Contribution ID : **91** Type : **Invited Talk**

Extensions of scalar-tensor theory: Parity violation and multiple fields

Thursday, 21 May 2026 13:30 (40)

This talk presents recent progress in the construction of scalar-tensor theories, with a focus on parity violation and multiple scalar fields. I will first review the relation between generally covariant scalar-tensor theories and spatially covariant gravity in the unitary gauge, emphasizing how this correspondence provides an efficient way to control higher-order time derivatives and avoid Ostrogradsky ghost degrees of freedom. Using this framework, I will discuss the systematic construction of the most general parity-violating scalar-tensor theory up to d=4 that is ghost-free in the unitary gauge, including the resulting "Qi-Xiu" Lagrangians and their relation to known examples such as Chern-Simons and chiral scalar-tensor theories. I will then describe a new geometric approach to multiple scalar-tensor theories, in which each scalar field defines a foliation of spacelike hypersurfaces and the theory is built from the corresponding hypersurface geometric quantities. This multiple-foliation construction provides a systematic route toward ghost-free multi-field scalar-tensor theories beyond the traditional Horndeski/DHOST framework.

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Session Classification : Day 2