SEMPARIS – Séminaires en région parisienne

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Cours

Vendredi 21 Avril 2017, 10 :00
IPHT, Salle Claude Itzykson, Bât. 774(https ://courses.ipht.cnrs.fr/ ?q=fr/node/167)
Domaines : hep-ph

Titre : *Effective field theories in particle physics (1/4)*

Orateur : **Adam Falkowski (LPT Orsay)**

Résumé : *The methods and ideas of Effective Field Theory (EFT) are among the most powerful and deep organising principles in physics, and particularly so in Quantum Field Theory and its ramifications and applications into particle physics, condensed matter physics, and statistical mechanics.*

The basic idea is to approximate a physical system by integrating out the degrees of freedom that are not relevant in a given experimental setting. These are traded for a set of effective interactions between the remaining degrees of freedom.

In these lectures we will review the concept, techniques, and applications of the EFT framework.

– Overview of the EFT landscape : Prominent examples including Fermi theory, the Heisenberg-Euler Lagrangian, and chiral perturbation theory.

– Integrating out heavy particles : Quantitative discussion of the procedure in a quantum field theory. Explicit example of the tree- and one-loop level matching between an EFT and its UV completion.

– Beyond the Standard Model : Introduction of the Standard Model EFT by extending the Standard Model Lagrangian with non-renormalizable interactions representing the effects of new heavy particles.

– Functional integration methods and EFTs for classical systems.