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Plasmonic Liquid Photonic Crystal Fiber: Phase 2

1. Validating Fig3 in the paper

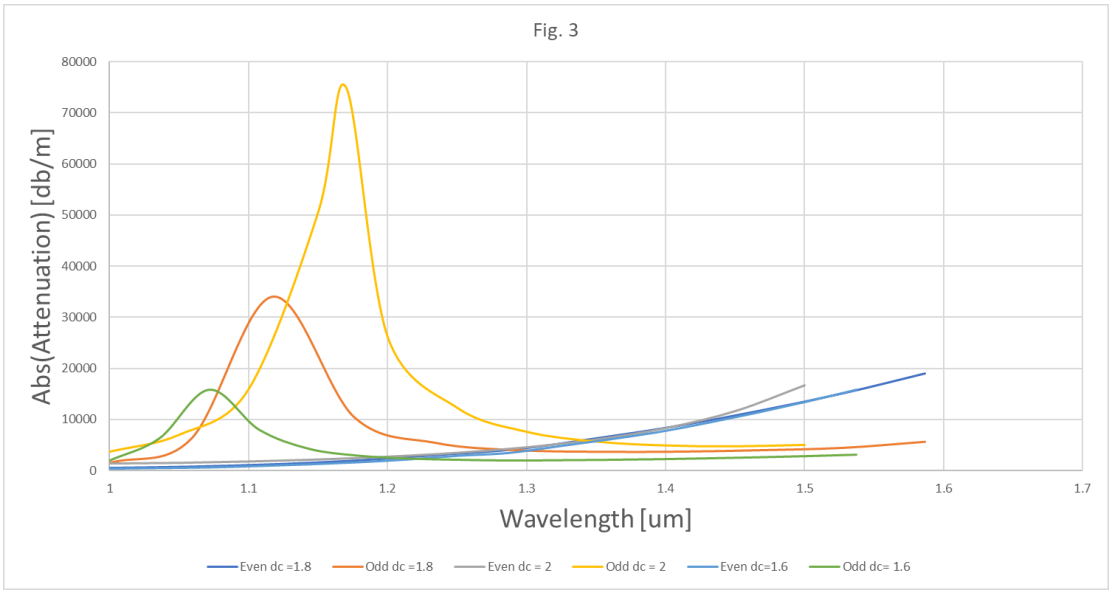

Figure 1 The attenuation loss of x-polarized even and odd dual-core modes changes with the gold wire diameter (dc), while other parameters such as d1 (2 µm), d2 (3.4 µm), temperature (25 °C), and φ (90°) are held constant.

The diameter of the gold rod significantly affects surface plasmon wave generation and the performance of the coupler. Figure 1 shows how gold wire diameter impacts the loss behavior of core modes, with other parameters constant. Larger diameters increase loss and resonance wavelength in odd modes, emphasizing the need for precise diameter selection. However, this diameter has a minimal effect on the loss of even modes due to coupling mismatch with surface plasmon modes.

2. Validating Fig4 in the paper

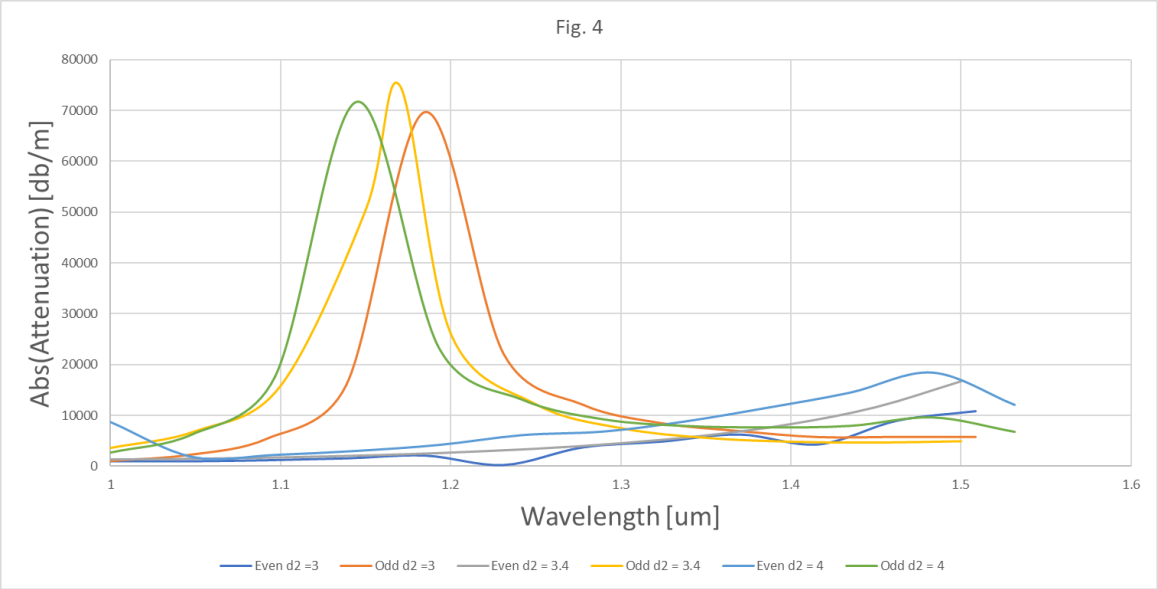

Figure 2 The attenuation loss of x-polarized even and odd dual-core modes varies with the NLC core diameter (d2), while maintaining constant parameters: d1 at 2 µm, dc at 2 µm, temperature at 25 °C, and φ at 90°.

The performance of the HPLC-PCF coupler is dependent on the diameter of NLC cores. Figure 2 demonstrates how varying the NLC core diameter (d2) affects the attenuation loss of both even and odd modes, with other parameters (d1 = 2 um, dc = 2 um, T = 25°C, and ϕ =90°) remaining constant. It shows that resonance wavelengths decrease as the NLC diameter increases, with specific resonance wavelengths at d2 values of 3.0 um (1.185 um), 3.4 um (1.161 um), and 4 um (1.145 um).

3. Validating Fig5 in the paper

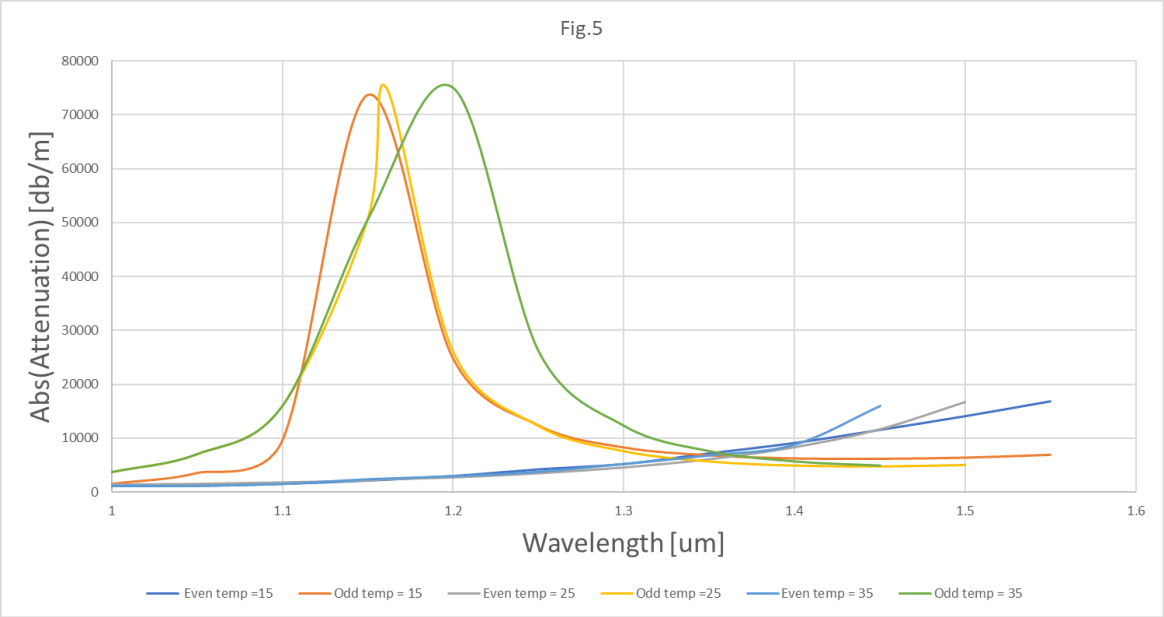

Figure 3 The attenuation loss of x-polarized even and odd dual-core modes changes with temperature, while other parameters are kept constant at d1 = 2 µm, d2 = 3.4 µm, dc = 2 µm, and φ = 90°.

The performance of the proposed coupler is affected by the temperature sensitivity of the NLC material. We studied how temperature changes influence the attenuation loss of x-polarized odd and even dual-core modes in the HPLC-PCF coupler, shown in Fig.3. The figure indicates that with an increase in temperature at ϕ= 90°, the odd mode resonance wavelengths shift towards longer wavelengths. At temperatures of 15°C, 25°C, and 35°C, the resonance wavelengths are 1150 nm, 1160 nm, and 1170 nm, respectively, suggesting a temperature sensitivity of about 1 nm/°C for the coupler.