CMS and ATLAS H(125) fermion decays results: Discussion

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Note: cc covered in rare decays

Summary: bb

Production	ATLAS μ (Run 1 + *80 fb⁻¹($36fb⁻¹))	CMS μ (Run 1 + 41 fb⁻¹)
WH	1.08 ± 0.24 ± 0.29*	1.24 ± 0.29 ± 0.24
ZH	0.92 ± 0.21 ± 0.19*	0.88 ± 0.24 ± 0.16
VBF	2.5 ± 1.3 ± 0.5$	2.52 ± 0.98 ± 1.17
ttH	1.00 ± 0.28 ± 0.48$	0.85 ± 0.23 ± 0.37
ggF	5.8 ± 3.1 ± 2.5*	2.80 ± 2.08 ± 1.30
comb	1.01 ± 0.12 ± 0.16	1.01 ± 0.14 ± 0.14

- STXS, fiducial, differential measurements

  - Large BR: probe to high p_T

- Boosted and VBF H->bb measurements

- Adding a photon to VBF strongly suppresses non-quark backgrounds

- Challenges: background, pile up degrades resolution

Summary: ττ

Production	ATLAS σ (36 fb⁻¹)	CMS σ/μ (77 fb⁻¹)
ggF (boosted)	4.02 ± 0.79 ± 1.3	σ= 1.11 ± 0.81 ± 0.78
VBF	3.34 ± 0.9 ± 1.34	σ=0.34 ± 0.08 ± 0.09
V(ll)H	-	μ=2.5 ± 1.4
comb	3.77 ± 0.6 ± 0.8	μ=1.24 ± 0.29

- STXS, fiducial, differential measurements (higher precision, more bins)

- VBF to probe HVV vertex

- V(ll)H with ATLAS?

- Challenges: background estimation, mass reconstruction

Summary: μμ

- CMS (Run 1 + 35 fb⁻¹)

  - upper limit on σ/σ_{SM}: 2.9 (2.2) at 95% CL

  - $\mu = 1.0 \pm 1.0$ (stat) ± 0.1 (syst)

- ATLAS (Run 1 + 139 fb⁻¹)

  - upper limit on σ/σ_{SM}: 1.7 (1.3) at 95% CL

  - $\mu = 0.5 \pm 0.7$

Goal: observation during Run-3
First channel to probe second generation Higgs couplings