

CURRICULUM VITAE

Leonid Chernyak

Professional Preparation

Lvov Technical University (Ukraine)	Semiconductor Devices	M.Sc., 1986
Weizmann Institute of Science (Israel)	Semiconductor Materials	Ph.D., 1996
Colorado State University & Texas Tech University	Wide Band Gap Semiconductors	1996

Appointment

- **August 2011 – present: *Professor*** in the Department of Physics at the University of Central Florida. Research is focused on studies of minority carrier transport in Wide and Narrow Band Gap semiconductors as well as on *UV* and *IR* sensors.
- **August 2005 – August 2011: *Associate Professor*** (tenured) in the Department of Physics at the University of Central Florida. Research was focused on studies of minority carrier transport in Wide Band Gap semiconductors.
- **November 1999 – August 2005: *Assistant Professor*** in the Department of Physics at the University of Central Florida. Research efforts were in the area of dopants and point defects in semiconductors. This includes studies of electron injection-induced effects in III-Nitrides and of electric field-induced effects in ionic-electronic semiconductors.
- **February 1997 – November 1999:** Member of technical staff at Intel Corporation, working on flash memory and logic technology development. Work was focused on performance analysis of ultra-high-speed VLSI devices and tuning their electrical parameters.
- **June 1998 – November 1999:** Consultant in the Department of Materials & Interfaces, Weizmann Institute of Science, Rehovot, Israel. Area of expertise: dopant electromigration in semiconductors.
- **February 1996 – February 1997:** Research Associate in the Departments of Electrical Engineering at Colorado State University (Fort Collins, Colorado, USA) and Texas Tech University (Lubbock, Texas, USA). Scientific research was focused on optical and electronic properties of Gallium (Aluminum) Nitride, Gallium Indium Phosphide, and other III-V semiconductors.
- **November 1991 – January 1992:** Research associate at the Max Planck Institute for Solid State Research and in the Physics Department of Leipzig University, Germany, investigating electronic properties of ternary chalcopyrites.
- **1990 – January 1996:** Research Student in the Department of Materials & Interfaces of the Weizmann Institute of Science, Israel. Research was focused on investigation of ionic semiconductors. Ph.D. degree was awarded in 1996 upon acceptance of the thesis “Towards electric field-induced control over composition & properties of semiconductors at room temperature”.
- **1986 – 1990:** Device Engineer in Semiconductor Device Fabrication Plant, Lvov, Ukraine. Worked on electrical characterization of integrated semiconductor devices.
- **1982 – 1986:** Research Student in the Department of Semiconductors of Lvov Technical University, Ukraine. Research was focused on Silicon-on-Insulator device structures with SiO₂ and Si₃N₄ dielectric layers. M.Sc. degree was awarded in 1986 upon acceptance of the thesis “Electrical properties of Si-based device structures with buried dielectric layers”.

Awards

- **2002-2021: 7 National Science Foundation Awards, 2 American Chemical Society Awards, 7 NATO Awards; 3 US-Israel Binational Science Foundation Awards; 3 Israel Ministry of Defense Awards. Total awards amount ~ \$6M**
- **2004, 2015, 2021: University of Central Florida Research Incentive Award**
- 1999: Senior Member, Institute of Electrical and Electronics Engineers (IEEE)
- 1992: Minerva Award of German-Israeli Scientific Foundation

Professional Recognition

- 2001-2020: Numerous invited talks at the international conferences and seminars
- biography included in the various Editions of **Who's Who in America** and **Who's Who in Science and Engineering**
- **h-index=28 (Web of Science; November 2020). Note: h-index for a full professorship in physics is about 18** (see <http://en.wikipedia.org/wiki/H-index> for details)
- 2001-2020: 15 invitations to NSF panel reviews and 3 invitations to NATO panels (2012, 2013, 2019, 2020, 2021).
- 7 book chapters

Professional Affiliations

- Institute of Electrical and Electronics Engineers (Senior Member)
- Materials Research Society (Member)
- American Physical Society (Member)

Synergetic Activities

- 2006-present: Coordinator and Director of seven international multi-institutional projects under NATO umbrella
- Panelist for NSF ECS Division (15 times)
- Reviewer for NSF Chemical & Transport Systems Division
- Reviewer for NSF Division of Materials Research
- Reviewer for the Petroleum Research Fund
- Reviewer for U.S. Civilian Research and Development Foundation (CRDF)
- Reviewer for Israel Science Foundation
- Reviewer for Applied Physics Letters, Journal of Applied Physics, Journal of Physics, Journal of Vacuum Science and Technology, Journal of the Crystal Growth, Applied Surface Science, Advanced Materials, Electrochemical and Solid State Letters, Thin Solid Films, IEEE Transaction on Electronic Devices, Springer-Verlag, Kluwer Academic Publishers
- Panelist for NATO Science for Peace Program (3 times)

Courses Taught

- Condensed Matter Physics (3 times)
- Intermediate Physics Lab (once)
- Advanced Physics Lab (4 times)
- Physics for Scientists and Engineers I, II (more than 15 times)
- Modern Physics (twice)
- Coordinator of multi-section Physics for Scientists and Engineers II course (2004-2007)
- Coordinator of Summer Seminars (2005)
- Recitations for Physics for Scientists and Engineers I, II (each semester)

New Course Development

- Developed a Condensed Matter Physics course which was offered 3 times between 2000 and 2010
- Advanced Physics Laboratory: 2015-2019. Developed a cluster 4 news projects within this laboratory course

High-School Students Supervised

- Maximillian Shatkhin, Winter Springs High School (2009-2011)
- Thanapat Phoolsuk, Olympia High School (2004-2007)

Undergraduate Research Supervised

- Tylor Adams, “EBIC studies of infrared materials”, 2018 – present.
- Michael Antia, “Cathodoluminescence studies of Ga₂O₃”, 2015-2017.
- Jon Edmiston, “Software development for TRIAX tunable light source”, 2009-2010.
- Sherwin Solomon, “Software development for photovoltaic detector response measurements”, 2004-2006.
- Alfred Keller, “Fabrication and characterization of GaN wave guides”, 2004-2005. Co-supervised with Prof. Alfons Schulte.
- Jill Adcox, “Novel approach to revolutionize a GaN photovoltaic detector performance”, (REU Program, 2002).
- Seth Jonas, “Software development for the Electron Beam Induced Current measurements”, 2001.

Graduate Research (Ph.D. Student) Supervision and Training

- August 2018 – present: Sushrut Modak “Non-Equilibrium Carrier Dynamics in Gallium Oxide”.
- August 2018 – present: Leslie Davis “Non-Equilibrium Carrier Dynamics in infrared type II InAs/GaSb superlattices”.
- August 2016 – August 2018: Jonathan Lee “Non-Equilibrium Carrier Dynamics in Wide Band Gap Semiconductors”.
- August 2012 – 2016: Anupama Yadav “Studies of Gamma Irradiation-Induced Effects in Wide Band Gap Semiconductors”.
- June 2009 – 2010: Yuqing Lin “Studies of minority carrier transport in wide band gap semiconductors”.
- August 2007 – 2012: Casey Schwarz “Optical and electrical studies of point and extended defects in ZnO-based semiconductors”.
- August 2007 – August 2008: Sartaj Bhullar “EBIC characterization of wide band gap semiconductors”.
- August 2001 – May 2003: Rumiana Petrova “Electron beam probing of GaN and related compounds”.
- August 2001 – July 2004: William Burdett “Electron Injection-Induced Effects in III-Nitrides: Physics and Applications”

Ph.D. Dissertations Supervised

- Sushrut Modak, Ph.D. candidate, “Electron Injection-Induced Effects in Ultra-Wide Bandgap Semiconductors”. **Defense – May 2021**. Employment: Augment Technologies.
- Jonathan Lee, Ph.D., “Electron Injection-Induced Effects in Narrow and Wide Bandgap Semiconductors”. **Defense – May 2018**. Employment: Gatan Inc.
- Anupama Yadav, Ph.D., “Radiation Hard High Electron Mobility Transistors”. **Defense – May 2016**. Employment: MIT.

- Casey Schwarz, Ph.D., “Radiation Effects on Wide Band Gap Semiconductor Transport Properties”. **Defense – May 2012**. Employment: UCF.
- Olena Lopatiuk-Tirpak, Ph.D., “Studies of minority carrier transport in wide band gap semiconductors”. **Defense – June 2007**. Employment: Anderson Medical Center, Orlando.
- William C. Burdett, Ph.D., “Electron Injection-Induced Effects in III-Nitrides: Physics and Applications”. **Defense – May 2004**. Employment: NAVAIR, Orlando.

Post-Doctoral Research Supervised

- 2006-2019: Dr. Konstantin Gartsman, Weizmann Institute of Science, Rehovot, Israel. “Electron beam probing of wide band gap semiconductors”.
- 2003, 2004, 2006: Dr. Volodymyr Kotlyarov, Lviv National Technical University, Ukraine, “Time-resolved cathodoluminescence studies of III-Nitride semiconductors”.

Service

- Chair of Physics Department Industrial Outreach Committee (2016-present)
- Chair of the Physical Science Building Committee (2008-2016)
- Physics Department representative in the College of Sciences Research Incentive Award Committee (number of times between 2010 and 2018)
- Physics Department representative in the College of Sciences Sabbatical Committee (number of times between 2010 and 2020)
- College of Sciences Representative in the University Research Incentive Award Committee (2010)
- Chair of the Physical Science Building Committee (2008-2016)
- Physics representative in the College of Sciences Research Incentive Award Committee (2007-2009)
- Chair of Physics Department new faculty Search Committee (2015)
- Chair of Departmental Tenure and Promotion Committee (for tenure-track faculty) (2009, 2010)
- Physics Department new faculty Search Committee (2000, 2003, 2004, 2005, 2006, 2007, 2009)
- Physics Department Candidacy Exam Committee (2001-present)
- Physics Department Graduate Committee (2001-2006)
- Physics Department Colloquium Chair (2001)
- M.Sc and Ph.D. Dissertation Committees: Omima Hammad (2004); William Burdett (2004); Olena Lopatiuk-Tirpak (2007); Fatma Salman (2007); You Guo (2007); Maxim Dolgikh (2008); Peter Olszak (CREOL, 2008, 2010); Himanshu Saxena (2009); Jeremy Mares (CREOL, 2010); Gautam Medhi (2011); Casey Schwarz (2012); Anupama Yadav (2016); Jonathan Lee (2018); Sushrut Modak (2020).

Referred Publications and Patents

Publications prior to joining UCF

1. K. Gartsman, **L. Chernyak**, J.M. Gilet, R. Triboulet, D. Cahen (1992)
Room Temperature Local Tailoring of Electronic Properties of $\text{Hg}_{1-x}\text{Cd}_x\text{Te}$ by Application of an External Electric Field, in "Mat. Res. Soc. Symp. Proc.", **262**, 809-814.
2. D. Cahen, J.M. Gilet, C. Schmitz, **L. Chernyak**, K. Gartsman and A. Jakubowicz (1992)
Room temperature, Electric Field-induced, Creation of Stable Devices in CuInSe_2 crystals, *Science*, **258**, 271-275.
3. K. Gartsman, **L. Chernyak**, J.M. Gilet, R. Triboulet and D. Cahen (1992)
Room temperature local tailoring of electronic properties of $\text{Hg}_{0.3}\text{Cd}_{0.7}\text{Te}$ by applying an external electric field, *Appl. Phys. Lett.*, **61**, 2428-2430.
4. D. Cahen, **L. Chernyak**, G. Dagan and A. Jakubowicz (1993)
Ion Mobility in Chalcogenide Semiconductors; Room Temperature Creation of Bipolar Junction Transistor, in "Fast Ion Transport in Solids", B. Scrosati, A. Magistris, C.M. Mari and G. Mariotto eds. (Kluwer, Dordrecht), 121-141.
5. D. Cahen, **L. Chernyak**, K. Gartsman, I. Lyubomirski, R. Triboulet (1993)
Room Temperature Tailoring of Electrical Properties of Ternary and Multinary Chalcogenide Semiconductors, in Proc. ICTMC-9 *Jpn. J. Appl. Phys. Suppl.*, **32-3**, 660-661.
6. **L. Chernyak**, D. Cahen, S. Zhao and D. Haneman (1994)
Local Temperature Increase during Electric Field-induced Formation of Transistor Structures in CuInSe_2 and $\text{Cu}_{0.95}\text{Ag}_{0.05}\text{InSe}_2$, *Appl. Phys. Lett.*, **65**, 427-429.
7. D. Cahen, **L. Chernyak**, K. Gartsman, I. Lyubomirski, Y. Scolnik, O. Stafsudd and R. Triboulet (1994)
Room Temperature Tailoring of Electrical Properties of Semi- and Super-conductors via Controlled Ion Migration, in "Soft Chemistry Route to New Materials - Chimie Douce", Materials Science Forum, **153-153**, J. Rouxel, M. Tournoux & R. Brec eds. (Trans Tech, Switzerland), 187-192.
8. D. Cahen, E. Moons, **L. Chernyak**, I. Lyubomirski, M. Bruening, A. Shanzer, J. Libman (1994)
Solid State and Surface Chemical Aspects of Chalcogenide Semiconductors (MX: X = Se, Te), Proc. 5th Int'l Symposium for Uses of Se & Te, S. Carapella, J.E. Oldfield and Y. Palmieri eds., 207-214.
9. **L. Chernyak**, A. Jakubowicz and D. Cahen (1995)
Junction Electroluminescence from microscopic diode structures in CuInSe_2 , prepared by Electric Field-assisted Doping, *Adv. Mater.*, **7**, 45-48.
10. **L. Chernyak**, V. Lyakhovitskaya and D. Cahen (1995)
Low Temperature Device Creation in Si via Fast Li Electromigration, *Appl. Phys. Lett.*, **66**, 709-711.
11. **L. Chernyak**, K. Gartsman, D. Cahen, and O.M. Stafsudd (1995)
Electronic Effects of Ion Mobility in Semiconductors. Semionic Behaviour of CuInSe_2 , *J. Phys. Chem. Solids*, **56**, 1165-1191.
12. D. Cahen, **L. Chernyak**, A. Jakubowicz
Monolithic Optoelectronic and Electronic Structures, US Pat. 5,650,337.
13. **L. Chernyak**, J. Vedel and D. Cahen (1996)
Voltage-Driven Doping of Mixed Ionic Electronic Semiconductors, *Solid State Ionics*, **83**, 29-33.

14. N.S. McAlpine, P. McConville, D. Haneman, **L. Chernyak**, and D. Cahen (1996)
Junction Sharpness in Field-induced Transistor Structures in $\text{Cu}_x\text{Ag}_{1-x}\text{InSe}_2$,
J. Appl. Phys., **79**, 7370-7372.
15. **L. Chernyak**, V. Lyakhovitskaya, S. Richter, A. Jakubowicz, J. Manassen,
S. Cohen and D. Cahen (1996)
Electronic Effects of Ion Mobility in Semiconductors. Mixed Electronic Ionic Behaviour
and Device Creation in Si:Li,
J. Appl. Phys., **80**, 2749-2762.
16. **L. Chernyak**, V. Lyakhovitskaya, and D. Cahen (1996)
Low Temperature Device Creation in Ternary Chalcogenide Semiconductors via
Thermally Assisted Electromigration of Native Dopants,
in Proc. ICTMC-10 *Crystal Res. & Technol.*, **31**, 163-167.
17. **L. Chernyak**, A. Osinsky, H. Temkin, J.W. Yang, Q. Chen, and M. Asif Khan (1996)
Electron Beam Induced Current Measurements of Minority Carrier Diffusion Length in
Gallium Nitride,
Appl. Phys. Lett., **69**, 2531-2533.
18. A. Osinsky, **L. Chernyak**, H. Temkin, Y. Ch. Wen, and B.A. Parkinson (1996)
Effect of Sulfur Doping on Optical Anisotropy of CdSiAs_2 ,
Appl. Phys. Lett., **69**, 2867-2869.
19. J.W. Yang, C.J. Sun, Q. Chen, M.Z. Anwar, M. Asif Khan, S.A. Nikishin,
G.A. Seryogin, A.V. Osinsky, **L. Chernyak**, H. Temkin, C. Hu, and S. Mahajan (1996)
High Quality GaN-InGaN Heterostructures Grown On (111) Silicon Substrates,
Appl. Phys. Lett., **69**, 3566-3568.
20. **L. Chernyak**, A. Osinsky, H. Temkin, A. Mintairov, I.G. Malkina, B.N. Zvonkov,
Yu. N. Safianov (1997)
Anomalies of Transport Anisotropy in Spontaneously Ordered GaInP_2 Alloys,
Appl. Phys. Lett., **70**, 2425-2427.
21. David Cahen and **Leonid Chernyak** (1997)
Dopant Electromigration in Semiconductors, *Adv. Mater.*, **9**, 861-876.
22. Konstantin Gartsman, **Leonid Chernyak**, Vera Lyahovitskaya, David Cahen, Vladimir
Didik, Vitaliy Kozlovsky, Roald Malkovich, Elena Skoryatina, Valentina Usacheva
(1997)
Direct evidence for diffusion and electromigration of Cu in CuInSe_2 ,
J. Appl. Phys., **82**, 4282-4285.
23. Felix Frolov, **Leonid Chernyak**, David Cahen, Hanna Hallak, Jamal Gabboun,
Ake Kvick, Heinz Graafsma (1998)
Single crystal synchrotron X-ray diffraction of CuInSe_2 , in Proc. ICTMC-11,
Inst. of Phys. Conf. Ser., **152**, 67-70.

Publications after joining UCF (2000-2015)

24. V. Lyahovitskaya, **L. Chernyak**, J. Greenberg, L. Kaplan, D. Cahen (2000)
n- and p-type post-growth self-doping of CdTe single crystals,
J. Cryst. Growth, **214**, 1155-1157.
25. V. Lyahovitskaya, **L. Chernyak**, J. Greenberg, L. Kaplan, D. Cahen (2000)
Low temperature, post-growth self-doping of CdTe single crystals due to controlled
deviation from stoichiometry,
J. Appl. Phys., **88**, 3976-3981.
26. **Leonid Chernyak**, Andrei Osinsky, Vladimir Fuflyigin, E.F. Schubert (2000)
Electron Beam-Induced Increase of Electron Diffusion Length in p-type GaN and
AlGaIn/GaN superlattices,
Appl. Phys. Lett., **77**, 875-877.
27. **L. Chernyak**, A. Osinsky, G. Nootz, A. Schulte, J. Jasinski, M. Benamara, Z. Liliental-
Weber, D.C. Look, R.J. Molnar (2000)
Electron beam and optical depth-profiling of quasi-bulk GaN,
Appl. Phys. Lett., **77**, 2695-2697.
28. **Leonid Chernyak**, Andrei Osinsky, Vladimir Fuflyigin, E.F. Schubert (2001)
Minority Electron Transport Anisotropy in p-type Al_xGa_{1-x}N/GaN superlattices,
IEEE Trans. Electron. Devices, **48**, 433-437.
29. **Leonid Chernyak**, David Cahen (2001)
Electric Field-Induced Tuning of Semiconductor Optoelectronic Properties,
Defect Diffus. Forum, **191**, 61-97.
30. **Leonid Chernyak**, Jamal Ghabboun, Vera Lyahovitskaya, David Cahen (2001)
Electric field-induced fabrication of microscopic, Si-based optoelectronic devices for 1.55
& 1.16 μm IR electroluminescence,
Materials Science Eng. B, **81**, 113-115.
31. **L. Chernyak** and M. Klimov (2001)
Nano-scale p-n junction fabrication in Silicon due to controlled dopant electromigration
Appl. Phys. Lett., **78**, 1613-1615.
32. **L. Chernyak**, G. Nootz, A. Osinsky (2001)
Enhancement of minority carrier transport in forward biased GaN p-n junction
Electron. Lett., **37**, 922-923.
33. **L. Chernyak**, A. Osinsky, S.J. Pearton, F. Ren (2001)
Phototransistor measurements in AlGaIn/GaN HBTs
Electron. Lett., **37**, 1411-1412.
34. **L. Chernyak**, A. Osinsky, A. Schulte (2001)
Minority carrier transport in GaN and related compounds
Solid State Electron., **45**, 1687-1702.
35. **L. Chernyak** (2002)
Studies of electron injection-induced effects in III-Nitrides
Wide Bandgap Semiconductor for Photonic and Electronic Devices and Sensors II, ECS,
178-183.
36. **L. Chernyak**, A. Schulte, A. Osinsky, J. Graff, E.F. Schubert (2002)
Influence of electron injection on performance of GaN photodetectors
Appl. Phys. Lett., **80**, 926-928.
37. **L. Chernyak**, W. Burdett, A. Osinsky (2002)
Study of temperature dependence for the electron injection-induced effects in GaN
Appl. Phys. Lett., **81**, 1633-1635.

38. W. Burdett, A. Osinsky, V. Kotlyarov, P. Chow, A. Dabiran, **L. Chernyak** (2003)
Impact of Aluminum concentration and Magnesium doping on the effect of electron injection in p-Al_xGa_{1-x}N
Solid-State Electron., **47**, 931-935.
39. **L. Chernyak**, W. Burdett (2003)
Electron injection-induced effects in GaN: Physics and Applications
MRS Proceedings, **764**, C5.4.
40. **L. Chernyak**, W. Burdett, M. Klimov, A. Osinsky (2003)
Cathodoluminescence studies of the electron injection-induced effects in GaN
Appl. Phys. Lett., **82**, 3680-3682.
41. **L. Chernyak**, W. Burdett (2003)
Physics of Electron Injection in III-Nitrides
Wide Bandgap Semiconductors for Photonic and Electronic Devices and Sensors III, ECS, 196-200.
42. D.I. Florescu, S.M. Ting, J.C. Ramer, D.S. Lee, V.N. Merai, A. Parkeh, D. Lu, E.A. Armour, **L. Chernyak** (2003)
Atomic Force Microscopy and Scanning Electron Microscopy/Cathodoluminescence Investigation of V-Defects and Embedded Inclusions in InGaN/GaN Multiple Quantum Wells Grown by Metalorganic Chemical Vapor Deposition on (0001) Sapphire
Appl. Phys. Lett., **83**, 33-35.
43. W. Burdett, **L. Chernyak** (2003)
Cathodoluminescence studies of the electron injection-induced effects in III-Nitrides
Wide Bandgap Semiconductors for Photonic and Electronic Devices and Sensors IV, ECS, 208-213.
44. **L. Chernyak**, A. Schulte (2004)
Method for performance improvement of photodetectors and solar cells
U.S. Patent #6,674,064; January 6, 2004.
45. W. Burdett, O. Lopatiuk, A. Osinsky, S.J. Pearton, **L. Chernyak** (2004)
Optical signature of electron injection in p-AlGaIn
Superlattices and Microstructures, **34**, 55-62.
46. H. Temkin, S. A. Nikishin, M. Holtz, **L. Chernyak** (2004)
Deep UV Light Emitting Diodes Based on Short Period Superlattices of AlN/AlGaIn
State-of-the-Art Program on Compound Semiconductors XL and Narrow Bandgap Optoelectronic Materials and Devices II, ECS, 1-6.
47. W. Burdett, O. Lopatiuk, **L. Chernyak**, M. Hermann, M. Stutzmann, M. Eickhoff (2004)
Electron injection-induced effects in Mn-doped GaN
J. Appl. Phys., **96**, 3556-3558.
48. W. Burdett, O. Lopatiuk, **L. Chernyak**, M. Eickhoff (2004)
Studies of electron trapping in III-Nitrides
Wide Bandgap Semiconductors for Photonic and Electronic Devices and Sensors V, ECS, 512-521.
49. A. Osinsky, J.W. Dong, M.Z. Kauser, B. Hertog, A.M. Dabiran, P.P. Chow, S.J. Pearton, O. Lopatiuk, **L. Chernyak** (2004)
MgZnO/AlGaIn Heterostructure Light Emitting Diodes
Appl. Phys. Lett., **85**, 4272-4274.
50. O. Lopatiuk, W. Burdett, **L. Chernyak**, K.P. Ip, Y.W. Heo, D.P. Norton, S.J. Pearton, B. Hertog, P.P. Chow, A. Osinsky (2005)
Minority carrier transport in p-type Zn_{0.9}Mg_{0.1}O doped with phosphorus
Appl. Phys. Lett., **86**, 012105 (3 pages).

51. Alexander Y. Polyakov, Qiang Li, Olena Lopatiuk, **Leonid Chernyak**, Sung Wook Huh, Marek Skowronski, Edward Sanchez (2005)
Minority Carriers Diffusion Length Measurements in 6H-SiC
J. Appl. Phys., **97**, 053703 (6 pages).
52. O. Lopatiuk, **L. Chernyak**, A. Osinsky, J.Q. Xie, P.P. Chow (2005)
Lithium-related states as deep electron traps in ZnO
Appl. Phys. Lett., **87**, 214110 (3 pages).
53. O. Lopatiuk, A. Osinsky, A. Dabiran, K. Gartsman, I. Feldman, **L. Chernyak** (2005)
Electron trapping effects in C- and Fe-doped GaN and AlGaIn
Solid-State Electronics, **49**, 1662-1668.
54. O. Lopatiuk-Tirpak, W.V. Schoenfeld, **L. Chernyak**, F.X. Xiu, J.L. Liu, S. Jang, F. Ren, S.J. Pearton, A. Osinsky, P. Chow (2006)
Carrier concentration dependence of acceptor activation energy in p-type ZnO
Appl. Phys. Lett., **88**, 202110 (3 pages).
55. O. Lopatiuk, A. Osinsky, **L. Chernyak** (2006)
Minority carrier transport in ZnO and related materials, chapter in *Zinc Oxide Bulk, Thin Films and Nanostructures*, C. Jagadish and S. Pearton (Editors), Elsevier.
56. O. Lopatiuk-Tirpak, **L. Chernyak**, F.X. Xiu, J.L. Liu, S. Jang, F. Ren, S.J. Pearton, K. Gartsman, Y. Feldman, A. Osinsky, P. Chow (2006)
Studies of Minority Carrier Diffusion Length Increase in p-type ZnO:Sb
J. Appl. Phys., **100**, 086101 (3 pages).
57. O. Lopatiuk-Tirpak, **L. Chernyak**, L.J. Mandalapu, Z. Yang, J.L. Liu, K. Gartsman, Y. Feldman, Z. Dashevsky (2006)
Influence of electron injection on the photoresponse of ZnO homojunction diodes
Appl. Phys. Lett., **89**, 142114 (3 pages).
58. O. Lopatiuk-Tirpak, **L. Chernyak**, B.A. Borisov *et al.* (2007)
Electron irradiation-induced increase of minority carrier diffusion length, mobility, and lifetime in Mg-doped AlN/AlGaIn short period superlattice
Appl. Phys. Lett., **91**, 182103 (3 pages).
59. O. Lopatiuk-Tirpak, **L. Chernyak**, Wang YL, *et al.* (2007)
Doping level dependence of electron irradiation-induced minority carrier diffusion length increase in Mg-doped GaN
Appl. Phys. Lett., **91**, 092197 (3 pages).
60. O. Lopatiuk-Tirpak, **L. Chernyak** (2007)
Studies of minority carrier transport in ZnO
Superlattices and Microstructures **42**, 201-205.
61. O. Lopatiuk-Tirpak, G. Nootz, E. Flitsyan, **L. Chernyak**, *et al.* (2007)
Influence of electron injection on the temporal response of ZnO homojunction photodiodes
Appl. Phys. Lett., **91**, 042115 (3 pages).
62. Y.I. Alivov, U. Ozgur, X. Gu, C. Liu, Y. Moon, H. Morkoc, O. Lopatiuk, **L. Chernyak**, C.W. Litton (2007)
Hybrid II-VI and III-V compound double heterostructures and their properties
J. Electron. Materials, **36**, 409-413.
63. O. Lopatiuk-Tirpak, **L. Chernyak**, Y.L. Wang, *et al.* (2007)
Cathodoluminescence studies of carrier concentration dependence for the electron-irradiation effects in p-GaN
Appl. Phys. Lett., **90**, 172111 (3 pages).

64. O. Lopatiuk, **L. Chernyak**, Y. Feldman, *et al.* (2007)
Studies of electron trapping in GaN doped with carbon
Thin Solid Films, **515**, 4365-436.
65. O. Lupan, L. Chow, G.Y. Chai, **L. Chernyak**, O. Lopatiuk-Tirpak, H. Heinrich (2008)
Focused-ion-beam fabrication of ZnO nanorod-based UV photodetector using the in-situ lift-out technique
Physica Status Solidi A, **205**, 2673-2678.
66. R.E. Peale, O. Lopatiuk, J. Cleary, S. Santos, J. Henderson, D. Clark, **L. Chernyak**, T.A. Winningham, E. Del Barco, H. Heinrich, W.R. Buchwald (2008)
Propagation of high-frequency surface plasmons on gold
J. of the Optical Society of America B, **25**, 1708-1713.
67. O. Lupan, L. Chow, G. Chai, A. Schulte, S. Park, O. Lopatiuk-Tirpak, **L. Chernyak**, H. Heinrich (2008)
Biopolymer-assisted self-assembly of ZnO nanoarchitectures from nanorods
Superlattices and Microstructures, **43**, 292-302.
68. Y.I. Alivov, B. Xiao, S. Akarca-Biyikli, Q. Fan, H. Morkoc, D. Johnstone, O. Lopatiuk-Tirpak, **L. Chernyak**, W. Litton (2008)
Properties of isotype n-ZnO/n-GaN heterostructures studied by I-V-T and electron beam induced current methods
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69. **L. Chernyak**, C. Schwarz, E.S. Flitsiyan, K. Gartsman (2008)
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Neutron transmutation doping and radiation hardness for solution-grown bulk and nano-structured ZnO
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Optical and electron beam studies of carrier transport in quasibulk GaN
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76. Z. Dashevsky, E. Shufer, V. Kasiyan, E. Flitsiyan and **L. Chernyak** (2010)
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77. E. Flitsyan, C. Schwarz, **L. Chernyak**, R.E. Peale, Z. Dashevsky, W. Vernetson (2011)
Neutron Irradiation-Induced Enhancement of Electronic Carrier Transport in ZnO
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84. E. Flitsyan, Z. Dashevsky and **L. Chernyak**, "Minority carrier transport in ZnO and
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85. C.F. Lo, L. Liu, T.S. Kang, F. Ren, C. Schwarz, E. Flitsyan, **L. Chernyak**, H.Y. Kim,
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86. V. Kasiyan, Z. Dashevsky, C.M. Schwarz, M. Shatkhin, E. Flitsyan, **L. Chernyak**,
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"Infrared detectors based on semiconductor p-n junction of PbSe", *J. Appl. Phys.*, **112**,
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88. C. Schwarz, A. Yadav, M. Shatkhin, E. Flitsyan, **L. Chernyak**, V. Kasiyan, L. Liu, Y.Y. Xi,
F. Ren, S.J. Pearton, C.F. Lo, J.W. Johnson, E. Danilova (2013)
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89. Ya-Hsi Hwang, Yueh-Ling Hsieh, Lei Lei, Shun Li, Fan Ren, Stephen J. Pearton, Anupama Yadav, Casey Schwarz, Max Shatkhin, Luther Wang, Elena Flitsiyan, **Leonid Chernyak**, Albert G. Baca, Andrew A. Allerman, Carlos A. Sanchez and I. I. Kravchenko (2014)
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"Effect of Annealing on Electronic Carrier Transport Properties of Gamma-Irradiated AlGaIn/GaN High Electron Mobility Transistors", *ECS Trans.*, **61** (4), 171-177.
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"Effect of Gamma Irradiation on DC Performance of Circular-Shaped AlGaIn/GaN High Electron Mobility Transistors", *ECS Trans.*, **61** (4), 205-210.
92. Elena Flitsiyan, **Leonid Chernyak** (2014)
"Electron Injection Effects in Wide-Band-Gap Semiconductors", Lambert Academic Publishing, 1-56.
93. Anupama Yadav, Elena Flitsiyan, **Leonid Chernyak**, Ya-Hsi Hwang, Yueh-Ling Hsieh, Lei Lei, Fan Ren, Stephen J. Pearton, and Igor Lubomirsky (2015)
"Impact of low dose gamma irradiation on electronic carrier transport in AlGaIn/GaN High Electron Mobility Transistors" *MRS Proceedings*, **1792**, 2137760.
94. Anupama Yadav, Michael Antia, Elena Flitsiyan, **Leonid Chernyak**, Igor Lubomirsky and Joseph Salzman (2015)
"Cathodoluminescence Studies of Gamma-Irradiation Effects on AlGaIn/GaN High Electron Mobility Transistors (HEMTs)", *Electrochemical Society Transactions*, **69**, 14, 137144.
95. Anupama Yadav, Elena Flitsiyan, **Leonid Chernyak**, Ya-Hsi Hwang, Yueh-Ling Hsieh, Lei Lei, Fan Ren, Stephen J. Pearton, and Igor Lubomirsky (2015)
"Low and moderate dose gamma-irradiation and annealing impact on electronic and electrical properties of AlGaIn/GaN High Electron Mobility Transistors", *RADIATION EFFECTS and DEFECTS IN SOLIDS: Incorporating Plasma Science and Plasma Technology*, **170**, 5, 377-385.
96. Svetlana G. Egorova, Vladimir I. Chernichkin, Anna O. Dudnik, Vladimir A. Kasiyan, **Leonid Chernyak**, Sergey N. Danilov, Ludmila I. Ryabova, and Dmitry R. Khokhlov (2015)
"Discrimination of conductive surface electron states by laser terahertz radiation in PbSe – a base for Pb_{1-x}Sn_xSe topological crystalline insulators", *IEEE TRANSACTIONS ON TERAHERTZ SCIENCE AND TECHNOLOGY*, **5** (4), 659-664.

Publications after joining UCF (last five years)

97. Anupama Yadav, Cameron Glasscock, Elena Flitsiyan, **Leonid Chernyak**, Igor Lubomirsky, Sergey Khodorov, Joseph Salzman, Carlo Coppola, Sebastian Guay and Jacques Boivin (2016)
"Optical and Electron Beam Studies of Gamma-Irradiated AlGaIn/GaN High Electron Mobility Transistors", *RADIATION EFFECTS and DEFECTS IN SOLIDS: Incorporating Plasma Science and Plasma Technology*, **171**, 1, 1-8.
98. Jonathan Lee, Elena Flitsiyan, **Leonid Chernyak**, Shihyun Ahn, Fan Ren, Lin Yun, Stephen J. Pearton, Ji Hyun Kim, Boris Meyler and Joseph Salzman (2016)
"Optical Signature of the Electron Injection in Ga₂O₃", *ECS J. Solid State Sci. Technol.*, **6**, 2, Q3049-Q3051.
99. J. Lee*, E. Flitsiyan, **L. Chernyak**, J. Salzman, B. Meyler (2017)
"Effects of Gamma Irradiation on AlGaIn-Based High Electron Mobility Transistors", *ECS JOURNAL OF SOLID STATE SCIENCE AND TECHNOLOGY*, **6** (11), S3063-S3066.
100. J.C. Yang, F. Ren, R. Khanna, K. Bevin, D. Geerpuram, L.C. Tung, J.Y. Lin, H.X. Jiang, J. Lee*, E. Flitsiyan, **L. Chernyak**, S.J. Pearton, A. Kuramata (2017)
"Annealing of dry etch damage in metallized and bare (-201) Ga₂O₃", *J. Vacuum. Sci. Technol.*, **35** (5), 051201.
101. J.C. Yang, Z.T. Chen, F. Ren, S.J. Pearton, G. Yang, J. Kim, J. Lee*, E. Flitsiyan, **L. Chernyak**, A. Kuramata (2018)
"10 MeV proton damage in beta-Ga₂O₃ Schottky rectifiers", *J. Vacuum. Sci. Technol.*, **36** (1), 011206.
102. J. Lee, E. Flitsiyan, **L. Chernyak**, J.C. Yang, F. Ren, S. Pearton, B. Meyler, Y.J. Salzman (2018)
"Effect of 1.5 MeV electron irradiation on beta-Ga₂O₃ carrier lifetime and diffusion length", *Appl. Phys. Lett.*, **112** (8), 082104.
103. Jonathan Lee, Chris Fredricksen, Elena Flitsiyan, Robert Peale, **Leonid Chernyak**, Zahra Taghipour, Lilian Casias, Alireza Kazemi, Sanjay Krishna, and Stephen Myers (2018)
"Impact of temperature and gamma radiation on electron diffusion length and mobility in p-type InAs/GaSb superlattices", *J. Appl. Phys.*, **123** (23), 235104.
104. S. Modak, J. Lee, **L. Chernyak**, J. Yang, F. Ren, S. J. Pearton, S. Khodorov and I. Lubomirsky (2019)
"Electron injection-induced effects in Si-doped β -Ga₂O₃", *AIP Adv.*, **9**, 1, 015127.
105. S. Modak, **L. Chernyak**, S. Khodorov, I. Lubomirsky, J. Yang, F. Ren and S. J. Pearton (2019)
"Impact of Electron Injection and Temperature on Minority Carrier Transport in Alpha-Irradiated β -Ga₂O₃ Schottky Rectifiers", *ECS Journal of Solid State Science and Technology*, **8**, 7, Q3050-Q3053.
106. Sushrut Modak, **Leonid Chernyak**, Igor Lubomirsky, Sergey Khodorov, "Continuous and time-resolved cathodoluminescence studies of electron injection induced effects in gallium nitride". **Book chapter** in *Advanced Technologies for Security Applications - NATO Science for Peace and Security Cluster Workshop on Advanced Technologies, 17-18 September 2019, Leuven, Belgium*.
107. **L. CHERNYAK**, R.E. PEALE, C.J. FREDRICKSEN, J. LEE
Infrared sensor device
Patent Number(s): US2019234803-A1.

108. Sushrut Modak, **Leonid Chernyak**, Sergey Khodorov, Igor Lubomirsky, Arie Ruzin, Minghan Xian, Fan Ren, Stephen J. Pearton (2020)
“Effect of Electron Injection on Minority Carrier Transport in 10 MeV Proton Irradiated β -Ga₂O₃ Schottky Rectifiers”, *ECS Journal of Solid State Science and Technology*, **vol. 9**, article 045018.
109. B. Dzundza, L. Nykyrui, T. Parashchuk, E. Ivakin, Y. Yavorsky, **L. Chernyak**, Z. Dashevsky (2020)
“Transport and thermoelectric performance of n-type PbTe films”, *Physica B: Condensed Matter*, **vol. 588**, article 412178.
110. Sushrut Modak, **Leonid Chernyak**, Minghan Xian, Fan Ren, Stephen Pearton, Sergey Khodorov, Igor Lubomirsky, Arie Ruzin, and Zinovi Dashevsky (2020)
“Impact of Electron Injection on Carrier Transport and Recombination in Unintentionally Doped GaN”, *J. Appl. Phys.*, **128**, article 085702.
111. T. Parashchuk, **L. Chernyak**, S. Nemov, Z. Dashevsky (2020)
“Influence of Deformation on Pb(1-x)In(x)Te(1-y)I(y) and Pb_{1-x-y}Sn_xIn_yTe Films” *PHYSICA STATUS SOLIDI B-BASIC SOLID STATE PHYSICS*, Article Number: 2000304.
112. A. Brovko, A. Adelberg, **L. Chernyak**, S. Gorfman, A. Ruzin (2020)
“Impact of polishing on crystallinity and static performance of Cd_{1-x}Zn_xTe”, *Nuclear Inst. and Methods in Physics Research A*, **984**, article 164568.
113. O. Kostyuk, B. Dzundza, M. Maksymuk, V. Bublik, **L. Chernyak**, Z. Dashevsky (2020)
“Development of Spark Plasma Sintering (SPS) for preparation of nanocrystalline p-type Bi_{0.5}Sb_{1.5}Te₃ thermoelectric material”, *J. Phys. Chem. of Solid State*, **21**, 628.
114. Jonas Gradauskas, Bohdan Dzundza, **Leonid Chernyak**, Zinovi Dashevsky (2021)
“Detection of 9.5 μ m CO₂ laser pulses in indium doped PbTe p-n junction”, *Physica B, in press*.
115. J. Gradauskas, B. Dzundza, **L. Chernyak**, Z. Dashevsky (2021)
“Two-Color Infrared Sensor on the PbTe:In p-n junction”, *Sensors* **21**, 1195.
116. S. Nemov, O. Kostyuk, B. Dzundza, **L. Chernyak**, Z. Dashevsky (2021)
“High Perfection Bulk and Film Thermoelectrics Based on PbTe Doped by In”, *Semiconductors*, 55 (6), in press.
117. S. Nemov, B. Dzundza, **L. Chernyak**, Z. Dashevsky (2021)
“Photovoltaic and thermal effects on PbTe p-n junction under CO₂ laser irradiation”, *Semiconductors*, 55 (9), in press.
118. A. Brovko, O. Amzallag, A. Adelberg, **L. Chernyak**, P.V. Raja, A. Ruzin (2021)
“Effects of oxygen plasma treatment on CdTe material and devices”, *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, in press (available online April 20, 2021; <https://doi.org/10.1016/j.nima.2021.165343>).
119. M. Maksymuk, T. Parashchuk, B. Dzundza, L. Nykyrui, **L. Chernyak**, Z. Dashevsky (2021)
“Development of the flexible film thermoelectric microgenerator based on Bi₂Te₃ alloys”, *Materials Today Energy* vol. 21, 100753; <https://doi.org/10.1016/j.mtener.2021.100753>
120. Sushrut Modak, **Leonid Chernyak**, Alfons Schulte, Minghan Xian, Fan Ren, Stephen J. Pearton, Igor Lubomirsky, Arie Ruzin, Sergey S. Kosolobov, Vladimir P. Drachev (2021)
“Electron beam probing of non-equilibrium carrier dynamics in 18 MeV alpha particle- and 10 MeV proton-irradiated Si-doped β -Ga₂O₃ Schottky rectifiers”, *Appl. Phys. Lett.*, **vol. 118** (20), May 17, 2021.
DOI: 10.1063/5.0052601

Conference and Seminar Presentations (till 2015)

1. "Electric field-induced tailoring of semiconductor electronic properties" *Gordon Conference on Point and Line Defects in Semiconductors*, Plymouth, NJ, July-August 1994.
2. "Low Temperature Device Creation in Ternary Chalcogenide Semiconductors via Thermally Assisted Electromigration of Native Dopants" *International Conference on the Ternary and Multinary Compounds*, Stuttgart, Germany, September 1995.
3. "Electron Beam Induced Current Measurements of Minority Carrier Diffusion Length in GaN" *Electronic Materials Conference*, Santa Barbara, CA, June 1996.
4. "Electric field-induced fabrication of microscopic Si-based optoelectronic devices for 1.55 and 1.16 μm IR electroluminescence", *E-MRS Spring Meeting*, Strasbourg, France, May 2000.
5. "Electron Beam-Induced Increase of Electron Diffusion Length in p-type GaN and AlGaIn/GaN superlattices", *Electronic Materials Conference*, Denver, CO, June 2000.
6. "Studies of Electron Injection-Induced Effects in GaN", *Florida Chapter of the American Vacuum Society Meeting*, Orlando, FL, March 2001, **invited**.
7. "Studies of electron injection-induced effects in III-Nitrides", *Electrochemical Society Meeting*, Philadelphia, PA, May 2002, **invited**.
8. "Electron injection-induced effects in GaN: Physics and Applications", *MRS Spring Meeting*, San Francisco, CA, April 2003, **invited**.
9. "Physics of Electron Injection in III-Nitrides", *Electrochemical Society Meeting*, Paris, France, April 2003, **invited**.
10. "Electron Injection in III-Nitride Semiconductors" *International Symposium on Compound Semiconductors*, San Diego, CA, August 2003, **invited**.
11. "Cathodoluminescence studies of the electron injection-induced effects in III-Nitrides" *Electrochemical Society Meeting*, Orlando, FL, October 2003, **invited**.
12. "Studies of Electron Trapping in III-Nitrides" *Electrochemical Society Meeting*, Honolulu, Hawaii, October 2004, **invited**.
13. "Impact of Electron Injection on Minority Carrier Transport in III-Nitride Semiconductors" Physics Department, University of Bologna, Italy, March 2005, **invited**.
14. "Tailoring of minority carrier transport by controlled electron injection" *International Conference on Materials for Advanced Technologies*, Singapore, Singapore, July 2005.
15. "Electron Beam studies of wide band gap semiconductors" Chemistry Faculty Seminar Series, Weizmann Institute of Science, Israel, December 2005, **invited**.
16. "Studies of electron trapping in III-nitride semiconductors" Photonic West International Conference, 23-25 January, 2006, San Jose, CA, USA, **invited**.
17. "Novel Approach to Improvement of Ultra-Violet Detectors for Homeland Defense" Presentation at NATO Headquarters, April 23, 2006, Brussels, Belgium, **invited**.
18. "Studies of Minority Carrier Transport in n- and p-type ZnO" European Materials Research Society Meeting, May 29-June 2, 2006, Nice, France.
19. "Electron injection effects in wide band gap semiconductors" Seminar in the Department of Electrical Engineering, Texas Tech University, Lubbock, TX, April 7, 2007, **invited**.

20. "Studies of the Electron Injection-Induced Effects in III-Nitride Device Structures", Workshop of the National Science Foundation, April 30-May 2, 2007, Reno, NV, **invited**.
21. "Impact of electron injection on performance of ZnO p-n junction photovoltaic detector" European Materials Research Society Meeting, May 28-June 2, 2007, Strasbourg, France.
22. "Novel Approach to Improvement of Ultra-Violet Detectors for Homeland Defense" College of Engineering Seminar Series, Ben-Gurion University of the Negev, Beer-Sheva, Israel, December 19, 2007, **invited**.
23. "Studies of Electron Injection-Induced Effects in Wide Band Gap Semiconductors" Seminar at the Lisbon Polytechnic Institute, Portugal, May 6, 2008, **invited**.
24. "Effects of Electron Injection in AlGaIn-based semiconductors" Seminar at Materials Science Institute, Vilnius University, Lithuania, May 30, 2008, **invited**.
25. "Effects of electron injection in III-N and oxide semiconductors", Seminar at the Institute of Semiconductors, Ukrainian Academy of Science, Kiev, Ukraine, May 12, 2009, **invited**.
26. "Studies of the Effects of Electron injection in ZnO Semiconductor" Seminar at Riga Technical University, Latvia, October 2, 2009, **invited**.
27. "Studies of the Effects of Electron Injection in III-Nitrides and other Wide Band Gap Semiconductors", 7th All-Russian Conference "Gallium, aluminum and indium nitrides", Moscow State University, February 1 - 3, 2010, Moscow, Russia, **invited**.
28. "Studies of Electron Trapping in ZnO semiconductor", 217th Electrochemical Society Meeting, April 25-30, 2010, Vancouver, Canada, **invited**.
29. "Electron beam probing of Wide Band Gap semiconductors", Institute of Semiconductor Optics and Functional Interfaces, Stuttgart University, Stuttgart, Germany, May 17, 2010, **invited**.
30. "Studies of the effects of electron injection in ZnO device structures", Workshop on "Perspectives of ZnO Materials and Devices for Optoelectronics", Mission Inn Hotel, Riverside, CA, July 7-9, 2010, **invited**.
31. "Studies of Electron Trapping in ZnO semiconductor", 2010 Fall E-MRS Meeting, September 13-17, Warsaw, Poland.
32. "Studies of the Effects of Electron Injection in III-Nitrides and Other Wide Band Gap Semiconductors", 22nd European Conference on Diamond, Diamond-Like Materials, Carbon Nanotubes, and Nitrides (Diamond 2011), September 4-8, 2011 Garmisch-Partenkirchen, Bavaria, Germany.
33. "Electron Injection-Induced Effects in Wide Band Gap Semiconductors", Institute for Solid-State Research, Hungarian Academy of Science, Budapest, Hungary, April 17, 2012, **invited**.
34. "Cathodoluminescence and EBIC studies of AlGaIn/GaN HEMT degradation", Ferdinand-Braun-Institute, Berlin/GaN Reliability Roundtable, May 7-8, 2012, **invited**.
35. "Novel Approach to Improvement of AlGaIn/GaN Photo-detectors for Homeland Defense", NATO Headquarters, Brussels/NATO Workshop on Explosive and Chemical Detection Technologies, October 16-17, 2012, **invited**.
36. "Studies of Electron Trapping in Wide Band Gap Semiconductors", Aalto Technical University, Helsinki, Finland/ Center for Micro- and Nano-Technology, February 28, 2013, **invited**.

37. "Novel Approach to Efficiency Improvement of Semiconductor Detectors for Fast Explosive Alert System", NATO-Russia Council SPS-sponsored STANDEX Management of Alerts and Related Technologies (SMART) Expert Meeting, Tours, France, December 3-5, 2013, **invited**.
38. "Effect of Annealing on Electronic Carrier Transport Properties of Gamma-Irradiated AlGaIn/GaN High Electron Mobility Transistors", 225th ECS Meeting, Orlando, FL, May 11-15, 2014, **invited**.
39. Anupama Yadav, Elena Flitsiyan, **Leonid Chernyak**, "Studies of gamma-irradiation induced effect on electronic carrier transport properties of AlGaIn/GaN high electron mobility transistors", *Material Research Society Meeting*, San Francisco, CA, May 16-20, 2015.
40. Anupama. Yadav, Elena Flitsiyan, **Leonid Chernyak**, "Optical and Electrical Studies of Gamma-Irradiated AlGaIn/GaN High Electron Mobility Transistors", APS March Meeting, Baltimore, March 14-18, 2016.
41. Anupama Yadav, Elena Flitsiyan, **Leonid Chernyak**, "Effect of Annealing on Electronic Carrier Transport Properties of Gamma-Irradiated AlGaIn/GaN High Electron Mobility Transistors", Florida Chapter of the AVS Science and Technology Society Meeting, Orlando, FL March 2-3, 2016.
42. Anupama Yadav, Elena Flitsiyan, **Leonid Chernyak**, "Effect of annealing on Electronic Carrier Transport properties of gamma-irradiated AlGaIn/GaN High Electron Mobility Transistors", 4th International Conference on Advanced Nanomaterial and Nanotechnology, I.I.T Guwahati, India, February 12-14, 2016.
43. Anupama Yadav, Michael Antia, Elena Flitsiyan, **Leonid Chernyak**, Igor Lubomirsky and Joseph Salzman, "Cathodoluminescence Studies of Gamma-Irradiation Effects on AlGaIn/GaN High Electron Mobility Transistors (HEMTs)", 228th ECS Meeting, Phoenix, October 11-16, 2015, **invited**.
44. **Leonid Chernyak**, "Effects of electron injection in Wide Band Gap Semiconductors", European Synchrotron Facility, Trieste, Italy, September 30, 2015, **invited**.

Conference and Seminar Presentations (last five years)

45. **Leonid Chernyak**, "Studies of radiation-induced effects in AlGaIn/GaN High Electron Mobility Transistors", Israel Institute of Technology, Haifa, Israel, January 5, 2016, **invited**.
46. **Leonid Chernyak**, "Electron Injection-Induced Effects in AlGaIn/GaN bipolar devices", University of Ljubljana, Slovenia, April 21, 2016, **invited**.
47. **Leonid Chernyak**, "Electron injection effects in GaN and ZnO semiconductors", Attolight AG, Lausanne, Switzerland, May 26, 2016, **invited**.
48. **Leonid Chernyak**, "Studies of Electron Trapping in Wide Band Gap Semiconductors", Israel Institute of Technology, Haifa, March 14, 2017, **invited**.
49. **Leonid Chernyak**, "Minority carrier transport in ultra-wide band gap semiconductors", Physics Department, Padua University, Italy, October 8, 2018, **invited**.
50. **Leonid Chernyak**, "Charge Trapping in Ultra-Wide Bandgap Semiconductors", Hungarian Academy of Science, April 2019, Budapest, Hungary, **invited**.

51. Jiancheng Yang, Chaker Fares, Fan Ren, Jean-Marie Lauenstein, S.J. Pearton, Ani Khachatrian, N. J.-H. Roche, Jeffrey Warner, Stephen Buchner, Dale McMorrow, Jihyun Kim, David Shahin, Kiran Kovi, Aayush Thapa, Yizhou Lu, Ilya Ponomarev, James Butler, Aris Christou, Michael Stavola, A.Y. Polyakov, J. Lee, S. Modak, E. Flitsiyan and **Leonid Chernyak**, “Recent Progress in Radiation Effects in Wide Bandgap and Ultra-Wide Bandgap Semiconductor Devices”, GOMACTech 2019 conference, Albuquerque, NM, March 25-28, 2019.
52. C. Carraro, R. Milazzo, F. Sgarbossa, G. Maggioni, W. Raniero, S. Carturan, D. Scarpa, L. Baldassarre, M. Ortolani, A. Ballabio, G. Isella, S. Modak, **L. Chernyak**, A. Andrighetto, D.R. Napoli, D. De Salvador and E. Napolitani, “Ultralow resistivity in Ge by Sb deposition and pulsed laser melting”, **EMRS Spring 2019 Symposium D** (D.P1.26), May 2019, Nice, France.
53. **Leonid Chernyak**, “Effects of Electron Injection in Wide Bandgap Semiconductors”, Electrical Engineering Department, University of Padua, Italy, October 23, 2019, **invited**.
54. **Leonid Chernyak**, “Electron Injection-Induced Effects in Wide and Ultra-Wide Bandgap Semiconductors”, School of Electrical Engineering, Tel Aviv University, Israel, September 4, 2019, **invited**.
55. **Leonid Chernyak** and Igor Lubomirsky, “Radiation hard UV detectors against terrorist threats”, NATO SPS Cluster Workshop on Advanced Technology at Electrical Engineering Department, KU Leuven, September 17-19, 2019, **invited**.
56. S. Modak, **Leonid Chernyak**, J. Yang, F. Ren, S.J. Pearton, “Radiation and Electron-Injection Induced Effects in Ga₂O₃ Schottky Rectifiers”, 19 American Institute of Chemical Engineers Annual Meeting, Orlando, FL, November 13, 2019, **invited**.
57. **Leonid Chernyak**, “Elemental and optical studies of Ohmic contacts to AlGaIn/GaN structures”, Weizmann Institute of Science/Israel Ministry of Defense”, Rehovot, Israel, December 24, 2019, **invited**.
58. Sushrut Modak, **Leonid Chernyak**, Minghan Xian, Fan Ren, Stephen Pearton, Sergey Khodorov, Igor Lubomirsky, Zinovi Dashevsky, “Effect of Electron Injection on Minority Carrier Transport Properties in Unintentionally Doped GaN”, Pacific Rim Meeting on Electrochemical and Solid-State Science, October 4-9, 2020.

External Research Funding (at UCF)

Intervalence Band THz Laser in p/p⁺ Ge Heterostructure. **PI: L. Chernyak**

Agency: Zaubertek, Inc.; Period: 02.01.02-12.31.02; \$33,673.

New approach to revolutionize a photovoltaic detector performance using electron injection-induced effects in AlGaIn. **PI: L. Chernyak**

Agency: National Science Foundation; Period: 06.15.02-05.31.04; \$68,000.

Acquisition of a cathodoluminescence system for research in III-Nitride nanostructures.

PI: L. Chernyak (with Alfons Schulte as Co-PI)

Agency: National Science Foundation; Period: 07.15.02-07.31.04; \$145,675.

Studies of Electron Injection-Induced effects in GaN. **PI: L. Chernyak**

Agency: American Chemical Society/PRF; Period: 08.01.02-08.31.04; \$51,000.

Physics of Electron Injection-Induced Effects in III-Nitrides. **PI: L. Chernyak**

Agency: American Chemical Society/PRF; Period: 01.01.04-08.31.06; \$80,000.

Collaborative grant: Controlling AlGaIn photovoltaic detector performance using electron injection.

PI and NATO Project Director: L. Chernyak

Agency: NATO; Period: 06.01.04-05.31.06; \$12,165

Summer Faculty Fellowship. **PI: L. Chernyak**

Agency: National Research Council; Period 06.01.04-08.01.04; \$15,000

Studies of the Electron Injection-Induced Effects in III-Nitride Device Structures.

PI: L. Chernyak

Agency: National Science Foundation; Period: 08.15.04-07.31.08; \$210,000

Minority Carrier Diffusion Length Measurements in Silicon Carbide. **PI: L. Chernyak**

Agency: Cree, Inc.; Period: 08.09.04-09.09.04; \$3,000

Cathodoluminescence studies of AlGaIn epitaxial layers. **PI: L. Chernyak**

Agency: Weizmann Institute of Science (Israel); Period: 12.15.05-02.15.06; \$2,000

Luminescence Studies of AlGaIn Epitaxial Layers. **PI: L. Chernyak**

Agency: Gal-El Ltd. (Israel); Period: 04.15.06-12.31.06; \$10,000

Phase II-Cathodoluminescence studies of AlGaIn epitaxial layers. **PI: L. Chernyak**

Agency: Weizmann Institute of Science (Israel); Period: 04.01.06-12.31.07; \$12,000

Electron Beam studies in ZnO-based semiconductors. **PI: L. Chernyak**

Agency: SVT Associates, Inc.; Period: 02.15.06-05.01.07; \$25,000

Surface Plasmon polariton dependence on metal surface morphology. PI: R. Peale;
Co-PI: L. Chernyak
Agency: Air Force Research Laboratory; Period: 11.30.06-10.31.07; \$21,420
(credited 50%)

Phase III-Cathodoluminescence studies of AlGaIn/GaN epitaxial layers.
PI: L. Chernyak
Agency: Weizmann Institute of Science (Israel); Period: 03.15.07-12.31.07; \$15,000

Studies of Point Defects in GaN using induced light emission. **PI: L. Chernyak**
Agency: Weizmann Institute of Science (Israel); Period: 10.1.07-12.31.08; \$28,000

Science for Peace-Improvement of UV Detectors. **PI and NATO Project Director:**
L. Chernyak
Agency: NATO; Period: 07.25.06-10.31.10; \$316,400 (credited 30%)

Collaborative grant: Studies of electron injection in ZnO-based structures for Ultra-Violet detection. **PI and NATO Project Director: L. Chernyak**
Agency: NATO; Period: 01.18.08-01.17.10; \$21,000

Electron Beam Probing of III-V Thin Films
PI: L. Chernyak
Agency: Weizmann Institute of Science (Israel); Period: 01.15.09-12.31.09; \$26,000

Collaborative Research: Studies of Electron Injection-Induced Effects in ZnO-based Materials and Device Structures. **PI: L. Chernyak**
Agency: National Science Foundation; Period: 08.01.09-07.31.13; \$215,277

Studies of the effects of electron injection in ZnO-based semiconductors.
PI: L. Chernyak
Agency: US-Israel Binational Science Foundation; Period: 10.1.09-03.31.13;
\$64,500

Studies of III-V Structures Using Deep Level Spectroscopy
PI: L. Chernyak
Agency: Weizmann Institute of Science (Israel); Period: 01.01.10-12.31.10; \$6,000

Spectral Cathodoluminescence Studies of AlGaIn/GaN HEMTs Degradation
PI: L. Chernyak
Agency: Israel Ministry of Defense; Period: 08.01.10-07.31.12; \$150,000

Graduate Research Supplement: Collaborative Research: Studies of Electron Injection-Induced Effects in ZnO-based Materials and Device Structures. **PI: L. Chernyak**
Agency: National Science Foundation; Period: 07.15.10-07.31.13; \$37,939

Collaborative Linkage Grant: Novel Generation of IV-VI semiconductor nano-structures for Infra-Red Applications. **PI: L. Chernyak**

Agency: NATO; Period: 07.15.2011-07.15.2013; \$25,200

Towards Radiation Hard AlGaIn/GaN HENTs for Homeland Security. **PI: L. Chernyak**; Co-PI: E. Flitsyan

Agency: NATO; Period: 02.01.2014-01.01.2017; \$496,800

Diffusion length measurements and CL mapping of AlGaIn. **PI: L. Chernyak**

Agency: Agnitron Technology; Period: 03.13.2014-07.15.2014; \$2,500

External Research Funding (at UCF) last five years

Gamma Irradiation-induced effects in AlGaIn/GaN structures, **PI: L. Chernyak**

Agency: US-Israel Binational Science Foundation; Period: 10.01.2015-09.30.2019; \$180,000

MRI: Acquisition of a Cathodoluminescence Microscope for Device Testing, Materials Research and Education, **PI: L. Chernyak**

Agency: National Science Foundation; Period: 09.01.2016-08.31.2018; \$1,500,000

Radiation Hard UV Detectors against Terrorist Threats, **PI: L. Chernyak**

Agency: NATO; Period: 06.01.2018-12.01.2021; \$456,000

Studies of minority carrier transport in InAs/GaSb structures, **PI: L. Chernyak**

Agency: Truventic LLC; Period: 08.15.2018-05.01.2020; \$313,000

Electrical mitigation of gamma radiation-induced defects in AlGaIn, **PI: L. Chernyak**

Agency: National Science Foundation; Period 08.15.2018-07.31.2022; \$325,014

Optical and Elemental Characterization of Ohmic Contacts to n-type AlGaIn/GaN Structures, **PI: L. Chernyak**

Agency: Israel Ministry of Defense; 12.01.2018-11.30.2020; \$130,064

RF: Electron injection- and light- and heavy-particles-induced effects in GaN- and ZnO-based bipolar device structures, **PI: L. Chernyak**

Agency: US-Israel Binational Science Foundation; Period: 10.01.2019-09.30.2023; \$330,000

RF: Radiation and electron injection in Gallium Oxide for deep-UV detection, **Co-PI: L. Chernyak** (50% credit);

Agency: NATO; Period: 11.15.2020-11.15.2023; Total \$616,474; \$308,237 (credited)

Total (2000-2020): \$5,903,674

Total last five years: \$3,542,315