

## **ML approach to VBF event topology classification: Recurrent Neural Network based on jets information**

*Monday 20 July 2020 17:00 (9 minutes)*

A new approach for the identification of VBF topology is presented. A Recurrent Neural Network (RNN) approach based on the 4-momentum of the small-R jets in the event has been developed in the context of the search of high mass resonances decaying into diboson semi-leptonic final states ( $X \rightarrow VV \rightarrow \nu\nu/l\nu/l + qq$ ). The class of RNN networks shows high performances and opportunity to deal with variable length input set as the 4-momentum of jets in an event. The analysis is performing the classification of VBF vs ggF/DY events based on the score of the RNN before the full analysis flow. This method shows higher classification performances and an higher signal efficiency respect to usual approaches based on the tagging of the VBF-like jets. The simple 4-momentum (low-level variables) of the small-R jets in the event are used instead of other variables built starting from them (high-level variables). Furthermore, this approach based on jets information of the event is independent by the lepton channel of the diboson decay and it has been used for different spin hypothesis.

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**Session Classification:** Session 6

**Track Classification:** New approaches