The Effect of Dark energy on Amplitude of Gravitational Waves

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Abstract : In this talk, we study the tensor mode equation of perturbation in the presence of nonzero $-\Lambda$ as dark energy, whose dynamic nature depends on the Hubble parameter H and/or its time derivative. Dark energy, according to the total vacuum contribution, has little effect during the radiation-dominated era, but it reduces the squared amplitude of gravitational waves (GWs) up to 60% for the wavelengths that enter the horizon during the matter-dominated era. Moreover, the observations bound on dark energy models, such as running vacuum model (RVM), generalized running vacuum model (GRVM), and generalized running vacuum subcase (GRVS), are effective in reducing the GWs' amplitude. Although this effect is less for the wavelengths that enter the horizon at later times, this reduction is stable and permanent.

Keywords : gravitational waves, dark energy, GW's amplitude, all stage universe

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