

Semi-classical modeling of quantum dot lasers with microscopic treatment of Coulomb scattering

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Drift-diffusion models provide a semi-classical description of the carrier transport in semiconductor devices. Self-consistently coupled to equations for the optical field they are established models for the simulation of semiconductor lasers. We consider quantum dot lasers with optically active regions consisting of quantum dots grown on a wetting layer. We present a drift-diffusion based modeling approach for the simulation of quantum dot lasers which uses a multi-species description of the carriers along the quantum dot active region and includes microscopically determined scattering rates describing the capture of the carriers into the quantum dots by Coulomb scattering. The presented results are joint work with U. Bandelow, K. Gärtner, A. Wilms, and A. Knorr (TU Berlin).