Distributed mode filtering rod fiber amplifier delivering 292W with improved mode stability.

We demonstrate a high power fiber (85μm core) amplifier delivering up to 292Watts of average output power using a mode-locked 30ps source at 1032nm. Utilizing a single mode distributed mode filter bandgap rod fiber, we demonstrate 44% power improvement before the threshold-like onset of mode instabilities by operating the rod fiber in a leaky waveguide regime. We investigate the guiding dynamics of the rod fiber and report a distinct bandgap blue-shifting as function of increased signal power level. Furthermore, we theoretically analyze the guiding dynamics of the DMF rod fiber and explain the bandgap blue-shifting with thermally induced refractive index change of the refractive index profile.
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