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Boosted Objects in Vector Boson Scattering: from classical to quantum ML prospects

The study of Vector Boson Scattering (VBS) at LHC provides an unique window into the electroweak symmetry breaking mechanism. The polarization of the vector bosons enables precision tests of the heart Standard Model at the TeV scale, additionally sensible

to new physics. The highest experimental sensitivity can be achieved in the boosted regime, where the bosons are produced with large transverse momentum, and decay hadronically.

However, the resulting collimated decay products are reconstructed as single large-R jets, posing a major challenge for event reconstruction and signal discrimination.

In this poster we explore a comprehensive machine learning strategy for polarization reconstruction in VBS topologies, from jet images to more advanced architectures.

Finally, we discuss emerging prospects for quantum-enhanced analysis.

INFN OpenAccess Repository link

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