Impact of missing transverse momentum resolution on sensitivity to Dark Matter in top quark events

The main signature in searches for Dark Matter at the Large Hadron Collider is the presence of missing transverse energy in the final state, given the invisible nature of these particles and thus the impossibility of identifying them when traversing the detectors. The success of finding the dark particles relies then on a good and precise measurement of the missing momentum along the transverse component. In this project, a study to assess the impact of the resolution of this quantity in the separation between the Standard Model background and the Dark Matter signal in final states with two leptons produced from decays from two top quarks will be carried out. The study targets the so-called S-transverse mass variable, which presents a characteristic high value in a process involving invisible decays and that could potentially be affected by the resolution of the missing transverse energy. The project aims to evaluate the quality of the limits imposed on the cross-section for the associated production of Dark Matter with top quarks when varying the resolution of the missing transverse energy. This investigation is intended to be done using fast simulation tools such as Delphes in the context of the simplified phenomenological framework MadAnalysis.

Field

B1: Particle physics analysis (software-oriented)

DESY Place

Hamburg

DESY Division

FH

DESY Group

CMS Exotics

Special Qualifications:

Required - C++, Python Desirable - ROOT, Statistical analysis

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