Contribution ID: **30** Type: **not specified**

The Di-Higgs Photography with Deep Neural Networks

Friday 17 January 2020 16:40 (20 minutes)

We search for a hint of new physics concealed in the structure of the Standard Model (SM) via double Higgs production. Focusing on a relatively overlooked bbWW* final state, we portray an entire final state using charged/neutral hadron, lepton, and reconstructed neutrino images. We design various types of residual neural networks (ResNet), which efficiently exploit the correlations among the images, to disentangle the Di-Higgs images of anomalous Higgs self-coupling against the SM backgrounds. The proposed method has a potential to improve the precise measurement of the Higgs self-coupling, and has a wide applicability to disentangle the higher dimensional operators in the effective field theory (EFT) framework.

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Session Classification: Applications