Estimating modal instability threshold for photonic crystal rod fiber amplifiers

We present a semi-analytic numerical model to estimate the transverse modal instability (TMI) threshold for photonic crystal rod amplifiers. The model includes thermally induced waveguide perturbations in the fiber cross section modeled with finite element simulations, and the relative intensity noise (RIN) of the seed laser, which seeds mode coupling between the fundamental and higher order mode. The TMI threshold is predicted to ~370 W – 440 W depending on RIN for the distributed modal filtering rod fiber.
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