Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Hohenberg-Kohn Theorem Including Electron Spin in the Presence of a Magnetostatic Field[1] VIRAHT SAHNI, The Graduate School CUNY, XIAO-YIN PAN, Ningbo University, China — We consider a system of N electrons in the presence of an external electrostatic $\mathcal{E}(\mathbf{r}) = -\nabla v(\mathbf{r})$ and magnetostatic $\mathbf{B}(\mathbf{r}) = \nabla \times \mathbf{A}(\mathbf{r})$ fields, and include the interaction of the latter with both the orbital and spin angular momentum. The relationship between the potentials $\{v(\mathbf{r}), \mathbf{A}(\mathbf{r})\}$ and the nondegenerate ground state Ψ is many-to-one. Explicitly accounting for this, we prove as in the case[2] when only the orbital interaction is considered, that for Ψ real, there is the one-to-one relationship: $\{v(\mathbf{r}), \mathbf{A}(\mathbf{r})\} \leftrightarrow \{\rho(\mathbf{r}), \mathbf{j}(\mathbf{r})\}$, where $\rho(\mathbf{r})$ and $\mathbf{j}(\mathbf{r})$ are the corresponding density $\rho(\mathbf{r})$ and physical current density $\mathbf{j}(\mathbf{r})$. Thus, $\{\rho(\mathbf{r}), \mathbf{j}(\mathbf{r})\}$ are the basic variables of the system. At present, except for the one electron system, no proof of bijectivity exists for the case of Ψ complex.

[1]Supported by RF CUNY & NNSF, China #11275100.
[2]XYP and VS, IJQC 2013, DOI: 10.1002/qua.24532

Viraht Sahni
The Graduate School CUNY

Date submitted: 01 Nov 2013 Electronic form version 1.4