

Experimental study of the polarization asymmetrical NOLM with adjustable switch power

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Abstract

This work presents a study of a nonlinear optical loop mirror (NOLM) based on polarization asymmetry. In contrast with the previously reported results where a quarter wave retarder was inserted to the loop to provide the polarization asymmetry, we used a wave retarder with variable retardation (VWR). We show that the use of the VWR allows easy adjustment of the switching power. We used in the experiment a NOLM made of 200-m length of standard SMF-28 fiber twisted at the rate of 6 turn/m to mitigate linear birefringence. As source of pulses we used a mode-locked ring fiber laser that generates 0.7-ps pulses. A change of nonlinear transmission up to 10 times at the same input power was found in the experiments. The experimental results were corroborated with numerical simulation. The adjustment of the NOLM transmission makes it attractive for applications in optical switching devices or mode-locked fiber lasers.