

Dissipative soliton generation with sidebands using Bismuth Telluride (Bi₂Te₃) in erbium doped fiber laser

ABSTRACT

In this work, the demonstration of dissipative soliton (DS) was observed in erbium doped fiber laser (EDFL) using of Bismuth Telluride (Bi₂Te₃) nanosheets saturable absorber (SA). The prepared SA was deposited on a fiber ferrule using optical deposition method. Interestingly, the DS generated was accompanied with sidebands and the number of sidebands grew with laser diode pump power. Sidebands were observed as a result of modulation instability (MI) process, which arises from the interaction between DS and nonlinear gain in the fiber laser cavity. Signal to noise ratio (SNR) of 58 dB was attained, confirming the stability of the generated pulse. This work proved the capability of Bi₂Te₃ as SA for generating DS with sidebands in an EDFL.