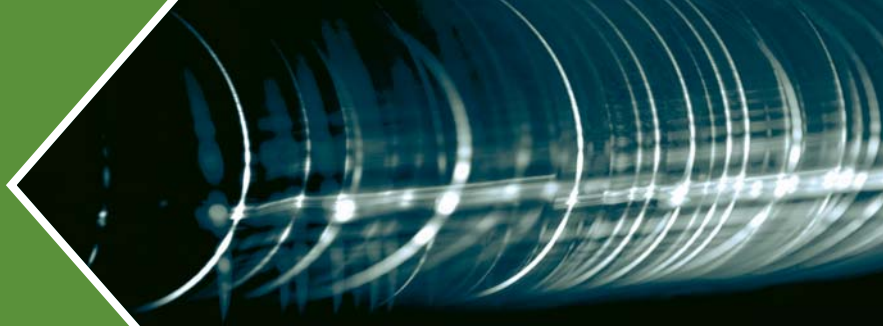
Aston University
Birmingham



Photonics

Photonics is one of the fastest growing research and technology areas with direct and almost-immediate impact on the development of new industries, on advances in healthcare and on the quality of life.

Photonics is a science and technology platform based on the use of photons (particles of light), with applications including: telecommunications, data storage, optical metrology, optical imaging, bio-photonics, medical diagnostics, broadband communications, manufacturing, displays, healthcare, sensing, lighting, biosciences and many others.

Fibre lasers

A rapidly growing market, fibre lasers are already used in a wide range of applications including communications, sensing, metrology, medical applications and also in manufacturing for cutting, ablation, welding, annealing, engraving, printing, scribing, marking, drilling and patterning. This fast growth offers exciting opportunities for the development of new fabrication technologies and industrial advances across many sectors.

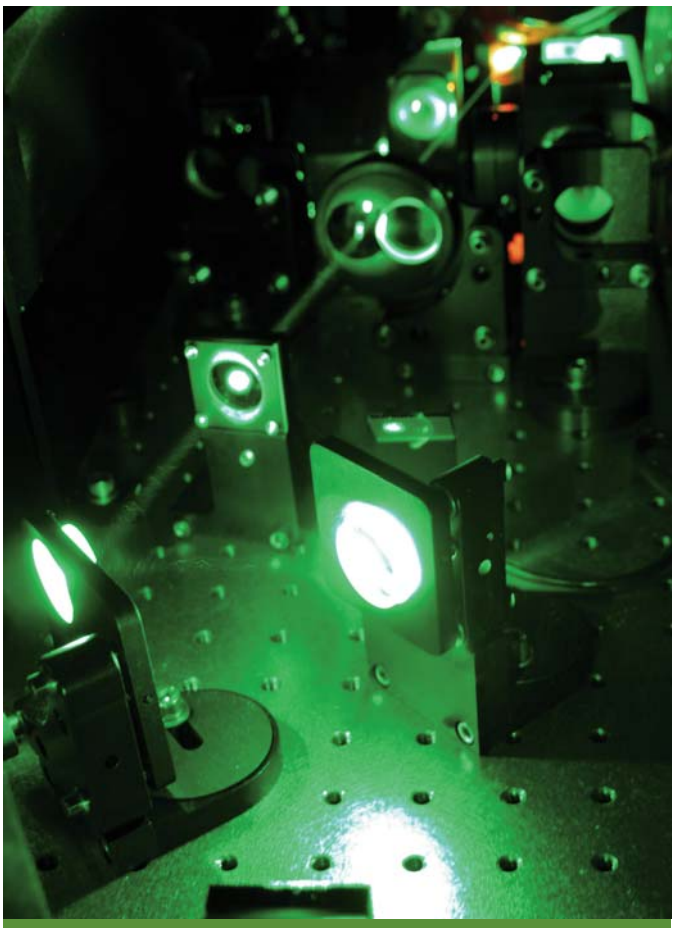
Optical sensing

Optical sensors involving the use of photonic devices/techniques can measure nearly all of the physical measurands; such as strain, temperature, pressure, force, displacement, load, flow, speed, vibration etc., and also a very large number of bio/chemical species and interactions. Optical sensors have significant advantages compared to conventional sensing devices and systems – they are capable of more efficient, fast and high sensitivity detection, immune to electromagnetic interference, sustainable to hazardous condition and amenable to multiplexing. Recent advances in optical sensing technology have boosted the utility and demand for optical sensors in an array of industrial sectors, ranging from traditional civil and aerospace engineering to environmental monitoring and healthcare.

Business benefits

Any West Midlands SME currently has the opportunity to access the expertise at Aston with two days of consultancy absolutely free of charge. The vast range of applications from telecommunications to welding and engraving could benefit your business, and this free consultancy can help you discover how.

- Two days of free consultancy
- Improve current practice of photonics technology
- Find out how photonics could be used for the first time
- Access world-class expertise at zero cost



West Midlands' companies across many sectors can benefit from the expertise and facilities of Aston University, through business assists and knowledge-based collaborations...
...all free of charge!

Business Partnership Unit, Aston University, Aston Triangle, Birmingham B4 7ET, United Kingdom
Tel: +44 (0)121 204 4242 Email: bpu@aston.ac.uk www.aston.ac.uk/bpu

Applications of fibre laser technologies

Fibre laser technologies have attracted a lot of attention over the last two decades due to their inherent merits over solid-state lasers.

The emergence of fibre Bragg gratings greatly enhanced the feasibility of all-fibre configurations and designs, which makes fibre lasers very competitive devices. Fibre laser technologies provide one of the most important new platforms for new technological processes and innovative products in a wide range of industries. Fibre lasers have already found a broad range of applications including communications, sensing, metrology, medical applications and also in manufacturing for cutting, ablation, welding, micromachining, annealing, engraving, printing, scribing, marking, drilling and patterning. Using fibre lasers many technological operations can be carried out faster and more accurately.

Markets that can benefit from fibre laser:

- Information & communication
- Life sciences & health care
- Manufacturing
- Mobility & transport
- Safety & security
- Illumination & energy
- Pollution conservation
- Entertainment
- Food
- Water

Smart Optical Fibre Sensing Technology

Optical fibre sensors have developed rapidly with numerous key advantages over conventional electronic sensing devices.

Among the majority of developed optical fibre sensing devices, fibre Bragg grating (FBG) sensors stand out as one of the most used sensor platform technologies. Aston University is at the forefront of this technology and can provide solutions for industrial applications where performance monitoring and physical and bio/chemical property detection is needed. Aston could assist West Midlands companies to explore potential of recently emerged smart optical fibre sensing technology for their particular applications and further develop more advanced new sensing devices, systems and interrogation techniques.

The technology is for applications across a wide range of industrial sectors including: aerospace, maritime, civil engineering, oil and gas, mining, wind energy, environmental monitoring, as well as bio/chemical detection and medical diagnostics.

Aston University technology could:

- Monitor strain & temperature throughout composite structure
- Detect cracks in composite structures
- Monitor vibrations
- Measure high-resolution temperature or strain profiles of key parts
- Measure wear on test components
- Check critical design parameters during design phase & understand how full-size structures will operate
- Monitor temperatures up to at least 600°c
- Allow very high precision monitoring of pressure through Interferometric sensors
- Monitor flow, level detection or proximity alarms

Partners in this European Regional Development Fund (ERDF) project awarded to the Photonics Research Group at Aston University include:

investing in your future
European Regional Development Fund
European Union

EPSRC
Engineering and Physical Sciences Research Council

Birmingham Science City
ideasforlife

HIGHER EDUCATION FUNDING COUNCIL FOR ENGLAND hefce

Business Partnership Unit, Aston University, Aston Triangle, Birmingham B4 7ET, United Kingdom
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