

Curriculum Vitae

ANTON VORONTSOV

Department of Physics
Montana State University
P.O. Box 173840
Bozeman, MT 59717-3840

web: <http://www.physics.montana.edu/avorontsov/index.html>
e-mail: anton.vorontsov@montana.edu
phone: (406) 994-6573
Fax: (406) 994-4452

EDUCATION

- Ph.D., 2004, Northwestern University, Evanston, Illinois, USA (GPA 4.0/4.0)
Thesis: *Theoretical investigations of superfluid ^3He films* (advisor: James Sauls)
 - M.Sc. in Physics, *with honors*, 1998, Nizhny Novgorod State University, Nizhny Novgorod, Russia
 - B.Sc. in Physics, 1996, Nizhny Novgorod State University, Nizhny Novgorod, Russia
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PROFESSIONAL EXPERIENCE

- Associate Professor, 2015-present, Dept. of Physics, Montana State University, Bozeman
 - Assistant Professor, 2009-2015, Dept. of Physics, Montana State University, Bozeman
 - Postdoctoral associate, 2007-2008, Dept. of Physics, University of Wisconsin-Madison (advisor: Maxim Vavilov and Andrey Chubukov)
 - Postdoctoral associate, 2004-2007, Dept. of Physics and Astronomy, Louisiana State University (advisor: Ilya Vekhter)
 - Graduate Research Assistant summer position 2004, Los Alamos National Laboratory, T-CNLS/T-11, Los Alamos, NM
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AWARDS

- Cottrell Scholar, 2013 (Research Corporation for Science Advancement)
 - National Science Foundation CAREER Award, 2010
 - KITP Scholar, 2010-2012 (Kavli Institute for Theoretical Physics)
 - International ICAM Junior Exchange Fellowship Track II, for study of superconductors without inversion symmetry, 2006
 - I2CAM Junior Scientist Travel Awards, 2006, 2007, 2008
 - Named Khariton Fellowship, 1997-1998, Nizhny Novgorod State University
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PROFESSIONAL AFFILIATIONS

- American Physical Society (APS), since 2002
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PROFESSIONAL SERVICE

Refereeing

- granting agencies: NSF, Research Corporation for Science advancement
- PRL, PRB, PRR; Frontiers, Nature Communications; JLTP; Physica C;

Conference organization

- APS March Meeting 2018, 2019: abstract sorting
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RESEARCH TOPICS AND INTERESTS

- New phases and their properties in strongly confined unconventional superfluids and superconductors
 - Magnetically active superconductors and materials without inversion center
 - Inhomogeneous states in superfluids and superconductors, Fulde-Ferrell-Larkin-Ovchinnikov state
 - Topological properties of surface states in unconventional superfluids
 - Non-equilibrium and strong-coupling effects in superfluid ^3He
 - Superconductivity in magnetic field: Thermodynamic and transport properties in the vortex state
 - Superconductivity and magnetism in Fe-pnictides
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ANTON VORONTSOV

Publication List

in reverse chronological order. Student authors are underlined.

- 50 **Chiral superfluidity of helium-3 in the quasi-two-dimensional limit** [[arXiv:2409.12901](#)] (under review in *Phys.Rev.Lett.*)
P. J. Heikkinen, L. V. Levitin, X. Rojas, A. Singh, N. Eng, A. Casey, J. Saunders, A. B. Vorontsov, N. Zhelev, A. T. Sebastian, and J. M. Parpia
- 49 **Comment on “Surface Pair-Density-Wave Superconducting and Superfluid States”** *Phys. Rev. Lett.* **126**, 179602 (2021) [[arXiv:2007.13696](#)]
A. B. Vorontsov
- 48 **Thermal transport in superconductors with coexisting spin density wave order** *Phys. Rev. B* **103**, 104501 (2021) [[arXiv:2011.07096](#)]
S. Sen Choudhury, A. B. Vorontsov
- 47 **Fragility of surface states in topological superfluid ^3He** *Nature Communications* **12**, 1574 (2021) [[arXiv:1909.04210](#)]
P. J. Heikkinen, A. Casey, L. V. Levitin, X. Rojas, A. B. Vorontsov, P. Sharma, N. Zhelev, J. M. Parpia and J. Saunders
- 46 **Phase crystals** *Phys. Rev. Research* **2**, 013104 (2020) [[arXiv:1906.04793](#)]
P. Holmvall, M. Fogelström, T. Löfwander, A. B. Vorontsov
- 45 **Spontaneous symmetry breaking at surfaces of d -wave superconductors: Influence of geometry and surface ruggedness** *Phys. Rev. B* **99**, 184511 (2019) [[arXiv:1902.07530](#)]
P. Holmvall, A. B. Vorontsov, M. Fogelström, T. Löfwander
- 44 **Broken translational symmetry at edges of high-temperature superconductors** *Nature Communications* **9**, 2190 (2018) [[arXiv:1711.07946](#)]
P. Holmvall, A. B. Vorontsov, M. Fogelström, T. Löfwander
- 43 **Andreev Bound States in Superconducting Films and Confined Superfluid $^3\text{He-3}$** *Philosophical Transactions of the Royal Society A* **376**, 20150144 (2018) [[arXiv:1602.06917](#)]
A. B. Vorontsov
- 42 **Spin susceptibility of Andreev bound states** *Phys. Rev. B* **94**, 144501 (2016) [[arXiv:1606.08497](#)]
B. Rosemeyer, A. B. Vorontsov
- 41 **Heat transport in nonuniform superconductors** *Phys. Rev. B* **94**, 064502 (2016) [[arXiv:1605.01634](#)]
C. Richard, A. B. Vorontsov
- 40 **Bound collective modes in nonuniform superconductors** *Phys. Rev. B* **93**, 014503 (2016) [[arXiv:1602.06900](#)]
A. R. Hammer, A. B. Vorontsov
- 39 **Nodal gap structure and order parameter symmetry of the unconventional superconductor UPt_3** *New Journ. of Physics* **17**, 023041 (2015) [[arXiv:1302.4144](#)]
W.J. Gannon, W.P. Halperin, C. Rastovski, K.J. Schlessinger, J. Hlevyack, M.R. Eskildsen, A. B. Vorontsov, J. Gavilano, U. Gasser and G. Nagy
- 38 **Enhancement of electronic spin susceptibility in Pauli-limited unconventional superconductors** *Phys. Rev. B* **89**, 220501(R) (2014) [[arXiv:1401.7268](#)]
B. Rosemeyer, A. B. Vorontsov

- 37 **Doping evolution of the quasiparticle excitations in heavily hole-doped $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$: A possible superconducting gap with sign-reversal between hole pockets** *Phys. Rev. B* **89**, 115112 (2014) [[arXiv:1307.3408](#)]
D. Watanabe, T. Yamashita, Y. Kawamoto, S. Kurata, Y. Mizukami, T. Ohta, S. Kasahara, M. Yamashita, T. Saito, H. Fukazawa, Y. Kohori, S. Ishida, K. Kihou, C. H. Lee, A. Iyo, H. Eisaki, A. B. Vorontsov, T. Shibauchi, and Y. Matsuda
- 36 **Field-angle-resolved anisotropy in superconducting CeCoIn_5 using realistic Fermi surfaces** *Phys. Rev. B* **87**, 174514 (2013) [[arXiv:1303.6258](#)]
 Tanmoy Das, Anton Vorontsov, Ilya Vekhter, and Matthias J. Graf
- 35 **Role of the Fermi-Surface Anisotropy in Angle-Dependent Magnetic-Field Oscillations for Identifying the Energy-Gap Anisotropy of $A_y\text{Fe}_2\text{Se}_2$ Superconductors** *Phys. Rev. Lett.* **109**, 187006 (2012) [[arXiv:1104.5037](#)]
 Tanmoy Das, Anton Vorontsov, Ilya Vekhter, and Matthias J. Graf
- 34 **Jump in specific heat at superconducting transition in the presence of Spin-Density-Wave in iron-pnictides.** *Phys. Rev. B* **84**, 140502(R) (2011) [[arXiv:1203.2211](#)]
 M. G. Vavilov, A. V. Chubukov, A. B. Vorontsov
- 33 **Nodal gap structure of $\text{BaFe}_2(\text{As}_{1-x}\text{P}_x)_2$ determined by the angle resolved thermal conductivity.** *Phys. Rev. B* **84**, 060507(R) (2011) [[arXiv:1103.0885](#)]
 M. Yamashita, Y. Senshu, T. Shibauchi, S. Kasahara, K. Hashimoto, D. Watanabe, H. Ikeda, T. Terashima, I. Vekhter, A. B. Vorontsov, Y. Matsuda
- 32 **^{75}As NMR of $\text{Ba}(\text{Fe}_{0.93}\text{Co}_{0.07})_2\text{As}_2$ in High Magnetic Fields** *Phys. Rev. B* **83**, 214501 (2011) [[arXiv:1101.1021](#)]
 Sangwon Oh, A. M. Mounce, S. Mukhopadhyay, W. P. Halperin, A. B. Vorontsov, N. Ni, S. L. Budko, P.C. Canfield, Y. Furukawa, A. P. Reyes, P. L. Kuhns
- 31 **Effect of annealing on the specific heat of $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$** *Phys. Rev. B* **83**, 064513 (2011) [[arXiv:1009.1091](#)]
 K. Gofryk, A.B. Vorontsov, I. Vekhter, A.S. Sefat, M.A. McGuire, B.C. Sales, D. Mandrus, E.D. Bauer, J.D. Thompson, and F. Ronning
- 30 **Calorimetric Evidence for Nodes in the Overdoped $\text{Ba}(\text{Fe}_{0.9}\text{Co}_{0.1})_2\text{As}_2$.** *New Journ. of Physics* **13**, 023036 (2011) [[arXiv:1011.4808](#)]
 Dong-Jin Jang, A. B. Vorontsov, I. Vekhter, K. Gofryk, Z. Yang, S. Ju, J. B. Hong, J. H. Han, Y. S. Kwon, F. Ronning, J. D. Thompson, Tuson Park
- 29 **Nodes versus Minima in the Energy Gap of Iron Pnictide Superconductors from Field-Induced Anisotropy** *Phys. Rev. Lett.* **105**, 187004 (2010) [[arXiv:1006.0738](#)]
 A.B. Vorontsov, I. Vekhter
- 28 **London penetration depth in $\text{Ba}(\text{Fe}_{1-x}\text{T}_x)_2\text{As}_2$ (T=Co, Ni) superconductors irradiated with heavy ions.** *Phys. Rev. B* **82**, 060518(R) (2010) [[arXiv:1003.2959](#)]
 H. Kim, R. T. Gordon, M. A. Tanatar, J. Hua, U. Welp, W. K. Kwok, N. Ni, S. L. Bud'ko, P. C. Canfield, A.B. Vorontsov and R. Prozorov
- 27 **Superconductivity and spin-density-waves in multy-band metals** *Phys. Rev. B* **81**, 174538 (2010) [[arXiv:1003.2389](#)]
 A.B. Vorontsov, M.G. Vavilov, A.V. Chubukov
- 26 **Pauli-limited superconductivity with classical magnetic fluctuations** *Phys. Rev. B* **81**, 224501 (2010) [[arXiv:1003.6126](#)]
 R. Beaird, A.B. Vorontsov, I. Vekhter
- 25 **Coexistence between superconducting and spin density wave states in iron-based superconductors: Ginzburg-Landau analysis** *Supercond. Sci. Technol.* **23**, 054011 (2010) [[arXiv:0912.3556](#)]
 M.G. Vavilov, A.V. Chubukov, A.B. Vorontsov

- 24 [Vortex state in *d*-wave superconductors with strong paramagnetism: transport and specific heat anisotropy](#) *Phys. Rev. B* **81**, 094527 (2010) [[arXiv:1002.0330](#)]
A.B. Vorontsov, I. Vekhter
- 23 [Reduced effect of impurities on the universal pairing scale in the cuprates.](#) *Phys. Rev. B* **81**, 012508 (2010) [[arXiv:0909.4580](#)]
A.B. Vorontsov, A.V. Chubukov, M.G. Vavilov, A. Abanov
- 22 [Theory of thermal conductivity in extended-*s* state superconductors: application to ferropnictides](#) *Phys. Rev. B* **80**, 224525 (2009). [[arXiv:0907.4657](#)]
V. Mishra, A.B. Vorontsov, P.J. Hirschfeld, I. Vekhter
- 21 [Momentum dependence and nodes of the superconducting gap in iron-pnictides](#) *Phys. Rev. B* **80**, 140515(R) (2009). [[arXiv:0903.5547](#)]
A.V. Chubukov, M.G. Vavilov, A.B. Vorontsov
- 20 [Nonexponential London penetration depth of external magnetic field in superconducting Ba_{1-x}K_xFe₂As₂ single crystals.](#) *Phys. Rev. B* **80**, 020501(R) (2009) [[arXiv:0902.1804](#)]
C. Martin, R.T. Gordon, M. A. Tanatar, H. Kim, N. Ni, S. L. Bud'ko, P. C. Canfield, H. Luo, H. H. Wen, Z. Wang, A. B. Vorontsov, V. G. Kogan, R. Prozorov
- 19 [Broken translational and time-reversal symmetry in unconventional superconducting films.](#) *Phys. Rev. Lett.* **102**, 177001 (2009) [[arXiv:0903.5102](#)]
A.B. Vorontsov
- 18 [Superfluid density and penetration depth in Fe-pnictides.](#) *Phys. Rev. B* **79**, 140507(R) (2009) [[arXiv:0901.0719](#)]
A.B. Vorontsov, A.G. Vavilov, A.V. Chubukov
- 17 [Inversion of specific heat oscillations with in-plane magnetic field angle in 2D *d*-wave superconductors.](#) *Phys. Rev. B* **79**, 064525 (2009) [[arXiv:0810.2772](#)]
G.R. Boyd, P.J. Hirschfeld, I. Vekhter, A.B. Vorontsov
- 16 [Interplay between magnetism and superconductivity in Fe-pnictides.](#) *Phys. Rev. B* **79**, 060508(R) (2009) [[arXiv:0812.2469](#)]
A.B. Vorontsov, A.G. Vavilov, A.V. Chubukov
- 15 [Spin relaxation in quantum dots due to electron exchange with leads.](#) *Phys. Rev. Lett.* **101**, 226805 (2008) [[arXiv:0810.4546](#)]
A.B. Vorontsov, M.G. Vavilov
- 14 [Pauli-limited upper critical field in dirty *d*-wave superconductors.](#) *Phys. Rev. B* **78**, 180505(R) (2008) [[arXiv:0806.2445](#)]
A.B. Vorontsov, I. Vekhter, M.J. Graf
- 13 [Surface bound states and spin currents in noncentrosymmetric superconductors.](#) *Phys. Rev. Lett.* **101**, 127003 (2008) [[arXiv:0804.2464](#)]
A.B. Vorontsov, I. Vekhter, M. Eschrig
- 12 [Anomalous Attenuation of Transverse Sound in ³He.](#) *Phys. Rev. Lett.* **101**, 085301 (2008) [[arXiv:0807.2221](#)]
J.P. Davis, J. Pollanen, H. Choi, J.A. Sauls and W.P. Halperin, and A.B. Vorontsov
- 11 [Unconventional superconductors under rotating magnetic field II: thermal transport.](#) *Phys. Rev. B* **75**, 224502 (2007) [[cond-mat/0702226](#)]
A.B. Vorontsov, I. Vekhter
- 10 [Unconventional superconductors under rotating magnetic field I: the density of states and specific heat.](#) *Phys. Rev. B* **75**, 224501 (2007) [[cond-mat/0702225](#)]
A. B. Vorontsov, I. Vekhter

- 9 [Interplane and intraplane heat transport in quasi 2D nodal superconductors.](#) *Phys. Rev. B* **75**, 094512 (2007) [[cond-mat/0612094](#)]
I. Vekhter, A. Vorontsov
- 8 [Crystalline order in superfluid \$^3\text{He}\$ films.](#) *Phys. Rev. Lett.* **98**, 045301 (2007) [[cond-mat/0601565](#)]
A.B.Vorontsov and J.A.Sauls,
- 7 [Microscopic evidence for field-induced magnetism in \$\text{CeCoIn}_5\$.](#) *Phys. Rev. Lett.* **98**, 036402 (2007) [[cond-mat/0608040](#)]
B.-L. Young, R. R. Urbano, N. J. Curro, J. D. Thompson, J. L. Sarrao, A. B. Vorontsov, M. J. Graf
- 6 [Fermi-liquid effects in the FFLO state of 2D \$d\$ -wave superconductors.](#) *Phys. Rev. B* **74**, 172504 (2006) [[cond-mat/0606572](#)]
A.B. Vorontsov, M.J. Graf
- 5 [Nodal structure of quasi-2D superconductors probed by magnetic field.](#) *Phys. Rev. Lett.* **96**, 237001 (2006) [[cond-mat/0601126](#)]
A. Vorontsov, I. Vekhter
- 4 [Phase Diagram and Spectroscopy of Fulde-Ferrell-Larkin-Ovchinnikov states of two-dimensional \$d\$ -wave superconductors.](#) *Phys. Rev. B* **72**, 184501 (2005) [[cond-mat/0506257](#)]
A.B. Vorontsov, J.A. Sauls and M.J. Graf
- 3 [Domain walls in superfluid \$^3\text{He-B}\$.](#) *Journ. of Low Temp. Physics* **138**, 283 (2005) [[cond-mat/0408465](#)]
A.Vorontsov and J.A.Sauls
- 2 [Spectrum of third sound cavity modes on superfluid \$^3\text{He}\$ film.](#) *Journ. of Low Temp. Physics* **134**, 1001 (2004) [[cond-mat/0309599](#)]
A.Vorontsov and J.A.Sauls
- 1 [Thermodynamic properties of thin films of superfluid \$^3\text{He-A}\$.](#) *Phys. Rev. B* **68**, 064508 (2003) [[cond-mat/0304054](#)]
A.Vorontsov and J.A.Sauls

CONFERENCE PROCEEDINGS (peer-reviewed)

- 7 [Disorder Induced Anomalous Thermal Hall Effect in Chiral Phases of Superfluid \$^3\text{He}\$](#) *JPS Conf. Proc.* **38**, 011002 (2023)
P. Sharma, A. B. Vorontsov, and J. A. Sauls
- 6 [Surface states in superconductors with no inversion symmetry.](#) *J. Phys. Soc. Japan* **77** (**Supplement A**), 165-171 (2008)
A. B. Vorontsov, I. Vekhter, M. Eschrig
- 5 [Searching for zeroes: Unconventional superconductors in a magnetic field.](#) *Physica B* **403**, 958-962 (2008) [[arXiv:0803.0583](#)]
I. Vekhter, A. B. Vorontsov
- 4 [Pauli-limited superconductors with fluctuating magnetic moments.](#) *Physica B* **403**, 1083-1085 (2008)
R. Beaird, A. B. Vorontsov, I. Vekhter
- 3 [Andreev bound states in non-centrosymmetric superconductors.](#) *Physica B* **403**, 1095-1097 (2008)
A. B. Vorontsov, I. Vekhter, M. Eschrig

- 2 **Anisotropy of heat capacity in Pauli limited unconventional superconductors.** *Physica C* **460-462**, 742-743 (2007) [[cond-mat/0606390](#)]
A. B. Vorontsov, I. Vekhter
 - 1 **Knight shift in the FFLO state of a two-dimensional *d*-wave superconductors.** *Journ. of Low Temp. Physics* **850**, 729 (2006) [[cond-mat/0507479](#)]
A.B. Vorontsov and M.J. Graf
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ANTON VORONTSOV

Talks & Conferences

CONFERENCES: Invited Presentations

- 2015 NSF-sponsored workshop "Grand challenges in quantum fluids and solids" University at Buffalo, NY, August 7-9
Invited talk: [Superfluids and superconductors in confinement](#)
- 2014 Symposium "Topological States of Matter" Chalmers University, Gothenburg, Sweden, June 9-13
Invited talk: [Localized quasiparticle states in superconducting and \$^3\text{He}\$ superfluid films](#)
- 2013 Quantum Fluids and Solids International Conference, Matsue, Japan
Invited talk: [Flow-induced phase transitions in superfluid \$^3\text{He}\$ films](#)
- 2011 International Workshop on Topological Quantum Phenomena in Condensed Matter, LaForet Biwako, Shiga, Japan, November 1-5
Invited talk: [Broken symmetries and bound quasiparticle states in superfluid \$^3\text{He}\$ films](#)
- 2011 New Generation SCES, Santiago de Compostela, Spain, July 3-8
Invited talk: [Superconductivity and magnetism in pnictides: co-existence or competition?](#)
- 2011 CALCON International conference, Oahu, Hawaii, June 12-17
Invited talk: [Probing superconducting states with rotated magnetic field](#)
- 2011 APS March Meeting, Dallas, TX
Invited talk: [Superconductivity and magnetism in pnictides: co-existence or competition?](#)
- 2010 APS Northwestern section meeting, October 1-2, Walla Walla, WA
Invited talk: [Superconductivity and magnetism in pnictides](#)
- 2010, July 1, International Conference on Strongly Correlated Electron Systems, Santa Fe, NM
Invited talk: [Superconductivity and magnetism in pnictides](#)
- 2009 Quantum Fluids and Solids International Conference, Evanston, IL
Invited talk: [Competing orders, broken spatial and temporal symmetries in superfluid \$^3\text{He}\$ and novel superconductors](#)
- 2008, August 9, LT-25, Amsterdam, the Netherlands
Invited talk: [Stripe order in superfluid \$^3\text{He}\$ and superconducting films](#)
- 2008, July 14, Workshop SPINS 08, Karlsruhe, Germany
Invited talk: [Surface bound states and spin currents in non-centrosymmetric superconductors](#)

CONFERENCES: contributed presentations

- 2024 Sept 21, Symposium "BillFest" Evanston, IL
Contributed talk: [Periodic superfluid \$^3\text{He}\$ as a model for Anisotropic aerogel](#)
- 2024 July 27, Quantum Fluids and Solids International Conference, Jacksonville, FL
Contributed talk: [Superfluid \$^3\text{He}\$ in periodic aerogel structures](#)
- 2024 March 5, APS March Meeting, Minneapolis, USA
Oral Presentation: [Magnetization of superfluid \$^3\text{He}\$ near semi-transparent interfaces](#)
- 2023 Quantum Fluids and Solids International Conference, Manchester, UK
Contributed talk: [Superfluid \$^3\text{He}\$ suppression by atomically smooth surfaces](#)
- 2023 March 7, APS March Meeting, Las Vegas, USA
Oral Presentation: [Superfluid \$^3\text{He}\$ suppression by atomically smooth surfaces](#)

- 2022 Oct 15, Symposium “JimFest” Evanston, IL
Contributed talk: Strongly confined ^3He
- 2022 August 18-25, International Conference on Low Temperature Physics LT-29, Sapporo, Japan
Poster Presentation: Collective modes in non-uniform superconductors
- 2021 August 17, Quantum Fluids and Solids International Conference, Online (Bangalore, India)
Contributed talk: Magnetic scattering of quasiparticles and T_c suppression in geometrically-confined superfluid $^3\text{He-A}$
- 2021 March 15, APS March Meeting, Online
Oral Presentation: Suppression of triplet superfluidity by magnetically-active surfaces
- 2019 August 12, Quantum Fluids and Solids International Conference, Edmonton, Canada
Contributed talk: Phase crystallisation near surfaces of unconventional superconductors
- 2019 March 10, APS March Meeting, Boston, USA
Oral Presentation: Phase crystallisation near surfaces of unconventional superconductors
- 2018 APS March Meeting, Los Angeles, USA
Oral Presentation: Magnetically-active Boundaries in Topological Superfluid $^3\text{He-B}$
- 2016 APS March Meeting, Baltimore, USA
Oral Presentation: Collective modes in non-uniform superconductors
- 2015 APS March Meeting, San Antonio, USA
Oral Presentation: Heat transport along domain walls and surfaces of superconductors
- 2014 August 6-13, International Conference on Low Temperature Physics LT-27, Buenos Aires, Argentina
Poster Presentation: Surface roughness effects on interface states and non-uniform phases in spatially-confined condensates
- 2014 APS March Meeting, Denver, USA
Oral Presentation: Effects of surface roughness on non-uniform phases of superfluid ^3He and spin-triplet models for Sr_2RuO_4
- 2013 Cottrell Scholar Conference, Tuscon, AZ
Oral Presentation: Mathematics, Physics and Magic
- 2013 APS March Meeting, Baltimore, USA
Oral Presentation: Phase Transitions and Critical Current in Superfluid ^3He Films
- 2011 APS March Meeting, Dallas, USA
Oral Presentation: Signatures of Crystalline Phases and Domain Walls in Superfluid ^3He Thin Films
- 2011 Jan, KITP miniworkshop on Fe-based materials
- 2009 APS March Meeting, Pittsburgh, USA
Oral Presentation: Competition of SDW and SC in two-band metals: pnictides
- 2008, August 12, LT-25, Amsterdam, the Netherlands
Poster presentation: Spin relaxation in quantum dots due to electron exchange with the leads
- 2008 APS March Meeting, New Orleans, USA
Oral Presentation: Spin-Triplet relaxation through leads in double quantum dots
- 2007, July 16-28, International Summer School *From BCS to Exotic superconductivity*, Cargèse, France
- 2007, May 13-18, SCES International Conference, Houston, USA
Poster Presentation: Andreev bound states in non-centrosymmetric superconductors

- 2007 APS March Meeting, Denver, USA
Oral Presentation: [Andreev bound states in non-centrosymmetric superconductors](#)
- 2006, August 14-25, Miniworkshop on New States of Stable and Unstable Quantum Matter, Trieste, Italy
Talk + poster: [Anisotropy of heat conductivity and specific heat in CeCoIn₅: nodal structure](#)
- 2006, July, M2S-HTSC 8th International Conference, Dresden, Germany
Poster Presentation: [Nodal structure of superconductors probed by magnetic field](#)
- 2006 APS March Meeting, Baltimore, USA
Oral Presentation: [Anisotropic properties of unconventional superconductors in magnetic field: testing the nodal structure](#)
- 2005, QPT program, KITP, Santa Barbara, CA
- 2005 APS March Meeting, Los Angeles, USA
Oral Presentation: [FFLO state in 2D d-wave superconductors](#)
- 2004 Quantum Fluids and Solids International Conference, Trento, Italy
Contributed talk: ["Striped order" in superfluid ³He films](#)
- 2003 Quantum Fluids and Solids International Conference, Albuquerque, USA
Poster Presentation: [Thermodynamic Properties of Thin Films of Superfluid ³He-A](#)
- 2002 APS March Meeting, Indianapolis, USA
Oral Presentation: [Surface Modes of Superfluid Films of ³He](#)
- 2000 International Summer School on Superconductivity, University of Colorado, Boulder, USA

CONFERENCES: co-author

- 2019 QFS conference, Edmonton, Canada; *Poster Presentation:* [Suppression of superfluidity by magnetic boundary scattering in confined superfluid ³He-A](#)
P. J. Heikkinen, A. Casey, L. V. Levitin, X. Rojas, A. Vorontsov, P. Sharma, N. Zhelev, J. M. Parpia, and J. Saunders
- 2018 APS March meeting, Los Angeles; *Oral Presentation:* [Pair breaking at the surface of the unconventional superfluid](#)
Petri Heikkinen, Andrew Casey, Lev Levitin, Xavier Rojas, John Saunders, Anton Vorontsov, Nik Zhelev, Jeevak Parpia
- 2015 Quantum Fluids and Solids International Conference, Niagara Falls, NY
Invited talk: [Thermal conductivity in non-uniform superconductors](#)
Caroline Richard, Anton B. Vorontsov
- 2015 APS March meeting; *Oral Presentation:* [Heat Transport in non-uniform superconductors](#)
Caroline Richard, A.B. Vorontsov
- 2014 APS March meeting; *Oral Presentation:* [Temperature Dependence of the London Penetration Depth and Nodal Gap Structure of UPt₃ from Small Angle Neutron Scattering](#)
W.P. Halperin, W.J. Gannon, C. Rastovski, K.J. Schlesinger, C. Steiner, M.R. Eskildsen, A.B. Vorontsov, J. Hlevyack, J. Gavilano, U. Gasser, G. Nagy
- 2012 APS March Meeting; *Oral Presentation:* [Gap structure probed by field-angle resolved thermal oscillations in CeCoIn₅ superconductor](#)
Matthias J. Graf, Tanmoy Das, Anton B. Vorontsov, Ilya Vekhter
- 2012 APS March Meeting; *Oral Presentation:* [Jump in specific heat at the superconducting transition in iron pnictides](#)
Maxim G. Vavilov, Andrey V. Chubukov, Anton B. Vorontsov

- 2011 APS March Meeting; *Oral Presentation*: [Effect of annealing on the gap structure of Ba\(Fe_{1-x}Co_x\)₂As₂: low temperature specific heat studies](#)
K.Gofryk, F.Ronning, E.D.Bauer, J.D.Thompson, *A.B.Vorontsov*, I.Vekhter, A.S.Sefat, T.Imai

CONFERENCES: presentations by students

- 2021 APS March meeting; *Oral Presentation*: [Thermal Transport in Superconductors with coexisting Spin Density Wave Order](#)
Sourav Sen Choudhury, *Anton Vorontsov*
- 2014 Symposium "Topological States of matter" Gothenburg, Sweden; *Poster Presentation*: [Collective modes in non-uniform superconductors](#)
Andrew Hammer, *Anton Vorontsov*
- 2013 APS March meeting; *Oral Presentation*: [Spin Susceptibility Enhancement in Superconductors](#)
Benjamin Rosemeyer, *Anton Vorontsov*
- 2013 APS March meeting; *Oral Presentation*: [Sign-changing nodal s-wave gap in heavily over doped Ba_{1-x}K_xFe₂As₂ evidenced from thermal-transport measurement](#)
Daiki Watanabe, Shigeru Kasahara, Takuya Yamashita, Takumi Ota, Takasada Shibauchi, Yuji Matsuda, Minoru Yamashita, Hideto Fukazawa, Taku Saito, Yoh Kohori, Shigeyuki Ishida, Kunihiro Kiho, Chul-Ho Lee, Akira Iyo, Hiroshi Eisaki, *Anton Vorontsov*
- 2011 APS March Meeting; *Oral Presentation*: [Critical current in disordered iron-pnictide superconducting wires](#)
Dushko Kuzmanovski, Maxim Vavilov, *Anton Vorontsov*

SEMINARS, COLLOQUIA, PUBLIC LECTURES

- 2024 June 6, Northwestern University, Evanston IL
Seminar: [Suppression of superfluid ³He by magnetically-active surfaces](#)
- 2024 April 19, Louisiana State University, Baton Rouge LA
Seminar: [Superfluid ³He near interfaces: effects of orbital and magnetic scattering](#)
- 2023 March 22, George Mason University, Fairfax VA
Seminar: [Phase crystallization in superconductors](#)
- 2022 May 26, Northwestern University, Evanston IL
Seminar: [Phase crystallization in superconductors](#)
- 2021 Feb 22, Idaho State University, Pocatello ID
Colloquium: [Superconductivity](#)
- 2021 Feb 11, Karlsruhe Institute of Technology, Germany
Seminar: [Phase crystallization in superconductors](#)
- 2019 Nov 25, Montana State University, Bozeman MT
Math Dept Seminar: [Crystallization of the phase in superconductors](#)
- 2019 Sep 13, Montana State University, Bozeman MT
Colloquium: [Phase Crystals](#)
- 2019 June 9, Chalmers University, Sweden
Seminar: [Quasiclassical approach to heat transport](#)
- 2019 May 23, Royal Holloway University of London, UK
Seminar: [Andreev Bound States and quasiclassical boundary conditions](#)

- 2017 Nov 17, Montana State University, Bozeman MT
Colloquium: Superfluid ^3He in tight spaces
- 2017 Oct 5, Montana State University, Bozeman MT
Interdisciplinary seminar: Art and physics: condensed matter and superconductivity
- 2017 Sept 28, Northwestern University, Evanston IL
Seminar: Heat transport in nonuniform superconductors
- 2017 Sept 25, Idaho State University, Pocatello ID
Colloquium: Superconductivity and Superfluidity
- 2017 June 12, Oxford University, UK
Seminar: Heat transport in nonuniform superconductors
- 2017 March 14, Rutherford Lab, UK
Seminar: Superconductivity and Magnetism: iron-pnictides and CeCoIn_5
- 2017 Mar 8, Chalmers University, Sweden
Seminar: Heat transport in domain walls of unconventional superconductors
- 2017 Jan 18, Royal Holloway University of London, UK
Seminar: Superconductivity and Magnetism: iron-pnictides and CeCoIn_5
- 2015 Oct 29, University of Florida, Gainesville, FL
Colloquium: Superconductivity, the Universe, and Everything
- 2015 Sept 21, Montana State University, Bozeman, MT
Seminar: Thermal Hall effect
- 2015 June 4, Northwestern University, Evanston, IL
Seminar: Collective modes in non-uniform superconductors
- 2015 Mar 20, Montana State University, Bozeman, MT
Colloquium: Superconductivity, the Universe, and Everything
- 2013 Nov 21, McGill University, Quebec, Canada
Seminar: Non-uniform Phases in Superconducting and Superfluid He-3 Films
- 2013 Sept 3, Workshop on Multi-Component Many-Body Systems, Aspen, CO
Blackboard talk: Non-uniform ground states in superfluid ^3He and unconventional superconductors
- 2012 May 31, Department of Physics and Astronomy, Northwestern University, Evanston, IL
Seminar: Superconductivity and magnetism in iron-pnictides
- 2011 Dec 1, Applied Math Department, Montana State University
Seminar: Physics, Symmetry and Topology of Superfluid ^3He
- 2011 July 1, Physics Department, George Mason University, Fairfax, Virginia
Seminar: Superconductivity and magnetism in iron-based materials: co-existence or competition?
- 2011 Feb 4, Physics Department, U. of Alberta, Edmonton, Canada
Colloquium: Superconductivity and magnetism in iron-based materials
- 2011 Feb 3, Condensed Matter Seminar, U. of Alberta, Edmonton, Canada
Seminar: Superconductivity in narrow places
- 2010, May 27, Northwestern University
Seminar: Superconducting gap structure in iron-based materials
- 2009, Nov 18, Texas A & M University,
Seminar: Inhomogeneous states in superconductors and superfluids: competing orders and broken symmetries
- 2009, March 30, Montana State University,
Seminar: Superconductivity and magnetism in FeAs-materials

- 2009, February 23, University of Florida,
Seminar: Inhomogeneous states in unconventional superconductors and superfluid Helium-3
 - 2009, February 20, Louisiana State University,
Seminar: Superconductivity and magnetism in FeAs-materials
 - 2008, March 24, Montana State University
Colloquium: Inhomogeneous superconductivity and surface Andreev states
 - 2007, November 6, University of Karlsruhe, Germany
Seminar: Anisotropic properties of Unconventional superconductors in magnetic field: testing the nodal structure
 - 2007, April 11, University of Wisconsin-Madison,
Seminar: Inhomogeneous states in films of superfluid ^3He and superconducting wires
 - 2007, February 23, Naval Research Lab,
Seminar: Inhomogeneous states in 2D d -wave superconductors: FFLO state
 - 2006, September 28, University of Karlsruhe, Germany
Seminar: Inhomogeneous states in 2D d -wave superconductors: FFLO state
 - 2005, May 2, T-11/LANL
Seminar: Superfluid ^3He films: an analogue of the FFLO state
 - 2005, January 18, Louisiana State University
Seminar: Physics of superfluid ^3He in thin films
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ANTON VORONTSOV

Funding and Grant Activity

AWARDED GRANTS

- 2010 CAREER grant, National Science Foundation, \$420,000
DMR-0954342 “Theory and modeling of non-uniform superconductors and superfluids”
- 2013 Cottrell Scholar Award, Research Corporation for Science Advancement, \$75,000
“Superconductivity and Magnetism in New Materials and New Environments”
- 2013 Instructional innovation grant, Montana State University, \$5,000
“Physics, Mathematics and Magic”
- 2020 National Science Foundation, \$300,000
DMR-2023928 “New Phases and Non-Equilibrium Transport in Topological Mesoscopic Superfluids”

SUBMITTED PROPOSALS

- Dept. of Energy CAREER “Inhomogeneous States in Novel Superconductors” 2009, Role: PI (declined)
 - Sloan Foundation Fellowship “Inhomogeneous superconducting states in novel complex materials” 2009, Role: PI (declined)
 - Sloan Foundation Fellowship “Superconductivity and Magnetism in New Environments” 2010, Role: PI (declined)
 - Pre-Proposal for AFOSR FY2010 “Theory Network on Nanoscale Superconducting, Magnetic and Semiconducting Materials and Interfaces: From Basic Physics to Simulation, Modeling and Device Design” 2010, Role: CO-PI (declined)
 - NSF-MRI pre-proposal “Extreme Computational Theoretical Physics” 2013, Role: CO-PI (declined)
 - Silicon Mechanics Research Cluster grant proposal “Extreme Computational Theoretical Physics” 2014, Role: CO-PI (declined)
 - National Science Foundation “Theory for detection and manipulation of interface states in realistic superconductors”, 2016 Role: PI (declined)
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ANTON VORONTSOV

Teaching & Outreach

TEACHING EXPERIENCE AND AWARDS

- Outstanding Graduate Lecture Instructor (OGLI), Physics Department MSU, 2018
- Cottrell Scholar Award, 2013
- Instructional Innovation Grant, MSU 2013
- Participation in a number of workshops on teaching methodology organized by American Association of Physics Teachers, MSU Center for Faculty Excellence, Research Corporation for Science Advancement
- Seminar lecture course (undergraduate and graduate)
"Introduction to superfluidity and superconductivity" (2023-'24)
- Seminar lecture course (advanced graduate)
"Introduction to Green's functions in Many-Body physics" (2011,2019)
- Undergraduate courses:
Introduction to Theoretical Physics
- Graduate courses:
Quantum Field Theory, Quantum Fluids, Statistical mechanics, Classical mechanics, Quantum mechanics, Electrodynamics -I, -II, Condensed Matter -I, -II

Table 1: Students' ratings of courses I taught during 2015-2024. The scale for the combined rating of course and instructor is 5.0 = excellent, 4.0 = good, 3.0 = average, 2.0 = poor, 1.0 = very poor.
300-level: undergraduate; 400-level: upper undergraduate; 500-level: graduate.

course number	course name	semester	enrollment (# of responses)	rating
PHSX 545	Condensed Matter II	2015 Spring	8 (-)	4.7
PHSX 520	Electromagnetic theory II	2015 Fall	9 (9)	4.67
PHSX 555	Quantum Field Theory	2016 Spring	6 (-)	-
PHSX 520	Electromagnetic theory II	2017 Fall	16 (15)	4.57
PHSX 535	Statistical mechanics	2018 Spring	15 (14)	4.46
PHSX 544	Condensed Matter I	2018 Fall	4 (2)	5.0
PHSX 555	Quantum Field Theory	2019 Spring	5 (4)	4.8
PHSX 520	Electromagnetic theory II	2019 Fall	11 (2)*	3.8
PHSX 535	Statistical mechanics	2020 Spring	8 (4)	4.6
PHSX 544	Condensed Matter I	2020 Fall	4 (2)	4.8
PHSX 545	Condensed Matter II	2021 Spring	5 (3)	5.0
PHSX 506	Quantum mechanics	2021 Fall	11 (7)	3.5
PHSX 555	Quantum Field Theory	2022 Spring	6 (2)	4.5
PHSX 544	Condensed Matter I	2022 Fall	7 (4)	4.5
PHSX 545	Condensed Matter II	2023 Spring	4 (1)	2.0
PHSX 520	Electromagnetic theory II	2023 Fall	9 (6)	4.1
PHSX 555	Quantum Field Theory	2024 Spring	4 (3)	5.0

* a significant drop in response percentage in 2019 correlates with transition to online evaluations.

SPECIAL LECTURES, PHYSICS SCHOOLS

- *Dirac Equation*, Workshop on Particle Physics for MSU SPS, June 25-27, 2018
- *Unconventional superconductivity*, Linnaeus summer school in quantum engineering, Aspenäs Hergrård, June 26-29 2017, Sweden
- *Free Energy functional in Quasiclassical theory of superconductivity*, Chalmers University, Sweden, March 6 2017
- *Superfluid phases of ^3He in bulk and films*, Northwestern University, 22 April 2008

MENTORING and former students

I have mentored several graduate and undergraduate students. Most undergraduate students have continued on to graduate school. Graduate students Benjamin Rosemeyer, Andrew Hammer, Sourav Sen Choudhory have published several papers as first authors.

As a way to introduce students into theoretical superconductivity research I have created a reading list and a set of conceptual questions that is suitable for both graduate and undergraduate students. Also there is a list of more advanced condensed matter problems on my research page:

<https://physics.montana.edu/avorontsov/research.html>

- graduate student Christopher Siebor 2023-present
- undergraduate REU student Joseph Roll, summer 2022 (now at UT Austin, Joe won NSF GRFP award)
- undergraduate REU student Izek Hornbeck, summer 2021
- graduate student Dylan Meyer, 2020-2023
- undergraduate student Ashland Knowles, 2018-2020
- graduate student Sourav Sen Choudhory, 2015-2021 (PhD)
- graduate student Andrew Hammer, 2013-2015
- graduate student Benjamin Rosemeyer, 2011-2016 (now in software industry)

- Postdoctoral associate Caroline Richard, 2014-2016 (now in optics industry)

OUTREACH ACTIVITIES

- 2023 Montana Science Olympiad - contributor to Fermi Questions Event
 - Judge for Bozeman High School Speech and Debate competitions (2021, 2022)
 - an organizer of Physics Bowl 2024, 2023, 2022, 2018, 2016 (a physics game show for undergraduate and graduate students, open to public, conducted in a cafe environment)
 - Lectures "Introduction to Superconductivity", "Quantum Life of a Liquid" to middle- and high-school students from Livingston, MT, visiting MSU as a part of STEM mentoring program
 - Consultant for "Superconducting levitating train" project for high school students from Whitefish High School, MT (2012)
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