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Thulium-doped fibre broadband source for spectral region near 2 micrometers

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Abstract:

We demonstrated two methods of increasing the bandwidth of a broadband light source based on amplified spontaneous emission in thulium-doped fibres. Firstly, we have shown by means of a comprehensive numerical model that the full-width at half maximum of the thulium-doped fibre based broadband source can be more than doubled by using specially tailored spectral filter placed in front of the mirror in a double-pass configuration of the amplified spontaneous emission source. The broadening can be achieved with only a small expense of the output power. Secondly, we report results of the experimental thulium-doped fibre broadband source, including fibre characteristics and performance of the thulium-doped fibre in a ring laser setup. The spectrum broadening was achieved by balancing the backward amplified spontaneous emission with back-reflected forward emission.