## Density Functional Theory Transformed into a One-electron Reduced Density Matrix Functional Theory for the Capture of Static Correlation

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Density functional theory (DFT), the most widely adopted method in modern computational chemistry, fails to describe accurately the electronic structure of strongly correlated systems. In this lecture we show that DFT can be formally and practically transformed into a one-electron reduced-density-matrix (1-RDM) functional theory, which can address the limitations of DFT while retaining favorable computational scaling compared to wavefunction-based approaches [J. Phys. Chem. Lett. **13**, 1382-1388 (2022)]. In addition to relaxing the idempotency restriction on the 1-RDM in the kinetic energy term, we add a quadratic 1-RDM-based term to DFT's density-based exchange-correlation functional. Our approach, which we implement by quadratic semidefinite programming at DFT's computational scaling of O(r<sup>3</sup>), yields substantial improvements over traditional DFT in the description of static correlation in chemical structures and processes such as singlet biradicals and bond dissociations.