

Measurement of the CP -violating phase ϕ_S in $B_S^0 \rightarrow J/\psi\phi$ decays in ATLAS at 13 TeV

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A measurement of the $B_S^0 \rightarrow J/\psi\phi$ decay parameters using 80 fb^{-1} of integrated luminosity collected with the ATLAS detector from 13 TeV proton-proton collisions at the LHC is presented. The measured parameters include the CP -violating phase ϕ_S , the width difference $\Delta\Gamma_S$ between the B_S^0 meson mass eigenstates and the average decay width Γ_S . The values measured for the physical parameters are combined with those from 19.2 fb^{-1} of 7 TeV and 8 TeV data, leading to the following:

$$\phi_S = -0.087 \pm 0.036 \text{ (stat.)} \pm 0.021 \text{ (syst.) rad}$$

$$\Delta\Gamma_S = 0.0657 \pm 0.0043 \text{ (stat.)} \pm 0.0037 \text{ (syst.) ps}^{-1}$$

$$\Gamma_S = 0.6703 \pm 0.0014 \text{ (stat.)} \pm 0.0018 \text{ (syst.) ps}^{-1}$$

Results for ϕ_S and $\Delta\Gamma_S$ are also presented as 68% confidence level contours in the $\phi_S - \Delta\Gamma_S$ plane. Furthermore, the transversity amplitudes and corresponding strong phases are measured. ϕ_S and $\Delta\Gamma_S$ measurements are in agreement with the Standard Model predictions.

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Author: NARAYANAN, Easwar Anand (University of New Mexico (US))

Presenter: NARAYANAN, Easwar Anand (University of New Mexico (US))

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