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Search for $B_s \to K\pi\pi^0$ decay mode using LHCb Run 2 Data

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The Standard Model of Particle Physics explains successfully the fundamental interactions between particles of ordinary matter. However, it is incomplete, as it cannot explain neutrino masses nor cosmological observations such as matter-antimatter asymmetry in the Universe or the origin of dark matter. Physics beyond the Standard Model is either searched for production of new particles via high energy collisions or from physics happening at the intensity frontier. The indirect approach provides accurate measurements of the Standard Model parameters to confront theory and studied process where virtual new particles could contribute.

The analysis, carried out in collaboration with physicists from Pekin, UCAS and Wuhan universities aims to provide precise measurements of the branching fractions of b-hadron such as $B^0_{(s)}$ and Λ_b baryon into h+h-π^0 final states, where h can either be protons, pions or kaons. These charmless b-quark transitions are dominantly proceeding through loop diagrams in the SM and can embody in principle Beyond Standard Model amplitudes.

This presentation will outline the search of the $B_s \to K\pi\pi^0$ decay mode using samples collected during data taking in the years 2016-2018 at LHC pp collider. Dedicated multivariate tools are used to select signal candidates where each particle is correctly identified and reject combinatorial background coming from random combination of unrelated particles. The main selection procedure, the contribution of background sources and the fitting strategy will be discussed.

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