VBF Study with HL-LHC

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High-Luminosity LHC

- Phase 0 upgrade, 14 TeV
  - 2014-2015
  - instantaneous luminosities of 10^34 cm−2 s−1
  - “pile-up” with an average number of pp interactions per bunch crossing, μ, of approximately 50
- Phase 1 upgrade, 14 TeV
  - 2018
  - instantaneous luminosity to above 2 × 10^34 cm−2 s−1, 300 fb−1 of integrated luminosity by about 2022
  - pile-up increasing to μ ~ 140
- Phase 2 upgrade, High-Luminosity LHC (HL-LHC)
  - instantaneous luminosity of 5 × 10^34 cm−2 s−1
  - collection of about 3000 fb−1 of data by 2030.

What we do for VBF propagation

- Scale the events number to HL-LHC with corresponding cross section and luminosity
  - ATL-PHYS-PUB-2013-014

- Change the signal and data number in the code
  - Keep everything else unchanged
  - 14 TeV and HL-LHC, this week, Yu Zhang

What we do for VBF propagation

- Pile-up jet condition and new samples
  - PUB-HIGG-2014-07
  - this week, Huijun Zhang, Qi Li, Maosen Zhou
- Detector performance
  - PHYS-PUB-2013-004
  - Next week and 3rd week, Huijun Zhang, Qi Li, Maosen Zhou

What we do for VBF propagation

- Estimation of the systematics
  - Theoretical uncertainties with VBF variables and ggF+jets
  - JET and other systematics
  - This week, Jin Wang

Time Scale

- Next week update
  - Results from simple propagation, Yu Zhang
  - Solutions and effects of pile-up condition, Huijun Zhang
  - Some systematics, Jin Wang