

Alexander Balatsky

Research Interests

Quantum materials, dynamics, Dirac Materials, materials informatics, DNA spectroscopy, Graphene, Superconductivity, Superfluidity, Materials informatics: <https://omdb.mathub.io/>

Education and Training

Postdoctoral

- Physics, University of Illinois at Urbana – Champaign (UIUC) - Champaign, IL
- Los Alamos National Laboratory, (LANL) Los Alamos, NM 1989 – 1993

Graduate

- Ph.D. “*Intrinsic Orbital Momentum in Superfluid He3*” 1987
Landau Institute for Theoretical Physics, Moscow Russia
- M.S. Physics, Moscow Physical Technical Institute 1984

Undergraduate

- Physics, Moscow Physical Technical Institute 1982

Research and Professional Experience

- Professor, Physics, University of Connecticut 2017 - present
- Professor, Theoretical Condensed Matter, Nordita, KTH/SU, Stockholm 2012 - present
- Founding Director, Institute for Materials Science, Los Alamos; <https://ims.lanl.gov> 2014 - 2017
- Research Professor of Physics, Boston College - Boston, MA 2011 – 2015
- Theory Thrust Partner, Center for Integrated Nanotechnologies (CINT) 2005 – 2012
- Team Leader, Strongly Correlated Electron Systems, T-11 LANL - Los Alamos, NM 2004 – 2012
- Chief Scientist, Center for Integrated Nanotechnologies, LANL - Los Alamos, NM 2004 – 2005
- Staff Member - Los Alamos National Laboratory - Los Alamos, NM 1994 – 2004
- Fellowship of Japanese Society for Promotion of Science 2003
 - ERATO Project - Y. Tokura & N. Nagaosa – Tokyo University – Tokyo, Japan
- J.R. Oppenheimer Fellow with K. Bedell, LANL - Los Alamos, NM 1991 – 1994
- Physics Department, University of Illinois at Urbana-Champaign - Champaign, IL 1989 – 1991
 - Postdoctoral Associate, Visiting Research Assistant Professor with D. Pines
- Landau Institute for Theoretical Physics - Moscow, USSR 1985 – 1989

Scientific Honors

- Global Fellow, U St Andrews, Scotland July-Dec 2019
- Senior Fellowship, Institute for Theoretical Studies, ETH Zurich 2016-2017
- Linneaus Colloquium, Chalmers Oct 2015
- AAAS Fellow Nov 2011
- American Physical Society (APS) - Outstanding Referee Nov 2009
- Colloquium Ehrenfestii, Lorentz Institute for Theoretical Physics, Leiden Univ., NL Feb 2007
- Los Alamos National Laboratory Fellow Oct 2005
- American Physical Society Fellow Nov 2003
- Senior Fellowship of Japanese Society for Promotion of Science Mar – Apr 2003
- Los Alamos National Laboratory Achievement Award Sept 2000
- Los Alamos National Laboratory Achievement Award Sept 1997
- J. Robert Oppenheimer fellowship at the Los Alamos National Laboratory 1991 – 1994

Funding

Department of Energy (DOE) Basic Energy Sciences (BES) since 1997-2018
 Los Alamos National Laboratory - Laboratory Directed Research & Development
 University of California – Office of the President
 Villum foundation grant, Center of Excellence on Dirac Materials
 European Research Council Synergy, KAW Foundation

Grant reviews

Department of Energy (DOE), National Science Foundation (NSF), US-Israel Binational Science Foundation (BSF), Keck Foundation , European Research Council, Wallenberg Foundatio, Reviewer, national research grant applications: Israel, Sweden, Germany, NL

Editorial Board

Physical Review Materials, APS, Member of the editorial board
 Advanced Quantum Technologies, Wiley, Member of the editorial board

Invited Presentations

More than 150 invited presentations including: American Physical Society (APS) Meetings, Quantum Fluids and Solids (QFS) Conference, Strongly Correlated Electron Systems (SCES) Conferences.

Publications

Approximately 350 publications, h-index = 49 citations ~13000 (Web of Science)
 h = 61, citations ~18500 (Google Scholar)

<https://scholar.google.com/citations?user=ufAozSIAAAAJ&hl=en&cstart=10&pagesize=50%5C>
http://arxiv.org/find/all/1/all:+balatsky/0/1/0/all/0/1?client_host=lanl.arxiv.org

ODD-FREQUENCY BEREZINSKII SUPERCONDUCTIVITY IN DIRAC SEMIMETALS

By: SUKHACHOV, PO; JURICIC, V; BALATSKY, AV.

Source: PHYSICAL REVIEW B Volume: 100 Issue: 18 Pages: 180502, (2019)

MULTIFERROIC QUANTUM CRITICALITY

By: NARAYAN, AWADHESH; CANO, ANDRES; BALATSKY, ALEXANDER V.; *et al*

Source: NATURE MATERIALS (2018)

EXCITONIC INSTABILITY IN OPTICALLY PUMPED THREE-DIMENSIONAL DIRAC MATERIALS

By: PERTSOVA, ANNA; BALATSKY, ALEXANDER V.

Source: PHYSICAL REVIEW B Volume: 97 Issue: 7 Article Number: 075109 (2018)

DIRAC MAGNONS IN HONEYCOMB FERROMAGNETS

By: PERSHOGUBA, SERGEY S.; BANERJEE, SAIKAT; LASHLEY, J. C.; *et al*

Source: PHYSICAL REVIEW X Volume: 8 Issue: 1 Article Number: 011010 (2018)

DYNAMICAL MULTIFERROICITY

By: JURASCHEK, DOMINIK M.; FECHNER, MICHAEL; BALATSKY, ALEXANDER V.; *et al*

Source: PHYSICAL REVIEW MATERIALS Volume: 1 Issue: 1 Article Number: 014401 (2017)

EXCITONIC GAP FORMATION IN PUMPED DIRAC MATERIALS

By: TRIOLA, CHRISTOPHER; PERTSOVA, ANNA; MARKIEWICZ, ROBERT S.; *et al*

Source: PHYSICAL REVIEW B Volume: 95 Issue: 20 Article Number: 205410 (2017)

ODD-FREQUENCY SUPERCONDUCTIVITY IN DRIVEN SYSTEMS

By: TRIOLA, CHRISTOPHER; BALATSKY, ALEXANDER V.

Source: PHYSICAL REVIEW B Volume: 94 Issue: 9 Article Number: 094518 (2016)

DIRAC MATERIALS

By: WEHLING, T. O.; BLACK-SCHAFFER, A. M.; BALATSKY, A. V.

Source: ADVANCES IN PHYSICS Volume: 63 Issue: 1 Pages: 1-76

DOI: 10.1080/00018732.2014.927109 (2014)

Patents

[Noise reduction methods for nucleic acid and macromolecule sequencing](#)

IK Schuller, M Di Ventra, A Balatsky (2018)

US Patent 9,965,586

Synergistic Activities

- Organizer Nordita workshop on Dirac Materials, Hybrid Nanostructures and Superconductivity

Jun 2014

- Organizer (with D. Abergel) Nordita Program on “Physics at Interfaces and layered Systems” Aug 2015
- Organizer, Nordita program on “Topological Matter” 2018
- Organizer, “Dynamic Quantum Matter”, UCONN 2018
- Organizer, “Machine Learning for Quantum Matter”, Nordita 2019
- Organizer, “Dynamic Quantum and Dirac Matter”, Jacksonville, FL 2016,2017,2019

Referee: Nature, Science, Physical Review, PNAS, other journals

Graduate Students

- B. Olsthoorn, KTH/Nordita 2018-present
- S. Banerjee, KTH/Nordita, (U Augsburg, PD now) Sept 2014 – 2018
- C. Triola, College of William and Mary (Los Alamos) Summers 2013-14
- Rudro Biswas, Harvard University (Asst Prof Purdue U) 2008 – Sept 2009
- R. Hembree, Hampden Sydney College, VA Jun – Aug 2008
- Tanwa Apronthip Washington Univ, St Louis Jun – Aug 2008
- H. Dahal BC summer student (APS Editor) Summer, 2006

Postdoctoral Fellows (recent, more than 30 overall)

- S. Bandyopadhyay 2019–present
- D. Carvalho 2019–present
- P. Sukhachev 2019–present
- K. Dunnett, now SU, Mathematics, d 2017 – 2019
- A. Pertsova 2017– present
- M. Geilhufe 2016 –present
- Z. Huang – PD LANL, now PD Argonne NL 2016 –2018
- C. Triola – PD Nordita, PD Uppsala, Los Alamos Staff member 2015 – 2017

Graduate and Post-doctoral Advisors

- K. Bedell – Boston College, Boston, MA
- D. Pines – University of Illinois at Urbana-Champaign, Champaign, IL
- G.E. Volovik – Thesis advisor, Landau Institute Theoretical Physics, Moscow, Russia
- M. Feigelman – Landau Institute Theoretical Physics, Moscow, Russia

Collaborators

Within last 48 month: D. Abergel, H. Agren, G. Aeppli, D. Arovas, D. Basov, H. Ronnow, C. Canali, O. Eriksson, G. Fernando, V. Juricic, J. Haraldsen, J. Helsvik, H. Herper, M. Islam, R. Mendoza, I. Sochnikov, N. Spaldin, P. Wahl, J. Wills, P. Wolfle, K. Zarembo, J.X. Zhu.