**Active control of terahertz wave based on metasurface**

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**Abstract:**

A structure of metasurface based on two-dimensional molybdenum disulfide ultrathin film was investigated. We characterized the transmission properties of the structure by terahertz spectroscopy when applying an external optical pumped field. Electrically induced transparency like phenomenon was observed in the transmission spectra, resulting from near-field coupling of two bright modes. According to simulated results, the phenomenon was based on the length of cut wire structure and distance between DSSRs. Furthermore, when the sample was applied with an optical field supported by a 1064 nm laser, the transmission of the sample could be tuned by optical power. The resonances of the EIT-like structure was disappeared when the optical field was further increased, as the excited carriers in molybdenum disulfide ultrathin film blocked the terahertz wave. In addition, we found the interface between molybdenum disulfide ultrathin film and Si substrate help the structure more sensitive to the optical field. Owing to its excellent optical property, the molybdenum disulfide ultrathin film was found to be a potential candidate for applications in the THz range, such as THz modulators and detectors. The results of the present experiment provide a reference for further development of tunable structures controlled by an external optical field.

**Biography:**   
Jie Ji, a doctoral student in optical engineering from Huazhong University of Science and Technology in China. Her primary research interests are in fields of ultrafast optics, and terahertz technology. She did some research work in optoelectric devices based on ferroelectric thin film and metasurface. In her free time, she likes running and visiting kinds of historical museums to enjoy different culture in .