

Professor Andy Schofield

Professor of Theoretical Physics
Head of School

[School of Physics and Astronomy \(/schools/physics/index.aspx\)](/schools/physics/index.aspx)

Contact details

Telephone **+44 (0) 121 414 4564 (PA)** (tel:+44 121 414 4564)

Telephone (2) **+44 (0) 121 414 4565 (direct line)** (tel:+44 121 414 4565)

Email **headphys@bham.ac.uk** (mailto:headphys@bham.ac.uk)

For personal/research/teaching matters **a.j.schofield.1@bham.ac.uk** (mailto:a.j.schofield.1@bham.ac.uk)



School of Physics and Astronomy
University of Birmingham
Edgbaston
Birmingham
B15 2TT
UK

About

Andy Schofield is Professor of Theoretical Physics and Head of School.

His research is focussed on the quantum properties of matter. His interests include the physics of quantum criticality where quantum fluctuations drive matter between different states and can sometimes nucleate new ones. This can include novel magnetism and superconductivity. His research also covers unusual metallic states such as the Luttinger liquid where the electron dissociates into its spin and charge degrees of freedom. He works closely with a number of experimental research groups around the world.

Qualifications

- Fellow of the Institute of Physics, 2002
- PhD in theoretical physics, University of Cambridge, 1993
- BA (Hons) Natural Sciences Tripos, University of Cambridge, 1989

Biography

Andy Schofield studied Natural Sciences at Gonville and Caius College, Cambridge where he graduated in 1989 winning the Mott prize for physics and the Schuldham Plate.

He stayed on in Cambridge where he undertook PhD research in the IRC for Superconductivity working on the theory of high temperature cuprate superconductors. He was elected a Research Fellow at Gonville and Caius College and obtained his PhD in 1993.

In 1994 he moved to the USA where he worked at Rutgers for two years, before returning to Cambridge. In 1997 Andy was awarded a Royal Society University Research Fellowship to work on theories of non-Fermi liquids. He became an Assistant Director of Studies at Gonville and Caius College on the Natural Sciences Tripos.

In 1999 Andy moved to the University of Birmingham and was promoted to Professor of Theoretical Physics in 2002. In that year he won the Institute of Physics' Maxwell Medal and Prize for work on the emergent properties of correlated electrons. From 2008-2010, Andy was Director of Research for the College of Engineering and Physical Science. Since 2010, he is the Head of School.

Teaching

- Physics
- Theoretical Physics
- Theoretical Physics and Applied Maths

Postgraduate supervision

Andy regularly supervises PhD students in the area of correlated quantum systems. Please see his **[personal pages \(http://www.theory.bham.ac.uk/staff/schofield/\)](http://www.theory.bham.ac.uk/staff/schofield/)** for more details of research topics.

Research

My interests lie in the field of strong correlated quantum systems and the new "emergent" phenomena that arise when interactions dominate the behaviour of quantum particles. Much of the motivation for this comes from experimental discoveries and I work closely with experimental groups from all over the world. Topics of current interest to me include

- **[Non Fermi liquids \(http://www.theory.bham.ac.uk/research/correlated-systems/non-Fermi-liquids\)](http://www.theory.bham.ac.uk/research/correlated-systems/non-Fermi-liquids)**
- **[Quantum criticality \(http://www.theory.bham.ac.uk/research/correlated-systems/quantum-criticality\)](http://www.theory.bham.ac.uk/research/correlated-systems/quantum-criticality)**
- **[High temperature superconductivity \(http://www.theory.bham.ac.uk/research/correlated-systems/high-Tc/\)](http://www.theory.bham.ac.uk/research/correlated-systems/high-Tc/)**

- Thermoelectric phenomena in correlated materials

Full details of my research are kept on www.theory.bham.ac.uk/staff/schofield (<http://www.theory.bham.ac.uk/staff/schofield>).

Publications

Selected high-profile publications:

- **Probing Spin-Charge Separation in a Tomonaga-Luttinger Liquid** (<http://www.sciencemag.org/content/325/5940/597>).
Y Jompol, CJB Ford, JP Griffiths, I Farrer, GAC Jones, D Anderson, DA Ritchie, TW Silk, AJ Schofield
Science **325**, 597-601 (2009).
- **Quantum Criticality** (<http://www.nature.com/nature/journal/v433/n7023/abs/nature03279.html>).
P Coleman, AJ Schofield
Nature **433**, 226 (2005)
- **Disorder-Sensitive Phase Formation Linked to Metamagnetic Quantum Criticality** (<http://www.sciencemag.org/content/306/5699/1154.full?ikey=HPw7UalOSx252&keytype=ref&siteid=sci>).
SA Grigera, P Gegenwart, RA Borzi, F Weickert, AJ Schofield, RS Perry, T Tayama, T Sakakibara, Y Maeno, AG Green, AP Mackenzie.
Science **306**, 1154-1157 (2004).
- **Magnetic Field-tuned quantum criticality in the metallic ruthenate $Sr_3Ru_2O_7$** (<http://www.sciencemag.org/content/306/5699/1154.full?ikey=HPw7UalOSx252&keytype=ref&siteid=sci>).
SA Grigera, RS Perry, AJ Schofield, M Chiao, SR Julian, GG Lonzarich, I Ikeda, Y Maeno
Science **294**, 329-332 (2001)

My full list is here, www.theory.bham.ac.uk/staff/schofield/allpublications (<http://www.theory.bham.ac.uk/staff/schofield/allpublications>).

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