Double Brillouin frequency shift through circulation of odd-order Stokes signal

ABSTRACT

We demonstrate a simple configuration for generating a double Brillouin frequency shift through the circulation of an odd-order Brillouin Stokes signal. It is operated based on cascaded Brillouin scattering in single-mode optical fibers that behave as the Brillouin gain media. A four-port circulator is incorporated into the setup to circulate the odd-order Brillouin Stokes signal in the fiber. It thus initiates a higher order Brillouin Stokes signal, which is double Brillouin frequency downshifted from the input signal. For the 5 km long fiber, the Brillouin pump power at 23 mW gives a clean output spectrum with 30 dB sideband suppression ratio. The output signal is 0.174 nm or ~21.7 GHz downshifted from the input signal.