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Title
High quality resonances for terahertz radiation diffraction at periodically corrugated semiconductor interfaces
Source
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Abstract
It is shown that the resonance features analogous to the well known optic Wood-type anomalies can be observed in the THz region for diffraction at periodically profiled semiconductor surfaces. The analytical theory of such resonance processes caused by excitation of surface plasmon polaritons (SPPs) is developed. It is shown that strong resonance effects such as total suppression of the specular reflection (TSSR) can be achieved for rather small inclinations of harmonic gratings. The analytical theory predictions are confirmed by strict numerical simulations. The analytical approach presented allows one to find parameters of the gratings so that the resonance diffraction results in specific redistributions of the reflected energy between different diffraction channels. As an example we demonstrate parameters of the InSb biharmonic grating responsible for the TSSR accompanied by 50% reflection in the minus first diffraction order when the SPP is excited in the plus first diffraction order. (29 References).