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Dark Matter, Dark Energy, Gravitational Waves and Black Holes

Friday, 16 September 2016 10:00 (1 hour)

The standard model of cosmology features three key theoretical paradigms:

1) Inflation
2) Dark Matter
3) Dark Energy (accelerated expansion of the universe)

Inflation has severe fine-tuning problems and the need for eternal inflation and a multiverse. The alternative model Variable Speed of Light Cosmology (VSL) can avoid these problems and fit available observational data. The CMB is described with remarkable success by the standard concordance model, based on six parameters. Of these the dark matter Ωm and dark energy ΩΛ parameters are poorly understood. Dark matter particle candidates have not been conclusively observed in the present universe in laboratory and satellite experiments. Dark Energy can be explained by the cosmological constant at the price of a huge fine-tuning problem. Moreover, the assumptions of a homogeneous and isotropic LFRW universe and the Copernican principle have not been fully tested. A modified gravitation (MOG) theory will be reviewed that can explain the lack of direct non-gravitational detection of Dark Matter in the present universe and its ability to fit galaxy and galaxy cluster data will be described. The conservative explanation of the accelerated expansion of the universe based on voids will be reviewed. The LIGO-Virgo experimental detection of gravitational waves and Event Horizon Telescope imaging of the supermassive black holes Sagittarius A* and M37 will be able to distinguish MOG black holes from the Schwarzschild and Kerr black holes.

Summary

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