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Collective plasmonic oscillations in nanostrips arrays and sine wave gratings. Comparative study NATALIA NOGINOVA, Norfolk State Univ, SOHEILA MASHHADI, SARAH WILSON, FRANCES WILLIAMS, Norfolk State University, JARRETT VELLA, AUGUSTINE URBAS, AFRL, Wright-Patterson AFB, MATTHEW LEPAIN, MAXIM DURACH, Georgia Southern University — Excitation of collective plasmonic modes and their effects on optical behavior were experimentally and theoretically studied in 1 D arrays of gold nanostrips in comparison with those in continuous gold films with a sine wave profile and similar periodicity. Two kinds of collective resonance modes are efficiently excited in gold strips, with participation of gold -air and gold- glass interfaces. These modes correspond to maxima in the angular dependence of reflection, as opposed to minima observed at surface plasmon polariton conditions in a continuous sine wave grating. Spectral and polarization dependences are obtained. A theoretical approach based on the novel combined transfer-matrix coupled-wave analysis and coordinate transformation method is shown to well describe experiments.

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