Variational principle for the chemical potential in the Thomas-Fermi model

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Abstract

We derive a variational characterization for the chemical potential in the Thomas-Fermi model of atoms and molecules. We use this variational principle to obtain accurate upper bounds for the chemical potential $\epsilon_B(N, Z)$ as a function of the atomic number *Z* and the number of electrons *N*. In particular we study the behaviour of $\epsilon_B(N, Z)$ for a weakly ionized atom.