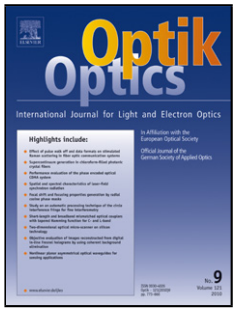

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Design and analysis of an ultrahigh birefringent nonlinear spiral photonic crystal fiber with large negative flattened dispersion

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Abstract: We proposed a simple design of spiral photonic crystal fiber (PCF) using an elliptical soft-glass rod in the core region for the purpose of controlling the property of dispersion and enhancing the performance of birefringence and nonlinearity simultaneously. The simulation results show that the proposed spiral PCF has ultra-flattened negative dispersion of 0.32 ps/(nm.km) for *y*-polarized mode over a 150 nm wavelength range, large negative dispersion values of -491.16 ps/(nm.km) and -399.98 ps/(nm.km) for *x*/*y*-polarized modes at 1.55 μm, large nonlinearity up to the order of 10^2 $W^{-1}km^{-1}$ for *x*/*y*-polarized modes, and ultrahigh birefringence up to the order of 10^{-2} within the wavelength range from 1.35 to 1.65 μm. The main advantage of this new design is that large negative flattened dispersion, large nonlinearity and ultrahigh birefringence can be realized simultaneous simply by introducing an elliptical soft-glass rod in the fiber core region to a spiral PCF.

Keywords: Birefringence; nonlinearity; negative flattened dispersion; spiral photonic crystal fiber.

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