

Terahertz Surface Plasmon in Carbon Nanotube Dielectric Interface via Amplitude Modulated Laser

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Abstract : A carbon nanotube thin film coated on dielectric interface is employed to produce THz surface plasma wave (SPW). The carbon nanotube has its plasmon frequency in the THz range. The SPW field falls off away from the metal film both inside the dielectric as well as in free space. An amplitude modulated laser pulse normally incident, from free space on slow wave structure, exert a modulation frequency ponderomotive force on the free electrons of the CNT film and resonantly excite the THz surface plasma wave at the modulation frequency. Carbon nanotube based plasmonic nano-structure materials provides potentially more versatile approach to tightly confined surface modes in the THz range in comparison to noble metals.

Keywords : surface plasmons, surface waves, thin films, THz radiation

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