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## Ionization-induced asymmetric self-phase modulation and universal modulational instability in gas-filled hollow-core photonic crystal fibers

Mohammed F. Saleh, Wonkeun Chang, John C. Travers, Philip St.J. Russell, Fabio Biancalana

(Submitted on 9 Apr 2012)

We study theoretically the propagation of relatively long pulses with ionizing intensities in a hollow-core photonic crystal fiber filled with a Raman-inactive gas. Due to photoionization, previously unknown types of asymmetric self-phase modulation and `universal' modulational instabilities existing in both normal and anomalous dispersion regions appear. We also show that it is possible to spontaneously generate a plasma-induced continuum of blueshifting solitons, opening up new possibilities for pushing supercontinuum generation towards shorter and shorter wavelengths.

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