

Abstract Submitted  
for the TSF21 Meeting of  
The American Physical Society

**Search for new physics using top quark pairs produced in association with a boosted Z or Higgs boson in effective field theory** BRYAN CARAWAY, Baylor University, CMS COLLABORATION — A data sample containing top quark pairs produced in association with a boosted Z or Higgs boson is used to search for signs of new physics within the framework of effective field theory (EFT). The data correspond to an integrated luminosity of  $137 \text{ fb}^{-1}$  of proton-proton collisions produced at a center-of-mass energy of 13 TeV at the LHC and collected by the CMS experiment. Selected collision events contain a single lepton and hadronic jets, including two identified with the decay of bottom quarks, plus an additional large-radius jet with high transverse momentum ( $p_T$ ) identified as a Z or Higgs boson candidate decaying to a bottom quark pair. Machine learning techniques are employed to discriminate  $t\bar{t}Z$  and  $t\bar{t}H$  events from background processes, dominated by  $t\bar{t} + \text{jets}$  production. The signal strengths of boosted  $t\bar{t}Z$  and  $t\bar{t}H$  processes are measured, and upper limits are placed on the  $t\bar{t}Z$  and  $t\bar{t}H$  differential cross sections as functions of the Z or Higgs boson  $p_T$ .

Bryan Caraway  
Baylor University

Date submitted: 13 Oct 2021

Electronic form version 1.4