Magnetic Plasmon Propagation in Deep-Subwavelength Plasmonic Metamaterial Resonators

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Abstract

Magnetic resonance coupling theory for connected spoof localized surface plasmon (LSP) resonators are studied and experimentally demonstrated. The deep-subwavelength plasmonic resonators have dominantly conductive coupling through the current exchange. Based on the strong coupling, one-dimensional magnetic-plasmon propagation along in a chain of LSP resonators is proposed to transmit energy. At the microwave frequency, dual-band waveguide and power divider are designed in spoof magnetic-plasmon system. Furthermore, by changing the connection configuration, the magnetic-plasmon wave can be switched between the forward wave and backward wave. The proposed novel mechanism of energy transport in the deep-subwavelength scale has potential applications in integrated devices and circuits.