Editorial Summary

Optics: Dynamically tuning how materials respond to light

Specially engineered materials known as metamaterials have led to a boost in the performance of optical and photonic devices, with yet further improvements within reach by finding ways to dynamically tune their properties. Metamaterials consist of arrays of structures smaller than the wavelength of light, offering an unprecedented opportunity to tune their interaction with electromagnetic waves. Xin Zhang's team at Boston University has reviewed approaches to integrate microelectromechanical systems and nanoelectromechanical systems (MEMS and NEMS) with metamaterials to create metadevices. By using MEMS and NEMS to adjust how the array in a metamaterial is arranged, metadevices can be rapidly and reversibly reconfigured to detect, modulate, or respond to specific electromagnetic frequencies. The authors conclude by highlighting avenues for the improvement of metadevices, which have applications from LIDAR to 5G communication. show less