Enhancing Stability and Radiation Resilience of Narrowband Optical Filters for High Power and Space Applications

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Abstract

Phase-shifted ultra-narrowband fiber Bragg gratings (PS-FBGs) exhibit significant sensitivity to optical power, which can impair their performance in demanding environments. In this study, we present the design and material optimization of PS-FBG-based filters capable of maintaining spectral stability up to 100 mW of injected optical power. We further investigate their radiation resilience by subjecting them to X-ray exposure up to 8.5 kGy(SiO2), simulating space-like conditions.

Keywords: narrowband filter, phase, shifted FBG, RIA, fiber optic sensor

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