

Reversed dispersion slope photonic bandgap fibers for broadband dispersion control in femtosecond fiber lasers

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Abstract: Higher-order-mode solid and hollow core photonic bandgap fibers exhibiting reversed or zero dispersion slope over tens or hundreds of nanometer bandwidths within the bandgap are presented. This attractive feature makes them well suited for broadband dispersion control in femtosecond pulse fiber lasers, amplifiers and optical parametric oscillators. The canonical form of the dispersion profile in photonic bandgap fibers is modified by a partial reflector layer/interface placed around the core forming a 2D cylindrical Gires-Tournois type interferometer. This small perturbation in the index profile induces a frequency dependent electric field distribution of the preferred propagating higher-order-mode resulting in a zero or reversed dispersion slope.

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