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**Open Systems and the Millikan Oil-Drop Experiment**<sup>1</sup> STEVEN VALONE, Materials Science and Technology Division, Los Alamos National Laboratory — When subsystems interact sufficiently, the subsystems can exchange electrons and the effective number of electrons on each subsystem can take on fractional values. The energy of the system can be expressed as a function of that fractional charge. Pioneering work of Perdew, Parr, Levy, and Balduz [1] showed that when the subsystems interact weakly, the energy depends linearly with the fractional charge. We explain recently derived energy dependencies, based on a 2-state model, for the case when the subsystems interact strongly [2]. Those results are extended to a more general 3-state case. Insights into the properties of the chemical potential of the subsystems is discussed. The show how the Millikan oil-drop experiment an open-system DFT are consistent.

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