THEORY OF THE PROPERTIES
OF RESONANT-TUNNELING NANOSTRUCTURES
AS ACTIVE ELEMENTS OF QUANTUM
CASCADE LASERS AND DETECTORS

M.V. Tkach, Yu.O. Seti

Yu. Fed'kovich National University of Chernivtsi
(*2, Kotsyubyns'kyi Str., Chernivtsi 58012, Ukraine;*
e-mail: ktf@chnu.edu.ua)

S u m m a r y

A theory describing the spectral parameters of quasistationary states and the dynamic conductivity in an open three-barrier resonant-tunneling system (RTS) as an active element of a quantum cascade laser or a quantum cascade detector has been developed in the framework of the rectangular potential model and the effective electron mass approximation. It is shown that the optimal functioning of a three-barrier RTS can be obtained by properly choosing its geometric configuration, namely, by arranging the inner barrier closer to the input one in a position determined by the electromagnetic field energy.