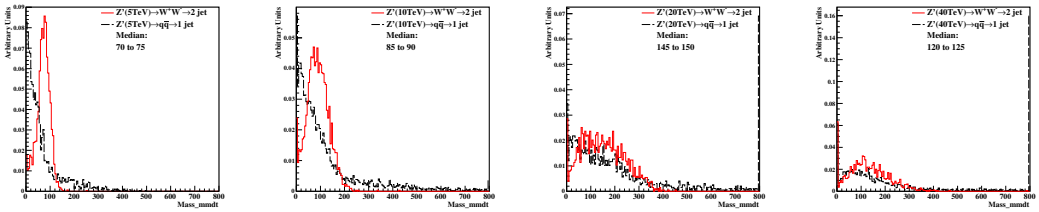
## 1. Soft drop method in future collider performance

In this section, we use the specific method about the soft-drop to study the performance of the detector in the different cell sizes. In the Figure , , , , are the distribution of the signal and background.

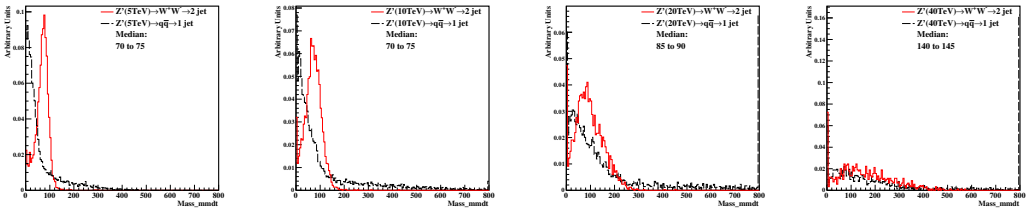
### *1.1. Analysis method*

In this analysis, We fix the central at the median in signal distribution, and we use the different width to open the window to draw ROC curves.

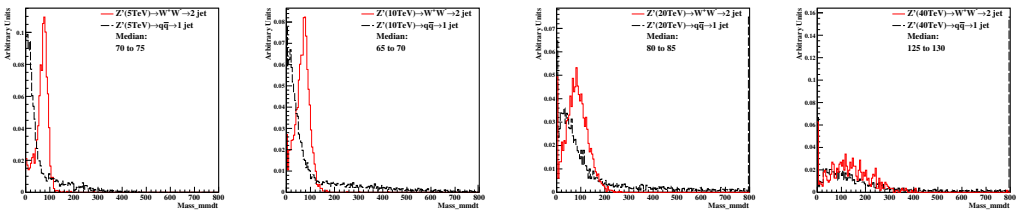
### *1.2. The conclusion of the results*




(a) 5TeV at 20×20(cm×cm) in cluster (b) 10TeV at 20×20(cm×cm) in cluster (c) 20TeV at 20×20(cm×cm) in cluster (d) 40TeV at 20×20(cm×cm) in cluster

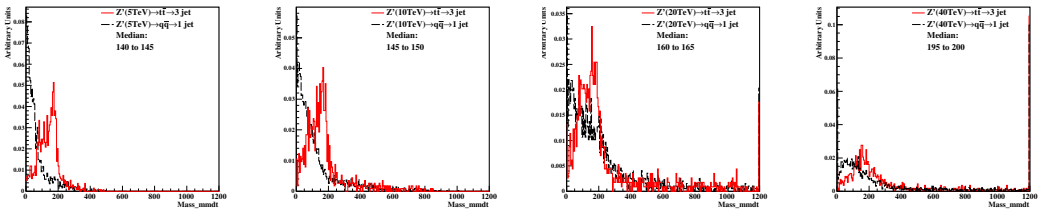



(e) 5TeV at 5×5(cm×cm) in cluster (f) 10TeV at 5×5(cm×cm) in cluster (g) 20TeV at 5×5(cm×cm) in cluster (h) 40TeV at 5×5(cm×cm) in cluster

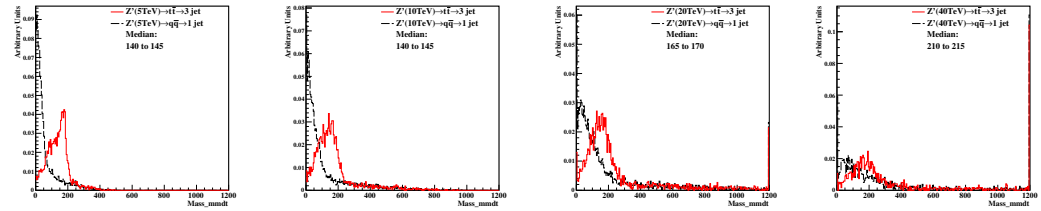



(i) 5TeV at 1×1(cm×cm) in cluster (j) 10TeV at 1×1(cm×cm) in cluster (k) 20TeV at 1×1(cm×cm) in cluster (l) 40TeV at 1×1(cm×cm) in cluster

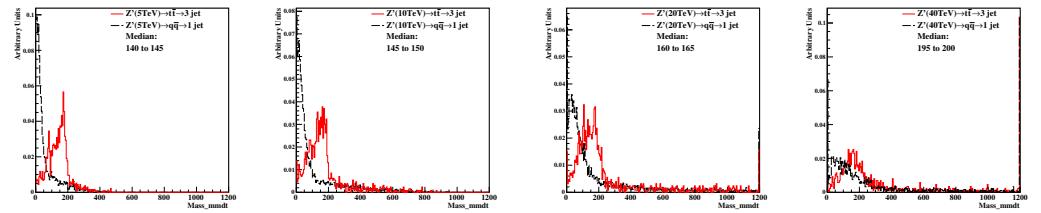
Figure 1: Distributions of mass soft drop at $\beta$=0, signal=ww, in 5,10TeV energy of collision in different detector sizes. Cell Size in 20×20, 5×5, and 1×1(cm×cm) are shown here.




(a) 5TeV at 20×20(cm×cm) cluster (b) 10TeV at 20×20(cm×cm) cluster (c) 20TeV at 5×5(cm×cm) cluster (d) 40TeV at 5×5(cm×cm) cluster

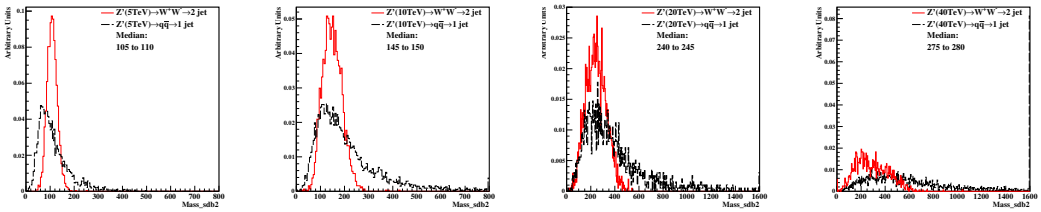



(e) 5TeV at 1×1(cm×cm) cluster (f) 10TeV at 1×1(cm×cm) cluster (g) 20TeV at 20×20(cm×cm) cluster (h) 40TeV at 20×20(cm×cm) cluster

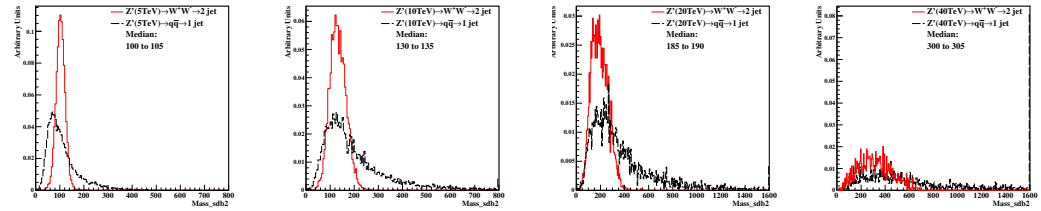



(i) 5TeV at 5×5(cm×cm) cluster (j) 10TeV at 5×5(cm×cm) cluster (k) 20TeV at 1×1(cm×cm) cluster (l) 40TeV at 1×1(cm×cm) cluster

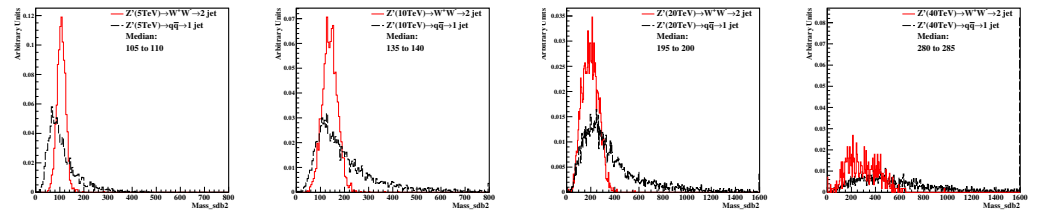
Figure 2: Distributions of mass soft drop at $\beta$=0, signal=tt, in 5,10TeV energy of collision in different detector sizes. Cell Size in 20×20, 5×5, and 1×1(cm×cm) are shown here.




(a) 5TeV at 20×20(cm×cm) cluster (b) 10TeV at 20×20(cm×cm) cluster (c) 20TeV at 20×20(cm×cm) cluster (d) 40TeV at 20×20(cm×cm) cluster

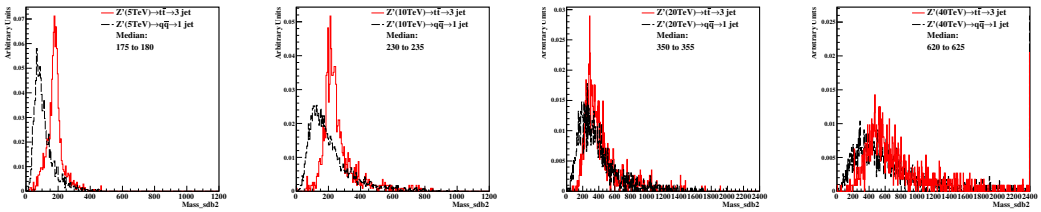



(e) 5TeV at 5×5(cm×cm) cluster (f) 10TeV at 5×5(cm×cm) cluster (g) 20TeV at 5×5(cm×cm) cluster (h) 40TeV at 5×5(cm×cm) cluster

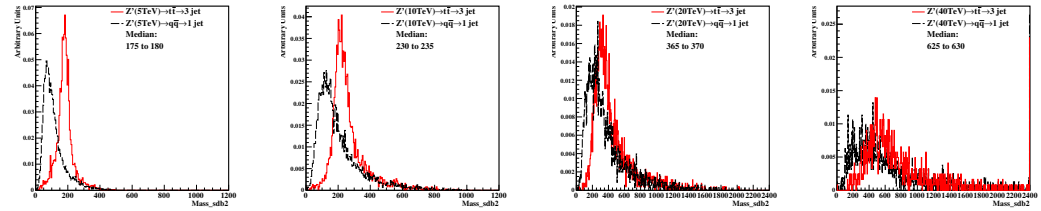



(i) 5TeV at 1×1(cm×cm) cluster (j) 10TeV at 1×1(cm×cm) cluster (k) 20TeV at 1×1(cm×cm) cluster (l) 40TeV at 1×1(cm×cm) cluster

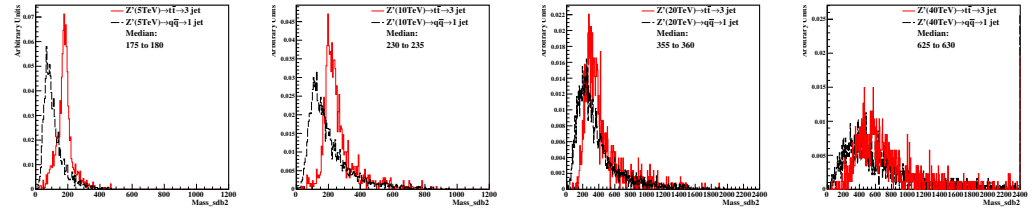
Figure 3: Distributions of mass soft drop at $\beta$=2, signal=ww, in 5,10TeV energy of collision in different detector sizes. Cell Size in 20×20, 5×5, and 1×1(cm×cm) are shown here.




(a) 5TeV at 20×20(cm×cm) in cluster (b) 10TeV at 20×20(cm×cm) in cluster (c) 20TeV at 20×20(cm×cm) in cluster (d) 40TeV at 20×20(cm×cm) in cluster




(e) 5TeV at 5×5(cm×cm) in cluster (f) 10TeV at 5×5(cm×cm) in cluster (g) 20TeV at 5×5(cm×cm) in cluster (h) 40TeV at 5×5(cm×cm) in cluster




(i) 5TeV at 1×1(cm×cm) in cluster (j) 10TeV at 1×1(cm×cm) in cluster (k) 20TeV at 1×1(cm×cm) in cluster (l) 40TeV at 1×1(cm×cm) in cluster

Figure 4: Distributions of mass soft drop at $\beta$=2, signal=tt, in 5,10TeV energy of collision in different detector sizes. Cell Size in 20×20, 5×5, and 1×1(cm×cm) are shown here.