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Eric C Stachura* (estachura@haverford.edu). *Existence of Propagators for Coulomb-like Potentials in Time Dependent Density Functional Theory*. Preliminary report.

Density Functional Theory (DFT) is one of the most widely used methods for electronic structure calculations in materials science. Motivated by the classical Runge-Gross Theorem of Time Dependent DFT, we prove existence and uniqueness of propagators for a time dependent N particle, M nuclei Schrödinger equation in \mathbb{R}^{3N} with a new class of smoothed out Coulomb potentials. We consider time dependent potentials by treating the nuclei as classical particles moving along sufficiently smooth trajectories. Spectral properties of the corresponding static Hamiltonian are analyzed, and it is shown that these new potentials are dilatation analytic. (Received December 16, 2016)