134
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Title:Common-arm counterpropagating interferometer for measurement of vibration-induced noise in fibers
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Abstract:We propose and demonstrate a novel technique to measure the vibration sensitivity of fiber-based optical components. It uses a common-arm counterpropagating frequency-shifted interferometer that reduces the vibration-induced phase noise of the interconnecting fibers feeding the signal to and from the vibrating device under test. The noise introduced by the vibrating fibers can be excessive, and measurements of a given device cannot be made with assurance. The proposed technique improves the vibration-induced phase noise floor by more than 30 dB compared to a conventional frequency-shifted Mach-Zehnder interferometer and allows measurement of low vibration sensitive devices. A phase sensitivity of 1 mrad/g at 192 Terahertz (THz) is achieved with this method. We also present results of vibration sensitivity of an assortment of commonly used fiber-based optical devices.
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