## **EPS-HEP2023** conference



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## Examining semileptonic decays of $B_s$ to $D_s^{**}$ mesons beyond the standard model

Deviations of the measured LFU ratios such as  $R_{D^{(*)}}$  and  $R_{J/\psi}$  from the standard model predictions by  $3.2\sigma$ and  $1.8\sigma$ , respectively, indicate the possible existence of new physics beyond the standard model. Precise measurements of other observables in decays involving  $b \to c\bar{\ell}\nu_{\ell}$  transitions in the future may substantiate or rule out the presence of new physics. Hence, it becomes important to analyze complementary  $b \to c\bar{\ell}\nu_{\ell}$ channels also such as  $B_s \to D_s^{**}\ell\nu_{\ell}$ , where  $D_s^{**} = \{D_{s0}^*, D_{s1}^*, D_{s1}, D_{s2}^*\}$ . The measured ratios  $R_{D^{(*)}}$ suggest an excess of taus, whereas the measured ratio  $R_{\Lambda_c}$  shows a deficit in taus. The complementary information obtained from the measurement of LFU ratios like  $R_{D_s^{**}}$  may become crucial in the interpretation of the contributing new physics. In this work, we analyze various  $q^2$ -dependent observables pertaining to the  $B_s \to D_s^{**}\ell\nu_{\ell}$  decay modes within a new physics approach. The new interactions are constrained using available experimental data of  $b \to c\bar{\ell}\nu_{\ell}$  transitions.

## **Collaboration / Activity**

**Primary authors:** MAWLONG, Barilang (University of Hyderabad); JAIN, Karthik (University of Hyderabad)

Presenter: JAIN, Karthik (University of Hyderabad)

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