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## Temporal and amplitude modulation at C-band region using Bi<sub>2</sub>Te<sub>3</sub>-based optical modulator (Article)

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### Abstract

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A temporal and amplitude modulator based on few-layers bismuth telluride (Bi<sub>2</sub>Te<sub>3</sub>) flakes is demonstrated for C-band operation. The few-layers thick Bi<sub>2</sub>Te<sub>3</sub> flakes are prepared by mechanically exfoliating a Bi<sub>2</sub>Te<sub>3</sub> crystal. As an optical pulse modulator, the Bi<sub>2</sub>Te<sub>3</sub>-based saturable absorber (SA) provides stable Q-switching operation at 1561.1 nm with a maximum repetition rate of 70.92 kHz and minimum pulse width of 2.38 μs. As an optical amplitude modulator, two linear regions at different pump power ranges are obtained in the regression line of the peak intensity. The first linear region covers a pump power range from 0.0 to 80.32 mW and corresponds to a modulation efficiency of 0.05 dB/mW, while the second linear region covers a pump power range of 80.32–98.64 mW with a modulation efficiency of 0.81 dB/mW. © 2020, © 2020 Informa UK Limited, trading as Taylor & Francis Group.

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Topic: Saturable Absorbers | Erbium-Doped Fiber | Mode-locked Fiber Lasers

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### Author keywords

amplitude modulator C-band region fibre laser pulse modulator Q-switched Topological insulator

### Indexed keywords

Engineering controlled terms:

Amplitude modulation Bismuth compounds Efficiency Light modulation  
Light modulators Pulse repetition rate Saturable absorbers

Engineering uncontrolled terms

Amplitude modulators Bismuth telluride Minimum pulse widths Modulation efficiency  
Optical amplitudes Pulse modulators Regression lines Switching operations

Engineering main heading:

Optical signal processing

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