

# Table of Contents

|  |          |
|--|----------|
| <b>LHC JHUGen MC files.....</b>  | <b>1</b> |
| Ideal samples without resolutions ( $E_{pp}=7$ or $8$ , $m_H=126$ ).....     | 1        |
| Spin 0.....  | 1        |
| Ideal samples without resolutions ( $E_{pp}=14\text{TeV}$ , $m_H=125$ )..... | 2        |
| Spin 0.....  | 2        |
| POWHEG Background.....   | 3        |
| VBF Samples.....   | 3        |
| Samples with resolutions ( $E_{pp}=14\text{TeV}$ , $m_H=125$ ).....          | 3        |
| Spin 0.....  | 3        |
| POWHEG Background.....   | 4        |
| <b>Results.....</b>  | <b>5</b> |

# LHC JHUGen MC files

## Instructions

1. Once a particular MC is made, please copy the files to the central locations (for spin 0)  
/scratch0/hep/snowmass2013/samples/JHUGen\_130429\_v3.1.1/spin0//
2. Update the tables below to book keep all the information

## Ideal samples without resolutions (E<sub>pp</sub>=7 or 8, m<sub>H</sub>=126)

### Spin 0

By default we set  $g_1 = 1$

| Generator couplings             | fa2 | phia2    | fa3 | phia3   | nEvents | Contact  |   |
|---------------------------------|-----|----------|-----|---------|---------|----------|---|
| $g_2 = 0.57$ ,<br>$g_4 = 0.88$  | 0.1 | 0        | 0.1 | 0       | 300K    | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.1/spin0/M12 |
| $g_2 = 0.57 i$<br>$g_4 = 0.88$  | 0.1 | $\pi/2$  | 0.1 | 0       | 300K    | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.1/spin0/M12 |
| $g_2 = -0.57$<br>$g_4 = 0.88$   | 0.1 | $\pi$    | 0.1 | 0       | 300K    | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.1/spin0/M12 |
| $g_2 = -0.57 i$<br>$g_4 = 0.88$ | 0.1 | $3\pi/2$ | 0.1 | 0       | 300K    | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.1/spin0/M12 |
| $g_2 = 0.57$ ,<br>$g_4 = 0.88$  | 0.1 | 0        | 0.1 | $\pi/2$ | 300K    | Jonathan | hep:/scratch0/hep/jaguilar/JHUGenV3.1.1/Higgs0Mf01ph90Hi  |
| $g_2 = 0.57 i$<br>$g_4 = 0.88$  | 0.1 | $\pi/2$  | 0.1 | $\pi/2$ | 300K    | Jonathan | hep:/scratch0/hep/jaguilar/JHUGenV3.1.1/Higgs0Mf01ph90Hi  |
| $g_2 = -0.57$<br>$g_4 = 0.88$   | 0.1 | $\pi$    | 0.1 | $\pi/2$ | 300K    | Jonathan | hep:/scratch0/hep/jaguilar/JHUGenV3.1.1/Higgs0Mf01ph90Hi  |
| $g_2 = -0.57 i$<br>$g_4 = 0.88$ | 0.1 | $3\pi/2$ | 0.1 | $\pi/2$ | 300K    | Jonathan | hep:/scratch0/hep/jaguilar/JHUGenV3.1.1/Higgs0Mf01ph90Hi  |
| $g_2 = 1.62$ ,<br>$g_4 = 0$     | 0.5 | 0        | 0   | 0       | 300K    | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.1/spin0/M12 |
| $g_2 = 1.62 i$<br>$g_4 = 0$     | 0.5 | $\pi/2$  | 0   | 0       | 300K    | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.1/spin0/M12 |
| $g_2 = -1.62$<br>$g_4 = 0$      | 0.5 | $\pi$    | 0   | 0       | 300K    | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.1/spin0/M12 |
| $g_2 = -1.62 i$<br>$g_4 = 0$    | 0.5 | $3\pi/2$ | 0   | 0       | 300K    | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.1/spin0/M12 |
| $g_2 = 0.54$ ,<br>$g_4 = 0$     | 0.1 | 0        | 0   | 0       | 300K    | Jonathan | hep:/scratch0/hep/jaguilar/JHUGenV3.1.1/Higgs0PHf01ph0To  |
| $g_2 = 0.54 i$<br>$g_4 = 0$     | 0.1 | $\pi/2$  | 0   | 0       | 300K    | Jonathan | hep:/scratch0/hep/jaguilar/JHUGenV3.1.1/Higgs0PHf01ph90To |
| $g_2 = -0.54$<br>$g_4 = 0$      | 0.1 | $\pi$    | 0   | 0       | 300K    | Jonathan | hep:/scratch0/hep/jaguilar/JHUGenV3.1.1/Higgs0PHf01ph180  |
| $g_2 = -0.54 i$<br>$g_4 = 0$    | 0.1 | $3\pi/2$ | 0   | 0       | 300K    | Jonathan | hep:/scratch0/hep/jaguilar/JHUGenV3.1.1/Higgs0PHf01ph270  |
| $g_2 = 0$ ,<br>$g_4 = 0.83$     | 0.0 | 0        | 0.1 | 0       | 300K    | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.5/spin0/M12 |

|                             |     |   |     |          |      |         |   |
|-----------------------------|-----|---|-----|----------|------|---------|---|
| $g_2 = 0, g_4 = 0.83 i$     | 0.0 | 0 | 0.1 | $\pi/2$  | 300K | Candice | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.5/spin0/M12 |
| $g_2 = 0, g_4 = -0.83$      | 0.0 | 0 | 0.1 | $\pi$    | 300K | Candice | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.5/spin0/M12 |
| $g_2 = 0, g_4 = -0.83 i$    | 0.0 | 0 | 0.1 | $3\pi/2$ | 300K | Candice | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.5/spin0/M12 |
| $g_2 = 0, g_4 = 2.50$       | 0.0 | 0 | 0.5 | 0        | 300K | Candice | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.5/spin0/M12 |
| $g_2 = 0, g_4 = 2.50 i$     | 0.0 | 0 | 0.5 | $\pi/2$  | 300K | Candice | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.5/spin0/M12 |
| $g_2 = 0, g_4 = -2.50$      | 0.0 | 0 | 0.5 | $\pi$    | 300K | Candice | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.5/spin0/M12 |
| $g_2 = 0, g_4 = -2.50 i$    | 0.0 | 0 | 0.5 | $3\pi/2$ | 300K | Candice | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.5/spin0/M12 |
| $g_2 = 0, g_4 = 0$          | 0.0 | 0 | 0.0 | 0        | 300K | Candice | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.5/spin0/M12 |
| $g_1 = 0, g_2 = 0, g_4 = 1$ | 0.0 | 0 | 1.0 | 0        | 300K | Candice | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.5/spin0/M12 |
| $g_1 = 0, g_2 = 1, g_4 = 0$ | 1.0 | 0 | 0.0 | 0        | 300K | Candice | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.5/spin0/M12 |

## Ideal samples without resolutions (Epp=14TeV, mH=125)

### Spin 0

By default we set  $g_1 = 1$

| Generator couplings         | fa2  | phia2 | fa3  | phia3 | nEvents | Contact  |  |
|-----------------------------|------|-------|------|-------|---------|----------|--|
| $g_2 = 0, g_4 = 0$          | 0.0  | 0     | 0.0  | 0     | 10M     | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| same                        |      |       |      |       | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| $g_2 = 0, g_4 = 0.85$       | 0.0  | 0     | 0.1  | 0     | 10M     | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| $g_2 = 0, g_4 = 2.56$       | 0.0  | 0     | 0.5  | 0     | 10M     | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| $g_2 = 0, g_4 = 2.56 i$     | 0.0  | 0     | 0.5  | 90    | 10M     | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| $g_2 = 0.59, g_4 = 0.90$    | 0.1  | 0     | 0.1  | 0     | 10M     | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| $g_1 = 0, g_2 = 0, g_4 = 1$ | 0.0  | 0     | 1.0  | 0     | 10M     | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| $g_2 = 0, g_4 = 1.48$       | 0.0  | 0     | 0.25 | 0     | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| $g_2 = 0, g_4 = -2.56$      | 0.0  | 0     | 0.5  | 180   | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| $g_2 = 0, g_4 = -2.56i$     | 0.0  | 0     | 0.5  | 270   | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| $g_2 = 0, g_4 = 0.65$       | 0.0  | 0     | 0.06 | 0     | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| $g_2 = 0.42, g_4 = 0$       | 0.06 | 0     | 0.0  | 0     | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| $g_2 = 0.43, g_4 = 0.67$    | 0.06 | 0     | 0.06 | 0     | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| $g_2 = 0, g_4 = 1.20$       | 0.0  | 0     | 0.18 | 0     | 10M     | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |

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|                          |      |     |      |   |     |          |  |
|--------------------------|------|-----|------|---|-----|----------|--|
| $g_2 = 0.78, g_4 = 0$    | 0.18 | 0   | 0.0  | 0 | 10M | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| $g_2 = 0.88, g_4 = 1.36$ | 0.18 | 0   | 0.18 | 0 | 10M | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| $g_2 = 0, g_4 = 0.37$    | 0    | 0   | 0.02 | 0 | 10M | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| $g_2 = 1, g_1 = g_4 = 0$ | 1.0  | 0   | 0.0  | 0 | 10M | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.8/0  |
| $g_2 = 1.66, g_4 = 0$    | 0.5  | 0   | 0.0  | 0 | 10M | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.8/0  |
| $g_2 = -1.66, g_4 = 0$   | 0.5  | 180 | 0.0  | 0 | 10M | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.8/0  |

## POWHEG Background

| Cut    | nEvents    | Contact | FileName  |
|--------|------------|---------|---|
| mll<4  | 48,284,598 | Candice | /scratch0/hep/cyou/AllSamples/pwgBkg/pwgevents_mllCut4_ideal_wDiscriminants.ro  |
| mll<10 | 5M         | Candice | /scratch0/hep/cyou/AllSamples/pwgBkg/pwgevents_mllCut10_ideal_wDiscriminants.ro |

## VBF Samples

| Model    | nEvents | Contact  | FileName   |
|----------|---------|----------|--|
| SM Higgs | 10.9M   | Xiaozhou | /scratch0/hep/zhouxz/EventGeneration/VBFSamples/VBFSMHiggs/VBFSMHiggs_false. |
| 0-       | 10.8M   | Xiaozhou | /scratch0/hep/zhouxz/EventGeneration/VBFSamples/VBF0M/VBF0M_false            |

## Samples with resolutions (Epp=14TeV, mH=125)

### Spin 0

By default we set  $g_1 = 1$

| Generator couplings         | fa2  | phia2 | fa3  | phia3 | nEvents | Contact  |  |
|-----------------------------|------|-------|------|-------|---------|----------|--|
| $g_2 = 0, g_4 = 0$          | 0.0  | 0     | 0.0  | 0     | 10M     | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| same                        |      |       |      |       | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| $g_2 = 0, g_4 = 0.85$       | 0.0  | 0     | 0.1  | 0     | 10M     | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| $g_2 = 0, g_4 = 2.56$       | 0.0  | 0     | 0.5  | 0     | 10M     | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| $g_2 = 0, g_4 = 2.56i$      | 0.0  | 0     | 0.5  | 90    | 10M     | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| $g_2 = 0.59, g_4 = 0.90$    | 0.1  | 0     | 0.1  | 0     | 10M     | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| $g_1 = 0, g_2 = 0, g_4 = 1$ | 0.0  | 0     | 1.0  | 0     | 10M     | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| $g_2 = 0, g_4 = 1.48$       | 0.0  | 0     | 0.25 | 0     | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| $g_2 = 0, g_4 = -2.56$      | 0.0  | 0     | 0.5  | 180   | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| $g_2 = 0, g_4 = -2.56i$     | 0.0  | 0     | 0.5  | 270   | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| $g_2 = 0, g_4 = 0.65$       | 0.0  | 0     | 0.06 | 0     | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| $g_2 = 0.42, g_4 = 0$       | 0.06 | 0     | 0.0  | 0     | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
|                             | 0.06 | 0     | 0.06 | 0     | 10M     | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |

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|                       |      |     |      |   |     |          |  |
|-----------------------|------|-----|------|---|-----|----------|--|
| g2 = 0.43 , g4 = 0.67 |      |     |      |   |     |          |  |
| g2 = 0 , g4 = 1.20    | 0.0  | 0   | 0.18 | 0 | 10M | Candice  | hep: /scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0 |
| g2 = 0.78 , g4 = 0    | 0.18 | 0   | 0.0  | 0 | 10M | Candice  | hep: /scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0 |
| g2 = 0.88 , g4 = 1.36 | 0.18 | 0   | 0.18 | 0 | 10M | Candice  | hep:/scratch0/hep/cyou/AllSamples/JHUGen_v3.1.7/0  |
| g2 = 0 , g4 = 0.37    | 0    | 0   | 0.02 | 0 | 10M | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/1 |
| g2 = 1 , g1= g4 = 0   | 1.0  | 0   | 0.0  | 0 | 10M | Candice  | hep: /scratch0/hep/cyou/AllSamples/JHUGen_v3.1.8/0 |
| g2 = 1.66 , g4 = 0    | 0.5  | 0   | 0.0  | 0 | 10M | Candice  | hep: /scratch0/hep/cyou/AllSamples/JHUGen_v3.1.8/0 |
| g2 = -1.66 , g4 = 0   | 0.5  | 180 | 0.0  | 0 | 10M | Candice  | hep: /scratch0/hep/cyou/AllSamples/JHUGen_v3.1.8/0 |

### POWHEG Background

| Cut    | nEvents    | Contact | FileName  |
|--------|------------|---------|---|
| mll<4  | 48,284,598 | Candice | /scratch0/hep/cyou/AllSamples/pwgBkg/pwgevents_mllCut4_wResolution_wDiscrimin |
| mll<10 | 5M         | Candice | /scratch0/hep/cyou/AllSamples/pwgBkg/pwgevents_mllCut10_wResolution_wDiscrimi |

# Results

Multidimensional fit for JHU (4e vs 2e2mu), Prophecy and toys for comparison between multidimensional fit and 1D KD fit here [↗](#)

|                    |   |   |      |   |     |          |  |
|--------------------|---|---|------|---|-----|----------|--|
| g2 = 0 , g4 = 0.37 | 0 | 0 | 0.02 | 0 | 10M | Xiaozhou | hep:/scratch0/hep/zhouxz/EventGeneration/Samples/14T125G0-_f002/XZ-H |
|--------------------|---|---|------|---|-----|----------|--|

This topic: Sandbox > MCSamples

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