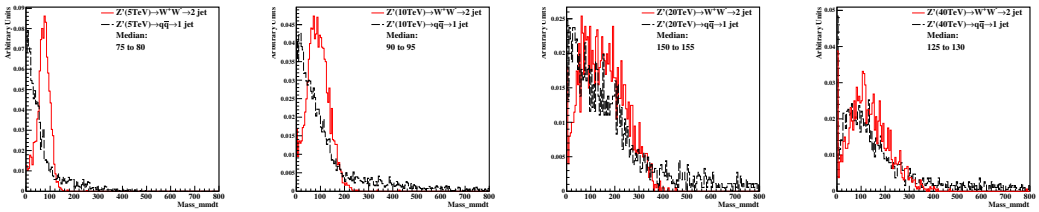
1. Soft drop method in future collider performance

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.

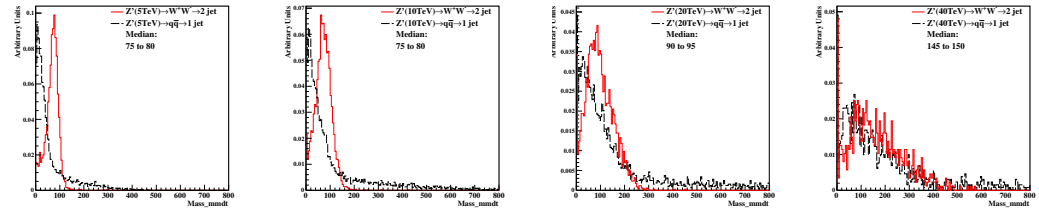
1.1. Analysis method

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.

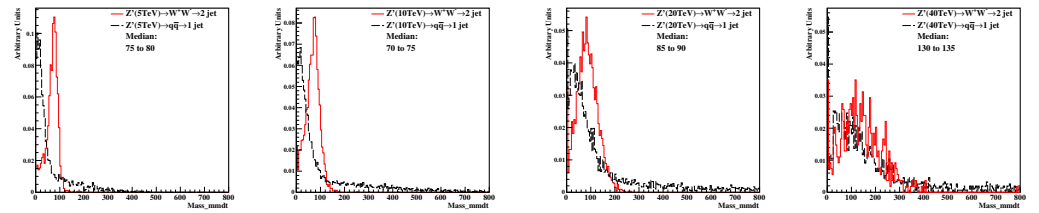
1.2. The conclusion of the results



(a) 5TeV at 20×20(cm×cm) 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

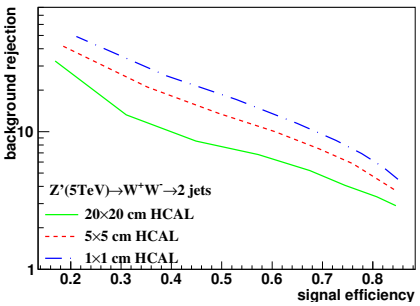


(e) 5TeV at 5×5(cm×cm) cluster (f) 10TeV at 5×5(cm×cm) cluster (g) 20TeV at 5×5(cm×cm) cluster (h) 40TeV at 5×5(cm×cm) cluster

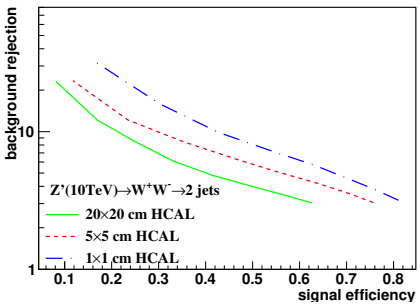


(i) 5TeV at 1×1(cm×cm) cluster (j) 10TeV at 1×1(cm×cm) cluster (k) 20TeV at 1×1(cm×cm) cluster (l) 40TeV at 1×1(cm×cm) cluster

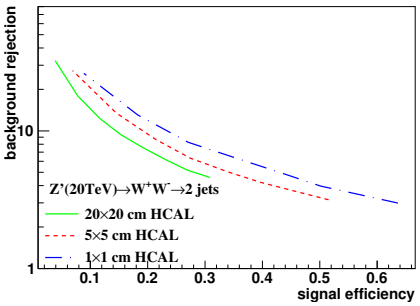
Figure 1: Distributions of mass soft drop at β=0, signal=ww, in 5,10TeV energy of collision in different detector sizes. Cell Size in 20×20, 5×5, and 1×1(cm×cm) are shown here.



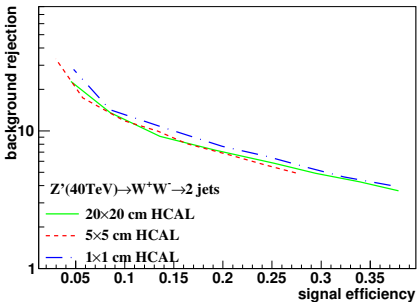
(a) Central at Median(20×20=80,5×5=80,1×1=80) change width in cluster at 5TeV



(b) Central at Median(20×20=95,5×5=80,1×1=75) change width in cluster at 10TeV

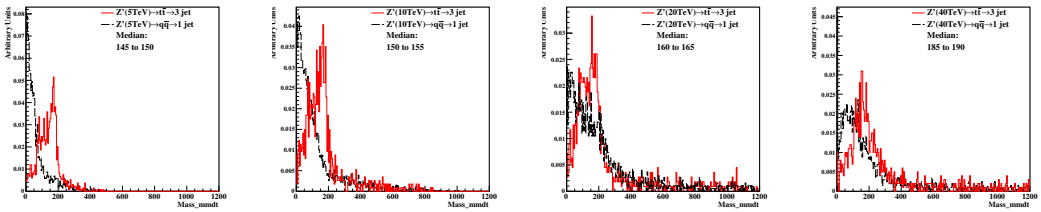


(c) Central at Median(20 × 20=155,5 × 5=95,1 × 1=90) change width in cluster at 20TeV

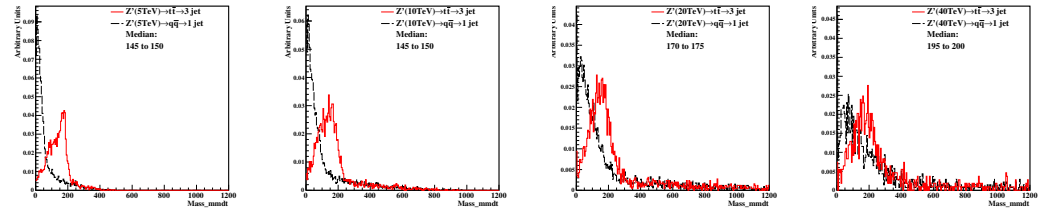


(d) Central at Median(20 × 20=130,5 × 5=150,1 × 1=135) change width in cluster at 40TeV

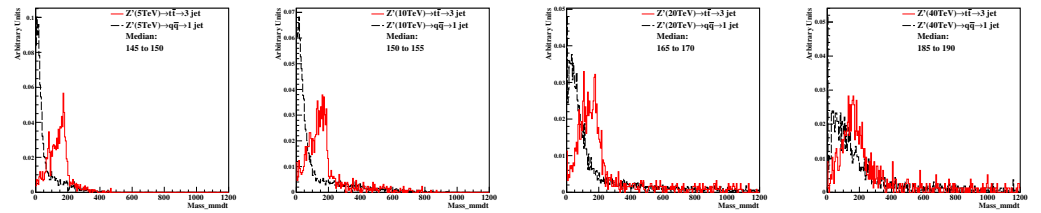
Figure 2: study of "fix central and change width" in mass soft drop at β=0, signal=ww, in 5, 10, 20, 40TeV energy of collision in different detector sizes. Cell Size in 20×20, 5×5, and 1×1(cm×cm) are shown in each picture.



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

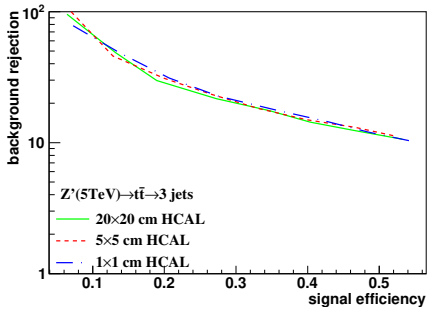


(e) 5TeV at 1×1(cm×cm) in cluster (f) 10TeV at 1×1(cm×cm) in cluster (g) 20TeV at 20×20(cm×cm) in cluster (h) 40TeV at 20×20(cm×cm) in cluster

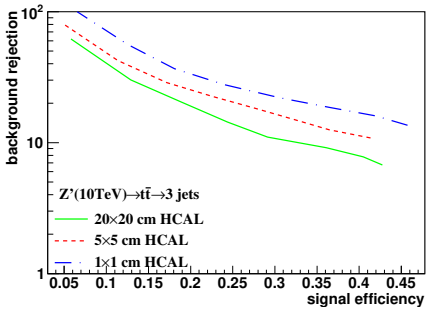


(i) 5TeV at 5×5(cm×cm) in cluster (j) 10TeV at 5×5(cm×cm) in cluster (k) 20TeV at 1×1(cm×cm) in cluster (l) 40TeV at 1×1(cm×cm) in cluster

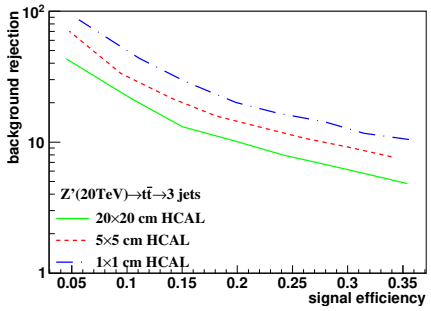
Figure 3: Distributions of mass soft drop at β=0, signal=tt, in 5,10TeV energy of collision in different detector sizes. Cell Size in 20×20, 5×5, and 1×1(cm×cm) are shown here.



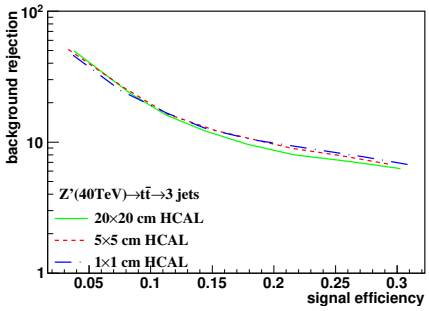
(a) Central at Median(20 × 20=150,5 × 5=150,1 × 1=150) change width in cluster at 5TeV



(b) Central at Median(20 × 20=155,5 × 5=150,1 × 1=155) change width in cluster at 10TeV

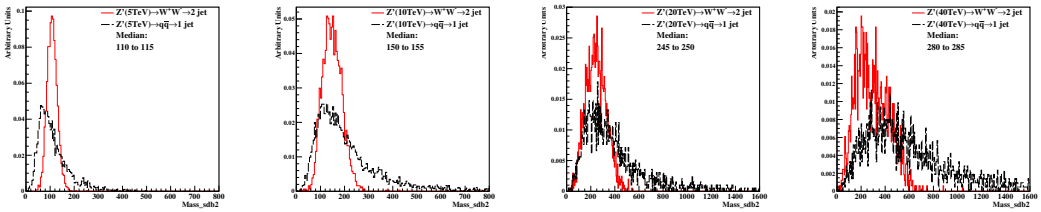


(c) Central at Median(20 × 20=165,5 × 5=175,1 × 1=170) change width in cluster at 20TeV

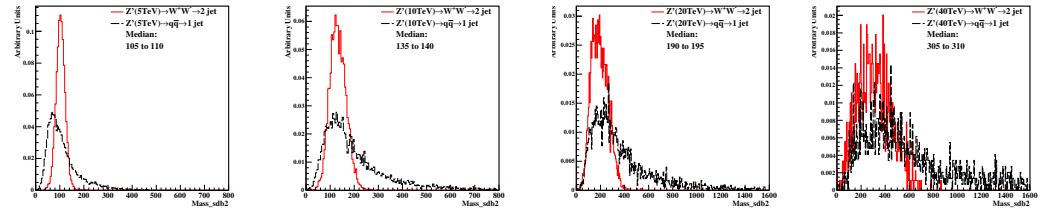


(d) Central at Median(20 × 20=190,5 × 5=200,1 × 1=190) change width in cluster at 40TeV

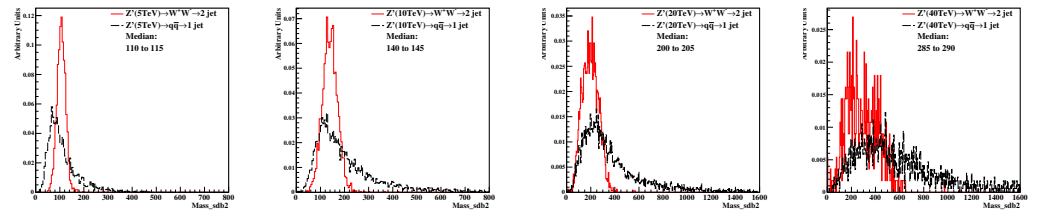
Figure 4: study of "fix central and change width" in mass soft drop at β=0, signal=tt, in 5, 10, 20, 40TeV energy of collision in different detector sizes. Cell Size in 20×20, 5×5, and 1×1(cm×cm) are shown in each picture.



(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

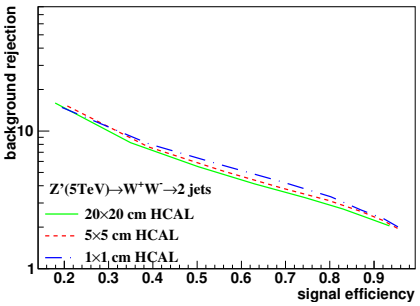


(e) 5TeV at 5×5(cm×cm) cluster (f) 10TeV at 5×5(cm×cm) cluster (g) 20TeV at 5×5(cm×cm) cluster (h) 40TeV at 5×5(cm×cm) cluster

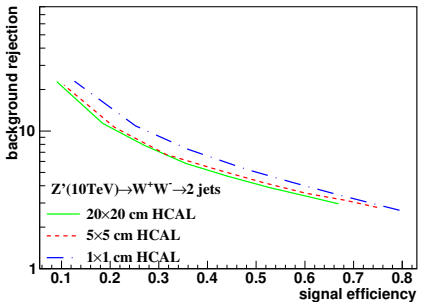


(i) 5TeV at 1×1(cm×cm) cluster (j) 10TeV at 1×1(cm×cm) cluster (k) 20TeV at 1×1(cm×cm) cluster (l) 40TeV at 1×1(cm×cm) cluster

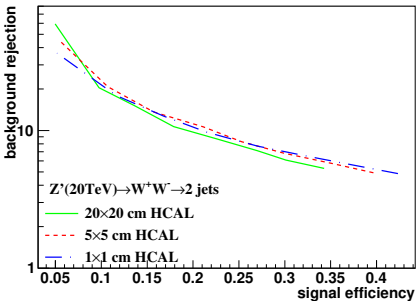
Figure 5: Distributions of mass soft drop at β=2, signal=ww, in 5,10TeV energy of collision in different detector sizes. Cell Size in 20×20, 5×5, and 1×1(cm×cm) are shown here.



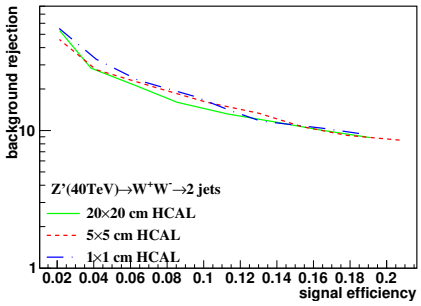
(a) Central at Median(20 × 20=115,5 × 5=110,1 × 1=115) change width in cluster at 5TeV



(b) Central at Median(20 × 20=155,5 × 5=140,1 × 1=145) change width in cluster at 10TeV

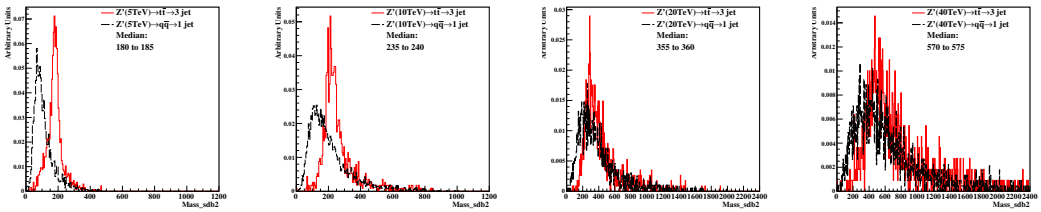


(c) Central at Median(20 × 20=250,5 × 5=195,1 × 1=205) change width in cluster at 20TeV

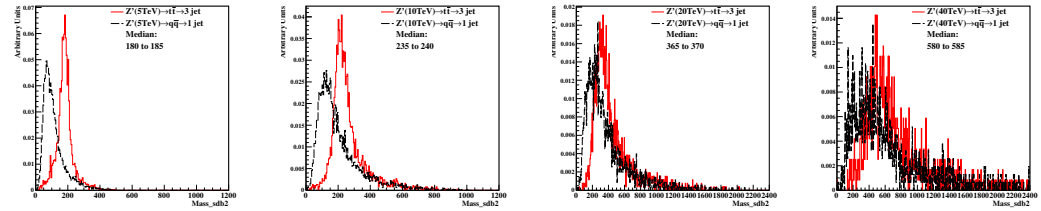


(d) Central at Median(20 × 20=285,5 × 5=310,1 × 1=290) change width in cluster at 40TeV

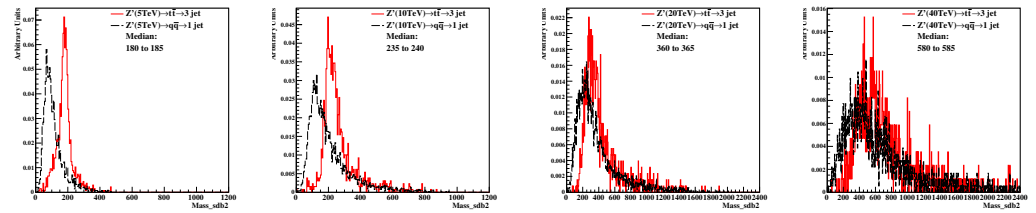
Figure 6: study of "fix central and change width" in mass soft drop at β=2, signal=ww, in 5, 10, 20, 40TeV energy of collision in different detector sizes. Cell Size in 20×20, 5×5, and 1×1(cm×cm) are shown in each picture.



(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

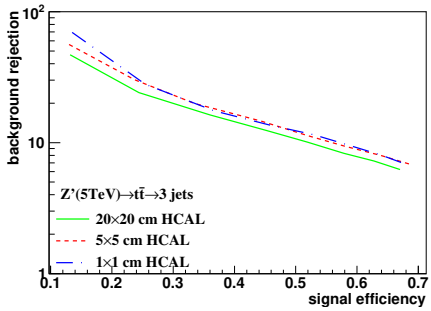


(e) 5TeV at 5×5(cm×cm) in cluster (f) 10TeV at 5×5(cm×cm) in cluster (g) 20TeV at 5×5(cm×cm) in cluster (h) 40TeV at 5×5(cm×cm) in cluster

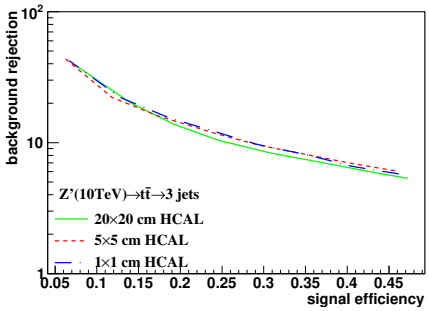


(i) 5TeV at 1×1(cm×cm) in cluster (j) 10TeV at 1×1(cm×cm) in cluster (k) 20TeV at 1×1(cm×cm) in cluster (l) 40TeV at 1×1(cm×cm) in cluster

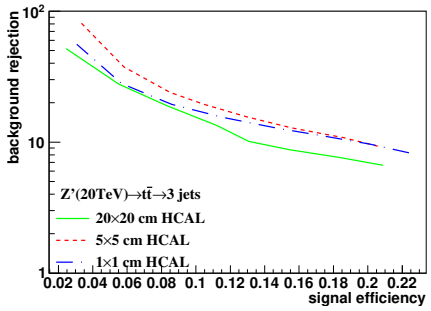
Figure 7: Distributions of mass soft drop at β=2, signal=tt, in 5,10TeV energy of collision in different detector sizes. Cell Size in 20×20, 5×5, and 1×1(cm×cm) are shown here.



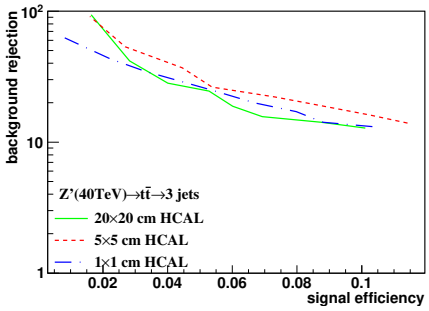
(a) Central at Median(20 × 20=185,5 × 5=185,1 × 1=185) change width in cluster at 5TeV



(b) Central at Median(20 × 20=240,5 × 5=240,1 × 1=240) change width in cluster at 10TeV



(c) Central at Median(20 × 20=360,5 × 5=375,1 × 1=365) change width in cluster at 20TeV



(d) Central at Median(20 × 20=620,5 × 5=625,1 × 1=630) change width in cluster at 40TeV

Figure 8: study of "fix central and change width" in mass soft drop at β=2, signal=tt, in 5, 10, 20, 40TeV energy of collision in different detector sizes. Cell Size in 20×20, 5×5, and 1×1(cm×cm) are shown in each picture.