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

Form Lambda to Lambdons: dynamical dark energy via symmetry breaking.

Thursday, July 10, 2025 4:25 PM (25 minutes)

Amidst a myriad of sophisticated alternatives to general relativity, unimodular gravity stands unique as a relatively simple extension. In the Henneaux-Teitelboim (HT) formulation of unimodular gravity, the cosmological constant Λ is promoted to a scalar field $\Lambda(x)$ at the level of the action. However, a non-dynamical vector density $\mathcal{T}^\mu$ ensures the constancy of Λ on shell and consequently, the retention of the original Einstein field equations.

In 4 space-time dimensions, the vector density $\mathcal{T}^\mu$ can be interpreted as a topological 3-form gauge field which exists in a non-standard $U(1)$ representation. In the regular electrodynamics for a $U(1)$ gauge field A_μ, the addition of a mass term or *Proca* term $m^2 A_\mu A^\mu$ increases the internal d.o.f of A_μ. Analogously, when $m^2 \mathcal{T}_\mu \mathcal{T}^\mu$ is added to the HT action unimodular symmetry is broken. Curiously, $\mathcal{T}^\mu$ is still non-dynamical, rather, the scalar field $\Lambda(x)$ now obeys a wave equation. *The Lambdon is born.*

Based on:
https://arxiv.org/pdf/2305.09380
https://arxiv.org/pdf/2311.11160

Primary author: ISICHEI, Raymond (Imperial College London)

Presenter: ISICHEI, Raymond (Imperial College London)

Session Classification: Contributions