

## **Bs STUDIES IN THE CHANNEL $J/\psi\phi$ IN THE CMS EXPERIMENT AT LHC**

LHC (Large Hadron Collider) is the most powerful particle collider in the world, in which many experiments are installed with the aim of studying physics at high energy. At design level, LHC is able to collide protons with center of mass energy of 14 TeV. One of the main experiments installed at one of the collision points is CMS (Compact Muon Solenoid).

The  $B_s$  is a meson which is composed of b and s quarks, and it is a relatively long-living particle. This feature is useful to discriminate it from the plenty of particles which are produced in each collision of LHC. Due to its instability, after having traveled some mil- limeters in the detector, it decays into more stable particles, which are then reconstructed in the detector with the reconstruction software.

One of the prominent decay channels of  $B_s$  is the  $B_s \rightarrow J/\psi\phi$ , with the  $J/\psi$  decaying in two muons and the  $\phi$  decaying in two kaons. This channel, more precisely the presence of the  $J/\psi$ , can fire the triggers of the experiment and permits us to reconstruct the full decay chain and the kinematics of the decay.

The  $B_s$  study has several steps, which depend on the available statistics. The first steps have been the detection and measurement of the invariant mass peak and the measurement of the differential cross sections  $d\sigma/dp_T$  and  $d\sigma/d|y|$ , where  $p_T$  is the transverse momentum and  $y$  the rapidity. Next steps will be measurement of  $\Delta\Gamma$ , the difference of decay rate of the two states of  $B_s$ , and  $\Phi_s$ , a measurement related to the CP violation in this channel.

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