

Contribution ID: 800 Type: Parallel Talk

## Decoupling effects in the running of the Cosmological Constant

Friday, 7 July 2017 10:45 (15 minutes)

We revisit the decoupling effects associated with heavy particles in the renormalization group running of the vacuum energy in a mass-dependent renormalization scheme. We find the running of the vacuum energy stemming from the Higgs condensate in the entire energy range and show that it behaves as expected from the simple dimensional arguments meaning that it exhibits the quadratic sensitivity to the mass of the heavy particles in the infrared regime. The consequence of such a running to the fine-tuning problem with the measured value of the Cosmological Constant is analyzed and the constraint on the mass spectrum of a given model is derived. We show that in the Standard Model (SM) this fine-tuning constraint is not satisfied while in the massless theories this constraint formally coincides with the well known Veltman condition. We also provide a remarkably simple extension of the SM where saturation of this constraint enables us to predict the radiative Higgs mass correctly. Generalization to constant curvature spaces is also given.

## **Experimental Collaboration**

Primary author: ANTIPIN, Oleg (Institut Rudjer Boskovic)

Presenters: Prof. MELIC, Blazenka (Rudjer Boskovic Institute, Zagreb); MELIC, Blazenka; MELIC, Blazenka

(IRB, Zagreb); MELIC, Blazenka

Session Classification: Cosmology, dark energy, gravitational waves

 ${\bf Track\ Classification:}\ \ {\bf Cosmology, Dark\ Energy, Gravitational\ Waves}$