1. Soft drop method in future collider performance
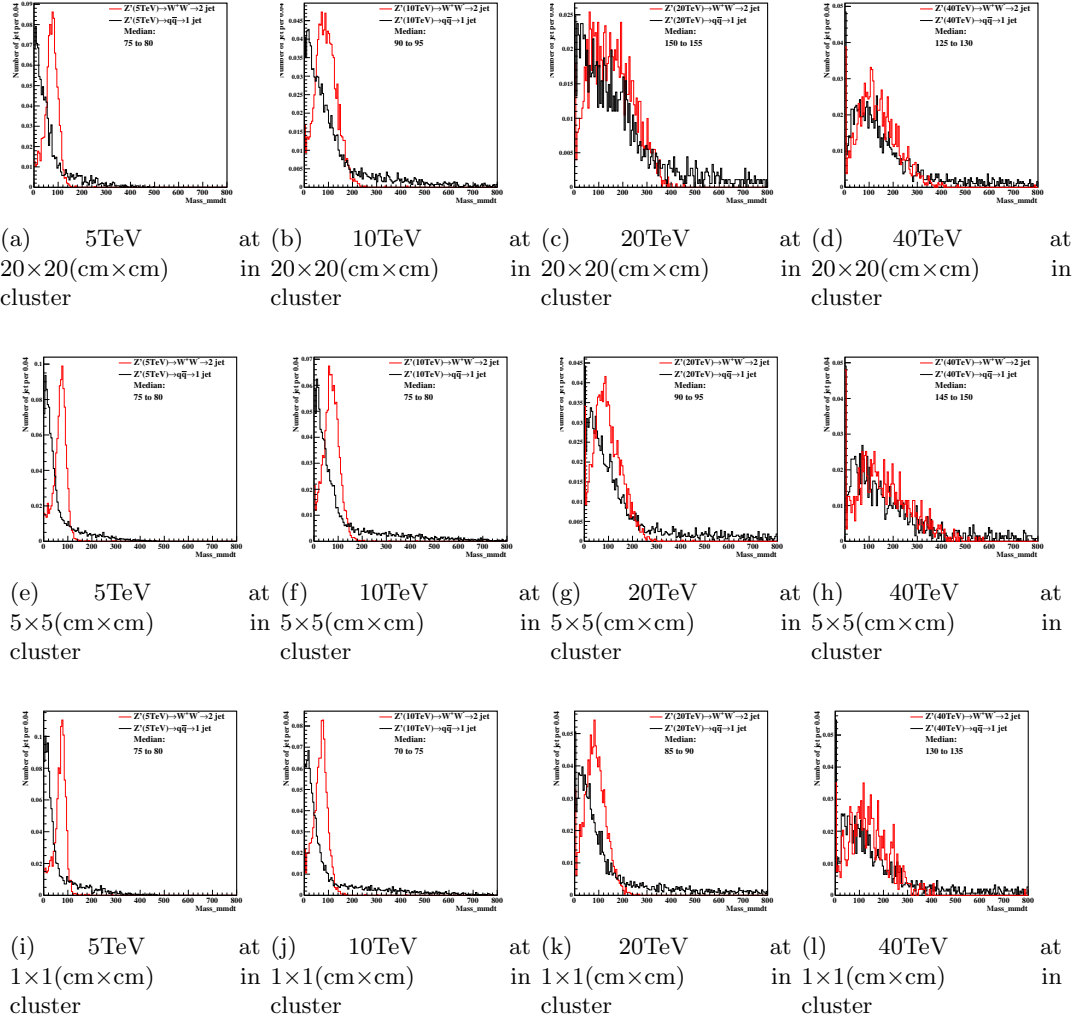
(a) 5TeV at 20×20(cm×cm) in cluster

(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 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.
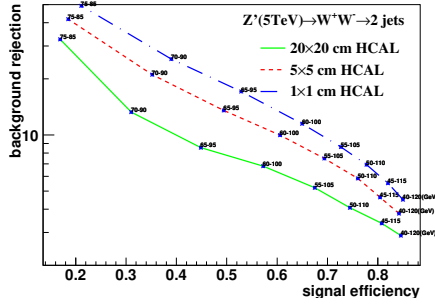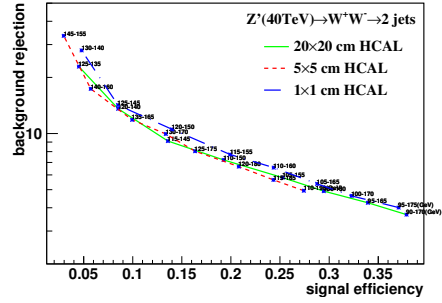
(a) Central at Median($20 \times 20 = 80, 5 \times 5 = 80, 1 \times 1 = 80$) change width in cluster at 5TeV
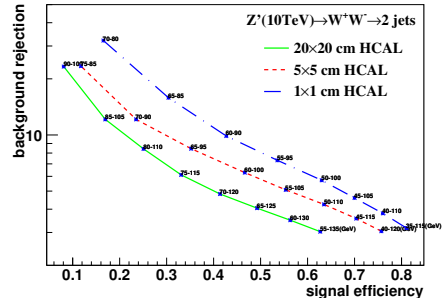
(b) Central at Median($20 \times 20 = 95, 5 \times 5 = 80, 1 \times 1 = 75$) change width in cluster at 10TeV
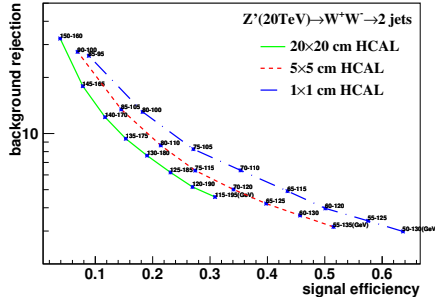
(c) Central at Median($20 \times 20 = 155, 5 \times 5 = 95, 1 \times 1 = 90$) change width in cluster at 20TeV

(d) Central at Median($20 \times 20 = 130, 5 \times 5 = 150, 1 \times 1 = 135$) 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$\times$cm) are shown in each picture.

(a) 5TeV at 20×20(cm×cm) in cluster

(b) 10TeV at in 20×20(cm×cm) cluster

(c) 20TeV at in 5×5(cm×cm) cluster

(d) 40TeV at in 5×5(cm×cm) cluster

(e) 5TeV at 1×1(cm×cm) in cluster

(f) 10TeV at in 1×1(cm×cm) cluster

(g) 20TeV at in 20×20(cm×cm) cluster

(h) 40TeV at in 20×20(cm×cm) cluster

(i) 5TeV at 5×5(cm×cm) in cluster

(j) 10TeV at in 5×5(cm×cm) cluster

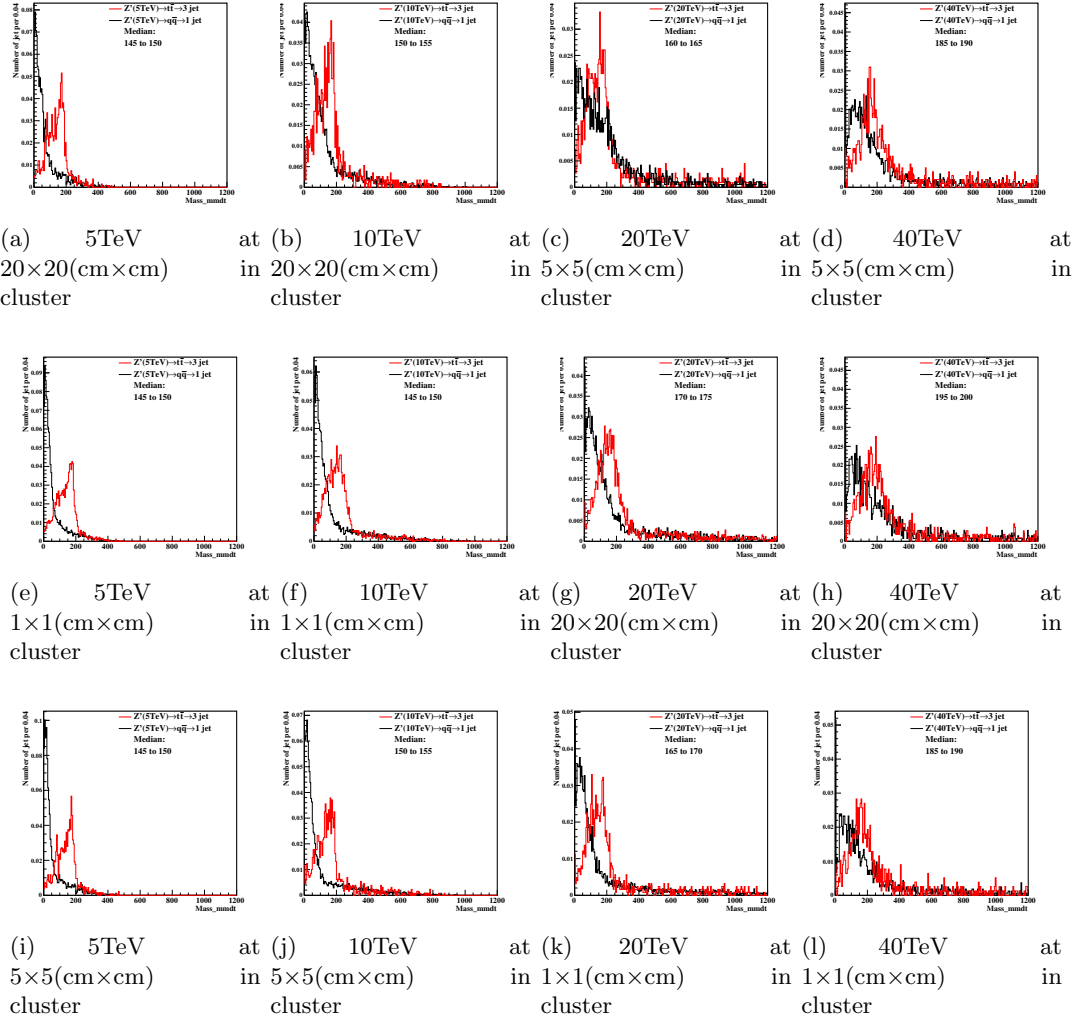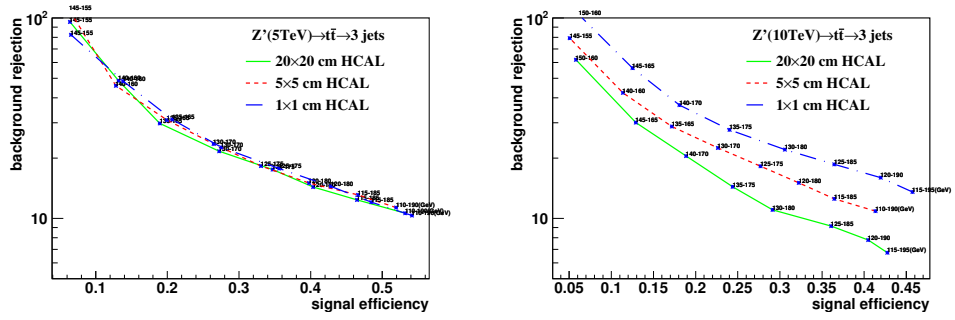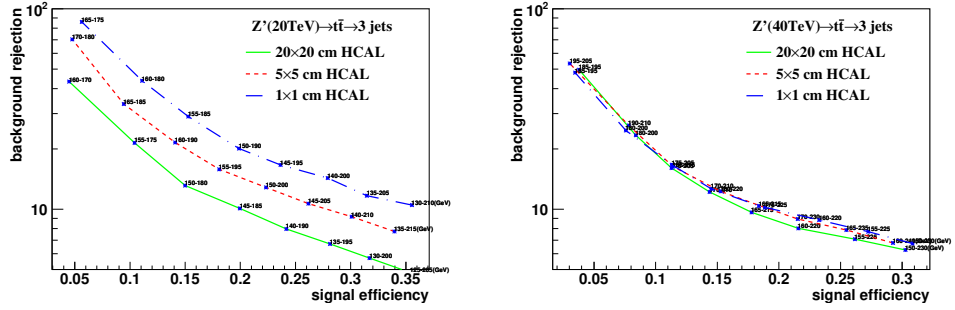(k) 20TeV at in 1×1(cm×cm) cluster

(l) 40TeV at in 1×1(cm×cm) 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.

4

(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) 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
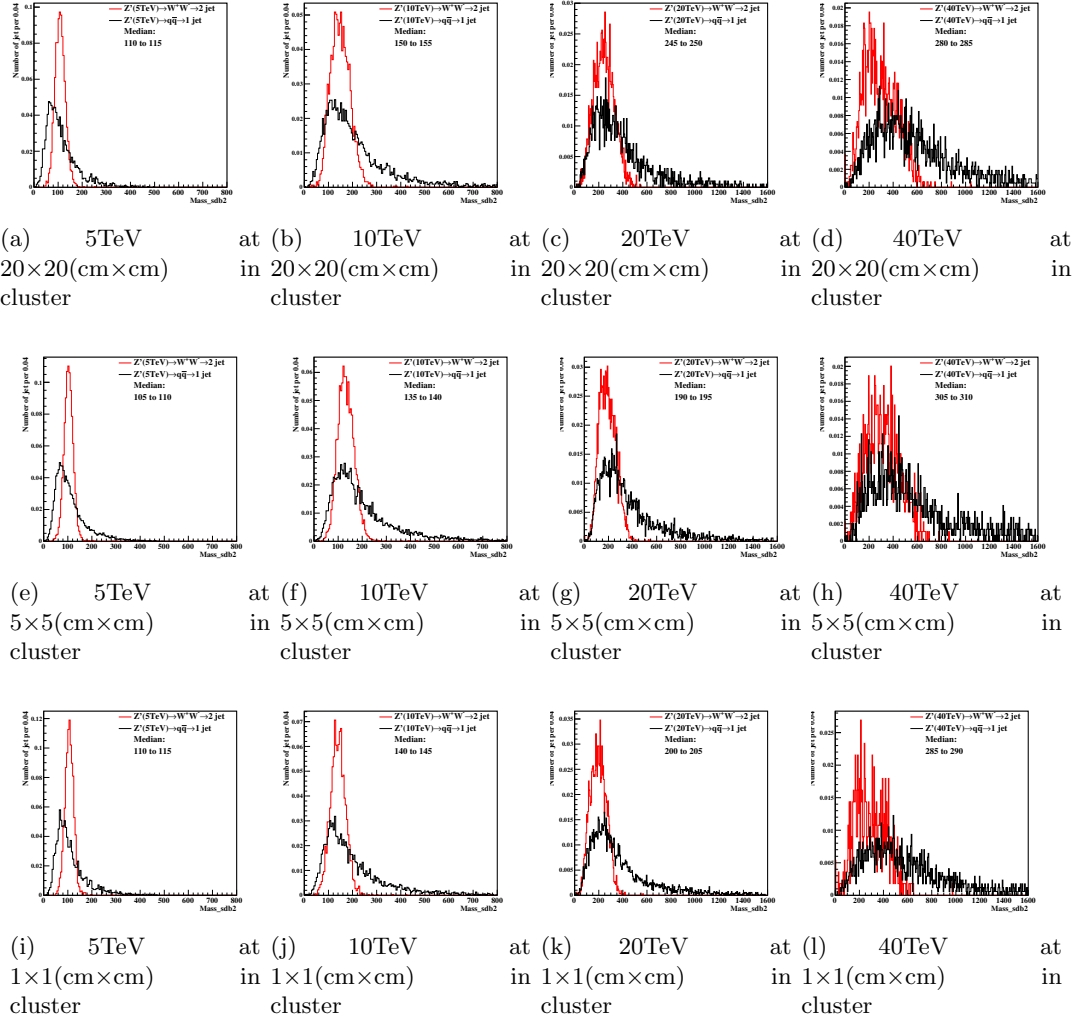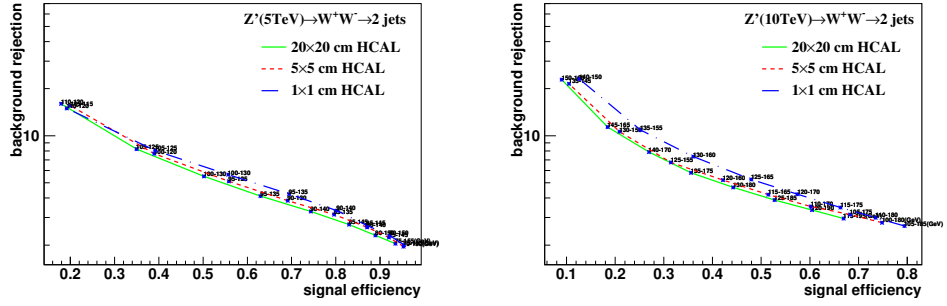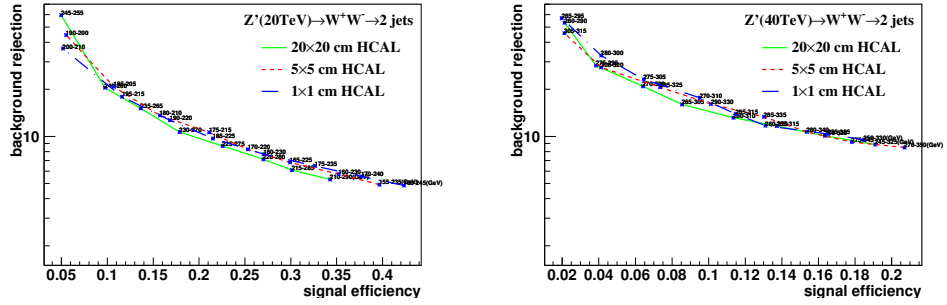

(l) 40TeV at 1×1(cm×cm) in cluster

Figure 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.

6

(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

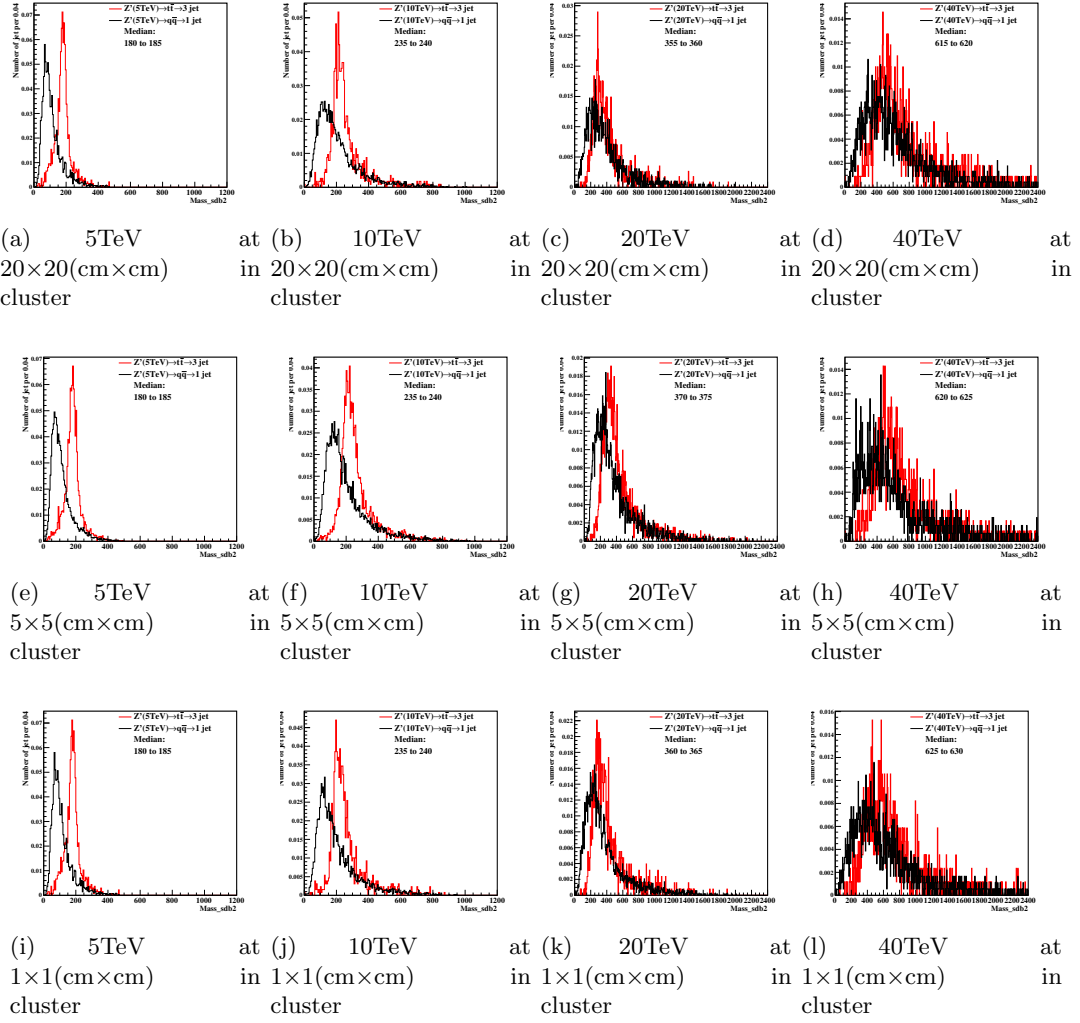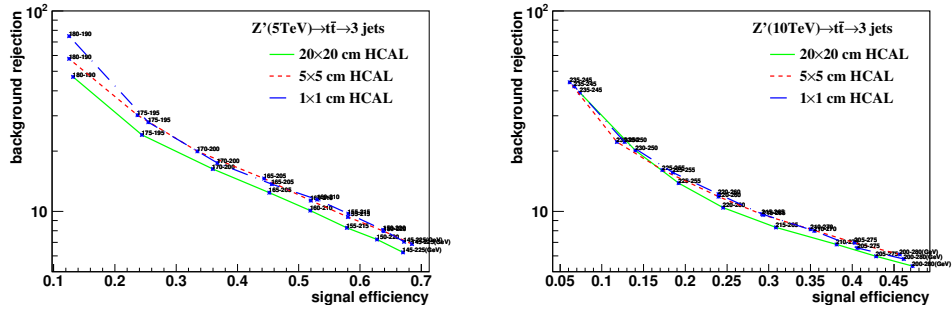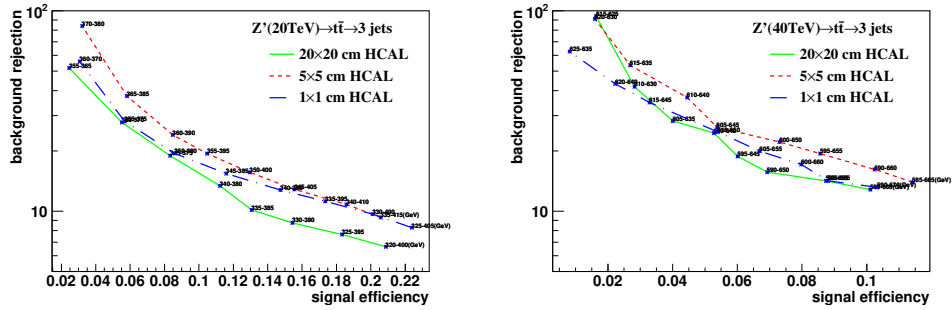(l)   40TeV   at
1×1(cm×cm)   in
cluster

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($20 \times 20{=}185, 5 \times 5{=}185, 1 \times 1{=}185$) change width in cluster at 5TeV

(b) Central at Median($20 \times 20{=}240, 5 \times 5{=}240, 1 \times 1{=}240$) change width in cluster at 10TeV

(c) Central at Median($20 \times 20{=}360, 5 \times 5{=}375, 1 \times 1{=}365$) change width in cluster at 20TeV

(d) Central at Median($20 \times 20{=}620, 5 \times 5{=}625, 1 \times 1{=}630$) change width in cluster at 40TeV

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