Contribution ID: **25**   Type: **not specified**

Discrimination between tWZ and ttZ production using Machine Learning

The production of a single top quark in association with a W and a Z boson is a very rare process in the SM. One of the challenges for its
identification, besides the small cross section, is the overlap with the ttZ process that has same final state but a cross section 5 times larger.
For this reason it is necessary to develop a machine learning algorithm to increase the discrimination of tWZ against ttZ with compared to
traditional methods.
The student will develop a binary classifier performing the feature selection (starting from a set of promising variables already selected), the
hyper-parameter tuning and the evaluation of the results obtained from the model. The first step will be a test on parton level variables to gauge
the achievable separation power. As a next step, the model will be employed at the particle and reconstruction levels, trying to obtain an
efficiency as close as possible to the one obtained at parton level. Depending to the time available, the project can be extended to learn the
features of other backgrounds apart from ttZ.

Field

B1: Particle physics analysis (software-oriented)

DESY Place

Hamburg

DESY Division

FH

DESY Group

CMS

Special Qualifications:

Basic knowledge of Python and coding.
Knowledge in Machine Learning would be an asset.

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