

# Professor Andrew Boothroyd

Professor of Physics, University of Oxford, and Tutorial Fellow of Oriel College, Oxford

Email: [andrew.boothroyd@physics.ox.ac.uk](mailto:andrew.boothroyd@physics.ox.ac.uk); Phone: +44 (0)1865 272376

## Education

1984 MA in Natural Sciences, Cambridge University, UK (*1st class honours, Physics & Theoretical Physics*)

1988 PhD in Physics, Cambridge University, UK (Advisor: Dr Gordon Squires)

## Academic Career

1988–1989	Research Associate, University of Warwick
1989–1991	Lecturer in Physics, University of Warwick
1992–Present	Lecturer in Physics, University of Oxford, and Tutorial Fellow of Oriel College, Oxford
2000	Awarded title of Reader in Physics
2006	Awarded title of Professor of Physics
2004–2008	Head of Condensed Matter Physics at Oxford University
2011–2015	Vice Provost of Oriel College, Oxford (also 2020–2021)
2019–2024	Associate Head of Department of Physics, Oxford University
2024–Present	Interim Head of Department of Physics, Oxford University

## Research interests

Novel phenomena in quantum materials that exhibit complex forms of electronic order, such as unconventional superconductivity and magnetic materials whose properties depend on a delicate interplay between the spin, charge and orbital degrees of freedom of the electron; structure and dynamics of quantum materials; emergent phenomena; topological electronic band structures; neutron and X-ray scattering techniques; magnetic, thermodynamic and transport measurements; crystal growth

## Awards

2011 Institute of Physics Brian Pippard Prize (formerly Superconductivity Group Prize)

2017 Outstanding Referee for the journals of the American Physical Society

## Professional Activities (last 3 years)

1999–Present	Member of EPSRC Peer Review College
2010–Present	Member of Diamond beamlines I05 (ARPES) and I21 (RIXS) User Working Groups
2016–2024	Member of ESS Science & Technology Advisory Panels (Sample Environment & Spectroscopy)
2017–2021	Chair of ILL College 4 proposal review panel, and member of ILL Scientific Council
2022–2024	Member of the Scientific Advisory Board of the LINXS Institute of Advanced Neutron and X-ray Science
2024–Present	Leader of QMat theme, LINXS Institute of Advanced Neutron and X-ray Science

## Invited talks at national and international conferences, and seminars (last 2 years)

15. *Polarized neutron scattering — an overview*, Flipper Conference, Institut Laue-Langevin, Grenoble, Dec 2024
14. *Topology: a new twist to electrons in quantum materials*, Quantum Matter Group seminar, Cambridge Univ, Oct 2024
13. *Weyl metallic state induced by helical magnetic order*, International Conference on Magnetism, Bologna, July 2024
12. *Unravelling complex order in quantum materials*, Physics Department Colloquium, Luxembourg University, Mar 2024
11. *Topology: a new twist to electrons in quantum materials*, Oxford University Physics Society, Oxford, Feb 2024
10. *Perspectives on neutron scattering and quantum materials*, IoP/RSC Future Perspectives Meeting, Jan 2024
9. *Topological electronic states induced by magnetic order*, ESS Quantum Materials Workshop, Lund, Nov 2023
8. *Topological electronic states induced by helimagnetic order*, Heraeus Seminar, Germany, Oct 2023
7. *Unravelling complex order in quantum materials*, DSO Tech Talk, Singapore, July 2023
6. *Neutron and X-ray scattering studies of quantum materials*, ICMAT, Singapore, June 2023
5. *Topology: a new twist to electrons in quantum materials*, LINXS Guest Researcher Seminar, Lund, June 2023
4. *Neutron and X-ray scattering as superlative probes of quantum materials*, LINXS Science Day, Lund, May 2023
3. *Magnetic order control of topological metals and semimetals*, Quantum Matter seminar, EPFL, Mar 2023
2. *Unravelling emergent order in quantum materials*, Condensed Matter Colloquium, Paul Scherrer Institut, Feb 2023
1. *Magnetic control of topological metals and semimetals*, DIPC Seminar, San Sebastian, Feb 2023

## Public outreach

I have given many public lectures on superconductivity and quantum materials (two of which are on YouTube), including the University of the Third Age and a meeting organized by the New Scientist called *Quantum World*, both in 2023. I have also given talks on similar topics to university and high school student science societies. During 1990–1993 I wrote the annual entry entitled “Physics” in the Encyclopaedia Britannica Book of the Year. In 2014 & 2015 I lectured at a UNIQ summer school at Oxford University for Year 12 students from state schools. I jointly led a STFC-funded project to develop and deliver two workshops entitled *Levitate!* and *Fantastic Fields*, on Superconductivity and Magnetism for Years 8–10 in secondary schools. In 2014, I demonstrated superconducting levitation on the BBC2 celebrity quiz show QI.

## Organiser of conferences, workshops and summer schools (selected)

2003–2024 Co-organiser and lecturer, Oxford School on Neutron Scattering, Oxford UK  
2012 Organiser of ESS Symposium on spin dynamics in correlated electron systems, Abingdon, UK  
2014 Organiser of conference Mott Physics beyond the Heisenberg model, Oxford, UK  
2019 Co-organiser of Floating-zone Techniques Workshop, Oxford, UK

## Publications

270 peer-reviewed papers; 7957 total citations; h-index = 48 (source: Web of Science, May 2025).

Papers in high impact journals: 28 PRL, 3 Science, 2 Nature, 10 other Nature titles (*Physics*, *Materials*, *Communications*).

A complete list of publications is available at <https://groups.physics.ox.ac.uk/Boothroyd>.

## Textbook

*Principles of Neutron Scattering from Condensed Matter*, A. T. Boothroyd (Oxford University Press, 2020)

## Selected journal papers (last 3 years)

10. [Weyl metallic state induced by helical magnetic order](#)  
Jian-Rui Soh, Irián Sánchez-Ramírez, Xupeng Yang, Jinzhao Sun, Ivica Zivkovic, J. Alberto Rodríguez-Velamazán, Oscar Fabelo, Anne Stunault, Alessandro Bombardi, Christian Balz, Manh Duc Le, Helen C. Walker, J. Hugo Dil, Dharmalingam Prabhakaran, Henrik M. Rønnow, Fernando de Juan, Maia G. Vergniory, and Andrew T. Boothroyd  
*npj Quantum Materials* **9** (2024) 7 (Open access. See also [arXiv:2305.00295](#))
9. [Topological electronic bands in crystalline solids](#)  
Andrew T. Boothroyd  
*Contemporary Physics* **63** (2022) 305 ([arXiv:2307.16258](#))
8. [Understanding unconventional magnetic order in a candidate axion insulator by resonant elastic x-ray scattering](#)  
Jian-Rui Soh, Alessandro Bombardi, Frédéric Mila, Marein C. Rahn, Dharmalingam Prabhakaran, Sonia Francoual, Henrik M. Rønnow and Andrew T. Boothroyd  
*Nature Communications* **14** (2023) 3387 (open access)
7. [Impact of mixed anion ordered state on the magnetic ground states of  \$S = 1/2\$  square-lattice quantum spin antiferromagnets,  \$\text{Sr}\_2\text{NiO}\_3\text{Cl}\$  and  \$\text{Sr}\_2\text{NiO}\_3\text{F}\$](#)   
Yoshihiro Tsujimoto, Jun Sugiyama, Masayuki Ochi, Kazuhiko Kuroki, Pascal Manuel, Dmitry D. Khalyavin, Izumi Umegaki, Martin Mansson, Daniel Andreica, Shigeo Hara, Takahiro Sakurai, Susumu Okubo, Hitoshi Ohta, Andrew T. Boothroyd, Kazunari Yamaura  
*Phys. Rev. Materials* **6** (2022) 114404
6. [Room-Temperature Type-II Multiferroic Phase Induced by Pressure in Cupric Oxide](#)  
Noriki Terada, Dmitry D. Khalyavin, Pascal Manuel, Fabio Orlandi, Christopher J. Ridley, Craig L. Bull, Ryota Ono, Igor Solovyev, Takashi Naka, Dharmalingam Prabhakaran, Andrew T. Boothroyd  
*Phys. Rev. Lett.* **129** (2022) 217601
5. [Magnetic structure of the topological semimetal  \$\text{Co}\_3\text{Sn}\_2\text{S}\_2\$](#)   
Jian-Rui Soh, ChangJiang Yi, Ivica Zivkovic, Navid Qureshi, Anne Stunault, Bachir Ouladdiaf, J. Alberto Rodríguez-Velamazán, YouGuo Shi, Henrik M. Rønnow, Andrew T. Boothroyd  
*Phys. Rev. B* **105** (2022) 094435 ([arXiv:2110.00475](#))
4. [Metamagnetism and crystal-field splitting in pseudohexagonal  \$\text{CeRh}\_3\text{Si}\_2\$](#)   
Andrea Amorese, Dmitry Khalyavin, Kurt Kummer, Nicholas B. Brookes, Clemens Ritter, Oksana Zaharko, Camilla Buhl Larsen, Orest Pavlosiuk, Adam P. Pikul, Dariusz Kaczorowski, Matthias Gutmann, Andrew T. Boothroyd, Andrea Severing, and Devashibhai T. Adroja  
*Phys. Rev. B* **105** (2022) 125119 ([arXiv:2202.13195](#))
3. [Model for coupled 4f-3d magnetic spectra: A neutron scattering study of the Yb-Fe hybridization in  \$\text{Yb}\_2\text{Fe}\_5\text{O}\_{12}\$](#)   
Viviane Peçanha-Antonio, Dharmalingam Prabhakaran, Christian Balz, Aleksandra Krajewska, and Andrew T. Boothroyd  
*Phys. Rev. B* **105** (2022) 104422 (Editors' Suggestion) ([arXiv:2111.04707](#))
2. [Inhomogeneous spin excitations in weakly coupled spin-1/2 chains](#)  
L. Shen, E. Campillo, O. Zaharko, P. Steffens, M. Boehm, K. Beauvois, B. Ouladdiaf, Z. He, D. Prabhakaran, A. T. Boothroyd, and E. Blackburn  
*Phys. Rev. Res.* **4** (2022) 013111 (open access)
1. [Magnetic monopole density and antiferromagnetic domain control in spin-ice iridates](#)  
M. J. Pearce, K. Götz, A. Szabó, T. S. Sikkenk, M. R. Lees, A. T. Boothroyd, D. Prabhakaran, C. Castelnovo and P. A. Goddard  
*Nature Communications* **13** (2022) 444 (open access)