

Monte Carlo comparisons in $W\gamma\gamma$ channel

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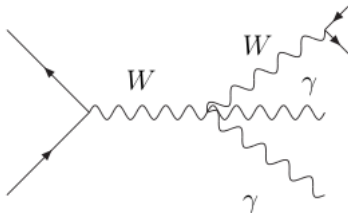
July 19, 2012

Overview

Monte Carlo comparisons in $W\gamma\gamma$ channel

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- Anomalous quartic couplings with ATLAS detector
- $W\gamma\gamma$ channel with W decaying leptonically



Recent Work

Monte Carlo comparisons in $W\gamma\gamma$ channel

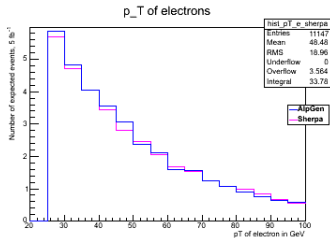
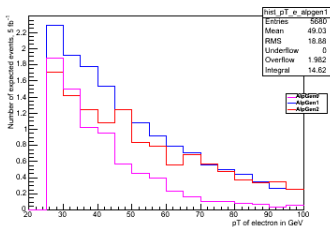
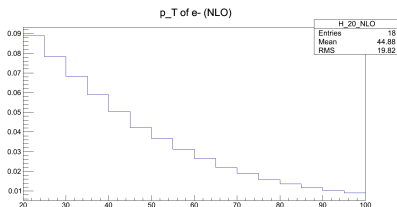
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- Work with Monte Carlo comparisons to get a feel for the process at matrix element level and at detector reconstruction level
- Looked at some basic kinematic variables like p_T , ΔR and mass
- VFBNLO used as a theory MC to understand NLO predictions
- AlpGen and Sherpa, both LO, but with parton showers and hadronizations to simulate the detector
- Comparison of AlpGen zero jets, one jet and two jets with each other
- Comparison of AlpGen up to 2 jets with Sherpa up to 2 jets

p_T of electron in GeV

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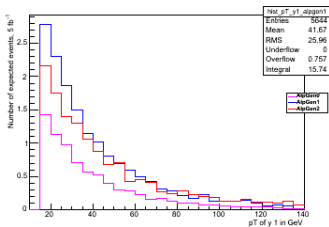
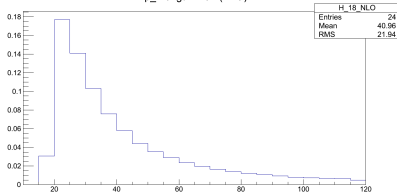


Highest p_T γ in GeV

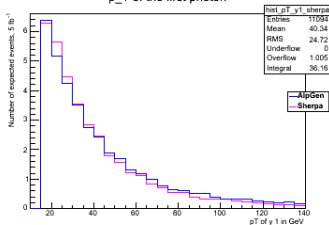
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p_T of gamma1 (NLO)



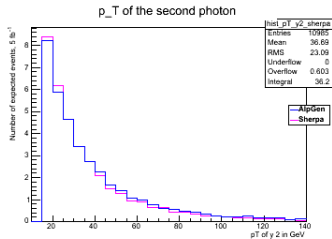
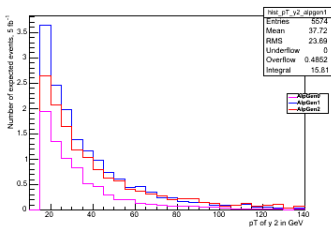
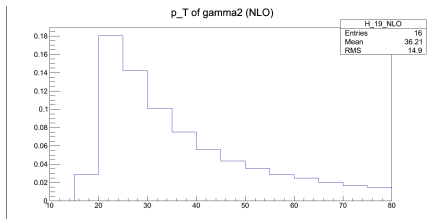
p_T of the first photon



Second Highest p_T γ in GeV

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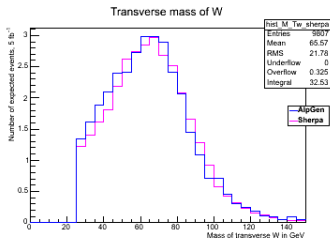
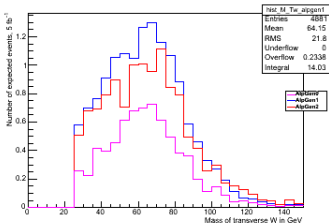
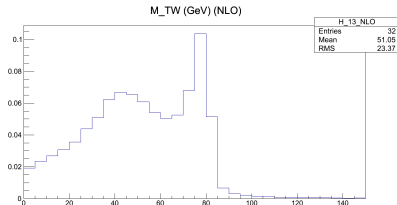
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Transverse mass of the W in GeV

Monte Carlo comparisons in $W\gamma\gamma$ channel

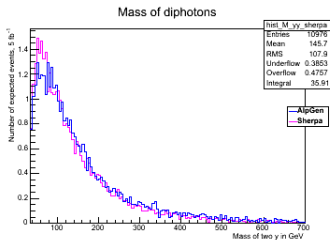
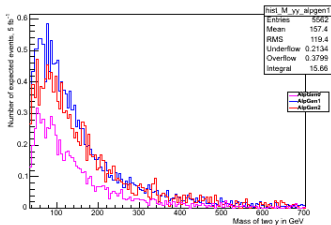
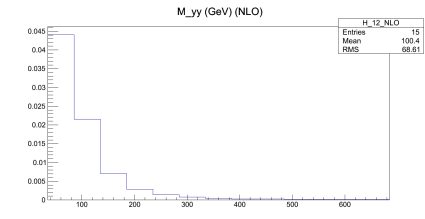
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Mass of the two photons in GeV

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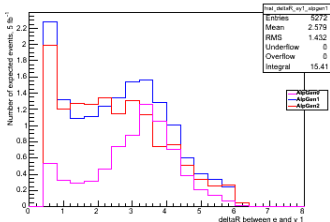
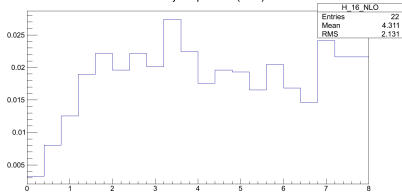


ΔR between electron and $\gamma 1$

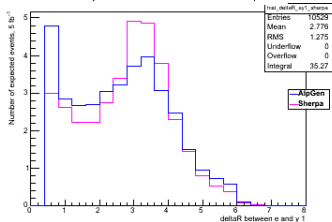
Monte Carlo comparisons in $W\gamma\gamma$ channel

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deltaR ey1 separation (NLO)



deltaR separation between electron and first photon

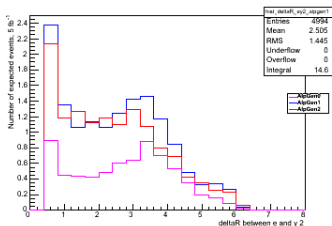
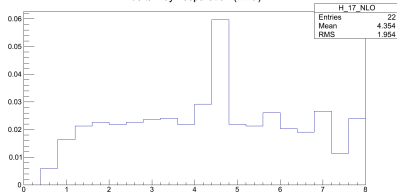


ΔR between electron and $\gamma 2$

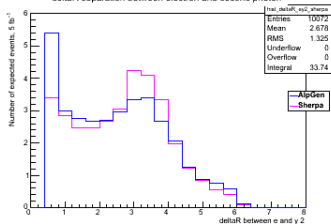
Monte Carlo comparisons in $W\gamma\gamma$ channel

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deltaR ey2 separation (NLO)



deltaR separation between electron and second photon

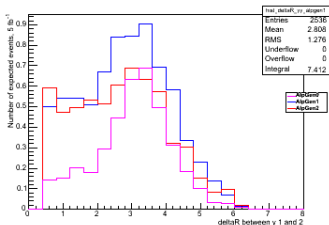
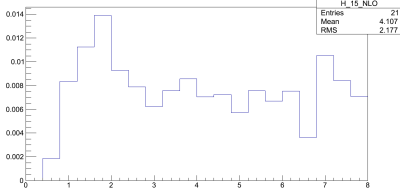


ΔR between the two γ

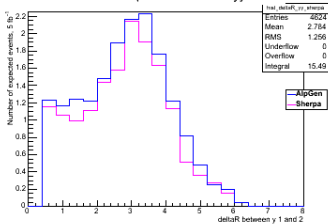
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deltaR yy separation (NLO)



deltaR separation between yy



Next Steps

Monte
Carlo com-
parisons in
 $W\gamma\gamma$
channel

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- Cut flow for AlpGen and Sherpa
- Optimize cuts for VBFNLO
- Compare VBFNLO to AlpGen and Sherpa at the truth level (without detector simulation)
- Start looking at 2011 data

Adventures

Monte Carlo comparisons in Wγγ channel

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Lake Annecy



Bern



Zürich



Geneva Botanical Gardens