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Profile

Dragan Mihailovic is Head of Department for Complex Matter at the Jozef Stefan Institute, Director of the CENN Nanocenter, Professor of physics at the University of Ljubljana and at the JS International Postgraduate School, where he is currently the head of the Nanoscience program and Vice Dean. He leads a research group on non-equilibrium studies of quantum materials.

Current interests

His two major current interests are in the study of mesoscopic metastable quantum states created through non-equilibrium processes using time-resolved methods in combination with scanning tunnelling microscopy, and charge configuration topological memory devices.

Scientific career

Since the beginning of career Dragan Mihailovic has been interested in fundamental problems in condensed matter physics, both experimental and theoretical, and his work has been largely driven by curiosity and a pioneering attitude towards research. His major achievements are in ultrafast studies of non-equilibrium phase transitions and related phenomena, magnetic fullerenes, molecular nanowires and superconductivity.

Some pioneering achievements:

- The first measurements of ultrafast quasiparticle dynamics with time-resolved optical spectroscopy in cuprate superconductors (PRB, 1999; 2x PRL, 1999)
 - The first measurement of ultrafast quasiparticle dynamics with time-resolved optical spectroscopy in 1D (PRL, 1999) and 2D CDW materials (PRB, 2002)
 - A report of the real-time observation of time-evolution of the order parameter through a transition using optical pump-probe spectroscopy (Nat. Phys. 2010)
 - The first report of the coherent formation and annihilation of domains in an electronic crystal (Nat. Phys. 2010)
 - The first to report a time-resolved study of the C60 fullerenes (EPL, 1997)
 - The first studies of CDW transitions in 1D and 2D. (PRL 1999, 2002, Nature Phys. 2010)
 - The experimental discovery of polar metals based on the pyroelectric, piezoelectric and ferroelectric properties of cuprates.(SSC, 1991): see [Wikipedia](#)
 - The discovery of high-temperature fullerene-derivative ferromagnets with record high Curie temperature.(CPL,1997)
 - The discovery of the molecular rotation mechanism responsible for fullerene ferromagnetism (Science, 1995; Nature, 2000)
 - Theoretical model (together with Viktor Kabanov) for a polaronic Jahn-Teller polaron mechanism of pairing with percolative superconductivity in cuprates (PRL 2005, EPL, 2006)
 - He proposed, and collaborated on experiments leading to the discovery of a polaronic quantum spin liquid in TaS₂. (Nat. Phys. 2008)
 - Performed the first demonstration of Grover's algorithm with real-time manipulation of collective CDW excitations (APL, 2002)
 - Discovered ultrafast switching to a metastable hidden quantum state in an electronic crystal (Science, 2014)
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- The first measurements of an ultrafast nonequilibrium topological transition (npj Quant. Mat, 2019)
- The discovery of quantum jamming and an amorphous Wigner state (Nat. Mat., 2019)
- Patented and demonstrated a new ultrafast ultra-low memory charge-configuration memory (CCM) device based on TaS₂. (Pat. Pend. 2019)
- Invention of light x-ray modulator based on TaS₂ (Nat. Photonics, 2024)

Education and major sabbaticals

Undergraduate degree in Physics, University of Oxford (MSc, 1979)

Doctorate at the University of Oxford. (DPhil, 1983).

Univ. of California, Santa Barbara (1989-90, 1991, 1992)

Clarendon Laboratory, Univ. of Oxford (1995)

Prizes and major research awards

Amongst other prizes he won the Kidric award in 1987, and in 2002 he was awarded the Zois prize, the highest award for outstanding achievements in science in Slovenia. He has held two ERC grants (AdG, PoC) on ultrafast studies of symmetry breaking transitions, and ultrafast non-volatile (non-magnetic) memories respectively and was a Fulbright scholar (1989-90). He is a member of the Slovenian Academy of Sciences and Arts (SASA) and the Slovenian Academy of Engineers.

Bibliographic data

He has over 500 scientific articles indexed by Google scholar, and over 11000 citations, with h=55. He is leading author of more than 10 Nature and Science articles and numerous other highly cited journals. He holds multiple patents in different areas of quantum materials and devices.

COMMISSIONS OF TRUST

Scientific Advisory Board, President of the Science Council of the Jozef Stefan Institute, (since 2011), member since 2006; Review Panel member, NATO Science for Peace programme, Vice-president of the Physical Sciences and Technology SfP Committee (2002 – 2004). DFG Science; Review panel Chair, Photon Science Review Committee Member, Paul Scherrer Institute, Switzerland (2016-), Review panel Member, Scientific council of the Slovenian Research Agency (2008-2014); Review panel Member, DFG Soderforschungsbereit evaluation (2019); Review panel Member, DFG Clusters of Excellence evaluation (2018); Scientific Advisory Board, Member of Expert Advisory Group of the NMP section of the 7th Framework programme (2007-2010); Scientific Advisory Board, Chair of the Materials section in NMP EAG advisory group, R&D priorities (2010-2013); Review board member, INFN, CNR, Italy (2005); NFFA advisory board (2012-2013); OECD Nanotechnology panel member for Slovenia; IUPAP Commissioner for Slovenia (2010 – 2014). And others.

ERC Panels: ERC PE3 Panel Member (CoG) (2014); ERC PE3 Panel Chair (CoG) (2016); ERC Panel Co-chair (SyG, 2017-18); ERC-Panel Chair (SyG) (2019-20)

Other project evaluations for scientific funding agencies: NSF, DoE, DFG, DWF, AWF, FWF, CNR-INFN, UK EPSRC, SNF, Royal Society, ARRS.
