Low-NA single-mode LMA photonic crystal fiber amplifier

Enabling Single-Mode (SM) operation in Large-Mode-Area (LMA) fiber amplifiers and lasers is critical, since a SM output ensures high beam quality and excellent pointing stability. In this paper, we demonstrate and test a new design approach for achieving ultra-low NA SM rod fibers by using a spatially Distributed Mode Filter (DMF). This approach achieves SM performance in a short and straight rod fiber and allows preform tolerances to be compensated during draw. A low-NA SM rod fiber amplifier having a mode field diameter of ~60µm at 1064nm and a pump absorption of 27dB/m at 976nm is demonstrated.

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