Reconstruction of decays

\[ D_s^+ \to \phi[K^+K^-]\pi^+, K_s^0[\pi^+\pi^-]K^+, K^{*0}[K^-\pi^+]K^+ \]\n
using proc11 data

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Abstract

This document contains the \( D_s^+ \) mass plots reconstructed in the decays to following final states, \( D_s^+ \to \phi[K^+K^-]\pi^+, K_s^0[\pi^+\pi^-]K^+, K^{*0}[K^-\pi^+]K^+ \). The plots were obtained using the data collected by Belle II during 2019 corresponding to integrated luminosity of 8.8 fb\(^{-1}\). For detailed description of the analysis see: BELLE2-NOTE-PH-2020-049
1. PLOTS FOR APPROVAL:

**FIG. 1:** $M_{D_s^+}$ fit in the decay mode $D_s^+ \rightarrow \phi[K^+K^-]\pi^+$. For above plot we have used the data collected by Belle II during 2019 (proc11, exp7,8,10). The data corresponds to an integrated luminosity of 8.8 fb$^{-1}$. We performed an unbinned extended maximum likelihood fit. Sum of two symmetric gaussian are used for signal fit and a 2nd order chebychev polynomial is used for background fit. From the fit we get $N_{sig}/fb^{-1} = 507 \pm 12$. 
$D_s^+ \rightarrow \bar{K}^{-\pi^0} [K^+ \pi^+] K^+$

$N_{\text{sig}}/fb^{-1} = 452 \pm 21$

$\chi^2/ndf = 0.82$

FIG. 2: $M_{D_s^+}$ fit in the decay mode $D_s^+ \rightarrow \bar{K}^{-\pi^0} [K^+ \pi^+] K^+$. For above plot we have used the data collected by Belle II during 2019 (proc11, exp7,8,10). The data corresponds to an integrated luminosity of 8.8 fb$^{-1}$. We performed an unbinned extended maximum likelihood fit. Sum of two symmetric gaussian are used for signal fit and a 2nd order chebychev polynomial is used for background fit. From the fit we get $N_{\text{sig}}/fb^{-1} = 452 \pm 21$. 
FIG. 3: $M_{D_s^+}$ fit in the decay mode $D_s^+ \rightarrow K_S^0[\pi^+\pi^-]K^+$. For above plot we have used the data collected by Belle II during 2019 (proc11, exp7,8,10). The data corresponds to an integrated luminosity of 8.8 fb$^{-1}$. We performed an unbinned extended maximum likelihood fit. Sum of two symmetric gaussian are used for signal fit and a 2nd order chebychev polynomial is used for background fit. From the fit we get $N_{\text{sig}}/fb^{-1} = 347 \pm 14$. 