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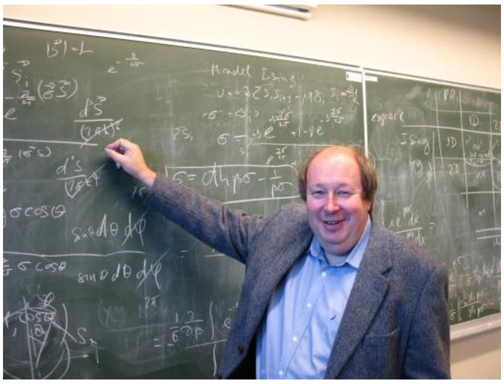

Igor A. LUKYANCHUK

1990 Researcher of the **Landau Institute for Theoretical Physics**, Russian Academy of Science
1991 Researcher in Rheinisch Westfalischen Technischen Hochschule **RWTH - Aachen, Germany**
1992 Invited Senior Researcher (DR2 CNRS), in Université de Montpellier, France
1993 Invited Professor (PAST) in Université de Montpellier, France
1996 Invited Professor in Universidade Federal de Minas Gerais, Brazil
1999 Researcher in Rheinisch Westfalischen Technischen Hochschule **RWTH - Aachen,, Germany**
2000 Researcher (Wissentschaftlische Mitarbeiter) in Technische Hochschule **ETH - Zurich**, Suisse
2001 Senior Researcher (DR2) in Institute Laue Langevin (ILL), Grenoble, France
2001-... Full Professor in Université de Picardie Jules Verne, France

Graduating from the Moscow Physico-Technical University, the best school in Physics in ex-USSR I passed the Landau minima entrance exams to the theory group in Landau Institute for Theoretical Physics in Moscow. Then, after completing my PhD I got the research position in ITP-Landau in 1990 where I had a unique opportunity to collaborate with the world-famous creators of modern Solid State Theory. Their guidelines idea of the predominant fundamental Physical Principles helps me further to switch easily between such different areas as superconductors, magnetic materials, fullerenes, and ferroelectrics. Working in Germany (91-92), Brazil (96-99), Swiss (2000), in USA and in France (since 2001), I always trying to follow the highest research and teaching standards, keeping the delicate balance between collaboration with experimentalists, applied and fundamental research, teaching, supervision of PhD students and management of research projects. International collaborations, mobility, organization of the dissemination and training events, coordination of European actions is another important part of my activity. A number of HORIZON European projects and networks were organized under my supervision. Highly believing in the necessity of high-level research in academic media, I am trying to apply all my knowledge and expertise to select the quality, competence and long-range recruiting strategy as decisive criteria of scientific policy.

Most important research results, Top 10

1. **Negative capacitance in ferroelectric films is caused by domain structures.** The effect of negative capacitance in ferroelectrics, important for the new generation of economic transistors was measured and explained by the emergence of domain structures [**Nature**, **534**, 524 (2016), **Nature Rev. Materials**, **4**, 243 (2019), Comm. Physics (Nature Publ.) **2**, 22 (2019)]. It results in THz oscillations for ultrafast nanoelectronics, Phys. Rev. B. **90**, 024102 (2014), **Nature**, **592**, 359 (2021), Nature Partner Journal Comp. Materials, **8**, 1, (2022)
2. **Dirac Fermions in Graphite*: precursor of the Nobel Prize 2010*.** We were the first who distinctly demonstrated the existence of Dirac Fermions in graphite [Phys. Rev. Lett. **93**, 166402 (2004)] and systematically studied their properties, including the integer [Phys. Rev. Lett. **97**, 256801 (2006)] and

fractional [Phys. Rev. Lett.. **103**, 116802 (2009)]. Quantum Hall effects. This discovery, done in 2004, was a precursor of the Nobel Prize 2010.

3. **Ferroelectric heterostructures: domains and switching phenomena** Theory of emergent domain structures [Phys. Rev. Lett. **94**, 047601 (2005), Phys. Rev. Lett. **102**, 147601 (2009)] and dynamical switching effects in strained heterostructures [Phys. Rev. B. **91**, 144110 (2015)], US Patents 17/721,484 & 17/685,996, (2022)
4. **Topology of confined ferroelectrics: vortices, skyrmions, hopfions, bubbles and entangled states** Confinement of ferroelectric domains by depolarization field results in the unusual topological excitations, having the fundamental nature in polarization texture [Nano Lett. **14**, 6931 (2014), Phys. Rev. B. **90**, 024102 (2014), Scientific. Rep. **7**, 42770 (2017). **Nature Comm.**, **11**., 2433, (2020), Scientific. Rep. **10,** 8657 (2020), Adv. Functional Materials, **30**, 2000284 (2020), **Nature Comm**. **13**, 1 (2022), **Adv. Mat.** 220328 (2022)
5. **Vortex-droplet states in superconducting nanoparticles** Experimental discovery and theoretical explication of the unusual confined vortex-droplet states in superconducting nanoparticles of Lead [**Nature Phys**., **11**, 21 (2015)].
6. **Invention of the phase-resolved Raman spectrometer** We propose the new principle of phase-resolved Raman spectrometry that substantially extends the frames of the method [US-Patent, US 8582097, 2013].
7. **Theory of critical superconductors, intermediate between type I and type II** The regular theory of crossover of superconductors from type I to type II was developed [Phys. Rev. B. **63**, 174504 (2001), Phys. Rev. B. **65**, 224504 (2002)]. The description of this regime was missed in the seminal works of Landau, Ginzburg and Abrikosov, awarded Nobel Prize 2003.
8. **Light scattering in Quartz - the strongest in Nature** Modulated phase of “Elongated triangles” (ELT) was discovered in quartz at structural alpha-beta transition at T = 847 K. It solves the 60-years problem of the anomalous light scattering which is the strongest scattering known in crystalline materials. Since its discovery in 1956, this question was the subject of many controversies and is frequently erroneously treated in the classical books as manifestation of the critical opalescence [Pisma ZhETP 64, 376 (1996)].
9. **Domains states in strained VO_2 nanorods at Metal-Insulator phase transition** We discovered that the strained samples of VO_2 demonstrate the unusual multiple domain states in which the new phases, not accessible in bulk were observed [Nano Lett. **10**, 2003 (2010), Nano Lett. **10**, 4409 (2010)].
10. **Theory of quantum Nernst oscillations** The complete theory of Nernst-Ettingshausen oscillations in semiclassically strong magnetic field in semimetals was constructed and applied for explication of the mysteriously-giant effect, observed in graphite, graphene and bismuth [Phys. Rev. Lett. **107,** 016601 (2011)].