

Search for the decay $B \rightarrow D^* \eta \pi$ at Belle and Belle II

We present a search for the yet-unobserved $B \rightarrow D \eta \pi$ decay at Belle and Belle II. This search aims to provide insights into the semileptonic gap, which refers to the deficit in the sum of the branching fractions of known exclusive decays compared to the measured inclusive $b \rightarrow c \ell \nu$ branching fraction. Common models addressing this deficit suggest the existence of $B \rightarrow D \eta \ell \nu$ decays with a branching fraction of 4×10^{-3} , which could imply a branching fraction of $B \rightarrow D \eta \pi$ around 2×10^{-4} based on a naive prediction derived from the ratio of branching fractions of $B \rightarrow D \pi$ and $B \rightarrow D^* \ell \nu$. Utilizing the $\sim 1.1 \text{ ab}^{-1}$ of data collected at Belle and Belle II combined, we are initiating a preliminary search to investigate and potentially observe this decay for the first time. This search is also expected to significantly enhance our understanding of the B hadronic sector.

Track type

Flavour Physics

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