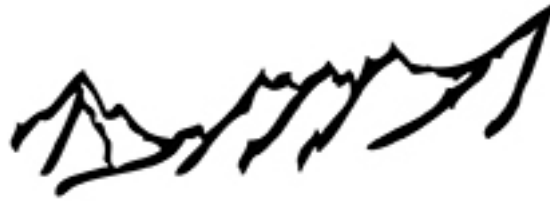


# **EFT in Particle Physics and Cosmology**



**Monday, July 3, 2017 - Friday, July 28, 2017**

**Ecole de Physique des Houches**

## **Scientific Program**

The underlying idea of EFT, is that at each scale, the relevant physics can be parametrised with appropriate variables, which may change with the scale. EFTs are essential tools both for precision analyses within known theories, and for a concise parameterization of hypothetical models. The school aims to bring together a group of experts, who can give pedagogical and profound introductions to various EFTs that are in use today, presenting the concepts such that attendees can adapt some of the latest developments in other fields to their own problems.

A characteristic feature of EFTs is that they describe systems containing many different scales. These scales could be masses (for instance, the light masses of the particles of the Standard Model versus the heavy masses of yet undiscovered particles), momenta (for instance, the hard, collinear and soft momenta playing a role in jets produced in high-energy collisions), or length scales (for instance, the lattice spacing appearing in numerical simulations versus the pion Compton wavelength of interest to low-energy hadronic interactions). Various of these possibilities are presented in the lectures listed below.

Two "student presentation" sessions are programmed in the first week, during which each student will have 2 minutes (and one slide?) to present their research interests. In addition, students wishing to bring a poster are invited to do so.

*Lectures:*

Renormalisation and RGEs (M. Neubert, 4 lectures )

EFT: basic concepts and electroweak applications (A. Manohar, 6 lectures)

EFT for quark flavour (L. Silvestrini, 4 lectures)

$\chi$ PT and electroweak symmetry breaking (A. Pich, 6 lectures)

Soft Collinear Effective Theory (T. Becher, 4 lectures)

Heavy Quark Effective Theory & NRQCD (T. Mannel, 4 lectures)

EFT for large-scale structure formation (T. Baldauf, 4 lectures)

EFT for thermal systems (S. Caron-Huot, 4 lectures)

EFT on the lattice, applied to HQET (R. Sommer, 2 lectures)

EFT for inflation (C. Burgess, 3 lectures)

EFT for the direct detection of dark matter (J. Hisano, 3 lectures)

EFT in nuclear physics (U. van Kolck, 2 lectures)

EFT for post-Newtonian gravity (P. VanHove, 2 lectures)