INTEGRATED DISRUPTIVE COMPONENTS FOR
2 µM FIBRE LASERS

ISLA project newsletter #2

October 2012

ISLA is a project supported by the European Commission under the Seventh Framework Programme (FP7).

Welcome to the second ISLA project newsletter!

The project is entering its second year, and we hope that we can continue the good progress! Ground-breaking new fibres, state-of-the-art components and new materials technology have all been achieved during a very successful first year. Also the ISLA Advisory Group (IAG) has attracted significant attention and many organisations have joined, reflecting the growing commercial and academic interest in 2 µm fibre laser technology. In this newsletter we review the main technology advances of this first year.

Photograph of a packaged G&H ISLA (6+1)×1 combiner.

Readers wishing to know more about the project are invited to join the ISLA Advisory Group, which offers an opportunity to help direct the development work and to identify and develop new applications for 2 µm fibre lasers with the consortium.

Photonics Europe 2012

ISLA had a tabletop display at Photonics Europe 2012 (Brussels; 16-18 Apr-2012), attended by Bruce Napier (Vivid Components), Mia Swain (G&H) and Toby Woodbridge (G&H). This was a very useful dissemination activity: a three day event consisting of a trade show and poster session alongside a major scientific conference. ISLA had a tabletop in the "Innovation Village" alongside a number of other FP7 projects. A host of new contacts were added to the newsletter distribution list, of which a dozen have joined the IAG.

ISLA representatives (Mia Swain from G&H and Bruce Napier from Vivid) ready and eager to help with project enquiries!

Consortium

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SEVENTH FRAMEWORK PROGRAMME

www.isla-project.eu

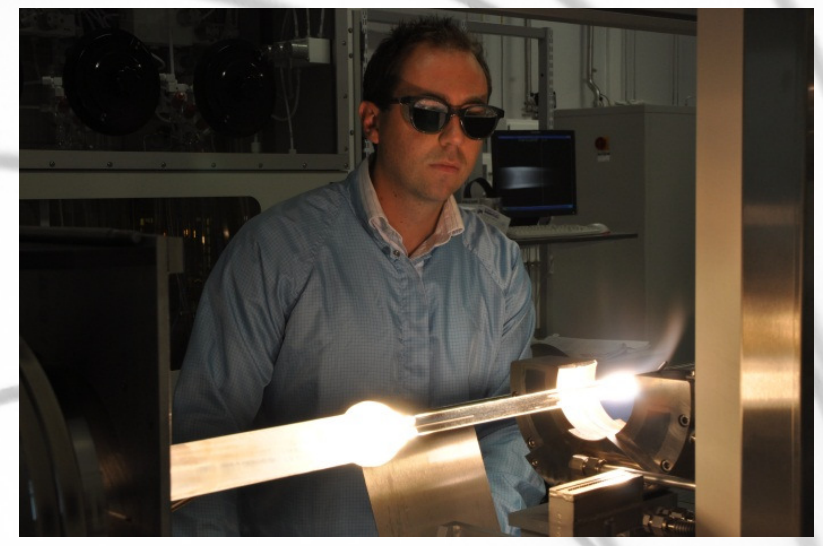
Rare-earth doped fibres for high power 2 µm lasers

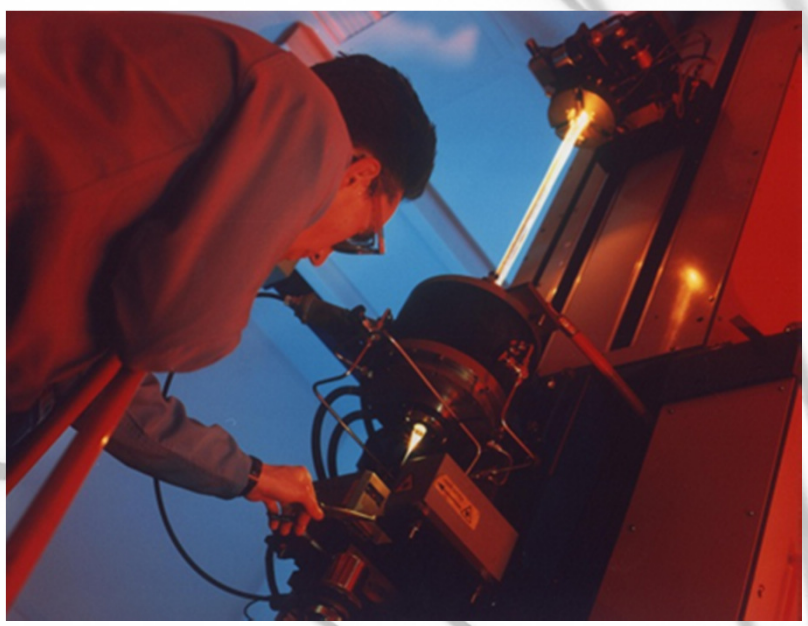
High power operation of thulium and holmium doped fibre lasers in the 2 µm wavelength regime requires optical fibres that are highly efficient and that can withstand very high pump power. Careful tailoring of the fibre core composition and design to minimise core propagation loss and maximise gain is crucial. In thulium and holmium fibre lasers operating in the 2 µm region the main source of unwanted absorption within the core is due to OH ions which enter the fabrication process in the form of water.

ISLA fibres are drawn from a preform of glass produced via modified chemical vapour deposition and solution doping. OH ions can become incorporated into the core of the doped glass via H_2O contamination of the doping solution as well as contamination of the source gases followed by thermal diffusion.

The Optoelectronics Research Centre at the University of Southampton has been optimising the fabrication process of the thulium-doped optical fibres to minimise this OH contamination by strict control of source materials as well as introducing chlorine drying stages and chlorine flow during the fabrication process. This chlorine acts to remove OH and H_2O converting them into HCl and O_2 which are then removed by gas flow.

Through optimisation of the chlorine drying process and source materials the ORC has reduced OH contamination in its fibres to ~0.1 ppm. The result is very low loss fibre that will form the bedrock of efficient 2 µm fibre lasers to be developed as part of the ISLA project.

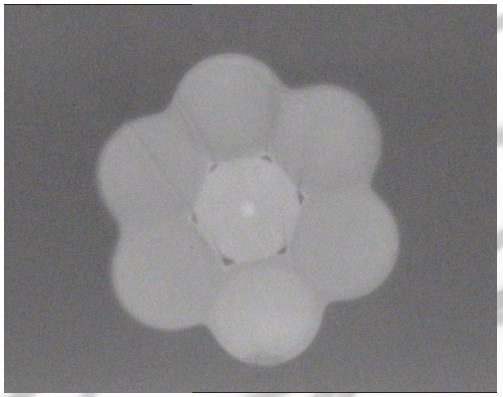




Fabrication of optical fibre at ORC Southampton.

Optimising the dopant concentration in order to maximise the efficiency of the ISLA thulium fibre lasers is underway as well as production of the first of the ISLA holmium doped fibres.

For more info contact Peter Shardlow
ps2c11@orc.soton.ac.uk



Micrograph cross-section through a G&H ISLA [(6+1)×1] 2 µm combiner.

Side-coupled multimode power combiner with PM signal feed-through developed through ISLA for 2 µm operation

Fused fibre components for 2 µm

Through ISLA, G&H has developed its power combiner technology to cover the 2 µm operating window. These devices provide a high efficiency means of combining radiation from several multimode (MM) sources (*e.g.* pump diodes) into a single fibre; a key requirement for high power fibre lasers.

G&H proprietary manufacturing techniques allow the precise fusion of input fibres around a central signal feed-through fibre and a dual-clad output fibre providing high coupling efficiency over a wide pump wavelength range. The technology extends to large mode area (LMA) signal feed-through fibres, dual-clad output fibres and a variety of port counts and configurations.

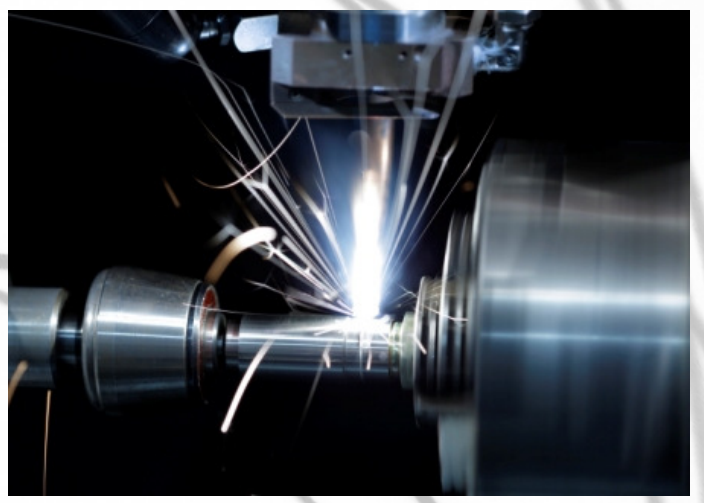
A range of other fused devices have also been developed for 2 µm applications through advances in the ISLA project, including side-coupled power combiners with polarisation maintaining (PM) signal feed-through. These devices provide the combination of MM pump fibres with a PM signal feed-through and a PM dual-clad output.

For more info contact Tom Legg:
tlegg@goochandhousego.com

ISLA Advisory Group

The consortium seeks to build relations with all organisations with an interest in 2 µm fibre lasers. In particular we would like to discuss ISLA with end users and we hope to find novel applications which could take advantage of 2 µm radiation. To date we have over fifty members of the IAG from a wide range of backgrounds:

- Component manufacturers
- Laser/ system integrators
- Academia
- Research organisations
- End users.



Join the IAG!

If you would like to find out more and be involved with the project please contact Bruce Napier bruce@vividcomponents.co.uk