

## **Artificial Intelligence for Particle and** Astroparticle Physics @ TIFPA

ATLAS collaboration, CSES-Limadou collaboration, deepPP initiative and PRIN "IONOTRANS"



**ATLAS** EXPERIMENT

ATLAS is a particle detector on the Large Hadron Collider at CERN. Its large open geometry is specifically designed to explore

## Deep Learning signal selection for the VBF H(cc/bb) analysis

Vector-boson fusion (VBF) is the second most frequent Higgs boson production mechanism. Studying Higgs boson decays into b-quarks in the VBF channel provides an avenue to pursue this challenging signature.



## Flavor tagging with Graph Neural Networks

**GN1** is the new flavor tagger based on Graph Neural Network, with multi-head attention.

- Starting from jet and track features.
- Jet flavor, vertexing and track origin tasks trained simultaneously to achieve better performance.



## **Deep Learning event reconstruction for Limadou HEPD-02**

The Limadou HEPD-02 event reconstruction strategy is based on the use of Deep Neural Networks. The core of the reconstruction chain is a set of neural networks that reconstructs the nature and the kinetic energy of incoming particle, starting from the signals recorded in the detector.





Training of the **DNNs is performed** on GPU at Recas



Identification accuracy of the DNNs on beam test data





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