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Physics and Cosmology on a Gravitational Wave Background

It is a fact that the universe lives on a Gravitational Wave Background (GWB), which may be in the form of extra energy, which is not contained in Einstein's field equations. In previous work, a new model called Compton Mass Dark Energy (CMaDE) was developed to explain the current accelerated expansion of the universe where a GWB was incorporated by extending Einstein's equations to
$R_{\mu\nu} - \frac{1}{2}Rg_{\mu\nu} + \frac{2\pi^2}{\lambda^2}g_{\mu\nu} = \kappa^2 T_{\mu\nu}$,
where λ is the Compton wavelength of the graviton. In the present talk we show that the geodesics in a GWB satisfy the Klein Gordon equation and then we show that
the CMaDE model agrees very well with the observations of the cosmic chronometers, Baryon Acoustic Oscillations and Pantheon Super Novae type Ia, reproducing the observational data with a $\Delta\chi^2 = 3.26$ in favor of the current model compared to the ΛCDM. The values favored by these observations are $\Omega_m = 0.31 \pm 0.02$, $H_0 = 68 \pm 0.02$ Km/s/Mpc, $\Omega_k = 0.001 \pm 0.011$. Using these same values we also find excellent consistency of this model with the Cosmic Microwave Background and the Power Spectrum of Matter, provided that $H_0 = 68.3$ Km/s/Mpc. We conclude that this model is an excellent alternative to explain the accelerated expansion of the universe without incorporating the cosmological constant or adding extra matter.

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