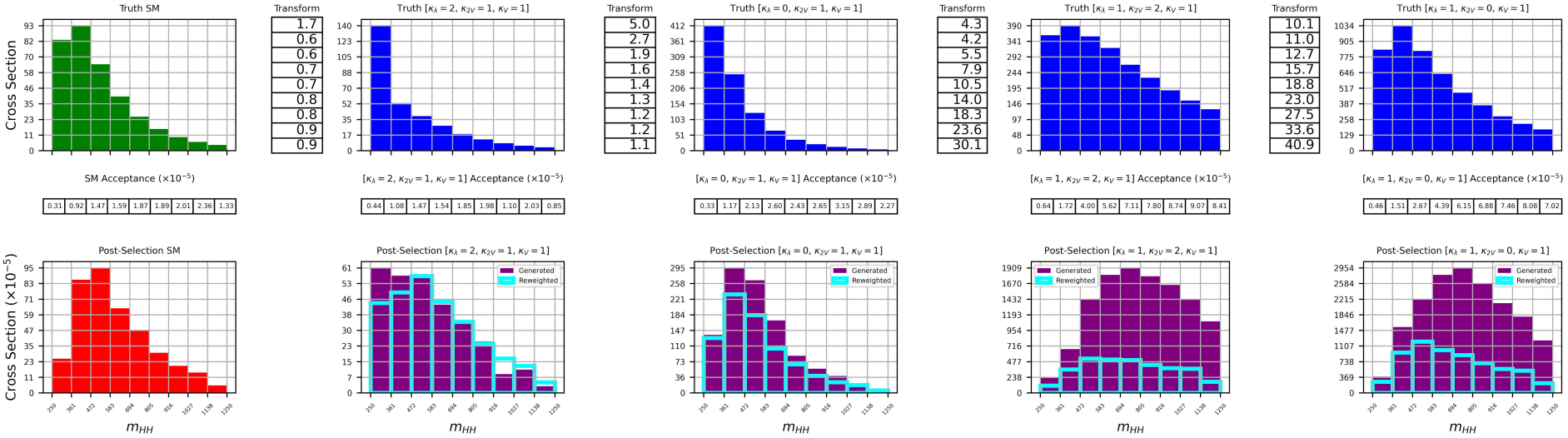
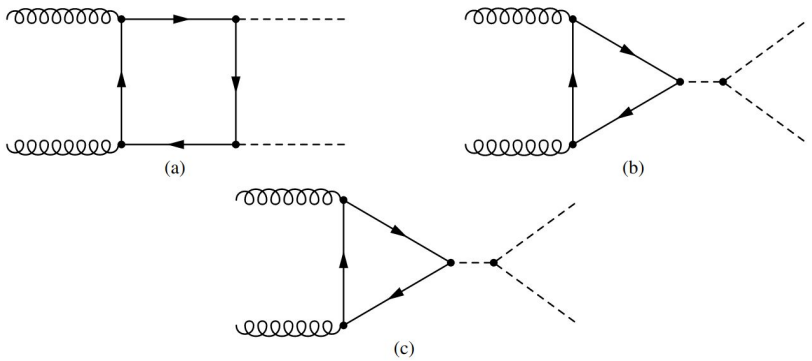
Truth reweighting consistently fails to accurately model other distributions, owing to unexpected differences in acceptance between coupling variations

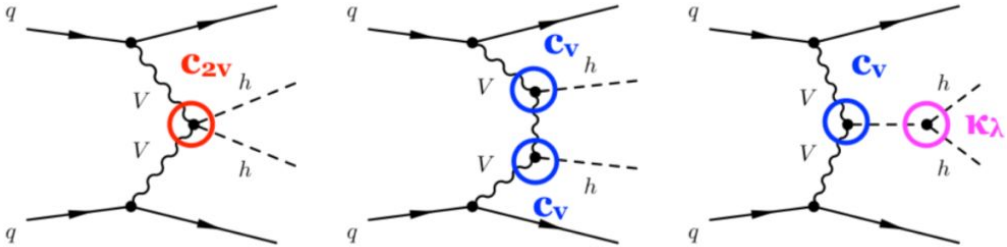


Why might mHH not be enough?

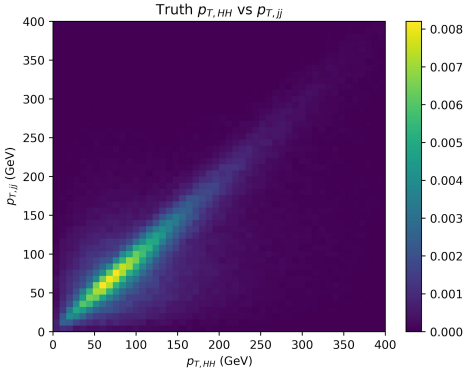
In ggF, all of the event kinematics go into the production of the di-Higgs system, the only exception to this being occasional radiation



In VBF, a huge portion of the event kinematics go into the rebounding initial scatter quarks

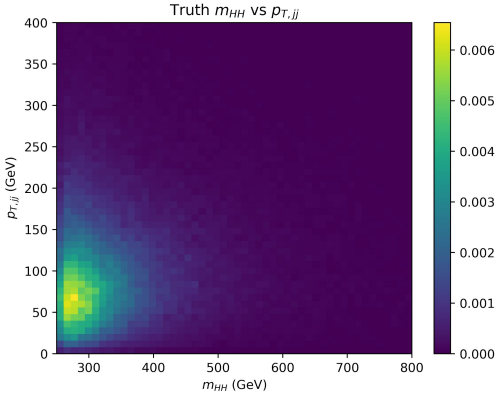


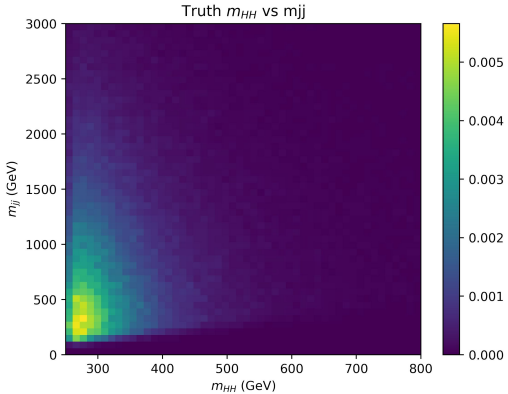
mHH has very little relation to the initial scatter jet kinematics

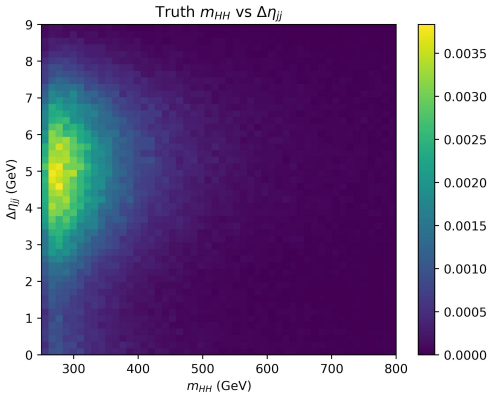


pt_HH and pt_jj are strongly correlated (because kinematically they must be)

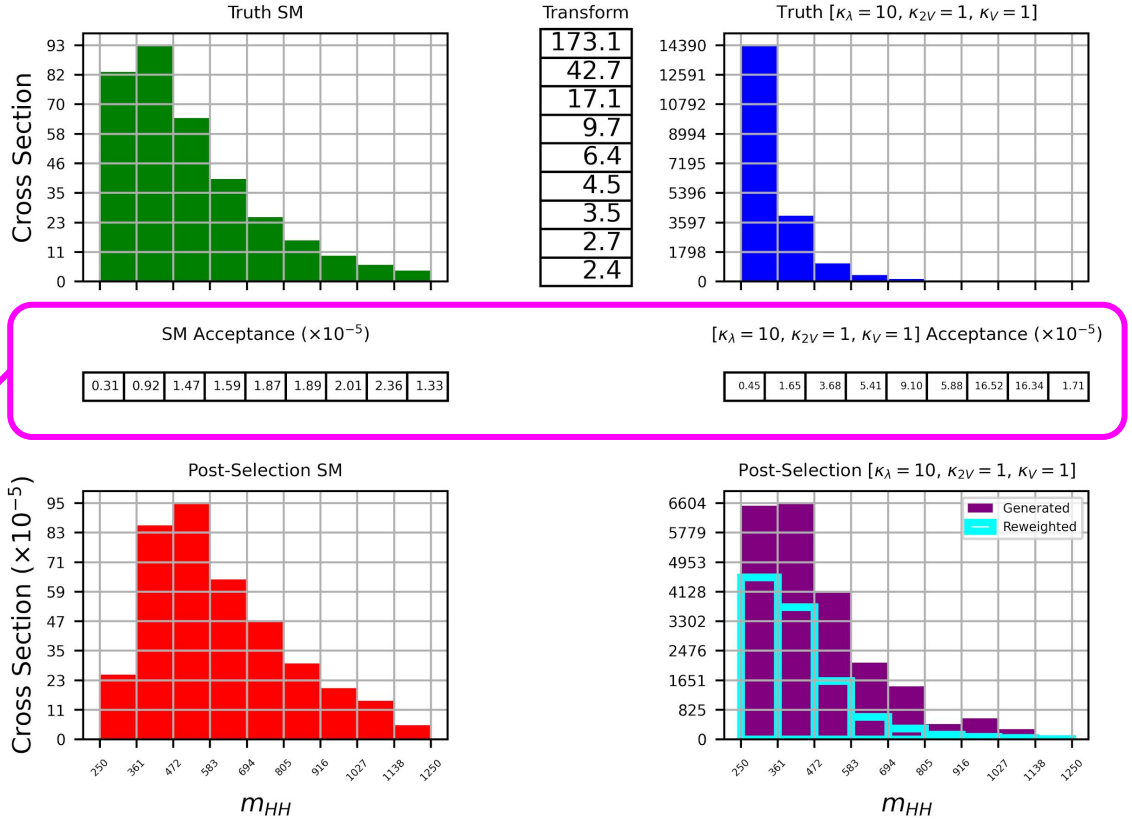
But mHH has almost no correlation to any kinematic properties of the initial scatter system







Create a metric for measuring divergence in acceptance



Combine to
“Relative Difference in Acceptance”:

D = (Var. accept. - SM accept.) / Var. accept

sig	0.31	0.44	0.60	0.71	0.79	0.68	0.88	0.86	0.22