

# Solving Combinatorial Problems in Multijet Signatures Using Machine Learning

*Tuesday 1 November 2022 15:00 (20 minutes)*

High-multiplicity signatures at particle colliders can arise in Standard Model processes and beyond. With such signatures, difficulties often arise from the large dimensionality of the kinematic space. For final states containing a single type of particle signature, this results in a combinatorial problem that hides underlying kinematic information. We explore using a neural network that includes a Lorentz Layer to extract high-dimensional correlations. We use the case of squark decays to jets in R-Parity-violating Supersymmetry as a benchmark, comparing the performance to that of classical methods. With this approach, we demonstrate significant improvement over traditional methods. Based on arXiv:2201.02205.

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**Session Classification:** Equivariance and New Architectures