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Charting the Fifth Force Landscape

Monday 29 March 2021 16:35 (6 minutes)

In recent years particle physics research has undergone somewhat of a phase transition, looking increasingly towards hidden sectors and the feebly interacting frontier. In this talk I will introduce a new approach to parameterising dark sector forces, underpinned by the Källén-Lehman representation, in which the effects of any general scalar fifth force are captured by a single positive-definite spectral function. Using this language, I will demonstrate how the effects of loop-level forces can be simply obtained, without needing to explicitly perform loop calculations. I will also show how experimental observables can be expressed in completely general terms, facilitating the straightforward extraction of limits to any specific model. Finally, I will discuss how this framework opens the possibility to speculatively probe violations of unitarity, causality or locality within hidden sectors.

Presenter: BANKS, Hannah (University of Cambridge)

Session Classification: Student Session