The **2021 High Energy and Particle Physics Prize of the EPS** for an outstanding contribution to High Energy Physics is awarded to **Torbjörn Sjöstrand and Bryan Webber** for the conception, development and realisation of parton shower Monte Carlo simulations, yielding an accurate description of particle collisions in terms of quantum chromodynamics and electroweak interactions, and thereby enabling the experimental validation of the Standard Model, particle discoveries and searches for new physics.

Particle collisions at high energies yield very complex final states, typically containing a large number of detected particles. Sjöstrand and Webber have spearheaded the development of the theoretical understanding, the models and the general purpose Monte Carlo event generators that make it possible to predict the structure of particle collisions down to the level of individual hadrons. Today, hardly any measurement at a particle physics experiment is planned or performed without making use of Monte Carlo event generators, such as Pythia [1] and Herwig [2].

Event generation is based on a Markov-chain formulation for the emission of an arbitrary number of gluons (or quark/anti-quark pairs) [3], incorporating quantum interference and determining the emission probabilities from perturbative quantum chromodynamics (QCD). A key concept enabling the description of proton-proton collisions in this framework is backward-evolution [4] to describe initial-state emissions. The subsequent parton-to-hadron transition is a non-perturbative phenomenon, which is described by empirical fragmentation models [5,6]. The past thirty years have seen the development of a large variety of methods and tools for event generation, including the merging and matching with high precision fixed-order computations, that extend and refine these basic concepts established by Sjöstrand and Webber.

The remarkable agreement of Pythia and Herwig with high-precision LEP data helped to firmly establish QCD as the theory of the strong interaction. Today, it is hard to imagine modern particle physics without such tools. For example, the hadron-level detail brought by Monte Carlo event generators has been crucial in almost every facet of LHC physics: the design of the original detectors and planned upgrades; the formulation of strategies for their use and their calibration; the correction of theoretical predictions for detector effects or measurements back to the level of hadrons for direct comparison to the Standard Model; and the estimation of perturbative and non-perturbative QCD effects on measurements of quantities as fundamental as the Higgs couplings, and the W boson and top quark masses.

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