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A comparative study of Z production via vector boson fusion (VBF) using PYTHIA8 shower models

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The production of Z bosons via vector boson fusion (VBF) is a standard candle process for probing Monte Carlo models as it can be easily compared with available real data. Accurate theoretical predictions for this process are essential, particularly when interfacing with parton shower models like Dipole and Vincia implemented in PYTHIA8. This presentation will synthesize findings from recent studies to elucidate the current understanding and challenges in modeling VBF-induced Z boson production. We will delve into the comparative analyses of different parton shower algorithms available in PYTHIA8 as explored in recent studies. These investigations highlight how variations in shower algorithms can impact the modeling of QCD radiation in VBF processes, affecting observables such as jet multiplicities and distributions.

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