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Nonequilibrium Green's functions approach to artificial atoms: Nonequilibrium behavior[1] MICHAEL BONITZ, KARSTEN BALZER, University Kiel, Germany, NIELS ERIK DAHLEN, ROBERT VAN LEEUWEN, University Groningen — Using a nonequilibrium Green's functions approach we directly compute the nonequilibrium behavior of quantum confined charged particles, which is of relevance for quantum dots, metal clusters or trapped ions. We study the nonlinear response to a strong laser pulse by solving the Keldysh-Kadanoff-Baym equations for the two-time Green's functions [1] where equilibrium initial correlations are selfconsistently included via computation of the Matsubara Green's functions. This method fully conserves momentum total energy and sum rules. Here we apply it to an inhomogeneous system – N charged fermions in a one-dimensional parabolic trap extending earlier results for atoms and molecules [2]. The results include the selfconsistently coupled intra and intersubband dynamics in the laser field [3]. [1] D. Semkat and M. Bonitz, chapter in "Introduction to Computational Methods for Many Body Systems", Rinton Press, Princeton 2006, M. Bonitz and D. Semkat (eds.) [2] N.E. Dahlen, R. van Leeuwen, and A. Stan, J. Phys: Conf. Ser. 35 (2006) [3] K. Balzer, M. Bonitz, N.E. Dahlen, and R. van Leeuwen, submitted for publication

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