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## Übungen zu Teilchenphysik I

### Wintersemester 2024/25

#### Exercise 8

To be worked on until February 06, 2025

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### Event Generation with Herwig7

[Herwig](#) is a multi-purpose particle physics event generator. It is composed of many modules, which have been developed over many years by various authors. In the current version it is written in C++. Many efforts have been done to improve and develop the description of particle collisions, which involve heavy theoretical and phenomenological research of perturbative and non-perturbative Quantum Field Theory (QFT) and empirical models. One of the [research groups of HERWIG 7](#) lead by [Stefan Gieseke](#) is based here at the KIT.

Multi-purpose (or general-purpose) event generators like HERWIG 7<sup>1</sup> can be used to generate events of a variety of colliding particles using various types of Monte-Carlo (MC) algorithms in several stages. These are based on perturbative and non-perturbative QFTs or motivated by empirical models, which aim to describe observed phenomena and characteristic properties of high energy collisions. This exercise is built with the notion to give you a feeling for the necessary generation steps, in our case implemented in HERWIG 7, to achieve a good prediction for measureable data, without the necessity to understand all technical and theoretical details.

Open the [jupytermachine](#) for the exercises and start a [Herwig](#) server. Once loaded, update your local copy of the [tp1\\_forstudents](#) repository and work through the Jupyter Notebook inside the `Exercise08` folder.

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<sup>1</sup>Other multi-purpose generators are [PYTHIA](#) or [SHERPA](#), which provide similar functionalities, but involve in many cases slightly different models.