

Abstract Submitted  
for the OSF14 Meeting of  
The American Physical Society

**An introductory physics laboratory that uses magnetic interactions to aid student understanding of the Coulomb and gravitational interactions** ANTHONY ROY DAY, John Carroll Univ — Introductory physics students often have difficulty interpreting energy curves and force curves for the  $1/r$  potentials of the Coulomb and the gravitational interaction. It has not been possible to give students direct experience with these potentials in the laboratory but the with the ready availability of powerful rare earth magnets laboratory studies of a dynamical system where the force increases rapidly with decreasing separation and tends to zero at large separation, qualitatively similar to the Coulomb and the gravitational interaction, are now possible. We present a series of experiments that allow students to infer the existence of magnetic potential energy from changes in the kinetic energy of the system, plot the potential energy as a function of separation, and confirm the relationship between the gradient of the magnetic potential energy and the magnetic force. Additional activities allow students to include the effect of kinetic friction and velocity dependent dissipative forces.

Anthony Day  
John Carroll Univ

Date submitted: 26 Sep 2014

Electronic form version 1.4