

Cosmological Naturalness

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The cosmological constant problem is the most spectacular failure of dimensional analysis in physics. The most credible explanation so far, requires the existence of a vast landscape of cosmological constant values, including exponentially tuned ones. If we accept the existence of a landscape, it is very likely that also the Higgs boson mass squared varies from vacuum to vacuum. Historically this point of view coincides with anthropic explanations for its observed value. More recently we have developed a class of ideas that makes a different use of a Higgs mass landscape, with much better prospects for detection and little or no recourse to anthropic arguments. After the results from LEP, LHC, Flavor and CP violation experiments, accumulated over more than 40 years, these ideas have become one of the most appealing possibilities to explain the observed value of the Higgs mass. In the talk I will first briefly discuss the role of naturalness in quantum field theory, then review these ideas, including their generic predictions for experiment and prospects for discovery.

Presenter: D'AGNOLO, Raffaele (IPhT/Saclay)

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