



H \rightarrow Z γ updates

National Central University, Taiwan

Yu-Hsuan Chou, Chia-Ming Kuo,
Prasant Kumar Rout, Debabrata Bhowmik

Status

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- The table shown in the last meeting should be the results for electron channel.
- The combined results compared to Run-2 paper results.
 - Directly sum up the signal yield in the subcategories.

results with dedicated photon ID

Yield	Lepton tag	Dijet tag	Untagged
Signal (S_{95})	0.87	29.93	155.72
Background (B_{95})	236.28	3528.83	40607.40
$\sqrt{2((S+B)\ln(1+S/B)-S)}(Z_{95})$	0.06	0.50	0.77

Run-2 results

Yield	Lepton tag	Dijet tag	Untagged
Signal (S_{95})	2.44	40.98	159.57
Data	1485	12353	23193
$\sqrt{2((S+B)\ln(1+S/B)-S)}(Z_{95})$	0.06	0.37	1.05

Backup



Results

- UL Run-2 results in electron channel are shown.
- The contribution from DY+jets process is significantly suppressed.
- After the categorization with kin./dijet MVAs, the signal and background ratio Z_{95} are increased in all categories.

Yield		Lepton tag	Dijet tag	Untagged
Signal (S_{95})		0.3 -7%	11.5 -5%	58.8 -5%
Background (B_{95})	DY+jets	32.2 -63%	453.4 -68%	5191.0 -66%
	SMZg	57.8 -14%	814.4 -11%	9692.6 -10%
$\sqrt{2((S+B)\ln(1+S/B)-S)}$ (Z_{95})		0.04 33%	0.24 63%	0.83 2%

Run-2 Yields and approximate significance

138 fb ⁻¹	Lepton		Dijet 1	Dijet 2	Dijet 3	Untagged 1	Untagged 2	Untagged 3	Untagged 4
SM signal yield									
ggH	0.51	e ⁺ e ⁻	1.10	1.62	9.44	6.89	7.35	29.8	22.5
		μ ⁺ μ ⁻	1.41	2.05	12.1	8.52	9.17	38.0	29.0
VBF	0.09	e ⁺ e ⁻	1.94	0.76	1.13	0.71	0.35	0.92	0.51
		μ ⁺ μ ⁻	2.40	0.97	1.43	0.89	0.43	1.18	0.65
VH + ttH	1.84	e ⁺ e ⁻	0.04	0.13	1.89	0.31	0.17	0.45	0.27
		μ ⁺ μ ⁻	0.05	0.16	2.36	0.39	0.21	0.57	0.33
SM resonant background									
H → μ ⁺ μ ⁻	0.14	μ ⁺ μ ⁻	0.27	0.27	0.43	0.62	0.49	2.02	1.78
Mass resolution (GeV)	2.12	e ⁺ e ⁻	1.91	2.06	2.15	1.80	1.97	2.12	2.33
		μ ⁺ μ ⁻	1.52	1.61	1.72	1.37	1.42	1.62	1.83
Data yield	1485		168	589	11596	1485	1541	2559	17608
S/√B	0.06		0.54	0.24	0.26	0.45	0.35	0.53	0.30