Clarendon Laboratory
University of Oxford
OX1 3PU
+44 (0)7897 383 574
jack.halliday@physics.ox.ac.uk
jackhalliday.github.io
@_jack_halliday

Jack Halliday

Employment

2023–present **Postdoctoral researcher**, *University of Oxford*
Experimental search for Axion Like Particles (ALPS) using high powered optical lasers and X-Ray free electron lasers.

2020–2023 **Postdoctoral researcher**, *Imperial College London*
Experimental study of the interaction between prompt X-rays and solid density targets.

Education

2016–2020 **PhD Plasma Physics**, *Imperial College London*
Project: Characterisation of particle acceleration in pulsed-power driven magnetic-reconnection experiments through the use of X-Ray self-emission diagnostics. *Supervisor:* S. V. Lebedev

2012–2016 **MSci Physics**, *Imperial College London*, First Class (Hons)
Final year project: An experimental study of shock waves in magnetised plasma flows

Teaching

2020–2023 **Master's project supervision (Imperial College)** – Provided training in laboratory skills and support on research direction to students completing their Master's thesis projects in the MAGPIE research laboratory.

2020–2021 **Transmission lines lab demonstration (Imperial College)** – Supported 2nd yr undergraduates in a remote lab over COVID shutdown. Students were sent a test circuit and oscilloscope. Demonstration was performed using video conferencing. Assessed performance in lab and in written reports.

2018–2019 **Microprocessor course supervision (Imperial College)** – Supervised projects in which 3rd yr undergraduates interfaced a microprocessing unit with hardware to create a product prototype.

2016–2018 **Spectroscopy lab demonstration (Imperial College)** – Supported 2nd yr undergraduates undertaking a spectroscopy experiment. Assessed performance in lab and in written reports.

Consultancy

2022–present **First Light Fusion (fusion startup)** – Compiling a specification of the timing and data acquisition systems for M4 (a proposed pulsed-power generator with a peak current of $50\,\mathrm{MA}$).

Invited Talks

2022 *"Radiatively driven plasma flows in experiments on the MAGPIE pulsed-power generator."* Journal of Plasma Physics Colloquium, virtual seminar.

2021 *"Investigating magnetised, radiatively driven plasmas with a university scale pulsed-power generator."* APS Division of Plasma Physics Annual Meeting, Pittsburgh, Pennsylvania.

Service

2023–present Peer-review for Physics Review Letters

2022–present Peer-review for Physics of Plasmas

2022–2023 Postdoctoral representative on the departmental occupational health committee

2022–2023 Member of the physics department's LGBTQ+ allies network

2022–2023 Organising group member for the Imperial 600 (university wide LGBTQ+ network)

2021–2023 Representative for plasma physics on the departmental postdoctoral committee

Contributed Presentations

2023 IOP Plasma Physics Conference, Oxford, United Kingdom. (talk)

2022 APS Division of Plasma Physics Annual Meeting, Spokane, Washington. (talk)

2022 High Energy Density Laboratory Astrophysics, Lisbon, Portugal. (talk)

2022 IEEE International Conference on Plasma Science, Seattle, Washington. (talk)

2022 High Temperature Plasma Diagnostics, Rochester, New York. (poster)

2022 IOP Plasma Physics Conference, Liverpool, United Kingdom. (talk)

2020 APS Division of Plasma Physics Annual Meeting, virtual meeting. (poster)

2019 APS Division of Plasma Physics Annual Meeting, Fort Lauderdale, Florida. (talk)

2018 APS Division of Plasma Physics Annual Meeting, Portland, Oregon. (talk)

2018 EPS Plasma Physics Division Annual Meeting, Prague, Czechia. (poster)

2018 High Energy Density Laboratory Astrophysics, Kurashiki, Japan. (talk)

2017 APS Division of Plasma Physics Annual Meeting, Milwaukee. (talk)

Publications

2023 V. Valenzuela-Villaseca, L. G. Suttle, F. Suzuki-Vidal, J. W. D. Halliday, S. Merlini, D. R. Russell, E. R. Tubman, J. D. Hare, J. P. Chittenden, M. E. Koepke, E. G. Blackman, and S. V. Lebedev, *"Characterization of Quasi-Keplerian, Differentially Rotating, Free-Boundary Laboratory Plasmas"* Physics Review Letters 130, 195101 doi: 10.1103/PhysRevLett.130.195101

2023 J. Strucka, B. Lukic, M. Koerner, J. W. D. Halliday, Y. Yao, K. Mughal, D. Maler, S. Efimov, J. Skidmore, A. Rack, Y. Krasik, J. Chittenden, and S. N. Bland *"Synchrotron radiography of Richtmyer–Meshkov instability driven by exploding wire arrays"* Physics of Fluids 35, 044108 DOI:10.1063/5.0144839.

2022 D. R. Russell, G. C. Burdiak, J. J. Carroll-Nellenback, J. W. D. Halliday, J. D. Hare, S. Merlini, L. G. Suttle, V. Valenzuela-Villaseca, S. J. Eardley, J. A. Fullalove, G. C. Rowland, R. A. Smith, A. Frank, P. Hartigan, A. L. Velikovich, and S. V. Lebedev, *"Perpendicular subcritical shock structure in a collisional plasma experiment"* Physics Review Letters 129, 225001 doi: 10.1103/PhysRevLett.129.225001

2022 R. N. Markwick, A. Frank, J. Carroll-Nellenback, E. G. Blackman, P. M. Hartigan, S. V. Lebedev, D. R. Russell, J. W. D. Halliday, and L. G. Suttle , *"Morphology of shocked lateral outflows in colliding hydrodynamic flows"* Physics of Plasmas 29, 102901 doi: 10.1063/5.0095166

2022 J. W. D. Halliday, A. Crilly, J. Chittenden, R. C. Mancini, S. Merlini, S. Rose, D. R. Russell, L. G. Suttle, V. Valenzuela-Villaseca, S. N. Bland, and S. V. Lebedev. *"Investigating radiatively driven, magnetized plasmas with a university scale pulsed-power generator (invited)"* Physics of Plasmas 29, 042107 doi: 10.1063/5.0084550

2022 J. Strucka, J. W. D. Halliday, T. Gheorghiu, H. Horton, B. Krawczyk, P. Moloney, S. Parker, G. Rowland, N. Schwartz, S. Stanislaus, S. Theocharous, C. Wilson, Z. Zhao, T. A. Shelkovenko, S. A. Pikuz, and S. N. Bland. *"A portable X-pinch design for x-ray diagnostics of warm dense matter"*. Matter and Radiation at Extremes, 7, 016901. doi: 10.1063/5.0059926

2021 J. W. D. Halliday, S. N. Bland, J. D. Hare, S. Parker, L. G. Suttle, D. R. Russell, and S. V. Lebedev. *"A time-resolved imaging system for the diagnosis of x-ray self-emission in high energy density physics experiments"* Review of Scientific Instruments 92, 123507 doi: 10.1063/5.0073174

2021 L. G. Suttle, J. D. Hare, J. W. D. Halliday, S. Merlini, D. R. Russell, E. R. Tubman, V. Valenzuela-Villaseca, W. Rozmus, C. Bruulsema, and S. V. Lebedev. *"Collective optical Thomson scattering in pulsed-power driven high energy density physics experiments (invited)."* Review of Scientific Instruments 92, 033542. doi: 10.1063/5.0041118

2021 J. D. Hare, G. C. Burdiak, S. Merlini, J. P. Chittenden, T. Clayson, A. J. Crilly, J. W. D. Halliday, D. R. Russell, R. A. Smith, N. Stuart, L. G. Suttle, and S. V. Lebedev. *"An imaging refractometer for density fluctuation measurements in high energy density plasmas (invited)."* Review of Scientific Instruments 92, 033521. doi: 10.1063/5.0040919

2021 F. Suzuki-Vidal, T. Clayson, C. Stehlé, U. Chaulagain, J. W. D. Halliday, M. Sun, L. Ren, N. Kang, H. Liu, B. Zhu, J. Zhu, C. De Almeida Rossi, T. Mihailescu, P. Velard, M. Cotelo, J. M. Foster, C. N. Danson, C. Spindloe, J. P. Chittenden, and C. Kuranz *"First radiative shock experiments on the SG-II laser"* High Power Laser Science and Engineering, 9, E27. doi: 10.1017/hpl.2021.17

2020 L. G. Suttle, G. C. Burdiak, C. L. Cheung, T. Clayson, J. W. D. Halliday, J. D. Hare, S. Rusli, D. R. Russell, E. R. Tubman, A. Ciardi, N. F. Loureiro, J. Li, A. Frank and S. V. Lebedev. *"Interactions of magnetized plasma flows in pulsed-power driven experiments."* Plasma Physics and Controlled Fusion 62, 1. doi: 10.1088/1361-6587/ab5296

2019 C. A. J. Palmer, P. T. Campbell, Y. Ma, L. Antonelli, A. F. A. Bott, G. Gregori, J. W. D. Halliday, Y. Katzir, P. Kordell, K. Krushelnick, S. V. Lebedev, E. Montgomery, M. Notley, D. C. Carroll, C. P. Ridgers, A. A. Schekochihin, M. J. V. Streeter, A. G. R. Thomas, E. R. Tubman, N. Woolsey, and L. Willingale. *"Field reconstruction from proton radiography of intense laser driven magnetic reconnection."* Physics of Plasmas 26, p. 083109. doi: 10.1063/1.5092733

2019 J. D. Hare, J. Macdonald, S. N. Bland, J. Dranczewski, J. W. D. Halliday, S. V. Lebedev, L. G. Suttle, E. R. Tubman, and W. Rozmus. *"Two-colour interferometry and Thomson scattering measurements of a plasma gun"* Plasma Physics and Controlled Fusion 61, 8. doi: 110.1088/1361-6587/ab2571

2018 L. G. Suttle, J. D. Hare, S. V. Lebedev, A. Ciardi, N. F. Loureiro, G. C. Burdiak, J. P. Chittenden, T. Clayson, J. W. D. Halliday, N. Niasse, D. Russell, F. Suzuki-Vidal, E. Tubman, T. Lane, J. Ma, T. Robinson, R. A. Smith, and N. Stuart. *"Ion heating and magnetic flux pile-up in a magnetic reconnection experiment with super-Alfvénic plasma inflows."* Physics of Plasmas 25, p. 042108. doi: 10.1063/1.5023664

2017 J. D. Hare, L. G. Suttle, S. V. Lebedev, N. F. Loureiro, A. Ciardi, J. P. Chittenden, T. Clayson, S. J. Eardley, C. Garcia, J. W. D. Halliday, T. Robinson, R. A. Smith, N. Stuart, F. Suzuki-Vidal, and E. R. Tubman. *"An experimental platform for pulsed-power driven magnetic reconnection."* Physics of Plasmas 25, p. 055703. doi: 10.1063/1.5016280

2017 J. D. Hare, S. V. Lebedev, L. G. Suttle, N. F. Loureiro, A. Ciardi, G. C. Burdiak, J. P. Chittenden, T. Clayson, S. J. Eardley, C. Garcia, J. W. D. Halliday, N. Niasse, T. Robinson, R. A. Smith, N. Stuart, F. Suzuki-Vidal, G. F. Swadling, J. Ma, and, J. Wu. *"Formation and Structure of a Current Sheet in Pulsed-Power Driven Magnetic Reconnection Experiments"*. Physics of Plasmas 24, p. 102703. doi: 10.1063/1.4986012