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An Extended Electron Approach to the General Many-Body Problem

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An extended electron model has been shown to fully recover many of the experimental results of quantum mechanics while avoiding many of the pitfalls and paradoxes [1, 2]. The formulation for many body electronic structure calculations in this context resembles to Kohn-Sham formulation of standard density function theory, but rather than referring to a large set of single electron orbitals, the extended electron model is formulated using only mass density and field components, leading to a substantial increase in computational efficiency. We present a proof-of-concept all-electron implementation of this method for a set of atomic systems and show that the model works in practice for atomic systems.

Biography:

Dr. Thomas Pope Studied for a PhD in condensed matter theory at Lancaster University with CJ. Lambert, working on DFT and transport theory. Afterwards, worked at the University of Catania with G. Falci on Monte-Carlo simulations of quantum networks with noise-enhanced transport. Currently working at Newcastle University with WA. Hofer on Kondo physics in collaboration with HJ. Gao's group in Beijing. Also developing an implementation of an Extended Electron model to simulate many-body systems.