

# Jake Ayres

## Postdoctoral researcher

HFML-FELIX, Radboud University, Nijmegen, the Netherlands

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Google Scholar

## Positions

|                     |                                                                                            |
|---------------------|--------------------------------------------------------------------------------------------|
| Nov 2025 – Oct 2028 | <b>Postdoctoral Researcher</b><br>High Field Magnet Laboratory (HFML-FELIX) · Nijmegen, NL |
| Nov 2022 – Oct 2025 | <b>Leverhulme Early Career Fellow</b><br>University of Bristol · Bristol, UK               |
| Oct 2020 – Sep 2022 | <b>EPSRC Doctoral Prize Fellow</b><br>University of Bristol · Bristol, UK                  |
| Dec 2019 – Sep 2020 | <b>Research Associate</b><br>University of Bristol · Bristol, UK                           |

## Education

|                     |                                                                                                                        |
|---------------------|------------------------------------------------------------------------------------------------------------------------|
| Sep 2015 – Sep 2020 | <b>PhD Physics</b><br>University of Bristol and High Field Magnet Laboratory<br><i>Viva June 2020</i><br>Prize awarded |
| Oct 2011 – Jun 2015 | <b>MSc Physics</b><br>University of Bristol<br>Prize awarded                                                           |

## Awards and prizes

|      |                                                                                                                                              |
|------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 2023 | <b>European Magnetic Field Laboratory Prize</b><br>Awarded annually for exceptional achievements in science done in high magnetic fields.    |
| 2022 | <b>IoP Superconductivity Group Thesis Prize</b><br>Awarded annually for the PhD thesis with the strongest contribution to superconductivity. |
| 2015 | <b>MSci Dissertation Commendation</b><br>For quality of MSci project on specific heat studies of unconventional superconductors.             |

## Invited talks 16

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|----------|-------------------------------------------------------------------------------------------------|
| Sep 2026 | <b>Next Generation in Strongly Correlated Electron Systems 2026</b><br>Aarhus, DK               |
| Jul 2026 | <b>Condensed Matter and Quantum Materials 2026</b><br>Loughborough, UK                          |
| Jun 2026 | <b>Superstripes 2026</b><br>Rome, IT                                                            |
| Jan 2026 | <b>Condensed Matter Seminar</b><br>University of Birmingham, UK                                 |
| Nov 2023 | <b>International Superconductivity Symposium 2023</b><br>Victoria University, Wellington, NZ    |
| Jun 2023 | <b>Condensed Matter and Quantum Materials 2023</b><br>University of Birmingham, UK              |
| Jun 2023 | <b>European Magnetic Field Laboratory User Meeting 2023</b><br>Radboud University, Nijmegen, NL |
| May 2023 | <b>Magnetic Fields in Materials Research</b><br>University of Wrocław, Poland                   |
| Nov 2022 | <b>Online Seminar</b><br>National Yang Ming Chiao Tung University, Taiwan                       |
| Jul 2022 | <b>Strongly Correlated Electron Systems 2022</b><br>Amsterdam, NL                               |

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|----------|----------------------------------------------------------------------------------------|
| May 2022 | <b>Workshop: Strange Metals in the Hubbard Model and AdS/CFT</b><br>Online             |
| Feb 2022 | <b>Online Seminar</b><br>University of Warwick, UK                                     |
| Jan 2022 | <b>Young Investigators Workshop in uSC in Heavy Fermions</b><br>Online                 |
| Jul 2021 | <b>Workshop: Strange Metals</b><br>Online                                              |
| Jun 2021 | <b>Superconducting Hybrids @ Extreme</b><br>Tatry, Slovakia (hybrid)                   |
| Jun 2019 | <b>European Magnetic Field Laboratory User Meeting</b><br>University of Warsaw, Poland |

## Publications

18 papers · 4 first-author · 7 in Nature Portfolio journals

- 18 **Doping dependence of the low-temperature planar carrier density in overdoped  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$**   
R. Nicholls, R. D. H. Hinlopen, **J. Ayres**, T. Kotte, T. Förster, J. Park, J. Sourd, A. Carrington, N. E. Hussey  
*Physical Review B* **112**, 064511 (2025)
- 17 **Universal correlation between H-linear magnetoresistance and T-linear resistivity in high-temperature superconductors**  
**J. Ayres**, M. Berben, C. Duffy, R. D. H. Hinlopen, Y.-T. Hsu, A. Cuoghi, M. Leroux, I. Gilmudinov, M. Massoudzadegan, D. Vignolles, Y. Huang, T. Kondo, T. Takeuchi, S. Friedemann, A. Carrington, C. Proust, N. E. Hussey  
*Nature Communications* **15**, 8406 (2024)  
**First author**
- 16 **Insensitivity of  $T_c$  to the residual resistivity in high- $T_c$  cuprates and the tale of two domes**  
D. Juskus, **J. Ayres**, R. Nicholls, N. E. Hussey  
*Frontiers in Physics* **12**, 1396463 (2024)
- 15 **Lifshitz transition enabling superconducting dome around a charge-order critical point**  
R. D. H. Hinlopen, O. N. Moulding, W. R. Broad, F. Bangma, A. McCollam, **J. Ayres**, C. J. Sayers, E. Da Como, F. Flicker, J. van Wesel, S. Friedemann  
*Science Advances* **10**, ead13921 (2024)
- 14 **Expanded quantum vortex liquid regimes in the electron nematic superconductors  $\text{FeSe}_{1-x}\text{S}_x$  and  $\text{FeSe}_{1-x}\text{Te}_x$**   
M. Culo, S. Licciardello, K. Ishida, K. Mukasa, **J. Ayres**, J. Buhot, Y.-T. Hsu, S. Imajo, M. W. Qiu, M. Saito, Y. Uezono, T. Watanabe, K. Kindo, T. Shibauchi, S. Kasahara, Y. Matsuda, N. E. Hussey  
*Nature Communications* **14**, 4150 (2023)
- 13 **Superfluid density and two-component conductivity in hole-doped cuprates**  
**J. Ayres**, M. I. Katsnelson, N. E. Hussey  
*Frontiers in Physics* **10**, 1021462 (2022)  
**First author**
- 12  **$B^2$  to B-linear magnetoresistance due to impeded orbital motion**  
R. D. H. Hinlopen, F. A. Hinlopen, **J. Ayres**, N. E. Hussey  
*Physical Review Research* **4**, 033195 (2022)
- 11 **Transport evidence for decoupled nematic and magnetic criticality in iron chalcogenides**  
**J. Ayres**, M. Culo, J. Buhot, B. Bernath, S. Kasahara, Y. Matsuda, T. Shibauchi, A. Carrington, S. Friedemann, N. E. Hussey  
*Communications Physics* **5**, 100 (2022)  
**First author**
- 10 **Charge density waves and Fermi surface reconstruction in the clean overdoped cuprate superconductor  $\text{Ti}_2\text{Ba}_2\text{CuO}_{6+\delta}$**   
C. C. Tam, M. Zhu, **J. Ayres**, K. Kummer, F. Yakhov-Harris, J. R. Cooper, A. Carrington, S. M. Hayden  
*Nature Communications* **13**, 570 (2022)
- 09 **Incoherent transport across the strange-metal regime of overdoped cuprates**  
**J. Ayres**, M. Berben, M. Culo, Y.-T. Hsu, E. van Heumen, Y. Huang, J. Zaanen, T. Kondo, T. Takeuchi, J. R. Cooper, C. Putzke, S. Friedemann, A. Carrington, N. E. Hussey  
*Nature* **595**, 661–666 (2021)  
**First author** · 150+ citations  
*Featured in the Journal Club for Condensed Matter Physics*
- 08 **Possible superconductivity from incoherent carriers in overdoped cuprates**  
M. Culo, C. Duffy, **J. Ayres**, M. Berben, Y.-T. Hsu, R. D. H. Hinlopen, B. Bernath, N. E. Hussey  
*SciPost Physics* **11**, 012 (2021)

- 07 **Putative Hall response of the strange metal component in  $\text{FeSe}_{1-x}\text{S}_x$**   
M. Culo, M. Berben, Y.-T. Hsu, **J. Ayres**, R. D. H. Hinlopen, S. Kasahara, Y. Matsuda, T. Shibauchi, N. E. Hussey  
*Physical Review Research* **3**, 023069 (2021)
- 06 **Reduced Hall carrier density in the overdoped strange metal regime of cuprate superconductors**  
C. Putzke, S. Benhabib, W. Tabis, **J. Ayres**, Z. Wang, L. Malone, S. Licciardello, J. Lu, T. Kondo, T. Takeuchi, N. E. Hussey, J. R. Cooper, A. Carrington  
*Nature Physics* **17**, 826–831 (2021)  
[100+ citations](#)
- 05 **Pressure-induced reconstructive phase transition in  $\text{Cd}_3\text{As}_2$**   
M. Gamza, P. Abrami, L. V. D. Gammond, **J. Ayres**, I. Osmond, T. Muramatsu, R. Armstrong, H. Perryman, D. Daisenberger, S. Das, S. Friedemann  
*Physical Review Materials* **5**, 024209 (2021)
- 04 **Determination of the Fermi surface and field-induced quasiparticle tunneling around the Dirac nodal loop in  $\text{ZrSiS}$**   
C. S. A. Muller, T. Khouri, M. R. van Delft, S. Pezzini, Y.-T. Hsu, **J. Ayres**, M. Breitzkreiz, L. M. Schoop, N. E. Hussey, S. Wiedemann  
*Physical Review Research* **2**, 023217 (2020)
- 03 **Coexistence of orbital and quantum critical magnetoresistance in  $\text{FeSe}_{1-x}\text{S}_x$**   
S. Licciardello, N. Maksimovic, **J. Ayres**, J. Buhot, M. Culo, B. Bryant, S. Kasahara, Y. Matsuda, T. Shibauchi, V. Nagarajan, J. G. Analytis, N. E. Hussey  
*Physical Review Research* **1**, 023011 (2019)  
[50+ citations](#)
- 02 **Electrical resistivity across a nematic quantum critical point**  
S. Licciardello, J. Buhot, J. Lu, **J. Ayres**, S. Kasahara, Y. Matsuda, T. Shibauchi, N. E. Hussey  
*Nature* **567**, 213–217 (2019)  
[150+ citations](#)
- 01 **Charge order and superconductivity in underdoped  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$  under pressure**  
C. Putzke, **J. Ayres**, J. Buhot, S. Licciardello, N. E. Hussey, S. Friedemann, A. Carrington  
*Physical Review Letters* **120**, 117002 (2018)

## Funding

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