DESCRIPTION FOR THE GENERAL PUBLIC

The discovery of the Higgs boson, a major milestone in the quest to understand the fundamental nature of the Universe, required one of humankind's most ambitious scientific projects, the Large Hadron Collider (LHC). However, our ambition does not stop there, the **European Strategy for Particle Physics**[1] **is clear** that *"**Europe's top priority** should be the **exploitation of the full potential of the LHC**..."*. The primary reason for this is that the Standard Model (SM) of Particle Physics, which describes the fundamental components of ordinary matter and their interactions, is not yet a "Theory of Everything". Despite its great success in predicting many experimental results, including existence of the Higgs boson, the SM fails to account for a number of interesting phenomena. Among them: it cannot explain the observed matter-antimatter asymmetry of the Universe, it does not give an explanation for the large hierarchy between the weak scale and the Planck scale and does not provide a good candidate for dark mater. New physics Beyond the Standard Model (BSM) is needed to solve these and other open questions. It is expected that at the LHC new BSM Physics will either be discovered or excluded up to very high energies, which would revolutionize the understanding of particle physics and require completely new experimental and theoretical concepts.

At the end of March 2016 the LHC started Run 2 which operates at significantly higher centre of mass energy and offers an unprecedented insight into the largely unexplored region of TeV physics. It is a great opportunity to get a new understanding of the fundamental nature of the Universe. The usefulness of this wealth of forthcoming **high-quality data** is, however, **strongly dependent on the availability of theoretical predictions** with matching accuracy.

In practice, there is a huge gap between a one-line formula of a fundamental theory, like the Lagrangian of the SM, and the experimental reality that it implies. **Genera Purpose Monte Carlo (GPMC)** event generators are designed to bridge that gap. One can think of a GPMC as a "Virtual Collider" that produces simulated collisions similar to those that are produced in the actual LHC experiments, and therefore its results can be **directly compared against the experimental data**. This is the reason why the **GPMC event generators are central to high energy physics** (HEP) and are an indispensable part of HEP experiments. Almost all measurements and discoveries in the modern era have relied on GPMC generators. Therefore, it is very important to improve the precision of these "Virtual Colliders". The aim of the projects is to improve description of one of the least-understood elements of GPMC and answer the question "How the colour charge is distributed in hadron-hadron event?". Therefore, the title of the project is "Colourful precision for the Large Hadron Collider".

[1]Document adopted during European Strategy Session in Brussels, 30 May 2013.