Higher-order-mode fiber optimized for energetic soliton propagation

We describe the design optimization of a higher-order-mode (HOM) fiber for energetic soliton propagation at wavelengths below 1300 nm. A new HOM fiber is fabricated according to our design criteria. The HOM fiber is pumped at 1045 nm by an energetic femtosecond fiber laser. The soliton self-frequency shift process shifts the center wavelength of the soliton to 1085 nm. The soliton has a temporal duration of 216 fs and a pulse energy of 6.3 nJ. The demonstrated pulse energy is approximately six times higher than the previous record in a solid core fiber at wavelengths below 1300 nm.