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Title:Spatial optical filter sensor based on hollow-core silica tube

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Abstract:A spatial optical filter based on a hollow-core silica tube is proposed. Because of the hollow-core dimensions, it is possible to obtain a periodical spatial filter ranging from 1200 to 1700 nm with a channel spacing of 2.64 THz. The bandwidth is approximately 5.32 nm, and the isolation loss is ∼30 dB. The optical losses are approximately ∼0.67 dB?mm for a wavelength of 1500 nm. The 40 mm long spatial optical filter is tested as a sensing element and subjected to different physical parameters. The spatial optical filter is wavelength sensitive to strain and temperature, while for refractive-index variations there is an optical power dependency. This fiber structure can be used as a sensing element for extreme conditions, such as in very high temperature environments, where it presents a sensitivity of 27.5 pm°C?1. © 2012 Optical Society of America.

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Main heading:Optical filters

Controlled terms:Silica - Tubes (components)

Uncontrolled terms:Channel spacings - Extreme conditions - Fiber structures - High-temperature environment - Hollow-core - Optical power - Physical parameters - Sensing elements - Silica tubes - Spatial filters

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