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Title:Polarization-encoded all-optical quaternary universal inverter and design of multivalued flip-flop

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Abstract:Quaternary inverters are the fundamental building blocks of multivalued flip-flops (MVFFs). A novel all-optical quaternary universal inverter circuit with the help of a semiconductor optical amplifier-assisted Sagnac switch is proposed and described. This circuit exploits the polarization properties of light. Different logical states are represented by different polarization states of light. A terahertz optical asymmetric multiplexer-based gate plays an important role here. Numerical simulation results confirming the described method are given. An all-optical circuit for a MVFF (quaternary) with the help of our proposed quaternary universal inverter is also designed, and simulation results are presented.

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