## 0.1  Overview of activity and main contributions

Vector boson production with jets is important in many aspects. Leptonic decay of the vector boson is a clear experimental signature, and the associated production of jets is a property of QCD. We can probe the cross section dependence on the number of jets cleanly. Testing of the Berends-Giele scaling under 7 TeV collision is also something of interest. If an excess is seen, either there is more work for the theory calculation or new physics could be discovered (which is interesting either way). In the case of no excess, it gives a good confidence boost for people doing searches since this scaling is assumed in many analyses (to extrapolate to high number of jets) and any confirmation that we do not see excess is good.

People from Caltech contributes to the V+Jets program. Work has been ongoing since years to build up basis and understanding of related processes and samples. Finally, with the data taking in 2010, for the first time we can finalize the program and open the box to see if anything is there. An ongoing effort from many groups starting from last year has finalized the result for 2010 data and 30 GeV jet energy threshold and published a public physics analysis summary (PAS) and gave result in Moriond 2011. The group is now producing final results for a publication, hopefully soon.

## 0.2  Signal extraction (final contribution to the paper)

There are many people involved in the analysis, and many pieces are equally important. One piece of work on extracting signal yield and the Berends-Giele scaling parameters is carried out by a Caltech member. The fit script is independently produced and upgraded to encorporate many different aspects of signal extraction. In the case of extracting parameters for Berends-Giele scaling, the unfolding (of number of jets) is done in the fitter in order to correctly taking care of complex correlations of systematics introduced by the unfolding procedure. Raw yield of each jet multiplicity bin is also extracted indepently both for cross checking with results of Berends-Giele scaling and for input to the "unfolding" team in other parts of V+Jets group. Figure 1 shows one example of result cross-checking between two different methods from full 2010 dataset.

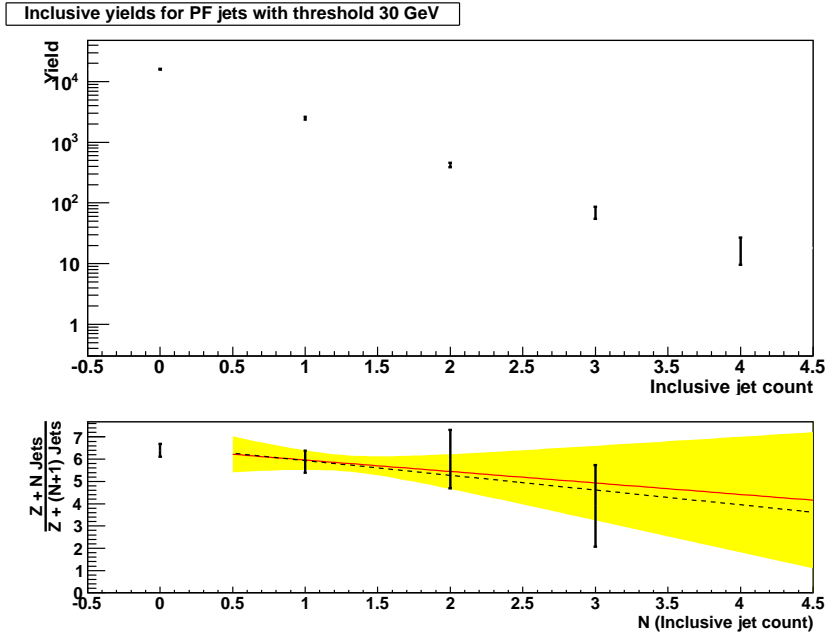The $Z \to \mu\mu$ signal extraction from data as shown in figure 2 from the physics analysis summary is done by us.

Figure 1: Signal extraction of number of jet spectrum from $Z \to \mu\mu$ channel. Band is from Berends-Giele scaling fit, while others are from direct signal extraction. They show good agreement within error.
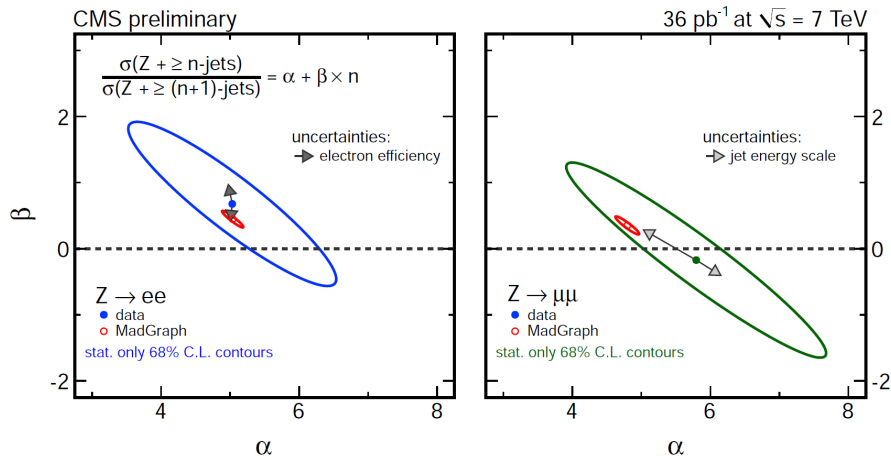


Figure 2: Extracted Berends-Giele scaling as shown in the PAS.