

Akash Dasgupta

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PROFILE

I am a final year PhD student who is passionate about physics, especially in measurement systems, and am excited to embark on the next stage of my career in the field of Perovskite solar cells. I am skilled in setting up optical systems including laser systems and imaging systems, and am fluent in python and C++. I am hard working, and enjoy tackling unsolved problems, and developing novel characterisation techniques, which enable us to gain insights that were not possible before. Coming from a school where many of my peers did not have the means or motivation to pursue higher education, I am passionate about outreach, striving to inspire a love for physics in the younger generations.

ACADEMIC BACKGROUND

Ph.D. Condensed Matter Physics
[University of Oxford](#), Oxford, UK

Oct 2020 - Present

Awarded the Penrose Scholarship

Supervised by of Prof. [Henry J. Snaith](#), FRS.

Thesis title: *Advancing Perovskite Solar Cells: Stability and Scalability, and Future Prospect*

Key Achievements:

- Pioneered brand new method for spatially resolved current measurement. Previous work could only calculate spatially resolved voltage from luminescent imaging, with my method one could obtain a holistic picture of solar cell performance (*ACS Energy Letters* 7 (7), 2311-2322)
- Set up and manage several systems such as the frequency dependant JV measurement, intensity dependant PLQE measurement, etc, which have enabled several publications in the group (Nature Communications 14 (1), 932; Advanced Materials, 2211742; Nature Energy, 1-11)
- Developed a framework that for the first time is able to reconcile the effect of mobile ions in perovskite material to their luminescence, allowing for better understanding of the measurements we already take (*Work submitted*)

M.Sc. Physics with Industrial placement

[University of Bristol](#), Bristol, UK

Sep 2016 - July 2020

- Achieved a **First class** degree classification

RESEARCH EXPERIENCE

Research student in Plasma Diagnostics group

July 2018-July 2019

[Central Laser Facility \(STFC\)](#), Rutherford Appleton Labs, Didcot

Was selected for 1-year industrial placement at CLF. Worked on detection systems for plasma diagnostics (X ray spectrometers, ultra-low sensitivity optical).

Produced several entries to the 'annual reports' for the CLF, on the topic of [image sensors](#) and [silicon photomultipliers](#)

Responsibility include:

- **Characterization and comparison of different sensors:** Including Silicon Photomultipliers and scientific cameras, advised experiments directly.
- **Modifying/refining data acquisition workflows:** Contributed to several diagnostic systems. Notably discovered an unconsidered phosphorescent effect

in X ray diagnostic, advising directly its deployment. Worked on developing several analysis scripts and scripts to operate equipment through python.

- **Contribution to setup of in high profile experiments:** Have provided support for experiments conducted on the Vulcan and Gemini laser (with groups such as DSTL).

TEACHING EXPERIENCE

Senior lab instructor (optics, computing) November 2022-Present

[University of Oxford](#), Oxford, UK

Led lab sessions which taught students how to conduct experiments, and provided hands on support through problems while they carry out experiments. Senior role involves actively improving experiments, training new teaching assistants, and taking a more central front facing role in the teaching.

Assistant lab instructor (optics, computing)

November 2020-2022

[University of Oxford](#), Oxford, UK

Contributed to lab sessions which taught students how to conduct experiments, and provided hands on support through problems while they carry out experiments

OUTREACH

Mentor under 'Levelling up' programme

September 2021-July 2021

[University of Oxford](#), Oxford, UK Led sessions with disadvantaged A-Level students with an interest in physics. Fortnightly sessions included topics such as applying for university, different fields in physics, best strategies to approach admission exams, future careered prospects, etc

Public talks

2021-present

When I find the opportunity I give public talks addressed to the general public, to engage them in the world of my research in perovskite solar cells. Examples include Cafe Scientifique (Henley, reading) and annual 'Lab to Life' scheme (University of Oxford)

Primary school science days

2021-present

[University of Oxford](#), Oxford, UK Take part for 2 months a year in a primary school outreach event. Students visit the university and we lead sessions where they do basic science experiments (Eg, making 'rockets' out of film canisters), encouraging them to think about the science

Secondary school visits

2021-present

[University of Oxford](#), Oxford, UK When asked, I take part in secondary school visits, where we run workshops around the physics of solar cells. This is received very positively, with us often receiving many questions both about solar cells as well as life as a researcher

CONFERENCES *MRS Spring Meeting and Exhibition, Seattle, Washington State, 2024*

Session Talk

MATSUS fall, Toremelinos, Spain, 2023

Session talk

Hybrid and Organic photovoltaics, London, UK, 2023

Poster

PSCO, Oxford, UK, 2023

Mini talk + Poster

Hybrid and Organic photovoltaics, London, UK, 2023

Poster

Binks Renewable Energy Conference, Oxford, UK, 2022

Poster

MRS Fall Meeting and Exhibition, Boston, Massachusetts, 2022

Session Talk

PUBLICATIONS *Visualizing macroscopic inhomogeneities in perovskite solar cells*

Akash Dasgupta, Suhas Mahesh, Pietro Caprioglio, Yen-Hung Lin, Karl-Augustin Zaininger, Robert DJ Oliver, Philippe Holzhey, Suer Zhou, Melissa M McCarthy, Joel A Smith, Maximilian Frenzel, M Greyson Christoforo, James M Ball, Bernard Wenger, Henr J Snaith [ACS Energy Letters 2022](#)

Bandgap-universal passivation enables stable perovskite solar cells with low photo-voltage loss

Yen-Hung, Vikram, Fengning Yang, Xue-Li Cao, **Akash Dasgupta**, Robert D. J. Oliver, Aleksander M. Ulatowski, Melissa M. McCarthy, Xinyi Shen, Qimu Yuan, M. Greyson Christoforo, Fion Sze Yan Yeung, Michael B. Johnston, Nakita K. Noel, Laura M. Herz, M. Saiful Islam, Henry J. Snaith [Science 2024](#)

Halide homogenization for low energy loss in 2-eV-bandgap perovskites and increased efficiency in all-perovskite triple-junction solar cells

Junke Wang, Lewei Zeng, Dong Zhang, Aidan Maxwell, Hao Chen, Kunal Datta, Alessandro Caiazzo, Willemijn H. M. Remmerswaal, Nick R. M. Schipper, Zehua Chen, Kevin Ho, **Akash Dasgupta**, Gunnar Kusch, Riccardo Ollearo, Laura Bellini, Shuaifeng Hu, Zaiwei Wang, Chongwen Li, Sam Teale, Luke Grater, Bin Chen, Martijn M. Wienk, Rachel A. Oliver, Henry J. Snaith, René A. J. Janssen, Edward H. Sargent [Nature Energy 2023](#)

Ion-induced field screening as a dominant factor in perovskite solar cell operational stability

Jarla Thiesbrummel, Sahil Shah, Emilio Gutierrez-Partida, Fengshuo Zu, Francisco Peña-Camargo, Stefan Zeiske, Jonas Diekmann, Fangyuan Ye, Karol P Peters, Kai O Brinkmann, Pietro Caprioglio, **Akash Dasgupta**, Seongrok Seo, Fatai A Adeleye, Jonathan Warby, Quentin Jeangros, Felix Lang, Shuo Zhang, Steve Albrecht, Thomas Riedl, Ardalan Armin, Dieter Neher, Norbert Koch, Yongzhen Wu, Vincent M Le Corre, Henry Snaith, Martin Stolterfoht [Nature Energy 2023](#)

Open-circuit and short-circuit loss management in wide-gap perovskite pin solar cells

Pietro Caprioglio, Joel A Smith, Robert DJ Oliver, **Akash Dasgupta**, Saqlain Choudhary, Michael D Farrar, Alexandra J Ramadan, Yen-Hung Lin, M Greyson Christoforo, James M Ball, Jonas Diekmann, Jarla Thiesbrummel, Karl-Augustin Zaininger, Xinyi Shen, Michael B Johnston, Dieter Neher, Martin Stolterfoht, Henry J Snaith [Nature Communications 2023](#)

Chloride-Based Additive Engineering For Efficient and Stable Wide-Bandgap Perovskite Solar Cells

Xinyi Shen, Benjamin M Gallant, Philippe Holzhey, Joel A Smith, Karim A Elmetekawy, Zhongcheng Yuan, PVGM Rathnayake, Stefano Bernardi, **Akash Dasgupta**, Ernestas Kasparavicius, Tadas Malinauskas, Pietro Caprioglio, Oleksandra Shargaieva, Yen-Hung Lin, Melissa M McCarthy, Eva Unger, Vytautas Getautis, Asaph Widmer-Cooper, Laura M Herz, Henry J Snaith [Advanced Materials, 2023](#)

The Role of the Organic Cation in Developing Efficient Green Perovskite LEDs Based on Quasi-2D Perovskite Heterostructures

Alexandra J Ramadan, Woo Hyeon Jeong, Robert DJ Oliver, Junke Jiang, **Akash Dasgupta**, Zhongcheng Yuan, Joel Smith, Jae Eun Lee, Silvia G Motti, Olivia Gough, Zhenlong Li, Laura M Herz, Michael B Johnston, Hyosung Choi, Jacky Even, Claudine Katan, Bo Ram Lee, Henry J Snaith [Advanced Functional Materials](#), 2303012

Hydrogen Bond-Assisted Dual Passivation for Blue Perovskite Light-Emitting Diodes

Zhongkai Yu, Xinyu Shen, Xiangyang Fan, Young-Kwang Jung, Woo Hyeon Jeong, **Akash Dasgupta**, Manuel Kober-Czerny, Pietro Caprioglio, Sung Heum Park, Hyosung Choi, Henry J Snaith, Samuel D Stranks, Bo Ram Lee [ACS Energy Letters](#), 2023

Alumina Nanoparticle Interfacial Buffer Layer for Low-Bandgap Lead-tin Perovskite Solar Cells

Heon Jin, Michael D Farrar, James M Ball, **Akash Dasgupta**, Pietro Caprioglio, Sudarshan Narayanan, Robert DJ Oliver, Florine M Rombach, Benjamin WJ Putland, Michael B Johnston, Henry J Snaith [Advanced Functional Materials](#), 2023