

**DpG Talk: Negative Event Weights in Machine Learning and search
for heavy Higgs bosons in top quark pair events at CMS**
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Key of the LHC research program are sophisticated Monte-Carlo event generators. When involving higher order predictions or interference effects, simulated events can be negatively weighted. To achieve correct results with maximum sensitivity, negative weights cannot simply be ignored when working with Machine Learning methods. In this talk, I will discuss the issues that arise in trainings of Deep Neural Networks through negatively weighted events and propose a solution on how to efficiently handle them. Additionally, I will discuss the application of these techniques in a search for heavy Higgs bosons and its potential for LHC data analyses in general.