Contribution ID: **34** Type: **not specified**

Matter in a Multi-Component Universe, Naturalness and the Quest for a Fundamental Theory

Thursday 1 March 2018 11:20 (40 minutes)

Finetuning describes unlikely coincidences on an effective level of description which are expected to be explained in a more fundamental theory. In this talk a fresh view on the topic of Naturalness and Finetuning is presented which is based on a "holistic" concept for the most fundamental layer of reality. We start with recent research on the abundances of leptons, baryons and dark matter in the Universe. As we have shown, it turns out that what appears to be finetuned or contradictory if only individual matter species are considered may be resolved in a multi-component approach, taking into account the interplay of all contributions to the total energy density of the Universe. This rather trivial example can be generalized to the relation of subsystems to the Universe in quantum cosmology. Adopting a universal applicability of quantum mechanics, in this framework the behavior of subsystems can be understood as the perspectival experience of an entangled quantum Universe perceived through the "lens of decoherence". In this picture the fundamental reality is non-local, and finetuned coincidences in effective theories may be understood in a way similar to EPR-correlations.

Author: PAES, Heinrich (University of Alabama)

Presenter: PAES, Heinrich (University of Alabama)

Session Classification: Thursday morning