Highlights

Other Materials - 2015

Controlled steering of Cherenkov surface plasmon wakes with a one-dimensional metamaterial

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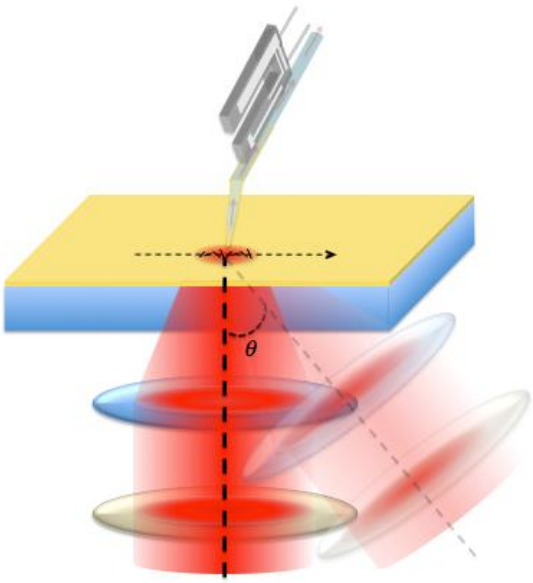
In the Cherenkov effect a charged particle moving with a velocity faster than the phase velocity of light in the medium radiates light that forms a cone with a half angle determined by the ratio of the two speeds. Here, we show that by creating a running wave of polarization along a onedimensional metallic nanostructure consisting of subwavelength- spaced rotated apertures that propagates faster than the surface plasmon polariton phase velocity, we can generate surface plasmon wakes, a two-dimensional analogue of Cherenkov radiation. The running wave of polarization travels with a speed determined by the angle of incidence and the photon spin angular momentum of the incident radiation. By changing either one of these properties we demonstrate controlled steering of the Cherenkov surface plasmon wakes.



Scanning Near-Field Optical microscope operating in collection mode.