# Improved sensitivity to BSM Higgs bosons from final states with unreconstructed particles and a modified approach to kinematic event reconstruction

Searches for heavy Higgs bosons decaying into pairs of top quarks is a promising avenue to discover new physics at the LHC. Due to the so-called peak-dip structure from interference effects with Standard Model ttbar production, current searches rely on fully reconstructed final states, which require the presence of at least 2 jets and 2 leptons. In this work, the inclusion of final states with just a single jet and two leptons will be explored. Several novel observables in this event category will be explored and the sensitivity increase estimated. Besides adding a new category of final states, a modified approach to kinematic event reconstruction will be explored. The outcome of the project will be the base for a future search for heavy scalar particles at the LHC Run 3 and has huge potential for significant gains in searches for BSM physics with top quark final states.

#### Field

B1: Particle physics analysis (software-oriented)

#### **DESY Place**

Hamburg

#### **DESY Division**

FH

### **DESY Group**

CMS Exotics

## **Special Qualifications:**

Required - Python Desirable - Statistical analysis, phenomenology background

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