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摘要: Recently, the single metal wire (SW) has become attractive for its potential applications in the terahertz and higher frequency range. However, as the most simple and typical surface plasmon polariton (SPP) transmission line, its study seems far from enough. Many important transmission behaviours have not been explained satisfactorily from the viewpoint of physics. In this paper, making use of the modified Drude model (MDM) based on the Sommerfeld theory, the transmission behaviours of SPPs along SW are systemically investigated theoretically. Some important physical phenomena such as the mode transformation, the lifetime of the radiative mode and the resonance frequency are revealed, and their mechanisms are explored. The results obtained in the paper will facilitate a general understanding of the features and the physical essence of the SPP transmission, not only for SW itself but also for other SPP transmission lines.
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