Contribution ID: **60** Type: **Poster**

Hollow Core Photonic Crystal Fibers in High-Precision Sensing Applications

Friday, 16 June 2023 12:10 (2h 20m)

Hollow Core Photonic Crystal Fibers (HC-PCFs) are a novel type of optical fibers, featuring several physical characteristic making them suitable for the development of high precision, next generation optical and optomechanical sensors. The hollow core and single-material structure allow for high power delivery and strongly increase the stability of interferometric fiber optic gyroscopes (IFOGs) by reducing non-reciprocal noise due to temperature fluctuations and electromagnetic radiation. We report on the characterization of optical guiding properties of HC-PCFs as well as their application as high-resolution temperature sensors through optical trapping and guidance of dielectric probes in the hollow core.

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Session Classification: Poster Session

Track Classification: Quantum optics