



A transmission length limit for space division multiplexing in step-index silica optical fibres

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ABSTRACT

By solving the power flow equation, we investigate the influence of mode coupling on space division multiplexing capability of three multimode step-index silica optical fibres with a different strengths of mode coupling. Results show that mode coupling significantly limits the length of these fibres at which the space division multiplexing can be realized with a minimal crosstalk between the neighbour optical channels. This is most pronounced in silica optical fibres with the strongest mode coupling. The two and three spatially multiplexed channels in the investigated step-index silica optical fibres can be employed with a minimal crosstalk up to the fibre lengths of few hundred of meters and few tens of meters, respectively. These lengths are much shorter than kilometer lengths at which these fibres are usually employed without space division multiplexing. Such characterization of optical fibres should be considered in designing an optical fibre transmission system for space division multiplexing.





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