

USE OF THE METHOD OF IMAGES IN STUDYING
THE ENERGY SPECTRA OF THE SURFACE STATES
OF ELECTRONS OR HOLES IN THREE-LAYER
SEMICONDUCTOR–DIELECTRIC–CONDUCTOR
STRUCTURES

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S u m m a r y

For the potentials obtained by the method of images, we have found the surface states of an electron or a hole in three-layer semiconductor–dielectric–conductor structures. For the arbitrarily thin layer of a dielectric, we deduced the exact formulas for the energy spectra E_n by the method of effective mass ($E_n \sim \frac{1}{n^2}$) and with regard for the discreteness of the crystal lattice of a semiconductor ($E_n \sim \sqrt{A + \frac{1}{n^2}}$). The surface states of an electron or a hole can be formed also in the two-layer semiconductor–dielectric structures in the cases where the permittivity of a dielectric is greater than that of a semiconductor. The obtained earlier exact solutions are applicable in this case as well. Other versions of the application of the method of images are discussed.