

Improving Belle II Simulation for Rare B Meson Decays

The Standard Model (SM) describes elementary particles and their interactions but may be part of a more general theory. The Belle II experiment tests the SM by studying B meson decays, particularly those with missing energy, which are sensitive to new physics.

A recent Belle II result on $B \rightarrow K \nu \bar{\nu}$ shows a deviation from the SM, increasing interest in similar decays. At DESY, an analysis of $B^0 \rightarrow \rho^0 (\rightarrow \pi^+ \pi^-) \nu \bar{\nu}$ is underway, where precise simulation is crucial. A key challenge is background from $a_1(1260) \rightarrow \pi \pi$, which mimics ρ^0 but has poorly known properties.

This project focuses on improving Belle II simulation by studying $a_1(1260)$ decays using control samples and real data. The student will reconstruct and identify these decays, reducing systematic uncertainties in the analysis. Basic Python knowledge is required.

Group

FH-BELLE

Project Category

B1. Physics data analysis and performance (software-oriented)

Special Qualifications

Basic Python knowledge

DESY Site

Hamburg

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