

CEPC HZZ Analysis Update

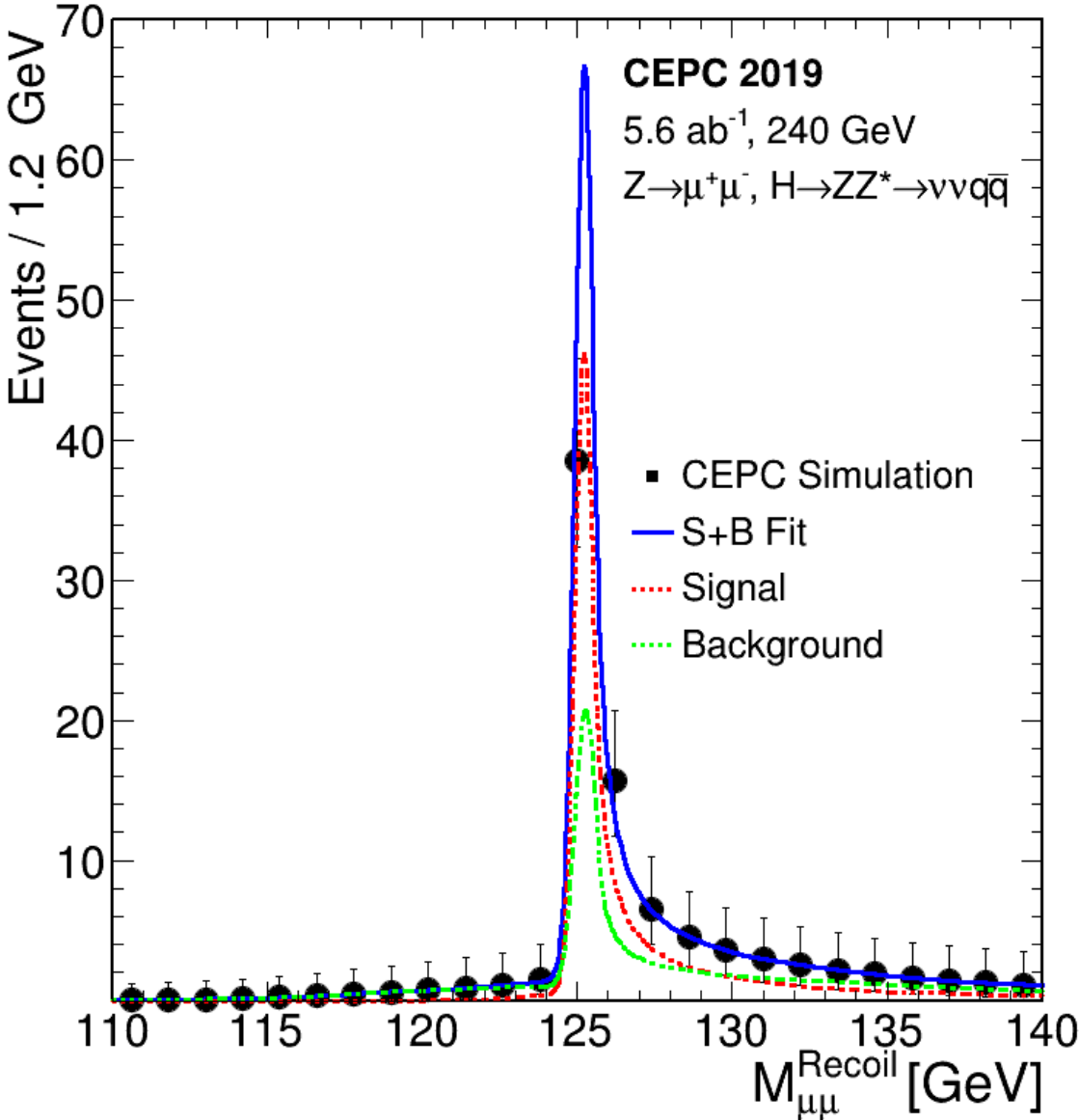
Min Zhong, Yanxi Gu

2020.4.1

Merely cut-based fitting results

➤ $\mu\mu HZZ$ ($\nu\nu jj$)

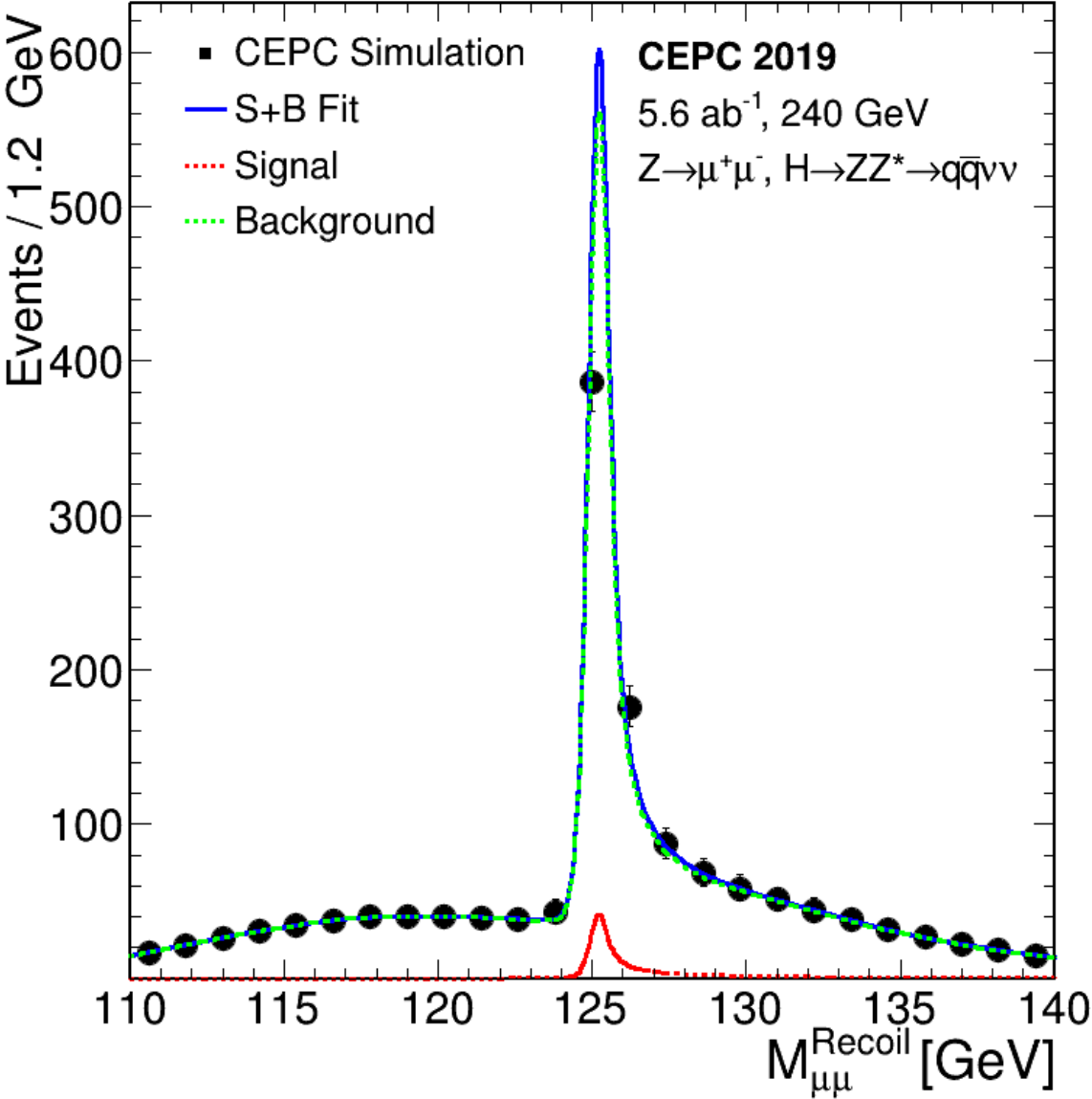
$$\frac{\Delta (\sigma (ZH) * BR(H \rightarrow ZZ *))}{\sigma (ZH) * BR(H \rightarrow ZZ *)} = 18.15 \%$$



Merely cut-based fitting results

➤ $\mu\mu HZZ (jj\nu\nu)$

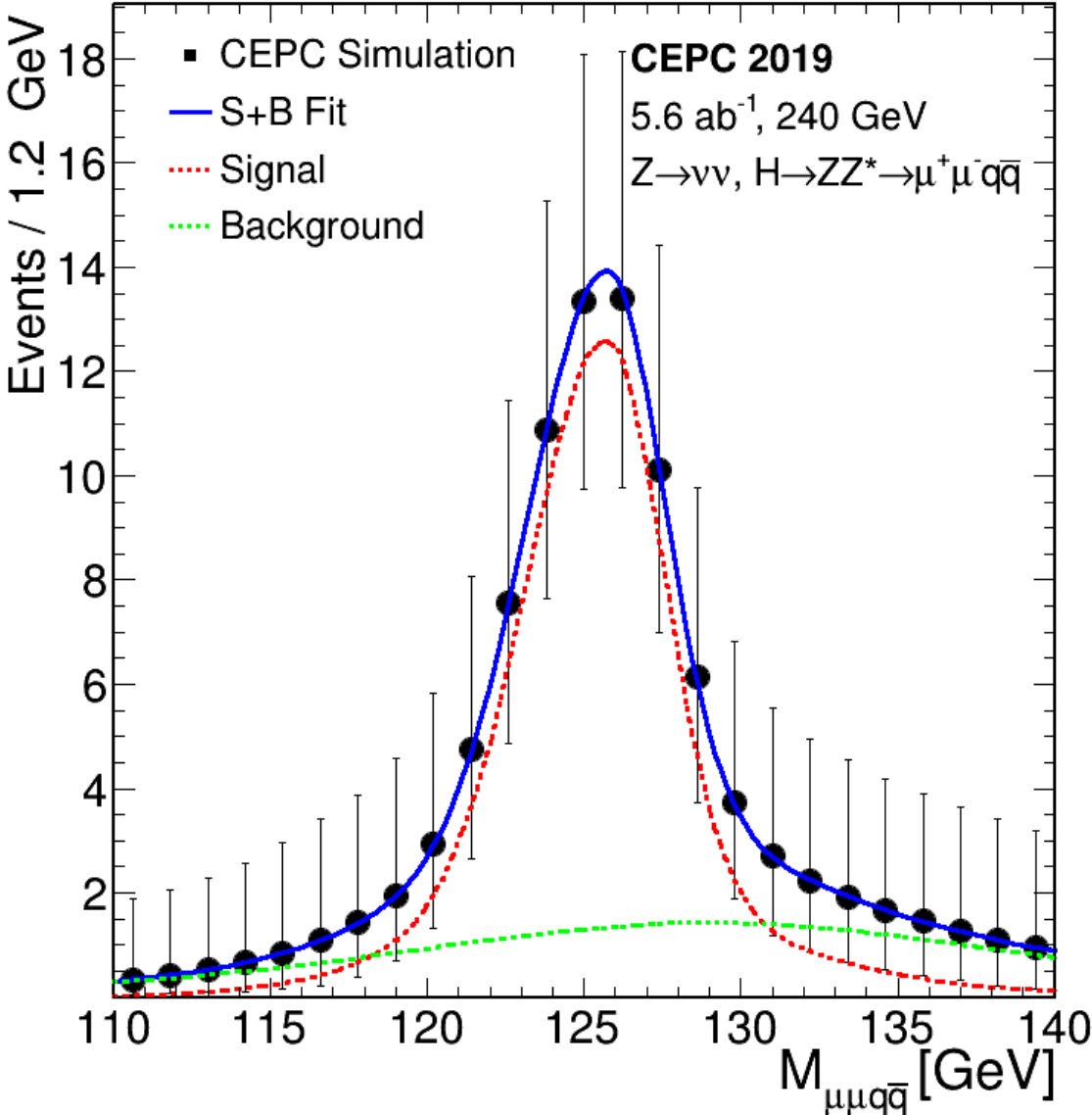
$$\frac{\Delta (\sigma (ZH) * BR(H \rightarrow ZZ^*))}{\sigma (ZH) * BR(H \rightarrow ZZ^*)} = 65.25 \%$$



Merely cut-based fitting results

➤ **$\nu\nu HZZ (\mu\mu jj)$**

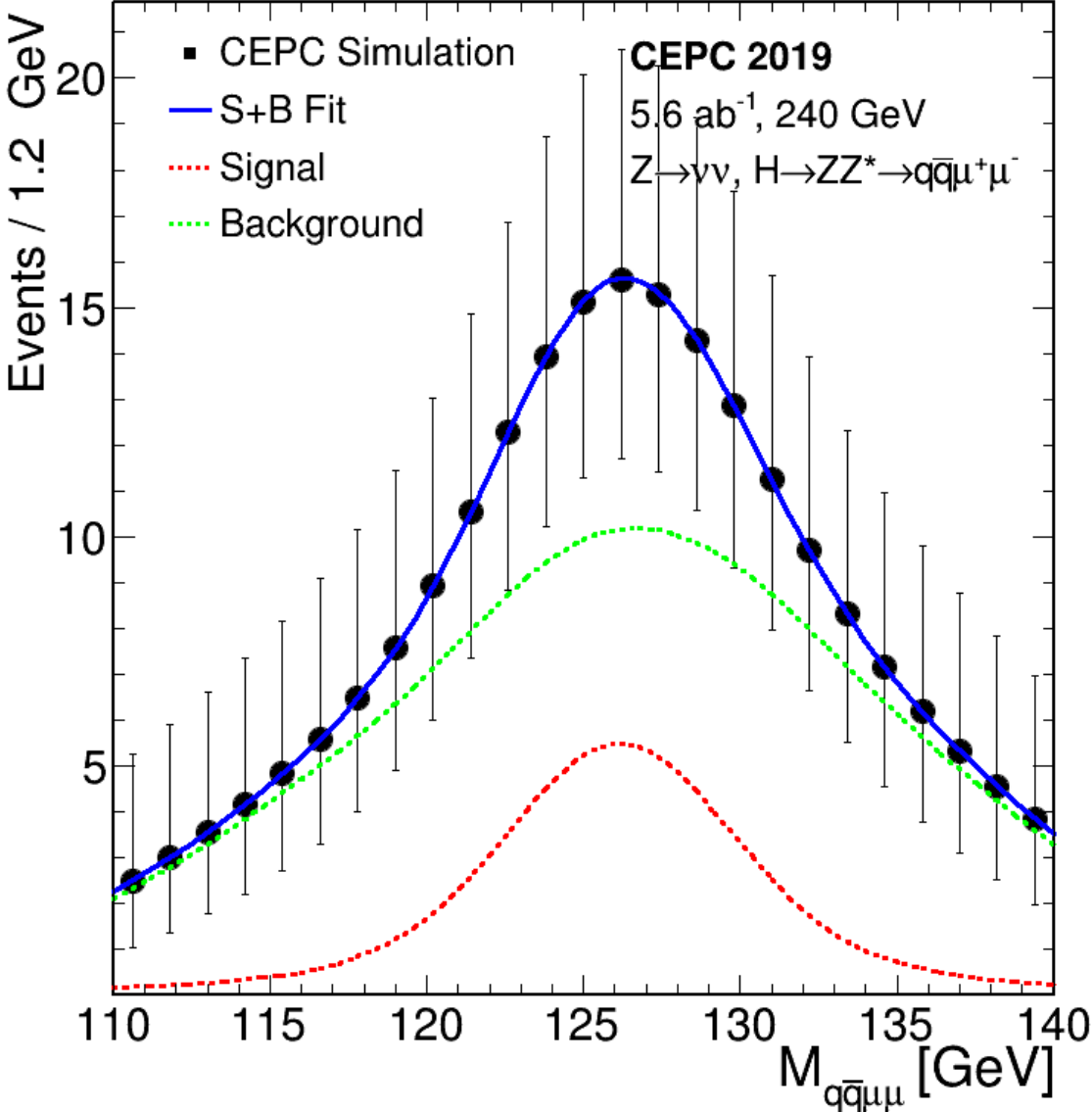
$$\frac{\Delta (\sigma (ZH) * BR(H \rightarrow ZZ^*))}{\sigma (ZH) * BR(H \rightarrow ZZ^*)} = 13.45 \%$$



Merely cut-based fitting results

➤ **$\nu\nu HZZ$ ($jj\mu\mu$)**

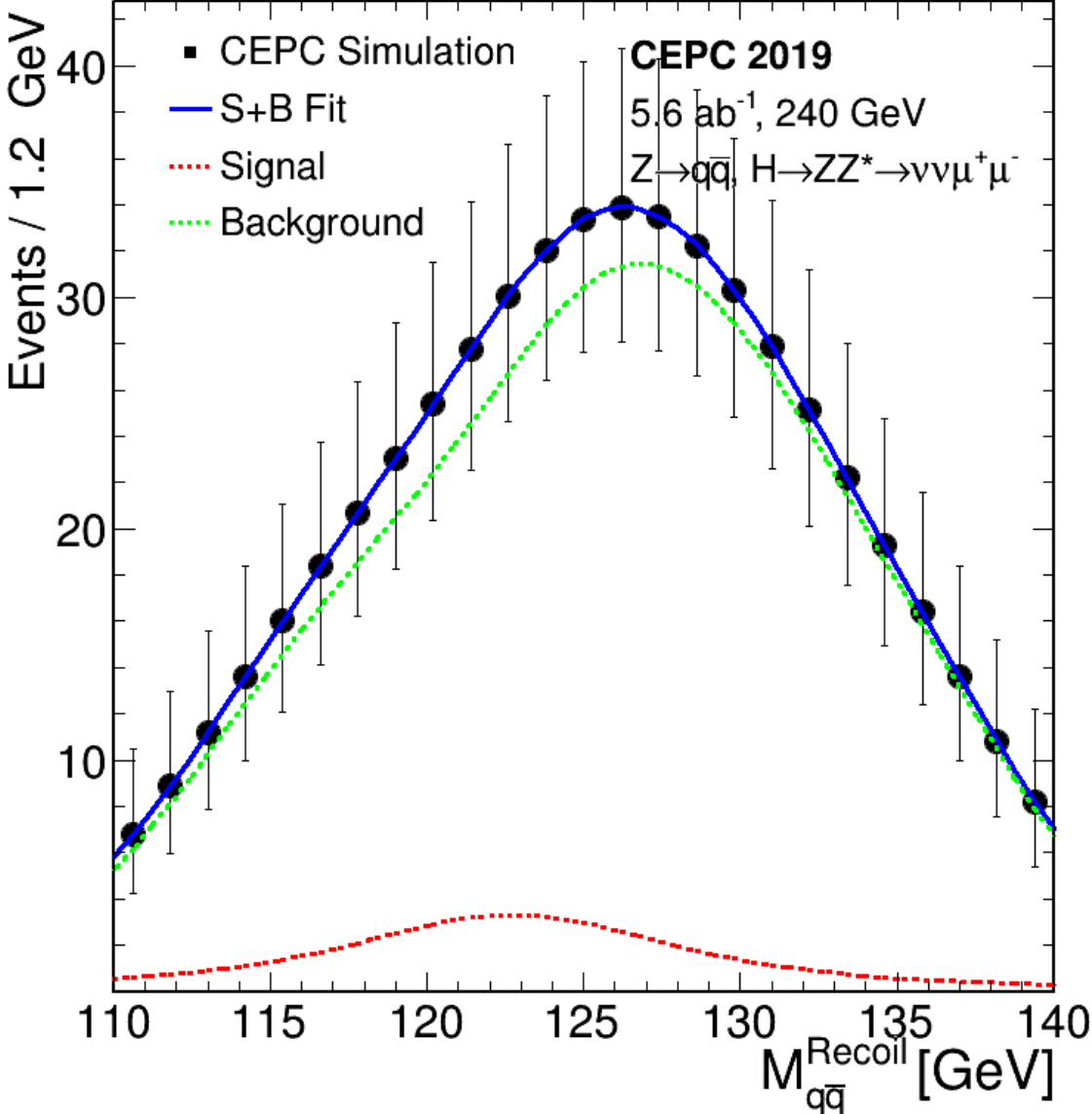
$$\frac{\Delta(\sigma(ZH) * BR(H \rightarrow ZZ^*))}{\sigma(ZH) * BR(H \rightarrow ZZ^*)} = 27.83\%$$



Merely cut-based fitting results

➤ qqHZZ (ννμμ)

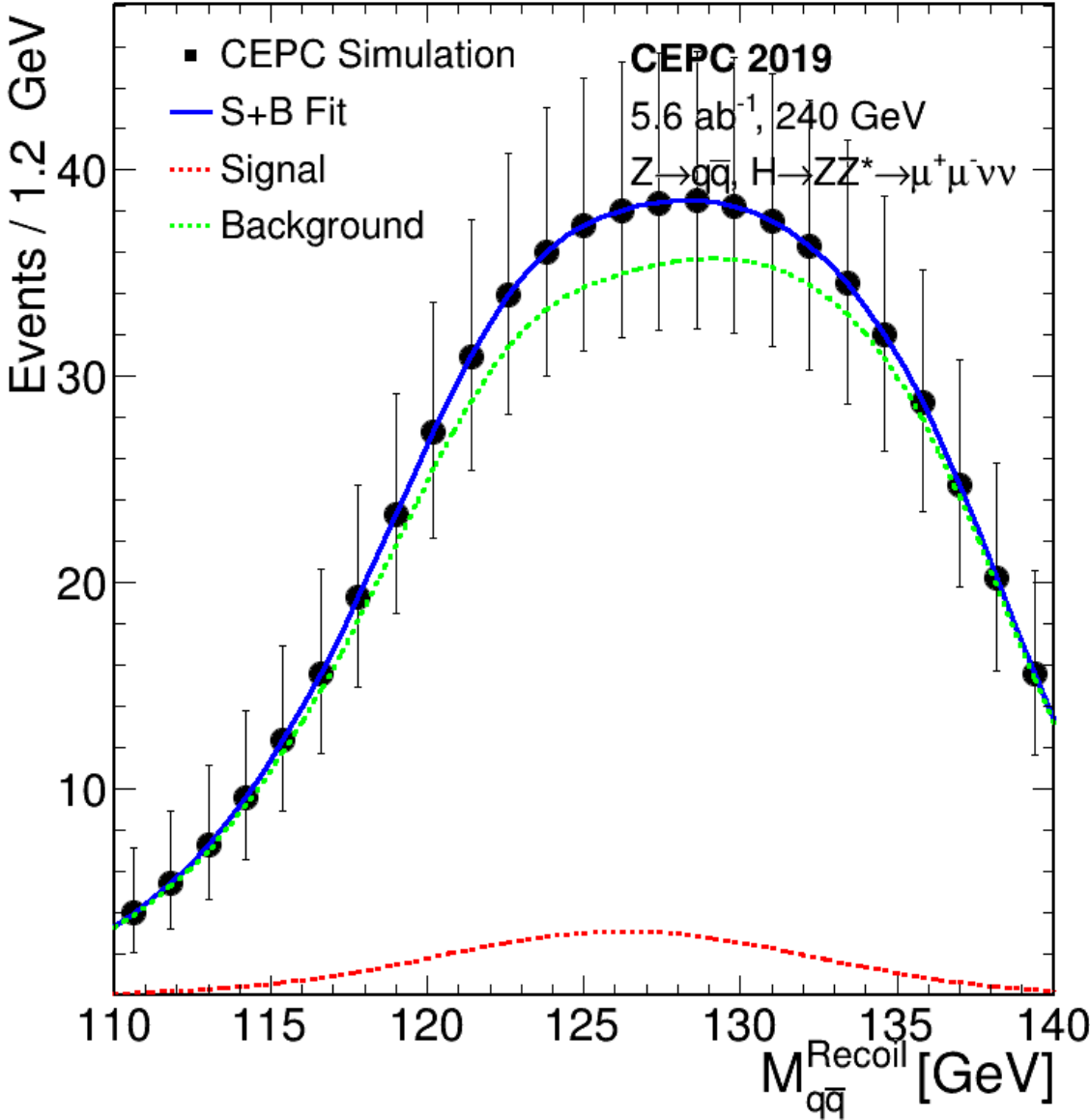
$$\frac{\Delta (\sigma (ZH) * BR(H \rightarrow ZZ *))}{\sigma (ZH) * BR(H \rightarrow ZZ *)} = 63.93 \%$$



Merely cut-based fitting results

➤ **qqHZZ (μμνν)**

$$\frac{\Delta (\sigma (ZH) * BR(H \rightarrow ZZ^*))}{\sigma (ZH) * BR(H \rightarrow ZZ^*)} = 54.26 \%$$



Merely cut-based fitting results

➤ Comparisons

Channel	BDT	Cut (previous)	Cut (BDT optimized)	Merely cut-based
$\mu\mu H\nu\nu jj$	15.10	17.82	16.89	18.15
$\mu\mu H jj\nu\nu$	56.76	71.09	71.62	65.25
$\nu\nu H\mu\mu jj$	13.45	15.41	13.22	13.45
$\nu\nu H jj\mu\mu$				27.83
$qq H\nu\nu\mu\mu$	50.89	65.23	54.19	54.26
$qq H\mu\mu\nu\nu$	45.60	54.17	42.74	63.93
Combined	9.49	11.09	9.85	9.68

Status

- **Finished six channels' cut flows and fitting**
- **Fitting results in CEPC memo updated**
- **Fitting part of analysis code updated**

Next to do

- **To be decided**