

# Jack Davies Hare

*Curriculum Vitae, August 2022*

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## Employment

- From 2021 **Massachusetts Institute of Technology**, Assistant Professor
- 2020–2021 **Imperial College London**, Post-doctoral Research Associate
- 2019–2020 **Max-Planck Institute for Plasma Physics**, Post-doctoral Research Associate
- 2017–2019 **Imperial College London**, Post-doctoral Research Associate

## Education

- 2013–2017 **Imperial College London**, PhD, Plasma Physics
- 2011–2013 **Princeton University**, MA, Plasma Physics
- 2007–2011 **University of Cambridge**, 1st Class BA (hons) and MSci, Natural Sciences

## Selected Invited Talks

- Oct 2022 Plasma Physics Colloquium, Columbia University NY
- Aug 2022 Z Fundamental Science Workshop, Albuquerque, NM
- May 2022 Magnetic Reconnection Workshop, Monterey CA
- April 2022 ZNetUS Workshop, Virtual
- April 2022 Z Fundamental Science Seminar, SNL, Albuquerque NM
- Feb. 2022 NNSA Stockpile Stewardship Academic Program Workshop, Virtual
- Jan 2022 Plasma, Pulsed Power, and Microwave Lab Seminar, U. Michigan, Ann Arbor MI
- Aug. 2021 Z Fundamental Science Workshop, Virtual
- May 2021 High Energy Density Science Association Colloquium
- July 2020 Heliophysics seminar, Princeton Plasma Physics Laboratory
- July 2020 Frontiers in Plasma Physics, Journal of Plasma Physics Colloquium
- Jan. 2019 Plasma Theory Group Seminar, University of Oxford, UK
- Oct. 2017 APS Division of Plasma Physics Annual Meeting, Milwaukee, WI
- March 2017 Magnetic Reconnection US-Japan Workshop 2017, Matsuyama, Japan

## Selected Grants and Awards

- 2021 PI, NSF EAGER: “Radiatively Cooled Magnetic Reconnection on Z”. 2 years, \$218k.
- 2021 PI, NSF/NNSA: “Developing Pulsed Power Driven Turbulent Reconnection Platforms”. 3 years, \$750k.
- 2021 Academic PI the Magnetically Ablated Reconnection on Z (MARZ) collaboration, awarded four shots (~\$3M) through the Z Fundamental Science Program FY22-23.
- 2018 European Physical Society Plasma Physics Division PhD Research Award.
- 2018 Imperial College Prize for Excellence in the Support of Teaching and Learning.

## Academic Service

- 2021 APS DPP Program Committee, Fundamental Science sub-committee.
- From 2021 MIT NSE departmental DEI committee.
- From 2021 APS Division of Plasma Physics Pride committee, co-founder and member-at-large.
- From 2020 Advisory Board member for the Journal of Plasma Physics.
- From 2017 Referee for *Physical Review Letters*, *Nature*, *Physical Review E*, *Journal of Plasma Physics*, *Review of Scientific Instruments*, and *Physics of Plasmas*, among others.
- 2018–2019 Chair of Imperial College Physics Department LGBT+ Allies Network.

## Preprints

3. 2022 J. A. Percy, M. J. Rosenberg, T. M. Johnson, G. D. Sutcliffe, B. L. Reichelt, **J. D. Hare**, N. F. Loureiro, R. D. Petrasso, and C. K. Li. *Experimental Evidence of Plasmoids in High- $\beta$  Magnetic Reconnection*. DOI: 10.48550/arXiv.2207.04119. Under review at Physical Review Letters
2. 2022 R. Datta, D. R. Russell, I. Tang, T. Clayson, L. G. Suttle, J. P. Chittenden, S. V. Lebedev, and **J. D. Hare**. *The Structure of 3D Collisional Magnetized Bow Shocks in Pulsed-Power-Driven Plasma Flow*. DOI: 10.48550/arXiv.2208.04535. Under review at the Journal of Plasma Physics
1. 2022 R. Datta, D. R. Russell, T. Clayson, J. P. Chittenden, S. V. Lebedev, and **J. D. Hare**. *Time-Resolved Velocity and Ion Sound Speed Measurements from Simultaneous Bow Shock Imaging and Inductive Probe Measurements*. DOI: 10.48550/arXiv.2205.06082. arXiv: 2205.06082 [physics]. Under review at the Review of Scientific Instruments

## Publications

Twenty-three publications, of which five are first author.

23. 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”. *Review of Scientific Instruments* 92.3, p. 033521. DOI: 10.1063/5.0040919.
22. 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* 92.3, p. 033542. DOI: 10.1063/5.0041118.
22. 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* 92.12, p. 123507. DOI: 10.1063/5.0073174.

20. 2021 E. D. Filippov, S. S. Makarov, K. F. Burdonov, W. Yao, G. Revet, J. Béard, S. Bolaños, S. N. Chen, A. Guediche, **J. Hare**, D. Romanovsky, I. Y. Skobelev, M. Starodubtsev, A. Ciardi, S. A. Pikuz, and J. Fuchs. “Enhanced X-ray Emission Arising from Laser-Plasma Confinement by a Strong Transverse Magnetic Field”. *Scientific Reports* 11.1, p. 8180. DOI: 10.1038/s41598-021-87651-8.
19. 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, p. 085012. DOI: 10.1088/1361-6587/ab2571.
18. 2019 L. G. Suttle, G. C. Burdiak, C. L. Cheung, T. Clayson, J. Halliday, **J. D. Hare**, S. Rusli, D. Russell, E. 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*. DOI: 10.1088/1361-6587/ab5296.
17. 2018 **J. D. Hare**, L. G. Suttle, S. V. Lebedev, N. F. Loureiro, A. Ciardi, J. 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.
16. 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.
15. 2018 T. Clayson, S. V. Lebedev, F. Suzuki-Vidal, G. C. Burdiak, J. W. D. Halliday, **J. D. Hare**, J. Ma, L. G. Suttle, and E. R. Tubman. “Inverse Liner Z-Pinch: An Experimental Pulsed Power Platform for Studying Radiative Shocks”. *IEEE Transactions on Plasma Science* 46.11, pp. 3734–3740. DOI: 10.1109/TPS.2018.2868757.
14. 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.
13. 2017 **J. D. Hare**, L. Suttle, S. V. Lebedev, N. F. Loureiro, A. Ciardi, G. C. Burdiak, J. P. Chittenden, T. Clayson, C. Garcia, N. Niasse, T. Robinson, R. A. Smith, N. Stuart, G. F. Swadling, J. Ma, J. Wu, and Q. Yang. “Anomalous Heating and Plasmoid Formation in a Driven Magnetic Reconnection Experiment”. *Physical Review Letters* 118, p. 085001. DOI: 10.1103/PhysRevLett.118.085001.
12. 2017 G. C. Burdiak, S. V. Lebedev, S. N. Bland, T. Clayson, **J. Hare**, L. Suttle, D. C. Garcia, J. P. Chittenden, A. Frank, and T. S. Lane. “The Structure of Bow Shocks Formed by the Interaction of Pulsed-Power Driven Magnetised Plasma Flows with Conducting Obstacles”. *Physics of Plasmas* 24, p. 072713. DOI: 10.1063/1.4993187.

11. 2016 L. G. Suttle, **J. D. Hare**, S. V. Lebedev, G. F. Swadling, G. C. Burdiak, A. Ciardi, J. P. Chittenden, N. F. Loureiro, N. Niasse, F. Suzuki-Vidal, J. Wu, Q. Yang, T. Clayson, A. Frank, T. S. Robinson, R. A. Smith, and N. Stuart. "Structure of a Magnetic Flux Annihilation Layer Formed by the Collision of Supersonic, Magnetized Plasma Flows". *Physical Review Letters* 116.22, p. 225001. DOI: 10.1103/PhysRevLett.116.225001.
10. 2016 G. F. Swadling, S. V. Lebedev, G. N. Hall, F. Suzuki-Vidal, G. C. Burdiak, L. Pickworth, P. De Grouchy, J. Skidmore, E. Khoory, L. Suttle, M. Bennett, **J. D. Hare**, T. Clayson, S. N. Bland, R. A. Smith, N. H. Stuart, S. Patankar, T. S. Robinson, A. J. Harvey-Thompson, W. Rozmus, et al. "Experimental Investigations of Ablation Stream Interaction Dynamics in Tungsten Wire Arrays: Interpenetration, Magnetic Field Advection, and Ion Deflection". *Physics of Plasmas* 23, p. 056309. DOI: 10.1063/1.4948279.
9. 2016 G. Haerendel, L. Suttle, S. V. Lebedev, G. F. Swadling, **J. D. Hare**, G. C. Burdiak, S. N. Bland, J. P. Chittenden, N. Kalmoni, A. Frank, R. A. Smith, and F. Suzuki-Vidal. "Stop Layer: A Flow Braking Mechanism in Space and Support from a Lab Experiment". *Plasma Physics and Controlled Fusion* 58, p. 064001. DOI: 10.1088/0741-3335/58/6/064001.
8. 2015 G. C. Burdiak, S. V. Lebedev, F. Suzuki-Vidal, G. F. Swadling, S. N. Bland, N. Niasse, L. Suttle, M. Bennet, **J. Hare**, M. Weinwurm, R. Rodriguez, J. Gil, and G. Espinosa. "Cylindrical Liner Z-pinch Experiments for Fusion Research and High-Energy-Density Physics". *Journal of Plasma Physics* 81, pp. 1–20. DOI: 10.1017/S0022377815000318.
7. 2015 M. Bennett, S. Lebedev, G. Hall, L. Suttle, G. Burdiak, F. Suzuki-Vidal, **J. Hare**, G. Swadling, S. Patankar, M. Bocchi, J. Chittenden, R. Smith, A. Frank, E. Blackman, R. Drake, and A. Ciardi. "Formation of Radiatively Cooled, Supersonically Rotating, Plasma Flows in Z-pinch Experiments: Towards the Development of an Experimental Platform to Study Accretion Disk Physics in the Laboratory". *High Energy Density Physics* 17, pp. 63–67. DOI: 10.1016/j.hedp.2015.02.001.
6. 2014 G. F. Swadling, S. V. Lebedev, G. N. Hall, S. Patankar, N. H. Stewart, R. A. Smith, A. J. Harvey-Thompson, G. C. Burdiak, P. de Grouchy, J. Skidmore, L. Suttle, F. Suzuki-Vidal, S. N. Bland, K. H. Kwek, L. Pickworth, M. Bennett, **J. D. Hare**, W. Rozmus, and J. Yuan. "Diagnosing Collisions of Magnetized, High Energy Density Plasma Flows Using a Combination of Collective Thomson Scattering, Faraday Rotation, and Interferometry". *Review of Scientific Instruments* 85, 11E502. DOI: 10.1063/1.4890564.
5. 2014 S. V. Lebedev, L. Suttle, G. F. Swadling, M. Bennett, S. N. Bland, G. C. Burdiak, A. Ciardi, A. Clemens, P. D. Grouchy, G. N. Hall, **J. D. Hare**, N. Kalmoni, N. Niasse, S. Patankar, L. Sheng, A. Smith, J. Yuan, A. Frank, E. G. Blackman, and R. P. Drake. "The Formation of Reverse Shocks in Magnetized High Energy Density Supersonic Plasma Flows". *Physics of Plasmas* 21, p. 056305. DOI: 10.1063/1.4874334.
4. 2014 M. J. Bennett, S. V. Lebedev, G. N. Hall, L. Suttle, G. Burdiak, F. Suzuki-Vidal, **J. Hare**, G. Swadling, S. Patankar, M. Bocchi, J. P. Chittenden, R. Smith, A. Frank, E. Blackman, R. P. Drake, and A. Ciardi. "Rotating Plasma Disks in Dense Z-pinch Experiments". *AIP Conference Proceedings* 1639, pp. 71–75. DOI: 10.1063/1.4904780.

3. 2013 J. Schmitt, T. Abrams, L. Baylor, L. Berzak Hopkins, T. Biewer, D. Bohler, D. Boyle, E. Granstedt, T. Gray, **J. Hare**, C. Jacobson, M. Jaworski, R. Kaita, T. Kozub, B. LeBlanc, D. Lundberg, M. Lucia, R. Maingi, R. Majeski, E. Merino, et al. "Results and Future Plans of the Lithium Tokamak eXperiment (LTX)". *Journal of Nuclear Materials* 438, S1096–S1099. DOI: 10.1016/j.jnucmat.2013.01.241.
2. 2013 R. Majeski, T. Abrams, D. Boyle, E. Granstedt, **J. Hare**, C. M. Jacobson, R. Kaita, T. Kozub, B. LeBlanc, D. P. Lundberg, M. Lucia, E. Merino, J. Schmitt, D. Stotler, T. M. Biewer, J. M. Canik, T. K. Gray, R. Maingi, A. G. McLean, S. Kubota, et al. "Particle Control and Plasma Performance in the Lithium Tokamak eXperiment". *Physics of Plasmas* 20, p. 056103. DOI: 10.1063/1.4802195.
1. 2011 Y. Alaverdyan, N. Vamivakas, J. Barnes, C. Leboutteiller, **J. Hare**, and M. Atatüre. "Spectral Tunability of a Plasmonic Antenna with a Dielectric Nanocrystal". *Optics Express* 19.19, pp. 18175–18181.