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(54) **PLASMON-PHOTON COUPLED OPTICAL DEVICES**

(57) **ABSTRACT**

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The present invention is directed to optical devices. More specifically, the disclosed devices include a film defining a periodic array of surface elements so as to give rise to surface plasmon polaritons. The film also includes at least a single aperture having a diameter less than the wavelength of light. In one embodiment, the surface elements can be an array of anisotropic apertures and the films can act as a polarizer. The disclosed devices can also include a material having a variable refractive index substantially adjacent to the metal film. For example, the refractive index of the adjacent material can vary according to some characteristic of the light incident to the device, for instance, the intensity or the angle of incidence of the light. In this embodiment, resonant coupling of incident light with the SPP, and hence transmittivity of the device, can depend upon the nature of incident light. The disclosed devices can be useful in, for example, remote polarizers, polarization mode dispersion, isolators, multi-color displays, switches, such as can be controlled according to incident sunlight, or optical filters, such as for eye protection devices, filtering out possibly harmful light.

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