Design of a Polymer-Based Hollow-Core Bandgap Fiber for Low-Loss Terahertz Transmission - DTU Orbit (31/12/2018)

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We use numerical simulations to design a hollow-core microstructured polymer optical fiber (HC-mPOF) suitable for broadband, terahertz (THz) pulse transmission with relatively low losses and small dispersion. The HC-mPOF consists of a central large air-core surrounded by periodically arranged wavelength-scale circular air holes in a hexagonal pattern, embedded in a uniform Teflon matrix. The THz guidance in this fiber is achieved by exploiting the photonic bandgap (PBG) effect. In our low index contrast Teflon-air (1.44:1) hexagonal periodic lattice, the PBG appears only for a certain range of non-zero values of the longitudinal wavevector. We have achieved PBG over a broad spectral range (bandwidth similar to 400 GHz) ranging from 1.65 to 2.05 THz in the proposed HC-mPOF. The achievable loss coefficient in our designed HC-mPOF is

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