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CP violation studies in the B_0 s system at D0

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We have performed searches for CP violation in the B_0 s system using data samples with $5-6.8 \text{ fb}^{-1}$ of proton-antiproton collisions collected with the D0 detector in Run II at the Fermilab Tevatron. We discuss results from a search in a sample of $B_0 \rightarrow \mu^+ D^{\prime -}_s X$ decays, where CP violation effects appear as a difference in the decay-time distribution for $B_0 \rightarrow \text{anti-}B_0$ s oscillated states versus that for $\text{anti-}B_0 \rightarrow B_0$ s. We also report an improved measurement of the CP-violating phase ϕ_s , of the decay width difference for the two mass eigenstates $\Delta \Gamma_s$, of the mean B_0 s lifetime $\overline{\tau}_s$, and of magnitudes of the decay amplitudes, from the flavor-tagged decay $B_{s0} \rightarrow J/\psi \phi$. Finally we combine these results with the measurement of the branching ratio for the decay $B_0 \rightarrow D^{(+)}_s D^{(-)}_s$ and the measurement of the like-sign asymmetry for semileptonic b decays.

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