Machine Learning negatively-curved manifolds and de Sitter vacua

Thursday 18 January 2024 10:30 (45 minutes)

Constructing detailed cosmological models in UV-complete theories of gravity is of great importance to connect theory and observation.

In this talk, I will describe the mathematical problems associated with a proposed class of de Sitter compactifications of M-theory on negatively-curved manifolds. These manifolds are generic and enjoy beautiful geometric properties, such as the absence of moduli and the presence of tunable short closed geodesics that support quantum effects. Despite their richness, smooth negatively-curved manifolds can be constructed explicitly starting from hyperbolic polytopes. I will describe the associated mathematical problems and current work in progress on using Machine Learning techniques for finding the detailed metrics and internal field configurations for de Sitter compactifications on these spaces.

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