

Reduction of stimulated Brillouin scattering threshold through pump recycling technique.

ABSTRACT

We demonstrate a simple method of stimulated Brillouin scattering (SBS) threshold reduction through a procedure of Brillouin pump recycling technique. High reflectivity optical mirror was incorporated onto our experimental structure in order to recycle the forward transmitted Brillouin pump signal back into the Brillouin gain medium thereby increasing its effective gain. In a 5.0 km single mode fiber spool, our technique reduced SBS threshold by over 48% (measured at 8.5 mW of input signal against 16.5 mW in the conventional technique under same input signal conditions). In addition, the Stokes power was amplified to 9.2 dBm by our method against 4.3 dBm measured in the conventional technique in the 5.0 km single mode fiber spool. Result of different lengths has proved that our technique considerably reduced SBS threshold compared to the conventional method of SBS characterization under same pumping schemes.

Keyword: Brillouin; Fiber; Nonlinear optics; Stimulated Brillouin scattering.