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Determination of the one-particle Green's function: freedom and constraints PINA ROMANIELLO, LPT, CNRS, University P. Sabatier and ETSF, GIOVANNA LANI, Forschungszentrum Juelich, LUCIA REINING, LSI, Ecole Polytechnique, CNRS and ETSF — In this work we explore an approach for the calculation of the one-particle Green's function that is an alternative to standard methods based on approximations to the self-energy, namely, the solution of Schwinger's functional integro-differential equations [1]. These equations relate the one-particle Green's function to its functional derivative with respect to an external source. Here we start from an approximate version of these equations, where the Hartree potential is linearized with respect to the source [2]. We show that this set of equations has, in principle, multiple solutions. However, only one can be identified as the physical solution. We provide an expression for the formally exact family of solutions with the help of an auxiliary quantity q. The latter is defined by a number of exact constraints. Our findings suggest that once q is known, the physical solution is uniquely fixed by the limit of vanishing Coulomb interaction. [1] L. P. Kadanoff and G. Baym, Quantum Statistical Mechanics (W.A. Benjamin Inc., New York, 1964) [2] G. Lani, P. Romaniello and L. Reining, New Journal of Physics 14, 013056 (2012); in preparation

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