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The MadNIS Reloaded

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Theory predictions for the LHC require precise numerical phase-space integration and generation of unweighted events. We combine machine-learned multi-channel weights with a normalizing flow for importance sampling to improve classical methods for numerical integration. By integrating buffered training for potentially expensive integrands, VEGAS initialization, symmetry-aware channels, and stratified training, we elevate the performance in both efficiency and accuracy. We empirically validate these enhancements through rigorous tests on diverse LHC processes, including VBS and W+jets

Primary authors: HUETSCH, Nathan (Heidelberg University); WINTERHALDER, Ramon (UCLouvain); HEIMEL, Theo (Heidelberg University); PLEHN, Tilman (Universität Heidelberg, ITP)

Presenter: WINTERHALDER, Ramon (UCLouvain)

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