

Physics Beyond the Standard Model (E8)

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This graduate course gives a brief overview on the successes and theoretical problems of the Standard Model (SM). It discusses applications of Effective Field Theory (EFT) ideas and techniques to the study of particle physics Beyond the Standard Model (BSM).

After introducing the basic concepts of EFTs and reviewing the SM from an EFT perspective, the course will give examples of how the precise measurements performed at the Large Hadron Colliders can be used as indirect probes of BSM Physics. A special emphasis will be given to the SMEFT and HEFT frameworks. The course will finally give an overview of the most promising Ultra-Violet completions of the Standard Model.

Pre-requisites

Background knowledge of Standard Model and Quantum Field Theories is highly desirable.

Literature

1. A. V. Manohar, *Effective field theories*, hep-ph/9606222
2. D. B. Kaplan, *Five lectures on effective field theory*, nucl-th/0510023.
3. B. Gripaios, *Lectures on Physics Beyond the Standard Model*, arXiv:1503.0263 [hep-ph]
4. S. Willenbrock and C. Zhang, *Effective Field Theory Beyond the Standard Model* arXiv:1401.0470 [hep-ph]
5. I. Brivio, M. Trott, *The Standard Model as an Effective Field Theory*, arXiv:1706.08945 [hep-ph]