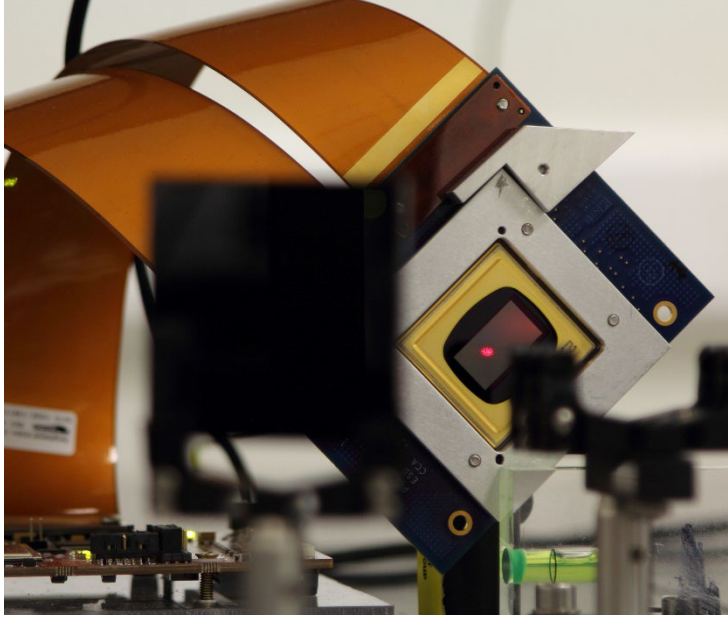
UNIVERSITY OF LIVERPOOL

QUASAR GROUP

CASE STUDY

Next generation particle accelerator diagnostics



Particle accelerators

Particle accelerators are used globally to help answer some of the biggest fundamental physics questions. They also drive the development of new medicines, treat cancer, and improve progress in chemistry and environmental sciences. Developing novel diagnostic solutions for accelerator and clinical facilities, increases their output, reliability and cost efficiency.

Beam diagnostics

Beam diagnostics systems are essential constituents of any particle accelerator; they reveal the properties of a beam and how it behaves in a machine. Without an appropriate set of diagnostic elements, it would simply be impossible to operate any accelerator complex let alone optimise its performance.

The QUASAR Group at the University of Liverpool has pioneered innovative beam diagnostics solutions for accelerators and light sources since its foundation in 2007. In collaboration with its spin out company D-Beam Ltd, the Group is helping to make prototype developments available to much wider markets and applications.

The QUASAR Group

The Group has developed a number of innovative non-invasive diagnostic technologies for particle accelerators via the application of coherent radiation imaging and Digital Micro-mirror Devices (DMDs), as well as the development of new techniques for measuring the absolute density profile of gas jets in use at particle accelerator facilities. The new beam diagnostics enable users to monitor beam parameters much quicker and with greater control, thus achieving less unanticipated downtime and improved research results.

Any new products are tested at particle accelerator facilities worldwide, with plans to sell to a global market in coming years. Cross sector collaboration enables the Group to work with industry and public sector organisations to support the commercialisation of our research. Together, we explore opportunities for proof-of-concept studies, pilot projects and ensure that technology transfer projects are brought to completion and effectively implemented.

The QUASAR Group's Business Development Manager assists in the identification of the most appropriate funding mechanism to suit the type and needs of our external partners. They also help obtain critical market insight and pave the way for commercialisation of new devices.

'The development and commercialisation of new technologies is at the forefront of our impact and R&D strategy. The partnership with external industry partners is paramount in establishing the first building blocks for getting our ideas off the ground to develop innovative, market led, impact generating technologies.'

- Professor Carsten P Welsch, QUASAR Group Leader

About us

The Quantum Systems and advanced Accelerator Research (QUASAR) Group is an internationally structured research group. We are amongst the world-leaders in beam instrumentations development, beam dynamics studies for accelerators and light sources. If you would like to find out more about our work on next generation particle accelerator diagnostics, please get in touch with Prof Carsten P Welsch: c.p.welsch@liverpool.ac.uk

www.quasar-group.org @QUASAR_6roup @TheQUASARGroup