Contribution ID: **862** Type: **Talk in the parallel session**

Analysis of the velocity Rotational Curves Via Weyl-Interaction Modified Gravity

Tuesday, 6 July 2021 11:30 (20 minutes)

Instead of appealing to dark matter to explain the flat rotation curves of galaxies, it had been proposed that the law of gravitation should be modified. However, the idea had been to modify Newton's law. Harko et al. (Phys. Rev. D 84 (2011) 024020) suggested that modified gravity be used. Qadir, Lee and Kim (Int. J. Mod. Phys. D 26 (2017) 1741001) had proposed a modification of the Einstein-Hilbert Lagrangian with cosmological constant by adding a product of the Ricci and matter tensors. Later Qadir and Lee (Int. J. Mod. Phys. D 28 (2017) 1741001) proposed coupling the matter with Weyl curvature, reminiscent of the way the charge couples with the electromagnetic field in QED, and provided the equations of motion for it. They considered the rotational velocity curves for a simple model, for different values of the coupling constant. The value of the coupling constant has been determined for the M31 galaxy for this simple model used and compared with that for the Milky Way to see if the suggestion seems consistent, barring minor adjustments in the matter distribution in the galaxies.

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Session Classification: The Nature of Galactic Halos

Track Classification: Dark Matter: The Nature of Galactic Halos