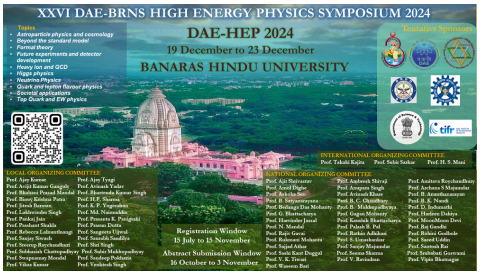

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Scalar Fields from Affine Connections and Quantum Theory

In this talk, we will use the affine connections to introduce new fields that can be helpful to explain a few cosmological observations.
We have previously introduced two massless scalar fields using connections more general than the Levi-Civita connections in the Einstein-Palatini action. These fields contribute positive and negative stress tensors to Einstein's equation and can be useful to explain inflation and dark energy.
In this article, we will develop a scheme to add suitable potential terms for these fields. We will construct a Lagrangian formalism to include these scalar fields in a theory of gravity coupled with ordinary matter and radiation. These fields need not to be present in the Lagrangians of gauge theories with conserved fermionic vector currents. The same remains valid for scalar fields. We will discuss a generalization of this aspect. We will discuss a model that includes the right-handed neutrinos in the electroweak theory in curved spacetime even with the Levi-Civita connections. This is required to have conserved vector currents for the neutrinos. Axial vector currents for different Dirac fields can remain anomalous depending on the theory. The right-handed neutrinos can be useful to explain neutrino oscillation or dark matter.

Field of contribution

Theory

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