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Fusion Splicing of Double-Clad Large Mode Area Fibres for Fabrication of High Power Fibre Laser

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Fibre based lasers have become a dominant laser architecture due to high output powers and efficiencies, compact form factors, and excellent beam quality. Double-clad large mode area fibres are required to achieve high output power (up to kW level).

The performance and integrity of an all-fibre laser is critically dependant on the quality of splices between different components constituting a fibre laser. Fusion splicing is the technique used to interconnect fibres and fibre components. Power loss at the splice joints (splice loss) has a deleterious effect on the performance and long-term reliability of high power fibre lasers. Splice losses, caused by poor fusion splices, lead to a decrease in the optical-to-optical efficiency as well as degradation in the beam quality of fibre lasers.

Obtaining low loss fusion splices remains a challenge in the development of fibre lasers. To address this problem, splice loss optimization experiments were conducted to find optimal parameters that can be used to produce low splice losses. Due to the large number of splice parameters, the experimental methodology made use of fractional factorial design which enables the reduction of the required number of experiments by performing them at a certain specific combination of parameters. A system was setup to conduct splice loss measurements. The splice loss results analysed by using a statistical tool called analysis of variance (ANOVA) will be presented.

Apply to be considered for a student award (Yes / No)?

yes

Level for award (Hons, MSc, PhD, N/A)?

MSc

Main supervisor (name and email) and his / her institution

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Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

No

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