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Modelling of a 2 micron cladding-pumped cw Tm-doped silica fibre laser

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Abstract content (Max 300 words) **Formatting & Special chars**

This work reports on the development of a model, using proprietary simulation software, for the design of large mode area diode-cladding-pumped 2µm Tm-doped fibre lasers. Mid-IR fibre lasers have a number of interesting applications from remote sensing, eye-safe LIDAR, non-linear frequency conversion, materials processing, to medical and defence applications.

The rate equations are solved using published spectroscopic data for a 3-level Tm³⁺-ion system hosted in an aluminosilicate glass. The doped fibre is optically pumped with a ~790nm diode source, thereby exploiting the “two-for-one” cross-relaxation (CR) process. Comparison of the simulated results in terms of the pump threshold, output power, slope efficiency and free-running wavelength showed very good agreement with the Tm:silica fibre laser constructed in our laboratory.

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