

1124-35-206

Junshan Lin* (jz10097@auburn.edu), Department of Mathematics and Statistics, Auburn University, Auburn, AL 36849. *Scattering and Field Enhancement of Narrow Slits.*

Subwavelength apertures and holes on surfaces of noble metals (e.g., gold or silver) induce strong electromagnetic field enhancement and extraordinary optical transmission. This remarkable phenomenon can lead to potentially significant applications in biological and chemical sensing, spectroscopy, and other novel optical devices. In this talk, I will present a quantitative analysis for the field enhancement of narrow slits perforated in a slab of perfect conductor. Both the single slit and periodic slits will be discussed. We demonstrate that the enhancement of the electromagnetic field can be induced by either scattering resonances or certain non-resonant effect in the quasi-static regime. We derive the asymptotic expansions of the resonances and quantitatively analyze the field enhancement at the resonant frequencies. The field enhancement at non-resonant frequencies in the quasi-static regime is also investigated. It is shown that the fast transition of the magnetic field in the slit induces strong electric field enhancement. (Received September 08, 2016)