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Some meetings may include special activities for students

* Are you a full time student? Yes
* Current level of study Doctorate
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* **What is the title of your presentation?**
  - Use only lowercase letters, except for proper names or acronyms (such as GIS, LCD).
  - Example: Remote sensing solutions using GIS from Associated National Laboratory

Development of a Gabor lens for symmetric focusing of laser-driven ion beams

* **What prompted you to make a submission for this conference?**

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* Contact Author:
Calvin Dyson

Change Contact Author

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Name	Email	Affiliation(s)	
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Speaker

Select who will be the speaker/presenter for this presentation at the meeting. The biography will be used to introduce you as the speaker. Subject to paper's acceptance.

* Select Speaker:

Calvin Dyson

* Speaker Biography: Character Count: 889 | Max: 1000

Calvin Dyson is a third-year PhD researcher at Imperial College London and a member of the LhARA (Laser-hybrid Accelerator for Radiobiological Applications) collaboration under the supervision of Professor Kenneth Long. His research spans several areas across LhARA, with a primary focus on understanding and modelling the experimental results from the Gabor lens testbench at Swansea University. This involves employing WarpX to investigate electron plasma confinement using three-dimensional particle-in-cell simulations. His other contributions within the collaboration include beamline optimisation and characterisation for the PoPLaR experiment, as well as simulations and data analysis for ion-acoustic diagnostics. His research contributes to the development and characterisation of the focusing technologies and diagnostics required to realise LhARA's radiobiological applications.

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Title:
Development of a Gabor lens for symmetric focusing of laser-driven ion beams

* **Presentation preference:**
Oral Presentation

* **Abstract text for online and/or printed programs**

REQUIRED: Enter a brief abstract description suitable for early release (50-150 words). The text you enter here will be published prior to the meeting in the online versions of the conference program with your presentation title and author listing.

Character Count: **642** | **1,200**

Laser-driven ion beams have significant potential for future applications in radiobiology and particle therapy, but their large divergence makes efficient capture and transport challenging. A Gabor lens offers a symmetric focusing solution using the electric field of a confined electron plasma. This contribution presents experimental progress at Swansea University in generating and stabilising the plasma required for such a lens, including improvements achieved using oscillating electric fields and a dimple potential. Complementary WarpX simulations support the development of a practical focusing system for applications such as LhARA.

* **Abstract text for technical review purposes**

REQUIRED: Enter a more detailed abstract for technical review purposes (200-300 words). Abstracts should contain enough detail to clearly convey the approach and the results of the research. This abstract version is for review only and will not be made public.

Character Count: **1,907** | **5,000**

Laser-driven ion sources offer potential advantages in a range of disciplines, including radiotherapy. However, these beams typically exhibit large divergence, creating significant challenges for conventional technologies that often rely on asymmetric focusing and require strong magnetic fields. The Laser-hybrid Accelerator for Radiobiological Applications (LhARA) proposes the use of a Gabor lens as a symmetric focusing system to capture the laser-driven beam. A Gabor lens uses the electrostatic field of a confined electron plasma to focus positively charged particles. The focusing strength is determined by the electron density and length.

This contribution reports results from a Gabor lens testbench at Swansea University. A Penning-Malmberg trap, comprising a radially confining solenoid and axially confining electrodes, is used to confine an electron plasma produced through seeding background CO_2 gas ionisation with an electron gun. Experimental results have explored rotating-wall

Topics

Select the topic area that best fits your submission. Provide your top three choices in order of preference. You may also provide your own topic area as a suggestion.

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Gabor lens

Plasma lens

Electron plasma confinement

Penning-Malmberg trap

Laser-driven ion beam capture

Laser-driven ion beam focusing

Particle-in-cell simulations

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Select an application track below if your research aligns with the track description. All accepted submissions will be placed in the conference program. All papers that are aligned with an application track via the submission process, will be grouped and viewable by track on the SPIE.org event website.

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  Papers that highlight advances in materials, design, fabrication, integration and applications of silicon or compound semiconductor microelectronics for use in the security and defense sectors and the commercial marketplace.
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