

MATERIALS AND STRUCTURES SYMPOSIUM (C2)  
Specialised Technologies, Including Nanotechnology (8)

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SURFACE PLASMONIC MULTISPECTRAL FILTERS

**Abstract**

A metallic nanostructure with plasmonic resonances can be considered as an “artificial atom” that can be programmed by changing the shape of the metal and its dielectric environment. We investigate the light propagating through two layers of metal thin film with sub-wavelength-hole array. The extraordinary light transmission (ELT) of the metallic array is investigated with the finite-difference time-domain (FDTD) method; the polarization of the light, the periodicity of the array, the features of the hole, and the thickness of the metal film all affect the optical spectral performance in transmission and reflection. The double layer structure provides additional flexibility in tuning transmission spectrum due to its Fabry-Perot cavity property. It is possible to obtain desired multispectral filters by programming the dielectric constant and the cavity length of the double layer arrange, and these parameters of the metallic structures. The surface plasmonic multispectral filters have potential applications in space imaging and communication systems.