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Ferroelectric graphene varactor

A novel graphene varactor design that incorporates a ferroelectric material as part of the insulator.

Technology No. 2019-251

IP Status: US Patent Issued; Patent #: 11,908,901

Applications

- Tunable radio frequency and microwave circuits
- Reconfigurable antennas and sensors

Technology Overview

Varactors are electronic components that have tunable capacitance and which are used in various electronic applications such as tuning radio frequencies and adjusting signal oscillators. However, current varactors typically require relatively high voltages to achieve significant tuning and require an applied voltage to maintain tunability. Researchers at the University of Minnesota have developed a novel varactor based upon graphene that incorporates a thin ferroelectric layer between a metal electrode and graphene that provides non-volatile variable capacitance that can be tuned using a relatively low transient applied voltage. Varactors that produce a tuning ratio of ~1.5 have been demonstrated, and their capability to be incorporated onto non-standard substrates make them of significant interest for use as tuning elements for use in novel military and communication applications.

Phase of Development

TRL: 3-4
Working prototype has been developed.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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Researchers

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