

Séminaire de physique des particules et de cosmologie

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Orme des Merisiers Salle Claude Itzykson, Bât. 774

Precarious Naturalness

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I will discuss a novel solution to the hierarchy problems, both for the Higgs mass and the cosmological constant. The only new ingredient is an ultra-light scalar coupled to the Higgs in the presence of heavier new physics. I will show that the potential has a maximum when the Higgs squared mass is a two-loop factor lighter than new physics. Regions of the Universe where the scalar lives around the top of the potential are meta-stable, whereas regions with heavy Higgs crunch quickly and are short lived: a light Higgs is selected both anthropically and environmentally. In addition, in part of the parameter space the cosmological constant can be canceled down to anthropically small values, without the presence of a landscape. Naturalness is precarious: we expect that the Universe is rolling down the potential today, with observable signatures.
