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High precision standard model physics

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Abstract content

Sometime 14×10^9 years ago, the Universe started in a Big Bang. In that moment, the huge amount of energy liberated in the explosion coalesced forming equal quantities of matter and antimatter. However, as the Universe expanded and cooled, its composition changed in such a way that, at about one second after the explosion, all the antimatter just disappeared, leaving matter to form the Universe as we know it today.

The main goal of the LHCb experiment, one of the four large experiments of the Large Hadron Collider, is to try to give answers to the question of why Nature prefers matter over antimatter ?. This will be done by studying the decay of b quarks and their antimatter partners, \bar{b} , which will be produced by billions in 14 TeV p - p collisions by the LHC. In addition, as “beauty” particles mainly decay in charm particles, an interesting program of charm physics will be carried on, allowing to measure quantities as for instance the $D^0 - \bar{D}^0$ mixing, with incredible precision.

Summary

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