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**Non-equilibrium coherent potential approximation for electron transport** ALAN KALITSOV, University of Puerto Rico, MAIRBEK CHSHIEV, SPINTEC, JULIAN VELEV, University of Puerto Rico — Treatment of disorder in extended systems presents essential difficulties because the disorder breaks the periodicity of the system. The coherent potential approximation (CPA) solves this problem by replacing the disordered medium with a periodic effective medium [1]. However, calculating the electron current within CPA requires summing scattering diagrams to infinite order, the so called vertex corrections. In this work we reformulate CPA for non-equilibrium electron transport (NE-CPA). This approach, based on the non-equilibrium Green function formalism, provides an efficient and precise way to solve the transport problems in the presence of disorder. We demonstrate that the NE-CPA current is equivalent to the CPA current with vertex corrections to infinite order. [1] B. Velicky, Phys. Rev. 184, 614 (1969).

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