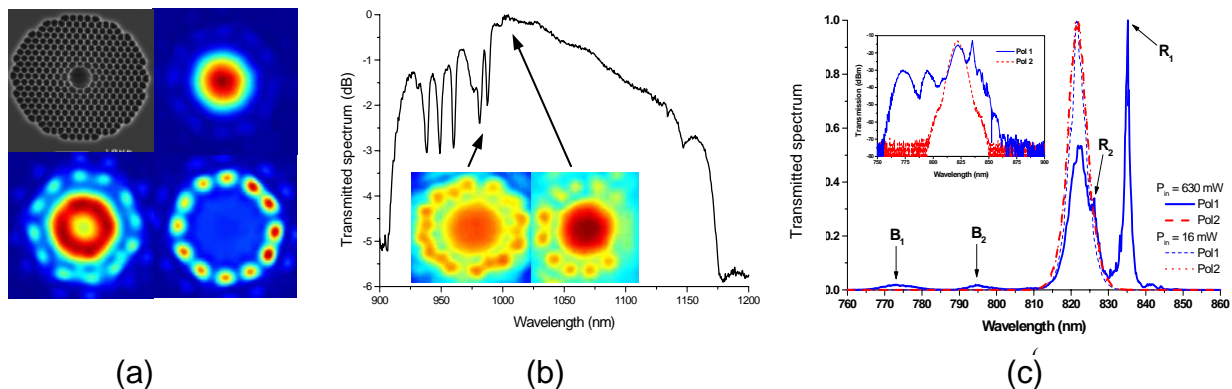


Linear and nonlinear effects due to interface modes in hollow-core photonic crystal fibers

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In terms of attenuation, hollow-core photonic crystal fiber (HC-PCF) represents the most advanced of photonic bandgap structures, exhibiting guidance lengths of the order of kilometres. Light is trapped in the core by the photonic bandgap of the cladding, which enables the propagation of light in unusual modes and makes these fibers a rich platform for studying various linear and nonlinear optical effects.

In specific wavelength ranges, interface or "surface" modes are confined to the core surrounds by the bandgap cladding. These modes interact with the core modes and strongly affect their properties, such as attenuation, overlap with the glass and dispersion. Here, we describe observations of linear and nonlinear interactions between interface and core modes of HC-PCFs.



(a) SEM and output near field Images of core modes and interface modes of a HC-PCF, (b) transmitted spectrum and spectrally selected output near field images of a white light source passed through 5 m length of HC-PCF, (c) transmitted spectrum of surface modes excited by fs laser pulses with different average power and input polarizations.