

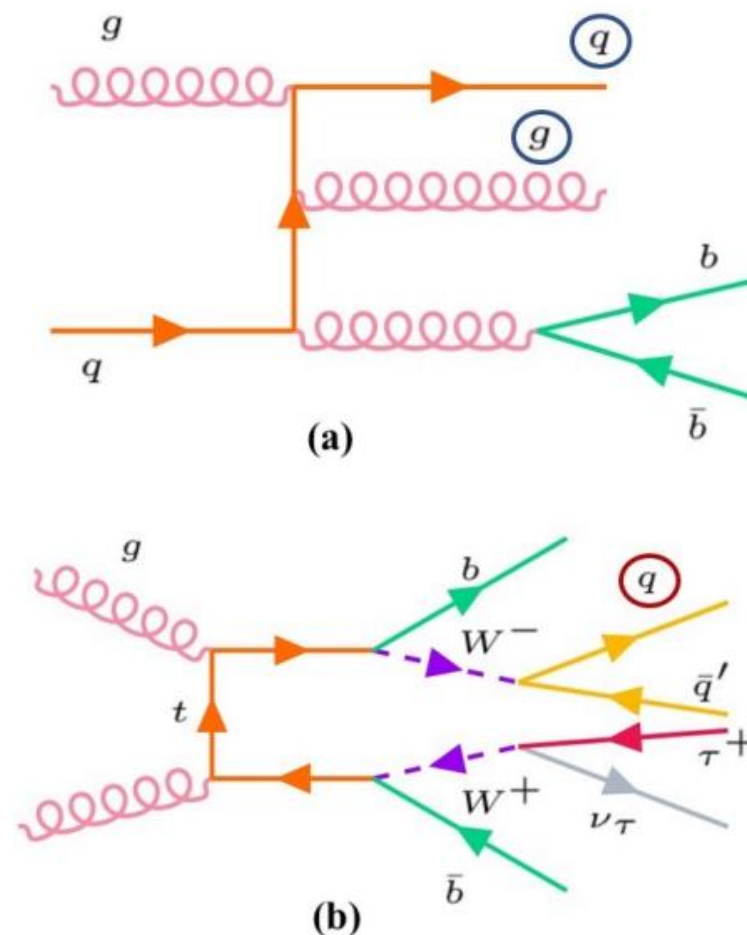
Physics Colloquium

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Data-Driven Study of Fake Tau Backgrounds in DiHiggs Analysis

ABSTRACT

The Standard Model (SM) of particle physics is one of the most successful scientific theories in the history of humankind. It describes the fundamental constituents of the universe and their interactions that define the world around us. CERN is home to the Large Hadron Collider (LHC) in Geneva, Switzerland and is the most robust particle accelerator to date. This talk will discuss the ATLAS detector at the LHC that is responsible for the data used within. The Higgs boson was discovered in 2012, and is the final piece of the SM. Di-Higgs (HH) production is of interest in the scientific community as correct measurement of self-coupling could lead to refinement of the shape of the scalar potential and introduce possible beyond SM physics. The modeling of the fakes background for the $HH \rightarrow \bar{b}b\bar{\tau}\tau$ decay channel is the use of data fakes (DataFakes) collected from ATLAS Run 2 of the LHC and compare them to fakes produced in Monte Carlo fakes (MCFakes) simulations for background modeling. A comparison of the two models is done by creating histograms of DataFakes and MCFakes inserted into background, seeing how the data fits the new backgrounds, and comparing the two with real ATLAS Run 2 data. The California State University (CSU) summer program made the work possible for students like me.



3:00-3:30 p.m., Friday, January 24th, 2025

In-person in McLane Hall 162