Abstract Submitted
for the OSF13 Meeting of
The American Physical Society

Gravitational Field Equations and Theory of Dark Matter and Dark Energy[1] TIAN MA, Sichuan University, SHOUHONG WANG, Indiana University — The main objective of this talk is to derive new gravitational field equations and to establish a unified theory for dark energy and dark matter. The gravitational field equations with a scalar potential φ function are the Euler-Lagrangian equations of the classical Einstein-Hilbert functional subject to energy-momentum conservation constraint. From quantum field theoretic point of view, the vector field $\Phi_\mu = D_\mu\varphi$, the gradient of the scalar function φ, is a spin-1 massless bosonic particle field. The field equations induce a natural duality between the graviton (spin-2 massless bosonic particle) and this spin-1 massless bosonic particle. Both particles can be considered as gravitational force carriers, and as they are massless, the induced forces are long-range forces. The (nonlinear) interaction between these bosonic particle fields leads to a unified theory for dark energy and dark matter.

[1]Supported in part by NSF, ONR and Chinese NSF

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Date submitted: 31 Jul 2013 Electronic form version 1.4