Thermal effect-resilient design of large mode area double-cladding Yb-doped photonic crystal fibers

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The effects of thermally-induced refractive index change on the guiding properties of different large mode area fibers have been numerically analyzed. A simple but accurate model has been applied to obtain the refractive index change in the fiber cross-section, and a full-vector modal solver based on the finite-element method has been used to calculate the guided modes of the fibers operating at high power levels. The results demonstrate that resonant structures added to the fiber cross-section can be exploited to provide efficient suppression of high-order modes with a good resilience to thermal effects.

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