

# Supplementary material for LHCb-PAPER-2022-031

## Amplitude projections with $K^{*-}$ resonances

In Fig. 1, one-dimensional projections of invariant mass distributions and the  $\cos\theta_{K^*}$  angular variable are shown for the model with only  $K^{*-}$  resonances. This model does not describe the data well as indicated by  $\chi_{max}^2/ndf = 123/46$ .

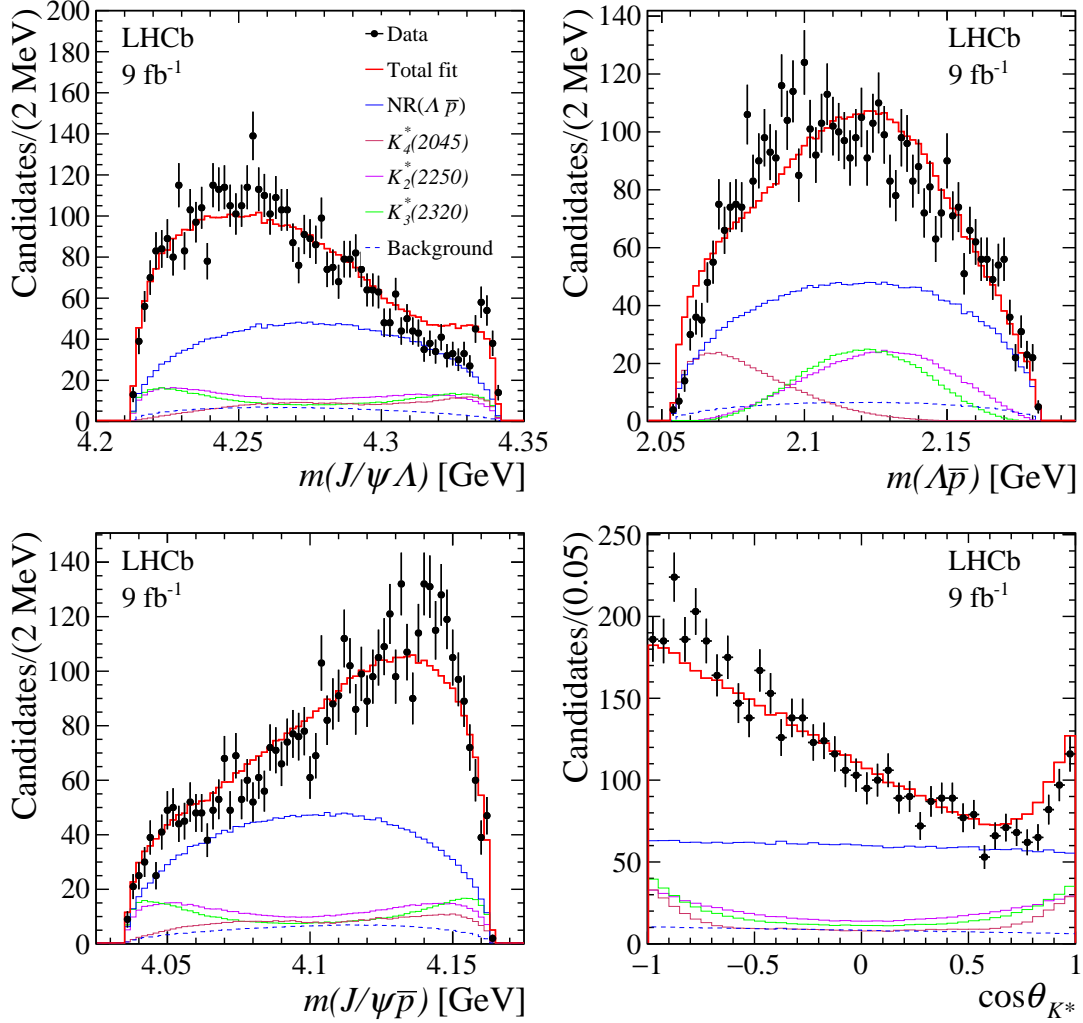


Figure 1: Distributions of invariant mass and  $\cos\theta_{K^*}$ . Fit results to data using the  $K^*$  model are superimposed.

## Amplitude projections with resonant $\overline{P}_\psi^{N^-}$ state

In Fig. 2, one-dimensional projections of invariant mass distributions, and the  $\cos\theta_{K^*}$  angular variable are shown for the model with a resonant  $\overline{P}_\psi^{N^-}$  contribution, modeled by a Breit-Wigner lineshape. This model is discarded because of an increase in  $-2 \log \mathcal{L}$  with respect to the nominal model of around 80.

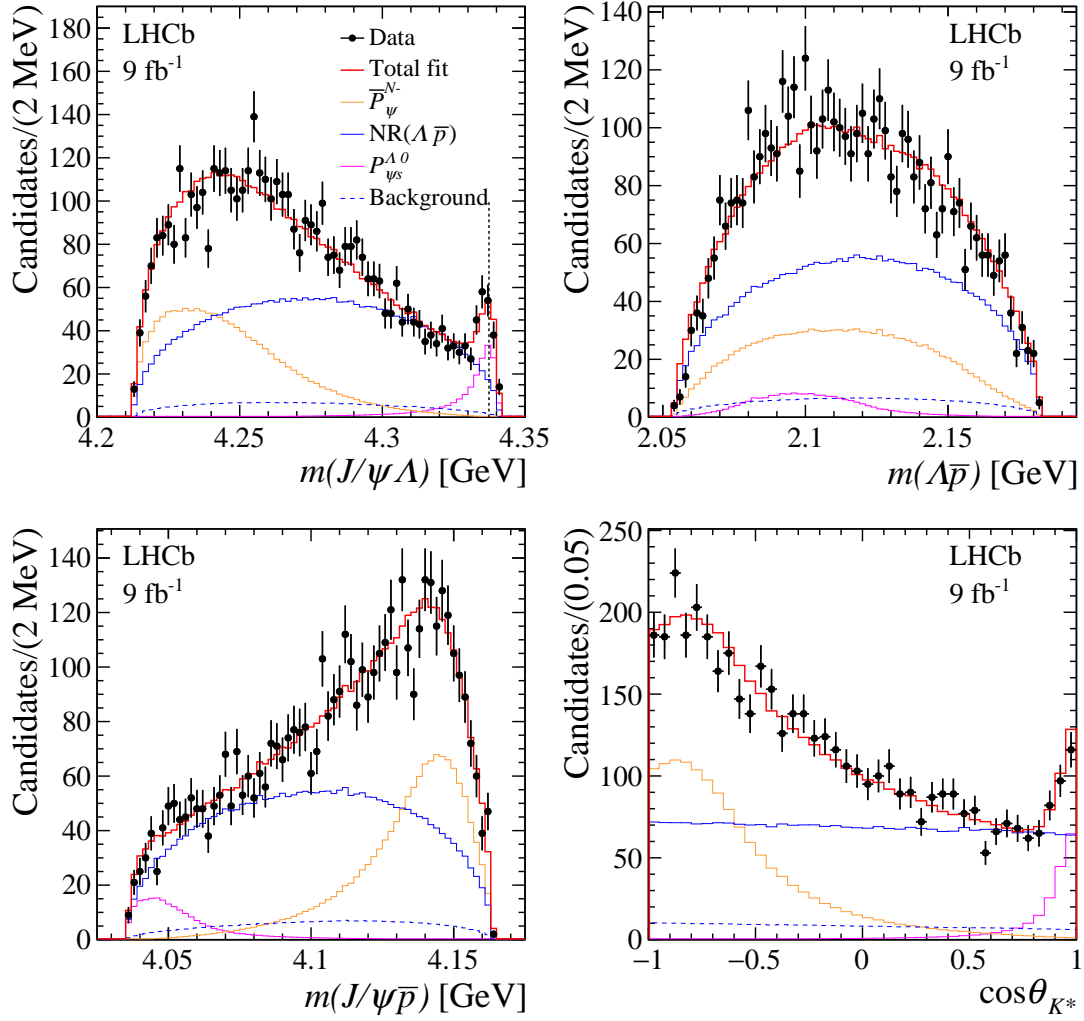


Figure 2: Distributions of invariant mass and  $\cos\theta_{K^*}$ . Fit results to data using the model with a  $\bar{p}J/\psi$  resonant contribution are superimposed.