GWADW2023 - Gravitational-Wave Advanced Detector Workshop



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Single frequency thulium fibre lasers between 1900nm and 2050nm

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Thulium-doped silica fibre (TDF) lasers have a broad emission band near 2 μ m, making them attractive for use with next-generation cryogenic-silicon gravitational wave detectors. We have demonstrated single-frequency, polarised 2 μ m TDF distributed Bragg reflector (DBR) lasers at wavelengths between 1900 nm and 2050 nm. A high Tm concentration allows the use of a short cavity length, ensuring robust single-frequency operation whilst achieving high efficiency and output powers of up to 80 mW at 2050 nm. These DBR lasers would be suitable for use as a seed laser for further amplification to achieve the application requirements. We also describe a fibre laser mount that provides the thermal and mechanical stability required to achieve low-noise free-running operation.

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