

## BEAUTIFUL MESONS AND STRANGE PHASES - $\phi_s$ MEASUREMENT IN THE CMS EXPERIMENT

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B physics studies different phenomena related to B hadrons that contain a beauty or an anti-beauty quark. Large quantities of these hadrons are produced at the Large Hadron Collider and their detection can be done with the Compact Muon Solenoid (CMS) apparatus [1] designed for the searches of new particles and physics beyond the standard model (SM).

Neutral  $B_s$  mesons, consisting of an anti-beauty and a strange quark, are especially interesting since their decays can violate charge-conjugation parity (CP) symmetry. This may happen in specific decay channels such as  $B_s \rightarrow J/\psi\phi$ , that are accessible by both  $B_s$  and its antiparticle.

CP violation can be studied in  $B_s \rightarrow J/\psi\phi$  decays by measuring a weak mixing phase  $\phi_s$  of the  $B_s - \bar{B}_s$  system. The weak phase is a physical quantity related to one of the unitary triangles of the CKM matrix. The standard model predicts the weak phase to be very small and hence, the  $\phi_s$  measurement deviating from the SM prediction could indicate new physics.

In this talk I present the result of the  $\phi_s$  measurement [2] in the CMS experiment in Run I of the Large Hadron Collider and discuss the prospects of B physics analyses in the on-going Run 2.

[1] S. Chatrchyan et al., (The CMS Collaboration), JINST **3**, S08004 (2008).

[2] S. Chatrchyan et al., (The CMS Collaboration), arXiv:1507.07527, Submitted for publication in Phys. Lett. **B**, (2015).