38th INTERNATIONAL CONFERENCE ON HIGH ENERGY PHYSICS
AUGUST 3 - 10, 2016
CHICAGO

Contribution ID: **535** Type: **Poster**

Boosting Higgs Pair Production in the bbbb Final State with Multivariate Techniques

Monday 8 August 2016 18:30 (2 hours)

The measurement of Higgs pair production will be a cornerstone of the LHC program in the coming years. Double Higgs production provides a crucial window upon the mechanism of electroweak symmetry breaking and has a unique sensitivity to the Higgs trilinear coupling. We study the feasibility of a measurement of Higgs pair production in the bbbb final state at the LHC. Our analysis is based on a combination of traditional cut-based methods with state-of-the-art multivariate techniques. We account for all relevant backgrounds, including the contributions from light and charm jet mis-identfication, which are ultimately comparable in size to the irreducible 4b QCD background. We demonstrate the robustness of our analysis strategy in a high pileup environment. For an integrated luminosity of L = 3 ab-1, a signal signficance of S/B˜3 is obtained, indicating that the bbbb final state alone could allow for the observation of double Higgs production at the High Luminosity LHC. We also fund that, provided light jet mis-identification can be reduced, the signal significance could be increased up to the discovery level.

Authors: ISSEVER, Cigdem (University of Oxford (GB)); Prof. BORTOLETTO, Daniela (University of Oxford (GB)); FROST, James (University of Oxford (GB)); BEHR, Janna Katharina (Deutsches Elektronen-Synchrotron (DE)); HARTLAND, Nathan (University of Oxford); Dr JUAN, Rojo (University of Oxford)

Presenter: Prof. BORTOLETTO, Daniela (University of Oxford (GB))

Session Classification: Poster Session

Track Classification: Higgs Physics