



THE CHINESE UNIVERSITY OF HONG KONG
Department of Physics
SEMINAR

Sensitivity on Two-Higgs Doublet Models from Higgs-Pair Production via Final State

by

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ALL INTERESTED ARE WELCOME

Abstract

Higgs boson pair production is a well known probe of the structure of the electroweak symmetry breaking sector. We illustrate this using gluon-fusion processes $pp \rightarrow H \rightarrow hh \rightarrow b\bar{b}b\bar{b}$ in the framework of two-Higgs-doublet models and show how a machine learning approach (three-stream convolutional neural network) can substantially improve the signal-background discrimination and thus improve the sensitivity coverage of the relevant parameter space. We further show that such $gg \rightarrow hh \rightarrow b\bar{b}b\bar{b}$ processes can probe the parameter space currently allowed by HIGGSIGNALS and HIGGSBOUNDS at the HL-LHC. Results are presented for 2HDM types I through IV.