LASER ACTION IN ELECTRICALLY DRIVEN QUANTUM DOT MATRIX

J. Krasnyj[2], A. Chuchmała[1], W. Jacak[1], M. Tytus[1], W. Donderowicz[1]

[1]Institute of Physics , Wrocław University of Technology, Wyb. Wyspiańskiego 27, 50-370 Wrocław, Poland, [2]Institute of Mathematics, University of Opole, Oleska 48, 45-051 Opole, Poland
e-mail: jacak@if.pwr.wroc.pl

The lasing system based on a matrix of quantum dots is proposed. The laser action is obtained by a rapid changes of in-plane electric field as a pumping force. Numerical analysis of a kinetics of electron-photon system is done for various electric fields and temperatures. For parabolic type of confinement in quantum dots a convenient amplification of contribution from several levels is indicated. Calculation utilizes exact solution of Cauchy problem for an infinite chain of linear differential equations with constant coefficients.