

Application of R-Matrix Formalism in Modeling of Semiconductor Nanostructures

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We show how the R -matrix formalism can be used for characterizing the transport properties of open quantum nanostructures. It gives a practical method for calculating the resonances of the open systems using the poles of the S -matrix. Applications at self-consistent calculations, capacitance characteristics and leakage current in MIS-type nanostructures are shown. New idea for calculation of the leakage current based on the decaying probabilities of the resonances will be discussed. These result have been obtained jointly with E.R. RACEC and U. WULF.