

## UK Plasma Physics news – Autumn 2023

Welcome to the UK IOP Plasma Physics Group (PPG) e-newsletter. If you have items for inclusion in future newsletters e.g. any meeting announcements or reports, research achievements, new appointments, facilities, projects, buildings etc. please contact: [kate.lancaster@york.ac.uk](mailto:kate.lancaster@york.ac.uk).

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### Committee news

As the new chair of the IOP plasma physics group (since Oct 2022), I'd like to take a moment to thank the outgoing chair Dr Ken McClements for all his hard work during the period he was chair for this committee. We wish him well in all his endeavours!

I would also like to thank our outgoing committee members (as of Oct 2023), Dr David Carroll (STFC-CLF) and Dr Mohammad Hasan (Liverpool) for all their work and contributions to the group. David was treasurer and did an excellent job keeping us on the financial straight and narrow! Mohammad has done an excellent job representing the low temperature plasma field, and organising meetings such as TPW 2021 (sadly curtailed by the pandemic).

I'd also like to welcome our two new members (as of October 2023) Dr Yasmin Andrew (Imperial) and Dr Francis Lockwood Estrin (UCL). We hope you will enjoy working with us.

As ever, details of the group and its activities can be found on our [website](#)

Finally, I would like to remind you of two funds available to PhD students and early career researchers who are members of the IOP. These are centrally held funds, so not PPG managed.

- The Research Student Conference Fund allows PhD students to apply for up to £300 for non-IOP conferences. Please refer to the [website](#) for details and eligibility.
- The Early Career Researchers Fund provides support up to £300 pounds for international conferences and visits. Please refer to the [website](#) for details and eligibility.

# In memory of Professor Adrian W. Cross: 1966-2023

*By Kevin Ronald with contributions from Alan Phelps, Bob Bingham, Bengt Eliasson and Colin Whyte*



Adrian Cross joined the Department of Physics and Applied Physics at the University of Strathclyde in 1984 qualifying with the degree of B.Sc. with Honours in 1989. He remained at Strathclyde taking his PhD under the supervision of Alan Phelps, which he received in 1993. His leadership credentials were evident even as he completed his PhD, he was taking responsibility in guiding and supporting other projects and less experienced researchers. It was during this period that I first met Adrian, as I joined the same laboratory as an undergraduate student. Adrian acted as a mentor to myself, and many others, in the early years of our careers. Adrian was a warm, personable figure who made everyone joining the laboratory feel welcome and valued. Shortly after completing his doctorate, he became the senior experimental research fellow in his laboratory.

His research leadership led to several outstanding contributions to science, including novel types of cold 'dielectric barrier' cathodes, high power microwave sources using cold field emission, observation of the

Cyclotron Autoresonance Maser instability at the 2nd harmonic, plasma flare cathodes and the development of particle beams from the pseudospark discharge. He played a strategic role in the development of an international research collaboration, enabled by the easing of East – West tensions in the early 90's. Important scientific outcomes of these collaborations include the demonstration of superradiant emission from short electron bunches, multiple free electron maser experiments, multi-dimensional distributed feedback to allow microwave sources of exceptional power levels and the use of helically corrugated waveguides for broadband microwave amplification.

His work has had a profound and ongoing impact in the international research landscape. In more recent times Adrian has focussed on addressing the THz gap – a long standing scientific challenge. He developed important collaborations across the UK and further afield to address this need and opportunity. Major inroads are being made thanks to his strategic vision and research leadership. He also took a leading part in linking the University of Strathclyde to the Cockcroft Institute, playing an important role in research applying mm-waves to accelerators and RF undulators.

With the announcement of the STEP initiative, recognising the vital importance and socio-economic impact that would arise from addressing the worldwide energy supply issue, Adrian enthusiastically engaged with colleagues, establishing research investigating novel methods of coupling microwave energy into spherical aspect tokamak plasma and exploring advanced microwave sources.

Throughout his career Adrian worked closely with industry. His PhD involved him working with EEV in Chelmsford (now part of Teledyne) and he also worked closely with TMD (now a division of CPI). Both relationships continued throughout his career and remain important to his laboratory.

With the breadth of his contribution, his international standing and his output in prestigious papers, Adrian's career progressed at Strathclyde, ultimately resulting in his promotion to Professor in 2014,

taking over the leadership of the laboratory he had first joined in 1989. As an academic he taught over 50 MSc students and thousands of undergraduates. He supervised many 10's of doctoral students and young research fellows. They remember his enthusiasm and support.

Adrian was an active member of the IoP and the plasma community. He served on the IoP Plasma Physics Group's Committee twice, most recently in a term starting in 2012. He organised the IoP Spring Conference at the Crieff Hydro in 2006, and for many years played a major role in organising the Winter Technological Plasma Workshop. He served on the IEEE Nuclear and Plasma Sciences committee 2004-2007 and played an important role in organising multiple IEEE ICOPS conferences.

It was with shock and heartfelt sadness that his friends and colleagues learned of Adrian's sudden and unexpected passing on the 21st January. He is very sorely missed but warmly remembered. Adrian was much more than his outstanding career: He was a loving and beloved family man. The thoughts of his friends and colleagues are first and foremost with his family – his wife Monica and their two wonderful daughters. Our thoughts are also with his other immediate family – his much loved Mother, Brother and Sister.

## Recent meetings

### 49<sup>th</sup> IOP Plasma Physics Conference

The 49<sup>th</sup> IOP Plasma Physics conference was held at St Catherine's college, Oxford. The conference was opened remotely by the Chair, Kate Lancaster, who was sadly unable to attend due to getting Covid! A total of 34 talks and 47 posters were given across a range of plasma physics including magnetic confinement fusion, laser-plasma interactions, warm dense matter, technological plasmas and space plasmas including the Culham thesis prize talk given by Alex Picksley (Oxford) and The Rutherford prize talk by Aaron Ho (DIFFER).

We were extremely grateful to First Light Fusion Ltd for offering a tour to a number of delegates of the FLF site on Tuesday afternoon. On Tuesday evening one of our invited speakers, Dr Steph Yardley (Reading), gave a fantastic and well received public lecture on "Our Explosive Sun".

Each year a poster prize is awarded at the conference dinner. This year we had two prizes, the usual "Student Poster Prize" and then an "Amplitude early career and Student poster prize" which was sponsored by Amplitude. **The Student poster prize won by Lars Henden (UKAEA)** for his poster on "Exploration of mitigation systems for disruption generated Runaway Electrons in a STEP concept". **Amplitude Early Career and Student Poster Prize was won by Luke Simons (Swiss Plasma Center)** for his poster on "Modelling and Design of a Hard X-Ray Spectrometer for TCV", pictured above with Ashley Crane from Amplitude. Both students won £50 and IOP publishing donated a text book to each of the winners entitled, "Plasma Modeling (Second Edition): Methods and applications edited by Gianpiero Colonna and Antonio D'Angola".



It was a fantastic meeting and we'd like to thank the organising committee – Sarah Elmore (UKAEA), David Carroll (STFC-CLF) and Vivien Thomas (IOP) for their excellent work putting the conference together. We would also like to thank our sponsors AWE, STFC Central Laser Facility, UKAEA, Amplitude, and Plasma Quest Ltd, this financial support is essential to the conference.

## Forthcoming meetings



We are pleased to announce the **50<sup>th</sup> IOP Plasma Physics Conference** will be held in York, April 8<sup>th</sup>-11<sup>th</sup> 2024. The meeting will be held at the [Hilton York](#), which is right in the centre of the historic city.

The website is forthcoming and registration will open in early 2024.

On a related note, since this meeting is the 50<sup>th</sup> if anyone has any stories, pictures, and memories from past IOP plasma physics conferences please do send them to Kate ( [kate.lancaster@york.ac.uk](mailto:kate.lancaster@york.ac.uk) )

## Community news

### Special issue of *Philosophical Transactions A*

Royal Society Publishing has recently published special issue of *Philosophical Transactions A* entitled **Dynamic and transient processes in warm dense matter** compiled and edited by David Riley, Thomas G White and Jiayu Dai and the articles can be accessed directly at [www.bit.ly/TransA2253](http://www.bit.ly/TransA2253)

### JPP frontiers of Plasma Physics colloquium

The JPP have been organising a series of online talks with speakers across the globe covering the frontiers of plasma physics since the beginning of 2020. They have put on a fascinating array of speakers across a large range of topics in plasma physics. Details of upcoming talks, past speakers, and how to join the sessions can be found on the [website](#)

## Prizes and Awards

### The Rutherford Plasma Physics Communication Prize (sponsored by STFC)

The Rutherford Plasma Physics Communication Prize is an annual award sponsored by STFC Central Laser Facility and hosted by the IOP Plasma Physics Group. The award recognises those who exemplify excellence in outreach to the general public through the communication of plasma physics to those that are non-experts and is open to ALL members of the plasma physics community, whose application is judged by a distinguished panel of scientists and communicators (including one plasma physicist, one non-plasma physicist and one non-physicist).

This year's winners were Aaron Ho (DIFFER, Netherlands) and Luca Vialetto (Kiel University, Germany) for their Podcast-style YouTube channel Coffee Break Down.

<https://www.youtube.com/@breakdownpodcast>

Aaron gave an invited talk remotely on behalf of both of them at the IOP plasma physics conference in Oxford this year and they also received £500. Well done to Aaron and Luca!

### **The Culham Thesis Prize (sponsored by UKAEA)**

The [Culham Thesis Prize](#) is an annual award sponsored by Culham Centre for Fusion Energy (CCFE) and jointly coordinated by CCFE and the IOP Plasma Physics Group.

The Culham Thesis Prize is awarded to the candidate who has displayed the highest degree of excellence in the execution of the scientific method as witnessed by the award of Doctor of Philosophy in plasma science from a UK or Irish university in the last two calendar years.

The thesis content should exhibit significant new work and originality, clearly driven by the nominee, be well explained and demonstrate a good understanding of the subject.

This year's winner was Alexander Picksley (Oxford / Berkeley) for his thesis on “Low density plasma waveguides for multi-GeV laser Wakefield accelerators”.

He received a prize of £500 and gave an invited talk at the annual IOP plasma physics conference. Congratulations Alex!

### **The Malcolm Haines Prize**

The [Malcolm Haines Prize](#) is a biennial award funded by Malcolm Haines' widow, Polly Haines and hosted by the IOP Plasma Physics Group. The Malcolm Haines Prize was created in honour of the late Malcolm Haines, an outstanding plasma physicist at Imperial College London. It recognises early researchers for outstanding research carried out in the UK or Ireland, leadership and/or innovation in any area of experimental or theoretical plasma physics. A panel of experts is appointed to act as judges for the prize.

The call for nominations is open and the deadline **for submissions is 31<sup>st</sup> of October 2023**. If you have any questions please do get in touch with Stuart Mangles ( [stuart.mangles@imperial.ac.uk](mailto:stuart.mangles@imperial.ac.uk) )