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Energy concentration of periodic nanoparticle array using Green function formalism KING CHUN LAI, SZE FUNG LEE, KIN WAH YU, The Chinese University of Hong Kong — We have studied a periodic array of nanoparticle wires by using the Green function formalism (GFF). When light is incident on the wire, a collective oscillation of the free electrons is excited on the surface of the wires, which is called the coupled surface plasmon. The excitation of coupled surface plasmon can cause an enhancement of the local energy density. By tuning the separation relative to the radius of the wires, an energy concentration can be controlled. When the separation of the wires is small, multipolar effect becomes significant. Dealing with tight-binding model by Park and Stroud (2004) would involve interaction term which appears to be non-existent and the resolution of FDTD is insufficient to resolve the multipole interaction as the multipole field can vary rapidly. We applied GFF to this problem which expresses all interaction in a Greenian within one unit cell. The system was studied under spectral representation and the relation between different resonance modes and the outcoming energy concentration was examined. The energy concentration is largest several hot spots which depend on the incident directions.

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