Plasmonic Antenna Coupling for QWIPs

Plasmonic antennas would be potentially superior alternatives to surface corrugations.

NASA’s Jet Propulsion Laboratory, Pasadena, California

In a proposed scheme for coupling light into a quantum-well infrared photodetector (QWIP), an antenna or an array of antennas made of a suitable metal would be fabricated on the face of what would otherwise be a standard QWIP (see figure). This or any such coupling scheme is required to effect polarization conversion: Light incident perpendicular to the face is necessarily polarized in the plane of the face, whereas, as a matter of fundamental electrodynamics and related quantum selection rules, light must have a non-zero component of perpendicular polarization in order to be absorbed in the photodetection process. In a prior coupling scheme, gratings in the form of surface corrugations diffract normally incident light to oblique an-