

Abstract Submitted  
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**Magnetic Forces without Magnetic Fields** MICHAEL ESPINOSA,  
JAMES ESPINOSA, Weatherford College — Classical electromagnetism uses tensor fields to unite electricity and magnetism. Physicists like Gauss approached their studies of electrodynamics using an action at a distance formulation. Walter Ritz provided a tentative equation that embodied all of the positive aspects of Maxwell's equations while avoiding the self-contradictions and spurious predictions such as the ultraviolet catastrophe and the inability to provide a framework for atomic physics. We will introduce Ritz's theory using a simple example of an electron moving beside a neutral wire carrying a current and compare it to the Lorentz-Maxwell result.

Michael Espinosa  
Weatherford College

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