Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Landscapes of Quantum Field Theories via the Eisenhart Lift[1]
SOTIRIOS KARAMITSOS, University of Pisa, KIERAN FINN, APOSTOLOS PILAFTSIS, University of Manchester — The gauge hierarchy problem and the cosmological constant problem are two of the most prominent examples of fine-tuning in modern physics. A possible way to evade them is by postulating the existence of a multiverse from which a viable universe may be selected under anthropic considerations. In this talk, I will present an application of the Eisenhart lift to field theories that can give rise to hierarchies by purely geometric means. The Eisenhart lift is a formalism that reproduces the dynamics of a classical system subject to a potential by means of a free system evolving in a higher-dimensional curved manifold. I will first outline the generalization of the classical lift to quantum mechanics, and then demonstrate that an ensemble of Fock spaces can be embedded in a curved *field-space* manifold. These spaces are disjoint from one another, and are indexed by a conserved quantum charge which corresponds to a physical constant. Therefore, this ensemble acts as a novel kind of a landscape, providing a novel avenue for generating hierarchies and dealing with fine-tuning issues.

[1]ERC grant 669668 NEO-NAT; STFC research grant ST/L000520/1

Sotirios Karamitsos
University of Pisa

Date submitted: 07 Jan 2021 Electronic form version 1.4