

Invited: AMOP-I-07

Terahertz guided wave devices using plasmonic metamaterials

Gagan Kumar

Department of Physics, Indian Institute of technology Guwahati, Guwahati 7801039, India

Terahertz technology is lagging in terms of devices and components such as switches, modulators, filters etc. which are commonplace in microwave and infrared regime of the electromagnetic spectrum. In order to realize these devices, one needs to develop guided wave components which can efficiently transfer terahertz signal from one place to another across a network. In my talk, I will discuss about the significance of plasmonic metamaterials in alleviating the propagation of terahertz modes in a highly confined manner on a planar surface. A planar metal surface when corrugated with subwavelength scale structures in a periodic manner, can result in a plasmonic waveguide. The plasmonic waveguide can support terahertz surface plasmon mode propagation at a specific frequency depending upon the size and shape of the structures. This idea can be used to make bends and splitter for the terahertz network and communication applications. I will discuss about my recent work in designing such waveguides using electromagnetic numerical simulations and subsequently their characterization.

References:

4. J. B. Pendry, L. Marti'n-Moreno, F. J. Garcia-Vidal, *Science* **305**, 847 (2004)
2. S. Li, M. M. Jadidi, T. E. Murphy, and Gagan Kumar, *IEEE Trans. THz Sci. and Tech.* **4**, 454 (2015).
3. Gagan Kumar, S. Pandey, A. Cui and Ajay Nahata, *New J. Phys.* **13**, 033024 (2011).