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UWB triplet and quadruplet pulses generation employs nonlinear effect in semiconductor optical amplifier nonlinear loop mirror

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Ultrawideband (UWB) triplet and quadruplet pulses generation exploits nonlinear effect in semiconductor optical amplifier (SOA) in nonlinear loop mirror (NOLM) is investigated in this work. Two signals are transmitted through the SOA-NOLM simultaneously to create cross-phase modulation (XPM) effect. Firstly, the XPM causes the production of doublet which later combines for creation of triplet and quadruplet. This technique engages a proper tuning of optical delay and a selection of suitable power in all loops. Besides, injection current of the SOAs also governs the formation of these pulses. Although, frequency of the signals can be varied accordingly, the pulses are limited to certain adjustment that shifted its position in time domain. Furthermore, the set up can also be assessed for monocycle and doublet pulses by extracting the output at several positions. It can be concluded that the design may work as multiple pulses generation. All pulses are examined and compared with their electrical spectrum counterpart for validity of this approach.