

SEMINAR NOTICE

Title: *Advanced Machine Learning Strategies for Probing Rare Top Quark Decays at the LHC*

Speaker: Dr. Amit Chakraborty

Affiliation: Department of Physics, SRM University, AP

Date: September 28 (Monday) 2026; **Time:** 4.30 PM

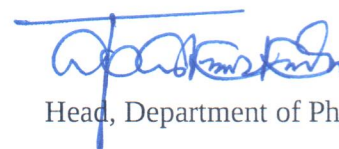
Venue: Seminar Room (M2-13), Department of Physics, Visva-Bharati

Abstract

Searching for rare top quark decays via Flavor-Changing Neutral Currents, such as $t \rightarrow cH$, offers a powerful window into Beyond the Standard Model physics. At the Large Hadron Collider, identifying these processes in the boosted regime relies heavily on reconstructed large- R jets containing three-prong substructures with b - and c -tagged components. This presentation explores both supervised and unsupervised machine learning approaches tailored for identifying such anomalous events. First, we highlight an advanced boosted top-tagging framework that incorporates refined jet substructure observables and game-theory-based SHAP analysis to assess variable contributions and optimize signal-background discrimination. Second, we present a model-agnostic anomaly detection framework using Self-Organizing Maps (SOM). By clustering high-dimensional event data onto a Kohonen map without relying on signal hypothesis assumptions, the SOM algorithm effectively separates signal and background regions to enhance significance. Together, these complementary techniques demonstrate the power of modern tagging and unsupervised learning architectures in broadening the reach of rare decay searches at current and future colliders.


Convener, Seminar Committee

23/09/2028

 23/9/2026
Head, Department of Physics