

# An Extended Electron Approach to the General Many-Body Problem

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An extended electron model fully recovers many of the experimental results of quantum mechanics while it avoids many of the pitfalls and remains generally free of paradoxes [1]. The formulation of the many-body electronic problem there resembles the Kohn-Sham formulation of standard density function theory. However, rather than referring electronic properties to a large set of single electron orbitals, the extended electron model uses only mass density and field components, leading to a substantial increase in computational efficiency. To date, the Hohenberg-Kohn theorems have not been proved for a model of this type, nor has a universal energy functional been presented. In this paper, we address this problem and show that the Hohenberg-Kohn theorems do also hold for a density model of this type thus paving the way for the development of fast, efficient, and accurate codes on this basis.

[1] Thomas Pope, Werner Hofer, *Frontiers of Physics* 12, 128503 (2017).