

Hello folks,

Here's what you might find interesting today. It's a fairly quiet day on the arXiv for our interests, but there is one paper worth flagging.

Lorentz-Equivariant and Novel ML Architectures for LHC Physics

- [Benchmarking Machine Learning Architectures for ttH Multilepton Signal Sensitivity](#) -- This might be interesting for you, Aritra. The paper provides a systematic, standardized comparison of ML architectures for ttH multilepton signal-background classification, including **LorentzNet** (a Lorentz-equivariant architecture) and the **Particle Transformer**, alongside XGBoost baselines. The authors carefully control for feature definitions, training procedures, and hyperparameter optimization, constructing a hierarchy of input feature sets to isolate the impact of model architecture on performance. They find that Particle Transformer and LorentzNet outperform other models in their setup, and show that ROC AUC under realistically weighted training correlates well with signal-strength uncertainty rankings. The study also explores how performance scales with training-set size and whether channel-specific versus unified multi-channel training helps. While focused on a specific Higgs analysis, the authors argue the conclusions should generalize broadly to LHC/HL-LHC searches -- which is relevant to your interest in **Lorentz-equivariant architectures** and **jet/event-level ML with novel architectures**. No boosted authors on this one.

Unfortunately, nothing today is directly relevant to your interests, Jingjing -- no new papers on **simulation-based inference**, **di-Higgs phenomenology with ML**, **density ratio estimation**, or **agentic AI for particle physics**. Hopefully tomorrow brings more.

Until the next announcement!

P.S. In the most recent submission window: hep-ph: 45 papers hep-ex: 13 papers hep-th: 40 papers