

Physics Beyond the Standard Model (E8)

Non-Examinable (Graduate Level)

Dr. Maria Ubiali

This graduate course gives a brief overview on the successes and theoretical problems of the Standard Model (SM). It then discusses the guiding ideas and a number of useful techniques to explore physics Beyond the Standard Model (BSM).

The course will cover a selection of topics including:

- Basic concepts about Effective Field Theories
- Standard Model Effective Field Theory and Higgs Effective Field Theory
- Supersymmetry (with emphasis on particle physics phenomenology)
- Composite Higgs models
- Phenomenology landscape of BSM physics searches at the LHC and beyond

Prerequisites

Background knowledge of Standard Model and Quantum Field Theories is essential.

Literature

1. A. Petrov, A. Blechman, “Effective field theories”, WorldScientific
2. B. Gripaios, *Lectures on Physics Beyond the Standard Model*, arXiv:1503.0263 [hep-ph]
3. S. Willenbrock and C. Zhang, *Effective Field Theory Beyond the Standard Model* arXiv:1401.0470 [hep-ph]
4. A. Wulzer, “Behind the Standard Model”, arXiv: 1901.01017
5. I. Brivio, M. Trott, *The Standard Model as an Effective Field Theory*, arXiv:1706.08945 [hep-ph]
6. S. P. Martin, ”A Supersymmetry Primer”, arXiv:hep-ph/9709356 [hep-ph]