

4. Conclusion

In conclusion, we have proposed and numerically demonstrated a compact high-speed EO modulator based on a silicon PCN cavity with gated graphene on top. The resonance wavelength and Q -factor can be controlled by electrically tuning the Fermi level of the graphene, providing an efficient method to achieve light modulation at the telecommunication band. Simulation results show that the proposed modulator can provide a large FSR up to 125.6 nm, a high modulation depth of 12.5 dB, and a high modulation speed of 133 GHz. The compact footprint, CMOS compatibility and excellent modulation performance may open new opportunities for applications in future chip-integrated interconnects and ultrahigh-speed WDM optical communication systems.

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