Contribution ID: **84**   Type: **Talk**

Reconstruction of the transverse momentum of a dark matter mediator using a neural network in regression mode

Wednesday 25 August 2021 11:30 (30 minutes)

Many searches at the LHC experiments target topologies with three or more invisible particles in the final state. The reconstruction of the full event kinematics is in general not possible even using the information provided by the missing transverse momentum or by the constraints based on the presence of known-mass resonances in the decay chain process. On the other hand, the space of momentum solutions for the invisible particles is frequently small enough to allow their inference through the momentum correlations of the visible particles. This work proposes an example in which a dark matter mediator is produced in association with one or two top quarks decaying semi-leptonically and yielding two neutrinos plus the mediator in the final state. A neural network has been trained in regression mode to predict the transverse momentum of the dark matter mediator, achieving a resolution of about 30%. These ideas could be exploited at the LHC experiments to characterize and discriminate possible signal events from standard model backgrounds.

Is this abstract from experiment?

No

Name of experiment and experimental site

N/A

Is the speaker for that presentation defined?

Yes

Details

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Internet talk

Yes

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Session Classification: Mini-workshop on Machine Learning for Particle Physics