

The design of polarization-maintaining and polarization-filtering hollow core with nested anti-resonance nodeless fiber for THz guidance

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Rationale and objective:

Nowadays, some applications are developed for 1 THz frequency for example, a highly sensitive, non-intrusive, label-free THz biosensor with microfluidic. Also, a highly sensitive bolometer is developed for THz frequency. Thus, we propose a hollow core with nested anti-resonant nodeless fiber designed to accommodate high birefringence and polarization-filtering properties with low effective material loss and low confinement loss at 1.0 THz. Our fiber can be applied to aforementioned applications in regard to the polarization property.

Summary: In this work, we proposed a numerical study of the polarization-maintaining and polarization-filtering hollow core with nested anti-resonance nodeless fiber, which operating in the THz regime. The transmission loss was found to be the lowest at 1 THz with 0.4 THz wide in low loss transmission window. By choosing an appropriate size of the nested tube in the vertical direction in comparison to the nested tube in the horizontal one, our fiber design gives a high birefringence as high as 10^{-4} and allows only one polarization to propagate along the fiber.

Related publications:

1. N. Phanchat and R. Chitaree, "The design of polarization-maintaining and polarization-filtering hollow core with nested anti-resonance nodeless fiber for THz guidance," *Engineering Research Express*, vol. 4, no. 3, p. 35018, 2022, doi: 10.1088/2631-8695/ac8336.

Preferred : <https://physics.sc.mahidol.ac.th/research/highlight/R-Chitaree-2022-5>