier structures," *JETP Lett.* **69**, 336–342 (1999).
- [35] **M. Feiginov**, V. A. Volkov, and J. C. Maan, "Lateral inhomogeneity of current in the resonant tunneling regime," *Phys. Low-Dim. Struct.* **1/2**, 67–73 (1999).
- [36] **M. Feiginov** and V. A. Volkov, "Self-excitation of 2D plasmons in resonant tunneling diodes," *JETP Lett.* **68**, 662–668 (1998).
- [37] **M. Feiginov** and V. A. Volkov, "The resonance behavior of the ac impedance of the one-barrier and two-barrier semiconductor tunnel structures," *Institute of Physics Conference Series – "Compound Semiconductors 1996"* **155**, 65–68 (1997).
- [38] **M. Feiginov**, S. A. Mikhailov, and V. A. Volkov, "Tunnel junction plasmons in hydrodynamic approximation," *Phys. Low-Dim. Struct.* **9**, 1–9 (1994).

## Patents

- [1] **M. Feiginov**. "Calibration of a radar system with optical camera". Filed (2016).
- [2] **M. Feiginov**, Y. Koyama. "Element, and oscillator and information acquiring device including the element". Filed (2016).
- [3] **M. Feiginov**. "Parameters of traveling-wave THz oscillators". Filed (2015).
- [4] B. Sartorius, **M. Feiginov**, C. Sydlo. DE102006058395, US2010080505 (2010), "Anordnung zur elektro-optischen Ansteuerung und schnellen Modulation von THz-Sendern und THz-Messsystemen" (Arrangement for electro-optic control and fast modulation of THz emitters and THz measurement systems). Filed (2006).

## Conference presentations

- [1] **M. Feiginov**. (Invited) "Resonant-Tunnelling-Diode Oscillators at THz Frequencies." EMN Meeting on Terahertz 2016, San Sebastian, Spain, May 14–18, 2016.
- [2] **M. Feiginov**, H. Kanaya, S. Suzuki and M. Asada. "1.46 THz RTD oscillators with strong back injection from collector." 39th Int. Conference on Infrared, Millimeter, and Terahertz Waves, Tucson, AZ, USA, September 14–19th, 2014.
- [3] **M. Feiginov**, C. Sydlo, O. Cojocari and P. Meissner. "THz resonant-tunnelling-diode oscillators and tunnel-lifetime limitation". Int. Symp. on Opt. Communication 2013, Tokyo, Japan, August 9–11, 2013.
- [4] **M. Feiginov**, C. Sydlo, O. Cojocari and P. Meissner. "THz resonant-tunnelling-diode oscillators and tunnel-lifetime limitation". 18th Int. Conf. on Electron Dynamics in Semiconductors, Optoelectronics and Nanostructures, EDISON18, Matsue, Japan, July 22–26, 2013.
- [5] C. Sydlo, **M. Feiginov**, O. Cojocari and P. Meissner. (Invited) "Resonant-tunnelling-diode-based THz transmitter". ISUPTW 2012 - 6th International Symposium on Ultrafast Phenomena and THz Wave, Wuhan, China, 1–2 November 2012.
- [6] **M. Feiginov**, C. Sydlo, O. Cojocari and P. Meissner. (Invited) "Resonant-tunnelling diodes for THz applications". SPIE International Symposium on Optics and Photonics, San Diego, CA, USA, 12–16 August 2012.

- [7] **M. Feiginov**, C. Sydlo, O. Cojocari and P. Meissner. (Invited) "Resonant-tunnelling diodes for THz applications". GDR-I 2012 THz Workshop, "Semiconductor Sources and Detectors of THz radiation", Tignes, France, 24-27 April 2012.
- [8] **M. Feiginov**. (Invited) "Resonant-tunnelling diodes for THz applications". Yearly meeting of German "Terahertz-Zentrum", Frankfurt am Main, Germany, 27-28 February 2012.
- [9] O. Cojocari, C. Sydlo, **M. Feiginov** and P. Meissner. "RTD-based THz-MIC by Film-Diode Technology". IMS2012 International Microwave Symposium, Montral, Canada, June 17-22, 2012.
- [10] **M. Feiginov**, C. Sydlo, O. Cojocari and P. Meissner. "On the Inherent Limitations of RTD Oscillators: Operation Beyond Tunnel-Lifetime Limit". 17th Int. Conf. on Electron Dynamics in Semiconductors, Optoelectronics and Nanostructures, EDISON17, Santa Barbara, California, USA, August 8-12th, 2011.
- [11] C. Sydlo, **M. Feiginov**, O. Cojocari and P. Meissner. "Demonstration of RTD oscillations beyond tunnel-lifetime limit". 35th Workshop on Compound Semiconductor Devices and Integrated Circuits, WOCSDICE 2011, Catania, Italy, May 29 - June 1, 2011, – P. 47.
- [12] C. Sydlo, **M. Feiginov**, T. Goebel, D. Schoenherr, P. Meissner and H. L. Hartnagel. "Electro-optical THz phase control". CLEO: 2011, Baltimore, Maryland, USA, May 1-6, 2011
- [13] T. Goebel, D. Schoenherr, C. Sydlo, **M. Feiginov**, P. Meissner and H. L. Hartnagel. "Phase stability considerations in coherent CW THz photomixing systems". 35th Int. Conf. on Infrared, Millimeter and Terahertz Waves, Rome, Italy, Sep. 5-10, 2010.
- [14] V. Faybisovich, **M. Feiginov** and M. Khoroshev. "Investigation of Frequency Domain Traveling Wave Fault Location Methods". IEEE PES Transmission and Distribution Conf., New Orleans, LA, USA, April 20-22, 2010.
- [15] T. Goebel, D. Schoenherr, C. Sydlo, **M. Feiginov**, P. Meissner and H. L. Hartnagel. (Invited) "Fiber-Coupled on-Chip THz Transceiver". 34th Int. Conf. on Infrared, Millimeter and Terahertz Waves, Busan, Korea, Sep. 21-25, 2009.
- [16] D. Schoenherr, T. Goebel, C. Sydlo, **M. Feiginov**, H. L. Hartnagel and P. Meissner. "Optical Fiber Stretcher as Phase Modulator in CW Photomixing Systems". 34th Int. Conf. on Infrared, Millimeter and Terahertz Waves, Busan, Korea, Sep. 21-25, 2009.
- [17] N. A. Mordovets, I.N. Kotelnikov and **M. Feiginov**. "Peculiarities in the current flow at the boundary of the tunnel Schottky gate in the delta-doped Al/GaAs structures". IX-th Russian Conference on Physics of Semiconductors, Novosibirsk and Tomsk, Russia, 28 Sep. - 3 Oct., 2009.
- [18] **M. N. Feiginov** and D. Roy Chowdhury. "Experimental demonstration of resonant-tunneling-diode operation beyond quasibound-state-lifetime limit". 16th Int. Conf. on Electron Dynamics In Semiconductors, Optoelectronics and Nanostructures (EDISON), Montpellier, France, August 24 - 28, 2009.
- [19] **M. N. Feiginov** and D. Roy Chowdhury. "Response time and negative conductance of resonant-tunneling-diode beyond resonant-state-lifetime limit". 17th Int. Symp. Nanostructures: Physics and Technology, Minsk, Belarus, June 22 - 26, 2009.
- [20] I. N. Kotelnikov, N. A. Mordovets and **M. N. Feiginov**. "Peculiarities in the current flow near the edge of the tunnel Schottky contact with the delta-doped GaAs layer". 17th Int. Symp. Nanostructures: Physics and Technology, Minsk, Belarus, June 22 - 26, 2009.
- [21] **M. N. Feiginov** and I. N. Kotelnikov. "Attainability of negative differential conductance in tunnel Schottky structures with 2D channels: theory and experiment". SPIE Europe Microtechnologies for the New Millennium ("Nanotechnology" session), 4 - 6 May 2009, Dresden, Germany.
- [22] D. Schoenherr, O. Cojocari, C. Sydlo, T. Goebel, **M. Feiginov**, H. L. Hartnagel and P. Meissner. "Optical Mixing in THz Schottky Diodes". Proc. of 33rd Int. Conf. on Infrared, Millimeter and Terahertz Waves, Pasadena, CA, USA, Sep 15-19, 2008. – P. 179.
- [23] **M. N. Feiginov** and D. Roy Chowdhury. "Experimental demonstration of resonant-tunneling-diode operation beyond resonant-state-lifetime limit". Int. Conf. on the Physics of Semiconductors - ICPS 2008, Rio de Janeiro, Brasil, Jul 27 - Aug 1, 2008.
- [24] **M. N. Feiginov** and I. N. Kotelnikov. "Experimental evidences and perspectives of attainability of negative differential conductance in tunnel Schottky structures with 2D channel". Int. Conf. on the Physics of Semiconductors - ICPS 2008, Rio de Janeiro, Brasil, Jul 27 - Aug 1, 2008.
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- [26] **M. N. Feiginov** and D. Roy Chowdhury. (Invited talk) "Resonant tunnelling diodes beyond quasi-bound-state lifetime limit". Ultrafast Phenomena in Semiconductors and Nanostructure Materials XII Conference (part of SPIE Photonics West 2008), 19-24 January 2008, San Jose, CA, USA.
- [27] A. Lisauskas, M. Dias, S. Beltz, **M. Feiginov**, H.G. Roskos. "Concept of internal mixing in semiconductor lasers and optical amplifiers for roomtemperature generation of tunable continuous terahertz waves". Proceedings of IRMMW-THz2007, 3-7th September 2007, Cardiff, U.K. – P. 204.
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- [29] D. Schoenherr, C. Sydlo, T. Goebel, **M. Feiginov**, H.L. Hartnagel, P. Meissner, H.-G. Bach, R. Kunkel, G.G. Mekonnen and R. Zhang. "Characterization of THz emitter based on a high-speed p-i-n photodiode". Proceedings of IRMMW-THz2007, 3-7th September 2007, Cardiff, U.K. – P. 1002.
- [30] A. Lisauskas, M. Dias, S. Beltz, **M. Feiginov**, H.G. Roskos. "Internal Mixing in Active Semiconductor Devices

- for Room-Temperature Generation of Tunable Continuous-Wave Terahertz Radiation". Proceedings of The Ninth International Conference on Intersubband Transitions in Quantum Wells, 9-14th September 2007, Cumbria, U.K.
- [31] A. Lisauskas, M. Dias, S. Beltz, **M. Feiginov**, H.G. Roskos. "Concept for tunable continuous-wave terahertz generation by internal mixing in active semiconductor devices". Proceedings of 13th Int. Symposium on Ultrafast Phenomena in Semiconductors, 26-29 August, 2007 Vilnius, Lithuania.
- [32] A. Lisauskas, M. Dias, S. Beltz, R. Sachs, **M. Feiginov**, and H.G. Roskos. "Concept of internal mixing in semiconductor lasers and optical amplifiers for room-temperature generation of tunable continuous terahertz waves", 13th International Conference on Modulated Semiconductor Structures Genova, Italy, 15-20 July 2007.
- [33] I.P. Kazakov, I.N. Kotelnikov, **M. Feiginov**, S. E. Dizhur, Yu.V. Fedorov, A.S. Bugaev and E.V. Glazyrin. "MBE-grown Al/GaAs heterostructure for tunnel spectroscopy of two-dimensional electron systems". Proceedings of VIII-th Russian Conference on Physics of Semiconductors, Ekaterinburg, Russia, 30 September - 5 October, 2007.
- [34] J. Sigmund, K. Zogal, J. F. Lampin, V. Ivannikov, C. Sydlo, **M. Feiginov**, D. Pavlidis, P. Meissner and H. L. Hartnagel. "Low-temperature grown GaAsSb with sub-picosecond photocarrier lifetime for continuous-wave terahertz applications". Proceedings of Topical Workshop on Heterostructure Microelectronic (TWHM 2007), Kisarazu, Chi- ba, Japan, August 21-24, 2007
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- [36] T. Goebel, D. Schoenherr, **M. Feiginov**, P. Meissner, H. L. Hartnagel. "THz grating sensors for investigation of thin dielectric layers". CLEO/Europe - IQEC 2007, Munich, Germany, 17 - 22 June 2007.
- [37] D. Roy Chowdhury and **M. N. Feiginov**. "Resonant tunnelling diode: intrinsic response time vs. quasi-bound-state lifetime". Proceedings of the 31th Workshop on Compound Semiconductor Devices and Integrated Circuits, Venice, Italy, May 20-23, 2007.
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- [40] Sydlo C., Kögel B., Cojocari O., **Feiginov M.**, Hartnagel H. L., Meissner P. "Broadband Power Detector Using A Circularly-toothed Planar Logarithmic-periodic Antenna". Proceedings of 11th International Symposium on Antenna Technology and Applied Electromagnetics, Saint-Malo, France, June 15-17, 2005.
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- [46] Krozer V., Leone B., Roskos H., Löffler T., Loata G., Döhler G., Renner F., Eckardt S., Malzer S., Schwanhäusser A., Klaassen T. O., Adam A., Lugli P., Di Carlo A., Manenti M., Scamarcio G., Vitiello M. S., **Feiginov M.** "Optical Far-IR Wave Generation - State-of-the-Art and Advanced Device Structures". Photonics Europe 2004, Microwave and Terahertz Photonics: Proceedings of SPIE Vol. #5466-21 – Strasbourg, France, 26-30 April 2004.
- [47] **Feiginov M. N.** "Nonparabolicity and Negative Differential conductance in Tunnelling from Metal into 2D Channel". 2003 International Semiconductor Device Research Symposium: Proceedings – Washington, D.C., USA, December 2003 – P. 240-241.
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- [49] **Feiginov M. N.** "Tunnel Schottky contacts with 2D channel, a new mechanism of negative differential conductance". XXVII Workshop On Compound Semiconductor Devices and Integrated Circuits: Proceedings – Zurich, Switzerland, 2003.
- [50] Kotelnikov I. N., Dizhur E. M., Voronovsky A. N., Dizhur S. E., Kokin V. A., **Feiginov M. N.** "Tunneling spectroscopy of 2DES in near-surface delta-doped GaAs at high pressure". Int. Symp. "Nanostructures: Physics and

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- [55] Feiginov M. N., Krozer V. "Modelling of  $1.55\mu m$  p-i-n photomixers for generation of THz radiation". 9th International Conference on Terahertz Electronics: Abstracts – Charlottesville, VA, USA, 2001.
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