



## 发光学应用及交叉前沿

### 亚波长之字形MIM等离子波导宽带滤波器

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**摘要：**运用时域有限差分(FDTD)方法数值研究了一种亚波长之字形金属-绝缘体-金属(MIM)等离子波导结构的传输属性。之字形波导在连续两个拐角可向外延伸出1~4个短切口。每个切口独立构成一个谐振腔，谐振波长近似与切口深度成线性正比，而与切口方向无关。当任意一个切口满足谐振条件时，该波导结构在对应波长的透射率均趋近于0。随着同深度切口数目的增加，禁带波长区域逐渐展宽，形成一个良好的宽带滤波器。

**关键词：**亚波长 表面等离子激元 等离子波导 滤波器

### A Broadband Plasmonic Filter of Subwavelength Zigzag-shaped MIM Waveguides

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**Abstract:** The transmission of a subwavelength zigzag-shaped metal-insulator-metal (MIM) plasmonic waveguide structure was numerically researched by using the finite-difference time-domain (FDTD) method. The zigzag-shaped waveguide has two bending corners, where waveguide can extend out from one to four cuts. Each cut can be looked as a self-existent resonant cavity. The resonant wavelength is approximately linear proportional to the depth of cut, and independent on the direction of cut. When any cut satisfies with the resonant condition, the transmission of the waveguide structure is close to zero at the resonant wavelength. With the increase of number of the same depth of cuts, the wavelength region of band gap is broaden gradually, thus a good broadband filter is formed.

**Keywords:** subwavelength surface plasmon polaritons plasmonic waveguide filters

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