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Title:Air-core microstructured fibers provide low-loss, broadband terahertz guidance

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Publisher:PennWell Publishing Co., 1421 South Sheridan Road, Tulsa, OK 74112, United States Abstract:Kagome air-core microstructured polymer fibers are a new class of broadband terahertz waveguides with low loss and low dispersion characteristics. It is drawn from a preform that is made by stacking PMMA tubes in a triangular lattice with the core formed by removing seven tubes from the stack. The drawn fibers have core diameters of 1.6 mm (Kagome-1) and 2.2 mm (Kagome-2), with outer diameters of 5 mm and 6.8 mm, respectively. The underlying guiding mechanism of the kagome fibers does not rely on a photonic bandgap to confine light in the core, but relies on an inhibited coupling mechanism instead, in which there is a reduced interaction between the core-guided modes and the cladding modes. By computing and comparing the Fourier transforms of the temporal signals with and without the fibers, we can extract the attenuation coefficient and the phase index of the guided mode in the fibers. For broadband pulse systems, it is important to evaluate the group-velocity dispersion (GVD) of the pulses propagating through the kagome fibers.

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