

PHYSIKALISCHES KOLLOQUIUM

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PARTICLE PHYSICS AT THE LHC: FROM THE LAGRANGIAN TO THEORETICAL PREDICTIONS

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The Large Hadron Collider (LHC) at CERN where protons are collided at very high energy is the most important particle-physics experiment of our time. The acquired data allows us to explore many fundamental aspects of particle physics by comparing them to theoretical predictions. In this presentation, I will describe the most important steps necessary to go from the Lagrangian of the Standard Model of particle physics to state-of-the-art predictions that can be compared with experimental data. This work involves field-theoretical concepts as well as calculational techniques such as advanced numerical Monte Carlo integrations. As an illustration, I will discuss a process of particular interest in testing perturbative QCD: the production of a W boson in association with a charm quark at the LHC.

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