

Abstract Submitted
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High-Aperture Narrow-Band Moire Filter in Volume Bragg Grating SERGIY MOKHOV, JULIEN LUMEAU, CREOL, The College of Optics and Photonics, Univ. of Central Florida, VADIM SMIRNOV, OptiGrate Corp., BORIS ZELDOVICH, LEONID GLEBOV, CREOL, UCF — We propose narrow-band filter in volume Bragg grating (VBG) with bandwidth less than ten picometers. Two recorded Bragg gratings with the same modulation amplitudes and slightly different resonant wavelengths form moire pattern with slowly varying envelope of modulation amplitude. Each semi-period of modulation is just apodized reflective VBG; however two of them together form narrow-band transmission Fabry-Perot cavity due to phase π -shift as result of sign change of slowly varying envelope. We fabricated first moire VBG filter in photo-thermo-refractive glass with resonance wavelength near 1550 nm, aperture size 5 mm, bandwidth 50 pm and 95% maximum transmittance. We considered also case when carrier Bragg grating wave vector does not coincide with moire pattern wave vector which allows creating filters with tunable one-period envelope profile from sinusoidal function to cosinusoidal one. Doubled resonant cavity with cosinusoidal profile demonstrates flattop transmission peak. Analytical expression for tunable bandwidth was found. Robust solid-state moire VBG filters tolerant to high-power laser irradiation with tunable filtering characteristics are suggested as optical elements for laser design and spectroscopy applications.

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