7th Red LHC Workshop, May 10-12, 2023

Round Table: Anomalies

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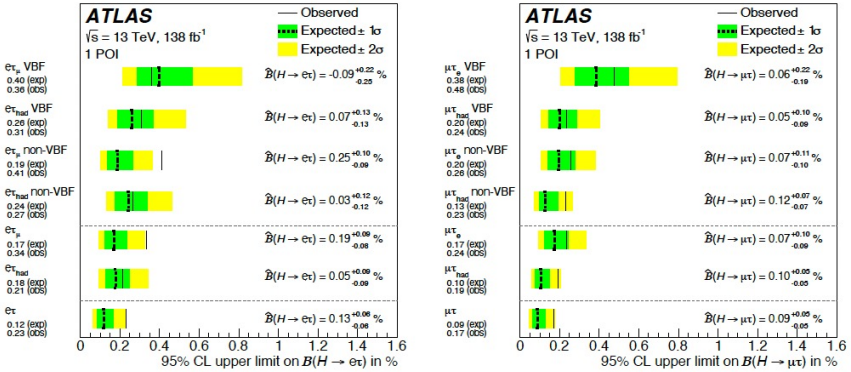
IFAE Institut de Física d'Altes Energies

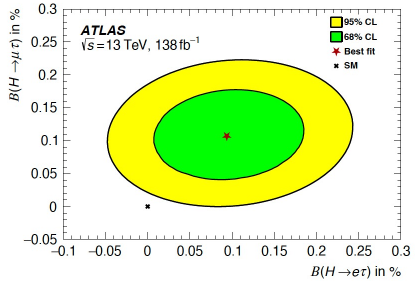
EXCELENCIA SEVERO OCHOA

BIST Barcelona Institute of Science and Technology

Hints of small flavor-violation in Higgs/top decays?

arXiv:2302.05225



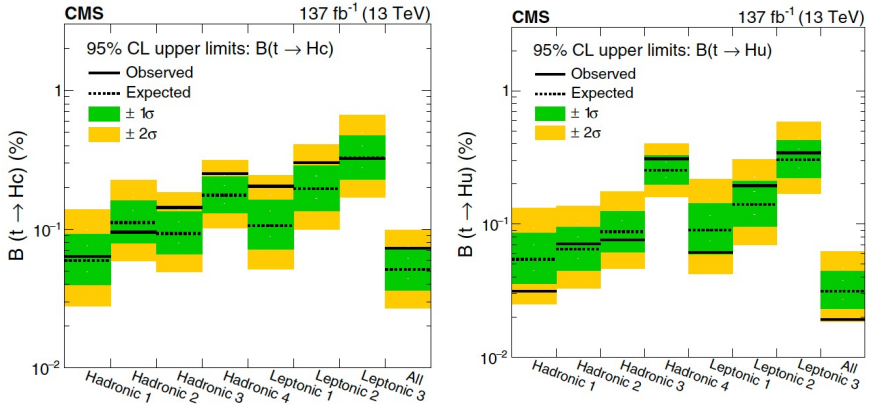


See talk by Antonio Jesus Gomez Delegido

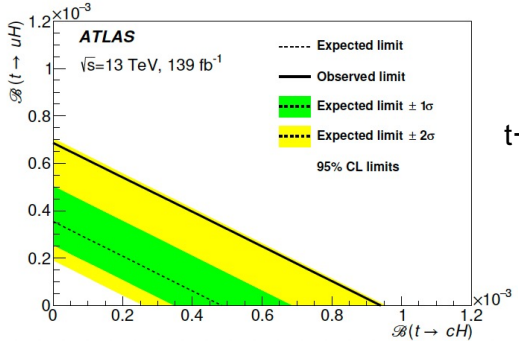
- Not excluded by CMS (arXiv:2105.03007):

	Observed (expected) upper limits (%)	Best fit branching fractions (%)	Yukawa coupling constraints
$H \to \mu\tau$	<0.15 (0.15)	0.00 ± 0.07	$< 1.11\,(1.10) \times 10^{-3}$
$H \to e\tau$	<0.22 (0.16)	0.08 ± 0.08	$< 1.35\,(1.14) \times 10^{-3}$

arXiv:2111.02219 t→qH(→γγ)



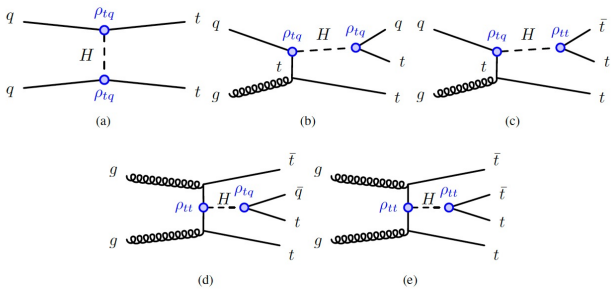
arXiv:2208.11415

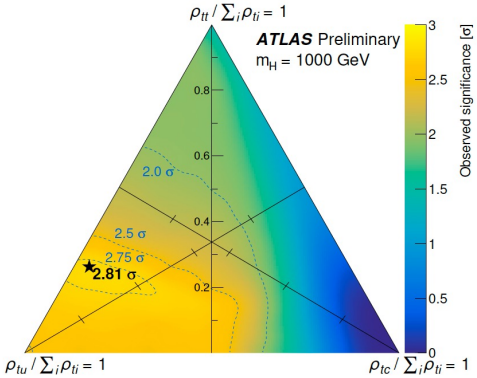


t→qH(→ττ)

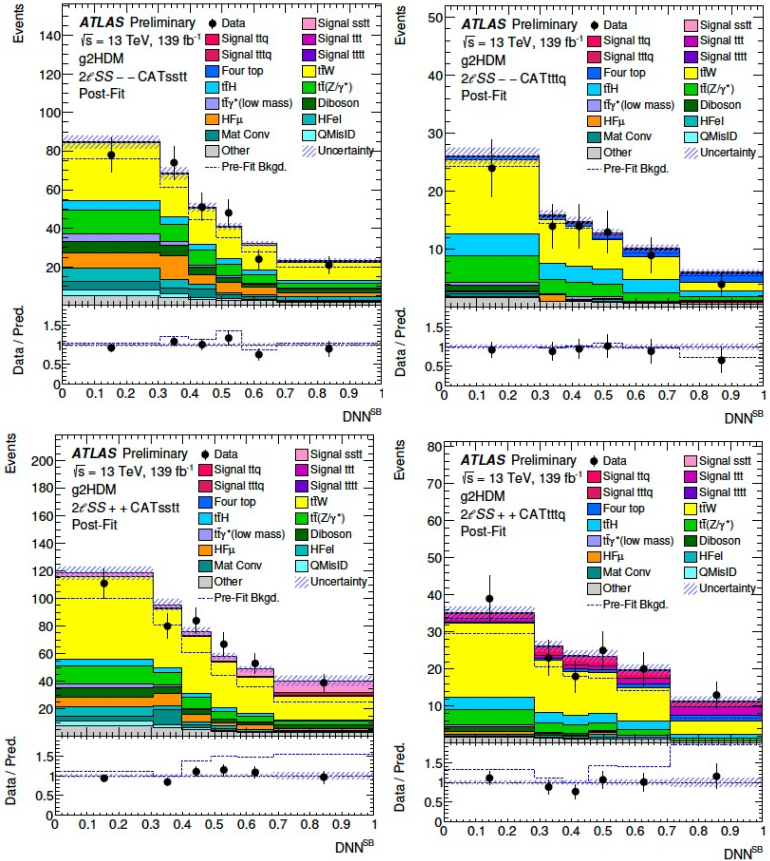
Hints of large flavor-violation in heavy Higgs sector?

ATLAS-CONF-2022-039

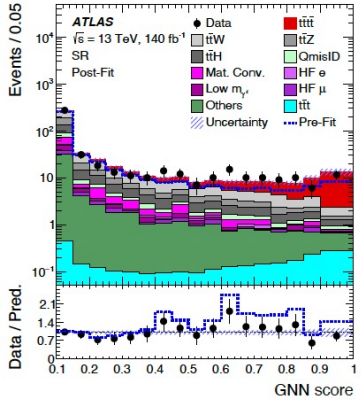




See talk by
Merve Nazlim Agaras

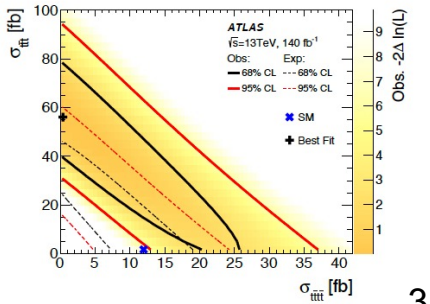


arXiv:2303.15061



$$\sigma_{t\bar{t}t\bar{t}} = 22.5^{+4.7}_{-4.3}(\text{stat})\,^{+4.6}_{-3.4}(\text{syst})\ \text{fb} = 22.5\,^{+6.6}_{-5.5}\ \text{fb}$$

SM: $\sigma_{t\bar{t}t\bar{t}} = 12.0 \pm 2.4$ fb

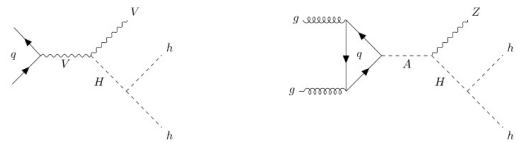


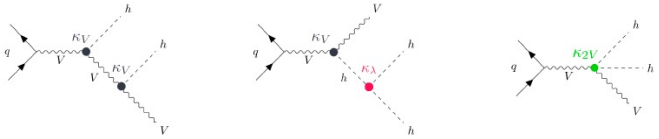
Hints of a signal in Vhh events?

arXiv:2210.05415

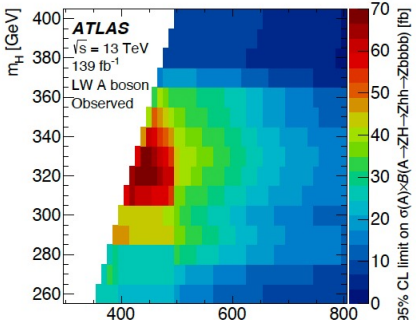
CMS-PAS-HIG-22-006

ATLAS

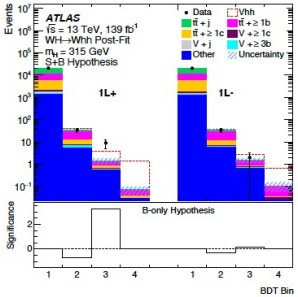


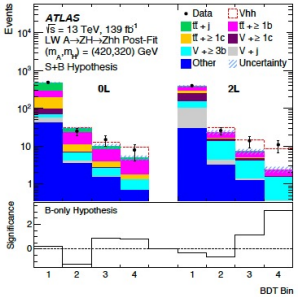


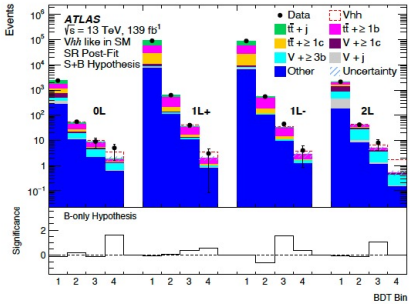
CMS



Large width (~20%):
3.8σ local
(2.8σ global)

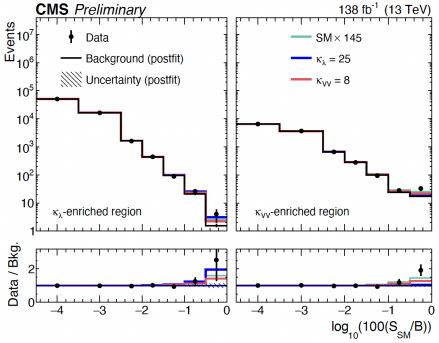


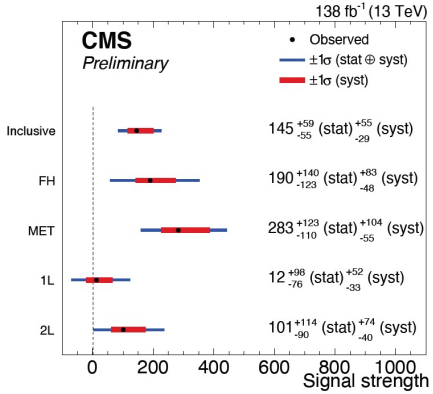




Obs (exp) 95% CL limit on
μ (κ_i=1): 183 (87)

Best-fit μ (κ_i=1): 82^{+58}_{-50}
~1.5σ



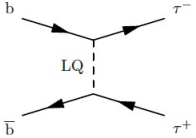


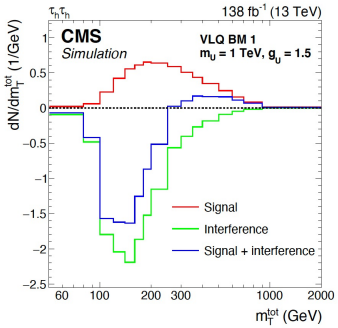
Obs (exp) 95% CL limit on
μ (κ_i=1): 294 (124)

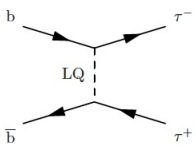
Best-fit μ (κ_i=1): 145^{+81}_{-62}
~2.6σ

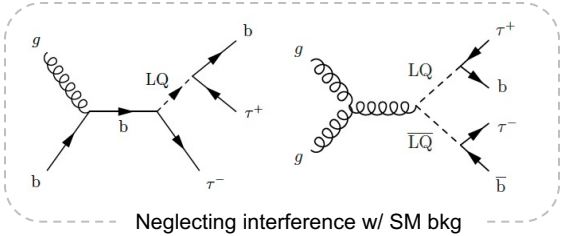
Beyond 3 slides

Leptoquarks coupling to bτ

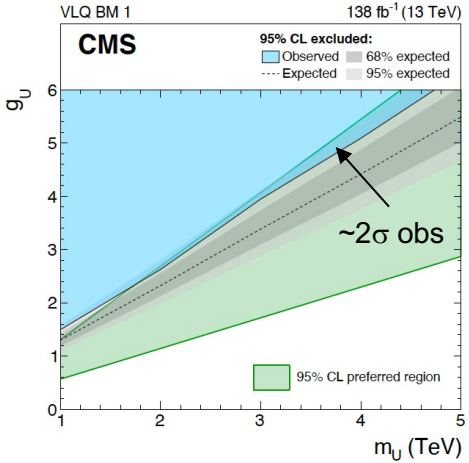






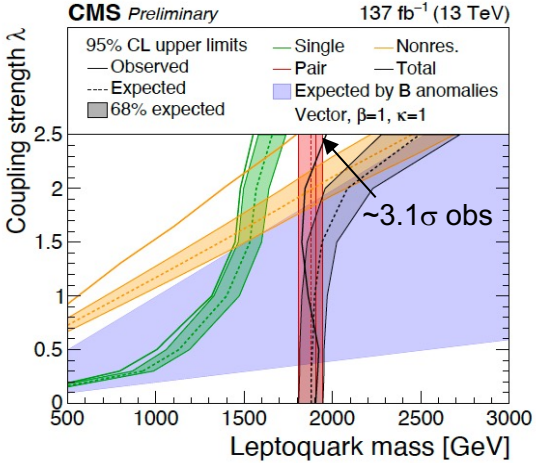


Neglecting interference w/ SM bkg

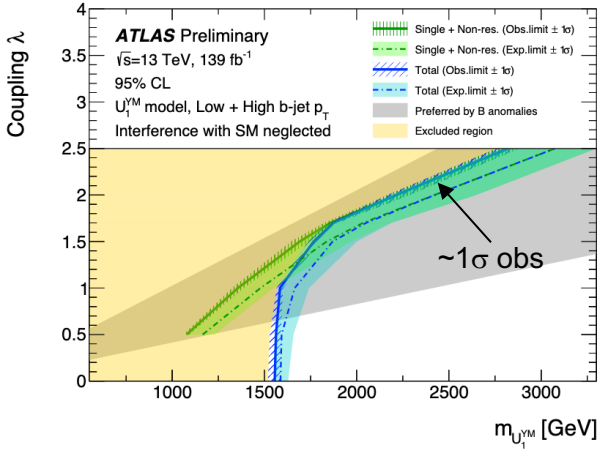


$\lambda = g_U/\sqrt{2}$

arXiv:2208.02717



CMS-PAS-EXO-19-016



Caveat: BR=1 (CMS) vs BR=0.5 (ATLAS)

EXOT-2022-39