Abstract for the general public

All the elementary particles predicted by the Standard Model (SM) of electroweak interactions have been already found, with the latest discovery being the one of the Higgs boson in 2012 at the Large Hadron Collider. Searches for real production of beyond the SM particles in such experiments have given null results so far. However, substantial deviations from the SM predictions are seen in several B-meson decays, and other observables. In addition, various independent astrophysical observations confirm existence of Dark Matter (DM), i.e. a non-luminous form of matter distributed in the Universe. The SM does not offer any realistic candidate for the DM. Therefore, it is natural to expect that a stable particle should be added to the SM. Last but not least, the SM has difficulties in explaining the asymmetry between matter and anti-matter abundances in the Universe. All these arguments show that extensions of the SM are mandatory. This simple statement is a cornerstone of our proposal that aims at investigation of more basic theories of fundamental interactions. We believe that a solution of the DM problem should also shed light on other aspects of beyond-SM physics. The existing evidence for DM originates exclusively from its gravitational interactions. Therefore, we are going to focus on DM that interacts with the SM only with gravitational strength. In parallel, we shall work at improving accuracy of the SM predictions for such B-meson decay probabilities that give relevant constraints on the beyond-SM theories we consider.