



Contribution ID: 300

Type: Parallel talk

## Measurement of the weak mixing phase $\phi_s$ through time-dependent CP violation in $B_s^0 \rightarrow J/\psi \phi$ decay in ATLAS

Thursday 11 July 2019 09:40 (15 minutes)

In the Standard Model of particle physics, CP violation arises due to a single complex phase in the Cabibbo–Kobayashi–Maskawa (CKM) quark mixing matrix. Testing the validity of the CKM mechanism as the only source of CP violation is one of the major experimental challenges in particle physics today. Precise measurement of the CKM parameters therefore constrains the Standard Model, and may reveal effects beyond the Standard Model. Measurement of the time-dependent decay rates of  $B_s^0 \rightarrow J/\psi \phi$  provides a theoretically clean method for extracting CP-violating weak mixing phase  $\phi_s$ . The Standard Model predicts  $\phi_s$  to be very small and it is very well constrained, while in many new physics models large  $\phi_s$  values are expected.  $B_s^0 \rightarrow J/\psi \phi$  decay channel is sensitive to the new physics contributions, and already small deviations in a measurement of  $\phi_s$  would be hints for the existence of the new particles.

The most recent results from ATLAS are presented in CP-violating mixing phase  $\phi_s$  and several other parameters describing the  $B_s^0$  meson system.

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**Session Classification:** Flavour Physics and CP Violation

**Track Classification:** Flavour Physics and CP Violation