

## EMISSION CHARACTERISTICS OF SEMICONDUCTOR QUANTUM CATHODES

*V.G. Litovchenko*

V. Lashkaryov Institute of Semiconductor Physics,  
Nat. Acad. of Sci. of Ukraine  
(41, Nauky Ave., Kyiv 03680, Ukraine;  
e-mail: *LVG@isp.kiev.ua*)

### S u m m a r y

Structures with a quantized band spectrum demonstrate important peculiarities of optical, electric, catalytic, and other characteristics. They are also promising for the investigation of emission effects. A special attention is attracted by semiconductor structures with a many-valley band spectrum, where the quantization provides the emission from “shallow” satellite bands with a relatively low work function. The electron population of these bands in low-strength electric fields is facilitated by a decrease of the distance of these bands from the main one, the pattern of the energy distribution of electron states, and a more effective heating of free electrons due to the dimensional quantization. In addition, the energy of the main conduction band gradually rises to the vacuum level, from where the field emission starts even at low fields, as well as the monochromatic emission from quantum cathodes. The work presents the results of the theoretical analysis and experimental investigations of the electron field (so-called cold) emission from semiconductor quantum cathodes.