

Abstract Submitted  
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**Quantum kinetic theory for nonequilibrium electrons: from TDHF to Keldysh Green functions**<sup>1</sup> MICHAEL BONITZ, KARSTEN BALZER, SEBASTIAN BAUCH, DAVID HOCHSTUHL, SEBASTIAN HERMANN, ITAP, Kiel University — In this talk we discuss dense quantum plasmas in nonequilibrium relevant for warm dense matter (WDM) situations. While the ions can usually be treated classically, the electrons require a quantum treatment out of equilibrium. We first present an overview on the results of quantum kinetic theory for modeling the electron dynamics in a time-dependent electric field in a homogeneous plasma [1,2]. The basis is provided by nonequilibrium Greens function which can be computed directly or used to derive an equation of motion for the Wigner distribution. Finally, we present recent results for excitation and relaxation dynamics of electrons in atoms subject to strong laser fields [3] and discuss prospects for WDM applications.

[1] M. Bonitz, “Quantum Kinetic Theory,” Teubner, Stuttgart, Leipzig 1998. [2] “Introduction to Computational Methods for Many-Body Physics,” M. Bonitz and D. Semkat (eds.), Rinton Press, Princeton 2006. [3] K. Balzer, S. Bauch and M. Bonitz, Phys. Rev. A 82, 033427 (2010).

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