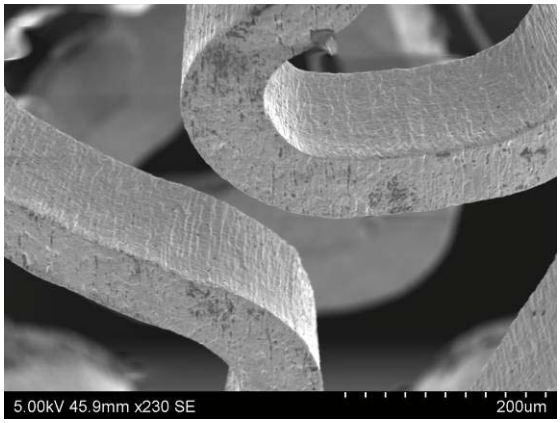
Case Study

Photonics KTN support helps establish key UK facility in stent development

By bringing together Swiss Tec AG (a Swiss manufacturer of high-end laser micromachining systems for precision cutting, drilling and welding of complex and intricate work pieces) and the Laser Processing Research Centre at Manchester University, the Photonics KTN has assisted UK academia gain its first laser stent cutting facility; a facility that offers unique clinical and technical services for testing new stent designs and processing technologies and provides researchers in the UK with new opportunities to conduct research in the bourgeoning medical product sector.

On 4 and 5 June 2008 the Photonics KTN organised a 2-day event on 'Industrial and research opportunities in laser micro and nano processing' at Daresbury Laboratory, Warrington; bringing together the Association of Laser Users (AILU), The North West Laser Engineering consortium (NWLEC, a strategic alliance between the Universities of Liverpool and Manchester in the area of laser engineering for micro- and nano-scale materials processing), the North West Photonic Alliance (NWPA) and the Nanotechnology KTN. As part of this event, the Photonics KTN launched a Laser Micro:Nano Special Interest Group, and it was through the PKTN laser clinic at this event that the link was made between Swiss Tec and Manchester University.

Networking opportunities stimulated by the Photonics KTN also brought Swiss Tec into contact with Rugby-based GSI Group and a deal was made whereby Swiss Tec has installed a stent-cutting machine at the Photon Science Institute, Manchester University, GSI would loan the fibre laser for the machine and for its part Manchester University would develop and optimise the laser cutting of a wide range of materials and carry out clinical trials (at the Manchester Medical School).



Close up of a coronary stent, as cut, showing smooth cut sides and negligible hear affected zone. A scale is included lower right. (Courtesy Swiss Tec)

Coronary, brain, femoral and orthodontic stents each have their own design requirements, including dimensions, materials and flexibility, as do the spiral-cut tubes that guide the stents through the body to their desired locations. The manufacturing process for stents starts with a tube of diameter ranging from 8 mm (femoral stent) to 0.2 mm (spiral tube delivery system), which is then cut in an intricate pattern so that once in position the diameter of the stent can be expanded to meet the wall of the containing vessel.

The Swiss Tec system was delivered in October 2008 and results achieved by the Laser Processing Research Centre at Manchester University quickly showed that the GSI fibre laser work achieved a spectacular improvement in stent quality over previous laser processing performance. This first laser stent cutting machine facility within UK academia has stimulated other university groups around the country to try out new stent designs and materials, also making use of the growing expertise in stent evaluation

and clinical testing available at the Manchester Medical School. Similarly, the facility has already attracted additional research grants from major pharmaceutical companies and requests for clinical trials.

On 24 November 2009 the PPE KTN is supporting a 1-day workshop organised by the Medical SIG created within the Photonics KTN. The 'Medical Device Manufacturing – A case study in Stents' workshop at Manchester University, which will bring together clinicians and laser machine practitioners as a case study in medical product manufacture.

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