

## Beauty mixing and CPV

LHCb has collected the world's largest sample of beauty hadrons. This sample is used to search for new sources of CP violation, and to measure  $B_{d/s}^0$  mixing parameters. We present a selection of recent measurements performed by the LHCb experiment using the full Run 1 dataset. Among these: the measurements of the mixing-induced CP-violating phase  $\phi_s$  in the  $B_s^0 - \bar{B}_s^0$  system using  $B_s^0 \rightarrow J/\psi hh$  (where  $h = K$  or  $\pi$ ) and  $B_s^0 \rightarrow D_s^+ D_s^-$  decays, as well as several other modes including  $B_s^0 \rightarrow \psi(2S)\phi$ . A good understanding of the pollution from sub-leading penguin topologies in the reference decay channels for the  $\phi_s$  and  $\sin 2\beta$  measurements can be achieved by measuring CP violation and polarization in the decay  $B_s^0 \rightarrow J/\psi K^*$ , CP violation and branching fraction of the decay  $B^+ \rightarrow J/\psi \pi^+$  and time dependent CP violation in  $B_s^0 \rightarrow J/\psi K_S^0$ . These results together with constraints from  $B^0 \rightarrow J/\psi \rho^0$  are used to put bounds on penguin pollution to  $\phi_s$  and  $\sin 2\beta$ .

### Summary

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