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The exact solution of the many-body problem in one-point: insights in approximate Green's function approaches ARJAN BERGER, Laboratoire de Chimie et Physique Quantiques (IRSAMC), UPS, CNRS, Toulouse, France and European Theoretical Spectroscopy Facility (ETSF), PINA ROMANIELLO, Laboratoire de Physique Théorique (IRSAMC), CNRS, UPS, Toulouse, France and European Theoretical Spectroscopy Facility (ETSF), LUCIA REINING, Laboratoire des Solides Irradiés, Ecole Polytechnique, Palaiseau, France and European Theoretical Spectroscopy Facility (ETSF) — In this work we obtain the exact one-body Green's function in one point by solving the Kadanoff-Baym equation. The result is a family of solutions. We show that only one of these solutions is a physical solution. We compare the exact physical solution to the exact solution of an approximate Kadanoff-Baym equation that was obtained recently [1] as well as to standard approximations such as GW. We show that the iterative solution of the GW equations is not always equal to the exact GW result.

[1] G. Lani, P. Romaniello and L. Reining, New J. Phys. 14, 013056 (2012)

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