# Preliminary calculations and fitting results of 2D selections

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## **Part 1: Fitting Results**

### ≻ Info.

- Same procedure as previous fitting (not "added")
- > For example, while analyzing  $\mu\mu$  HZZ channels,  $\nu\nu$  HZZ events that passed  $\mu\mu$  HZZ selections are still regarded as backgrounds

### Fitting precision comparison

Channel	Merely cut-based	2D cut applied
μμΗννjj	18.15	17.40
μμΗjjνν	65.25	63.13
ννΗμμjj	13.45	13.04
ννΗjjμμ	27.83	28.41
qqΗννμμ	54.26	57.26
qqΗμμνν	63.93	64.04
Combined	9.68	9.43

## **Part 2: Calculations**

### ≻ Info.

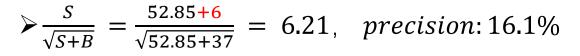
- Add different channels' signals together and use S/sqrt(S+B) to calculate the precision
- > For example, while analyzing  $\mu\mu$ HZZ channels,  $\nu\nu$  HZZ events that passed  $\mu\mu$ HZZ selections are regarded as signals
- > Calculation (take  $\mu\mu H\nu\nu qq$  channel as an example)

#### Event selection results

	signal	ZH	2f	4f
2D cut applied	52.85	33	0	4

#### > Remained backgrounds

	2D cut applied		2D cut applied
e2e2h_e3e3	3	zz_sl0mu_down	1
e2e2h_ww	22	zz_sl0tau_up	1
nnh_zz	6	zz_l0taumu	2



## **Part 3: Comparisons**

#### **>**Precision comparison

Unit: %

Channel	Merely cut-based	2D cut applied (not added)	Calculated (added)
μμΗννjj	18.15	17.40	16.11
μμΗjjνν	65.25	63.13	57.65
ννΗμμjj	13.45	13.04	11.63
ννΗjjμμ	27.83	28.41	24.17
qqΗννμμ	54.26	57.26	47.28
qqΗμμνν	63.93	64.04	52.36
Combined	9.68	9.43	8.43