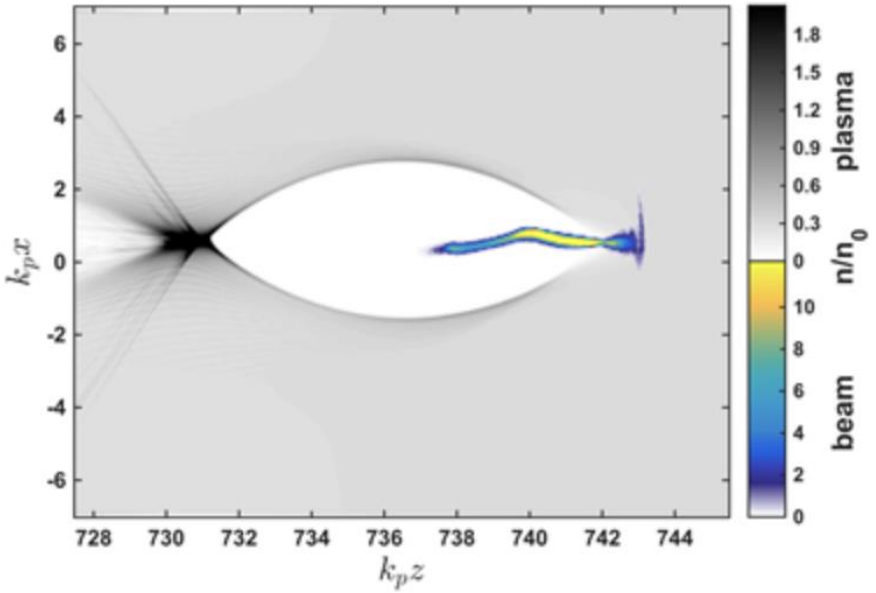
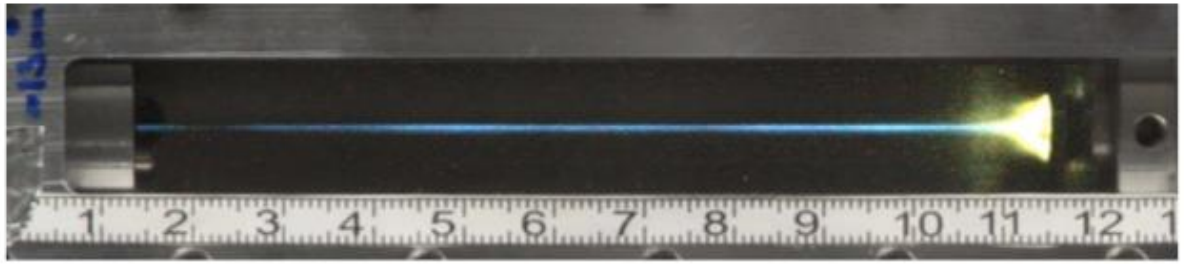
Introduction – work on plasma-based accelerators

- Previously worked with Simon Hooker on laser driven wakefield accelerators
- Now in the John Adams Institute with Richard D'Arcy using particle beams to drive plasma accelerators
- Strong links with the FLASHForward group in DESY



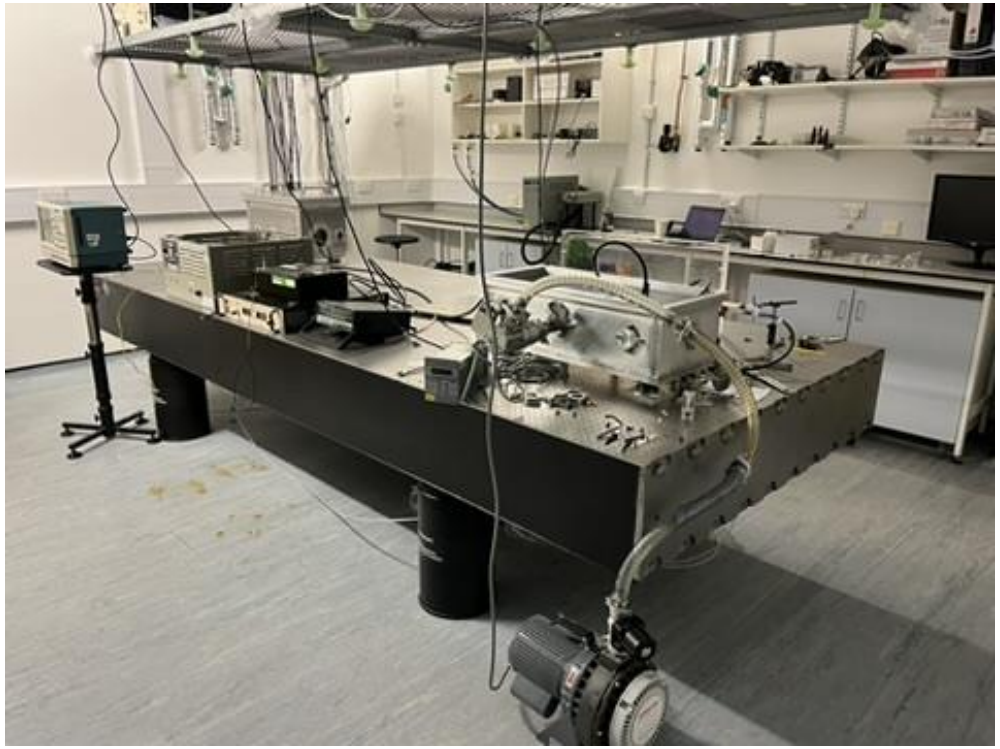
Simulation of beam driven plasma wakefield (credit: Timon Mehrling)

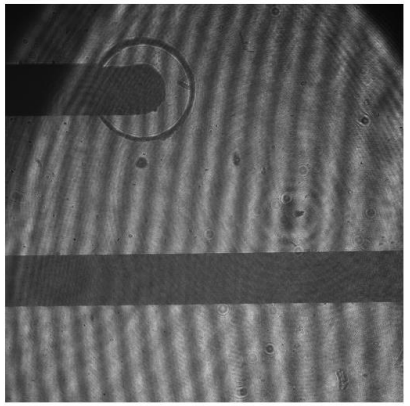


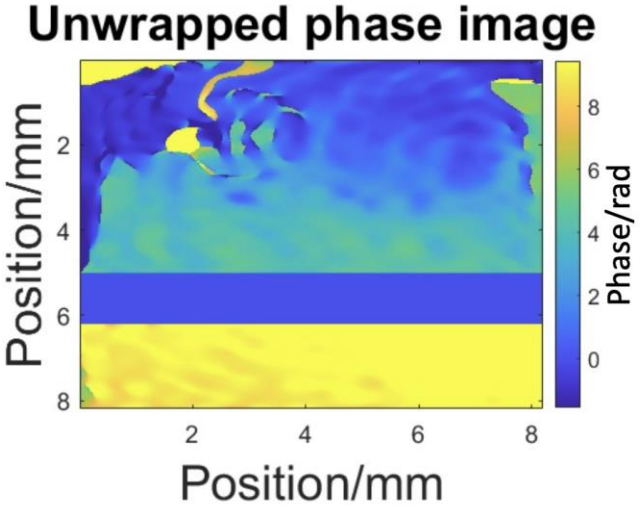
A laser-produced plasma acting as a waveguide for PW lasers (above) vs a capillary discharge waveguide (right)

My current work

- I am developing a laboratory in Oxford to be used as a testbed
- To understand the accelerator at DESY I spent several weeks there
- I also worked at DESY developing a non-invasive temperature diagnostic for the plasma source
- Longer term goals are to develop further diagnostics here and DESY to study energy pathways in plasma accelerators

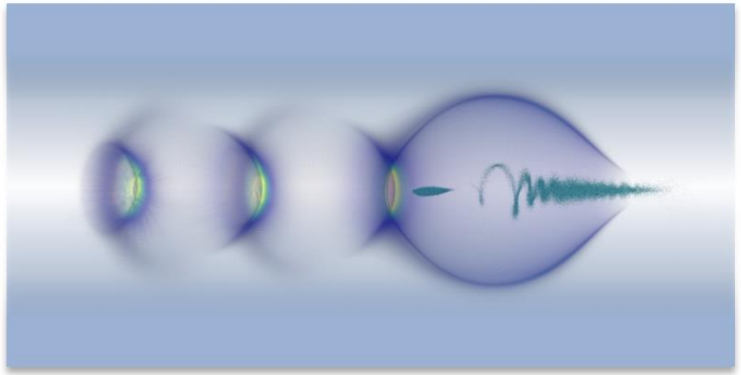






Raw data from temperature diagnostic and provisionally analysed data

My current work

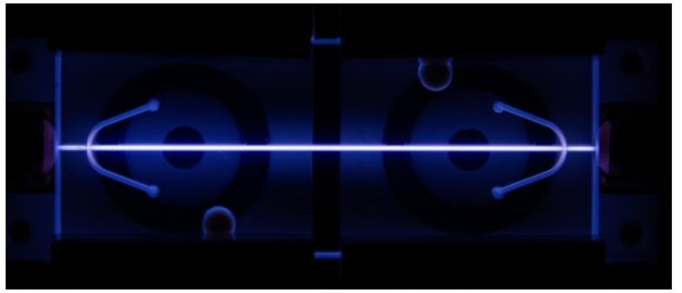


Energy deposited by wakefield and background plasma

Interferometry

Combined diagnostic

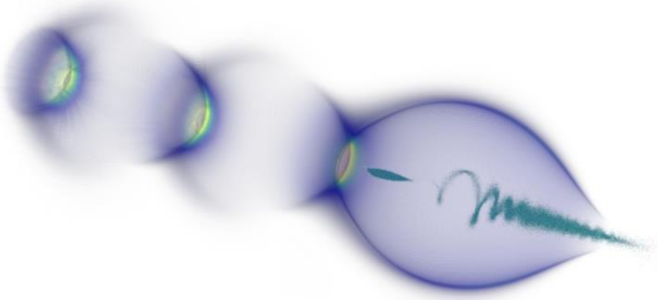
Pump-probe



Credit: DESY, Carl A. Lindstrøm

Energy from discharge

Energy from wake



Credit: DESY, Maxence Thévenet and Angel Ferran Pousa