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Plasmonic Coupled Cavities on Moire Surfaces SINAN BALCI, ASKIN KOCABAS, MUSTAFA KARABIYIK, COSKUN KOCABAS, ATILLA AYDINLI, Physics Department, Bilkent University, Ankara, 06800, Turkey — We investigate surface plasmon polariton (SPP) coupled cavity modes on Moire surfaces. An experimental study has been made of the propagation of SPPs on a thin silver surface that is textured with Moire surface pattern using interference lithography. The Moire surface contains periodic array of one dimensional cavities. The distance between the cavities can be controlled by changing the periodicities of Moire surface. When the SPP cavity separation is sufficiently small, we show splitting of strongly coupled plasmonic cavity modes through numerical simulations. Conversely, when the SPP cavity separation is sufficiently large, SPP cavity modes are found to be localized and do not show splitting of SPP cavity modes . This splitting of SPP cavity modes are well explained with a tight binding model that has been succesfully applied in photonic coupled cavities. Reflection measurements and numerical simulation of a large number of adjacent SPP cavities have shown a coupled resonator optical waveguide (CROW) type plasmonic waveguide band formation within the band gap region of unperturbed uniform grating.

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