Abstract Submitted
for the APR06 Meeting of
The American Physical Society

Quantum Gravity Modulates Fermion Field Strength during Inflation[1] RICHARD WOODARD, SHUN-PEI MIAO, University of Florida — Because gravitons are massless without being conformally invariant, they engender enormously enhanced effects during inflation. One such effect is to alter the wave function of massless fermions by a time dependent field strength renormalization which would, if unchecked at higher loops, eventually convert positive norm particles into ghosts! We prove this by solving the effective field equations for massless fermions using the recently computed one loop self-energy for Gravity + Dirac (gr-qc/0511140). The Schwinger-Keldysh formalism is used to keep the results real and causal. It is curious that our result agrees, up to a numerical factor, with the Hartree-Foch approximation of simply taking the expectation value of the Dirac Lagrangian in the graviton vacuum.

[1]Partially supported by NSF grant PHY-244714.

Richard Woodard
University of Florida

Date submitted: 13 Jan 2006 Electronic form version 1.4