Abstract Submitted
for the TS4CF08 Meeting of
The American Physical Society

**General relativistic effects in galactic rotation velocity profiles**
SOPHIA CISNEROS, NMSU — The anomalously high galactic rotation velocities deduced from spectroscopic observations have motivated the conjecture of additional Dark Matter. Here we investigate to what extent this picture may be impacted by general relativistic effects. Previous work involving General Relativity has used linearized field equations to arrive at estimates of wavelength shifts arising from spin induced curvature. We show here that, using the fully contravariant 3+1 dimensional wave equation (the D'Alembertian for a Kerr Metric), non-trivial results for observed velocities can be obtained. These velocities are much higher than those obtained from the linearized equations. The Kerr rotation curve is derived from first principles. The wavelength shifts are then weighted by an empirical factor which accounts for difference in curvature of the originating galaxy and the Milky Way. The resulting apparent radial dependence of the velocity is much flatter than obtained in the Keplerian case, which opens the possibility that, for our test galaxy(M33), we have correct estimates of (luminous) matter on the exterior edges, but have only underestimated the mass at the center. This result suggests that general relativistic effects mitigate, or may possibly even obviate the need to invoke the presence of Dark Matter in order to explain the observed apparent velocity profiles. All rotation curves presented are computed with data graciously provided by E.Corbelli and R.Walterbos for M33, taken in the wavelength band of H_alpha.

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Date submitted: 23 Sep 2008 Electronic form version 1.4