Contribution ID: **3**   Type: **not specified**

Neutrino oscillations in extended theories of gravity

Thursday 29 July 2021 11:40 (20 minutes)

In this talk, I discuss the investigation revolving around neutrino oscillations within the framework of extended theories of gravity. Based on the covariant reformulation of Pontecorvo's formalism, the oscillation probability of neutrinos propagating in static spacetimes described by gravitational actions quadratic in the curvature invariants is evaluated. For the sake of simplicity, calculations are carried out in the two-flavor approximation. Remarkably, it is shown that the neutrino phase is sensitive to the violation of the strong equivalence principle. By way of illustration, I specialize the analysis to various extended models of gravity in order both to quantify such a violation and to understand how the characteristic free parameters of these models affect neutrino oscillation phase. The possibility to fix new bounds on these parameters and to constrain extended theories of gravity is finally discussed.

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Session Classification: NuCo 2