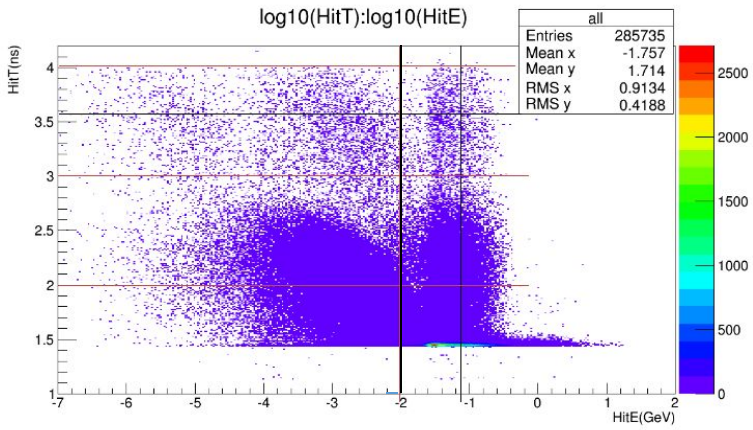
CEPC强子量能器优化研究

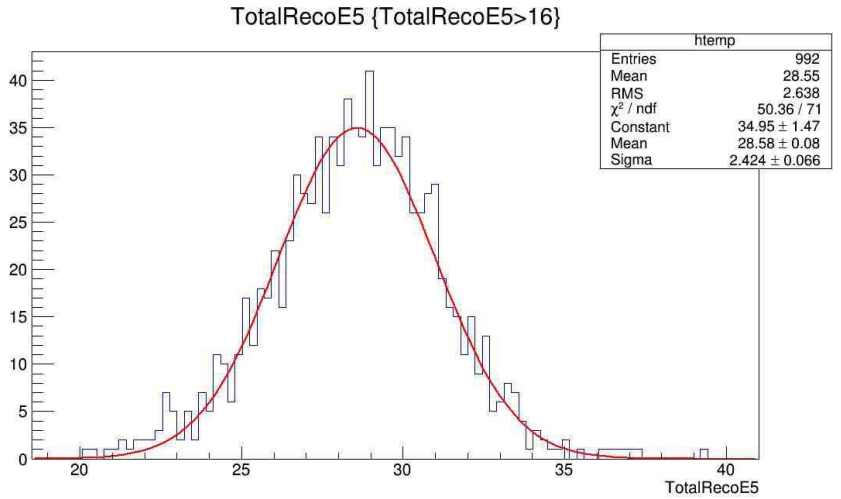
朱学正

- 强子簇射中hot hit甄别及研究

- hit时间和能量阈值研究

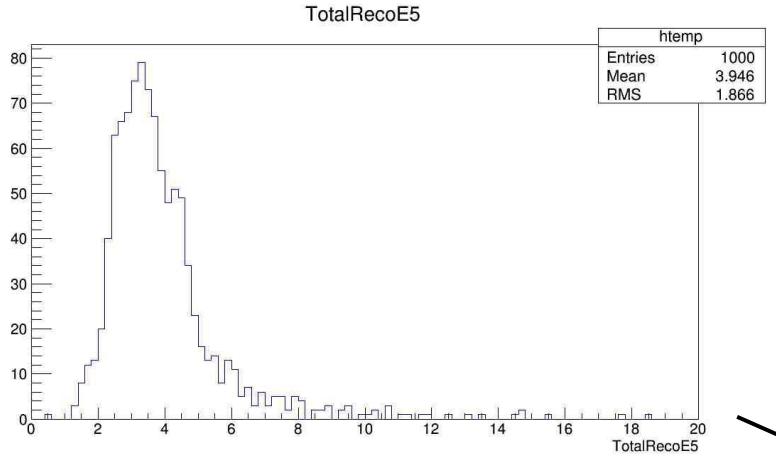
Geometry and TotalRecoE

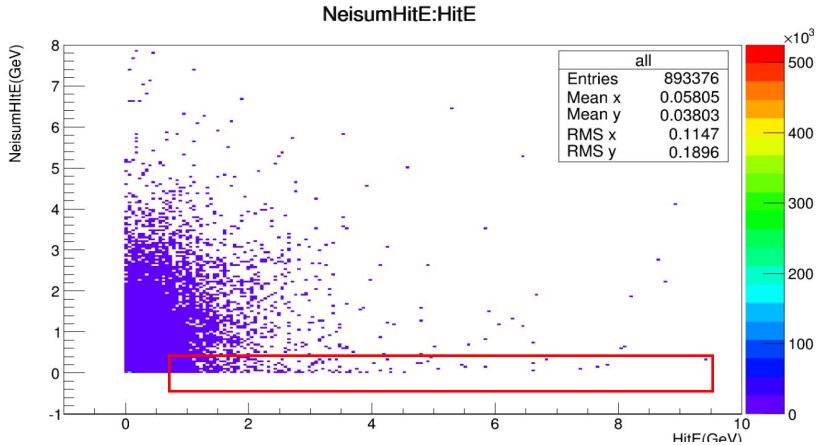


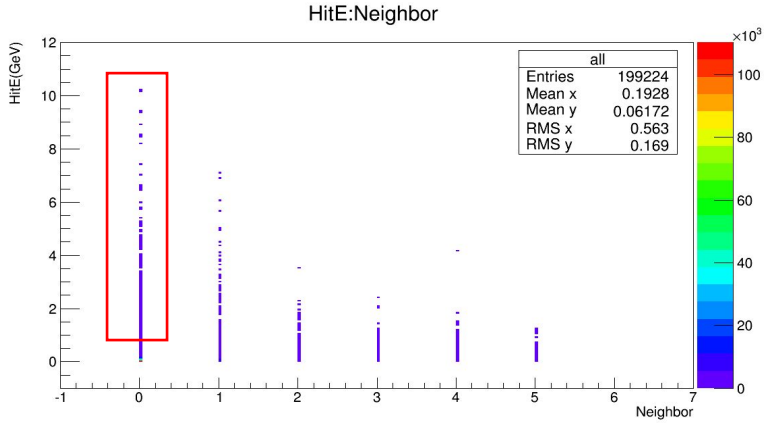


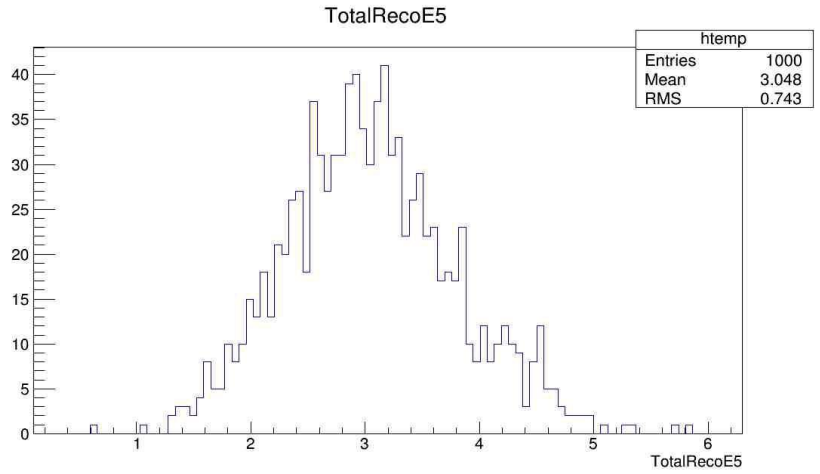
hot hit 减除

hot Hit:由核反应导致的高能hit







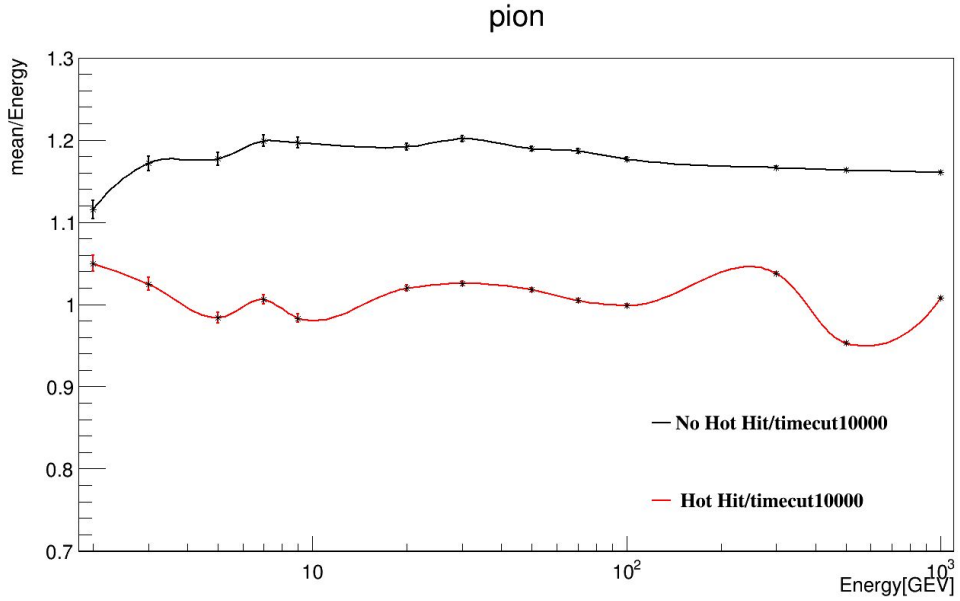


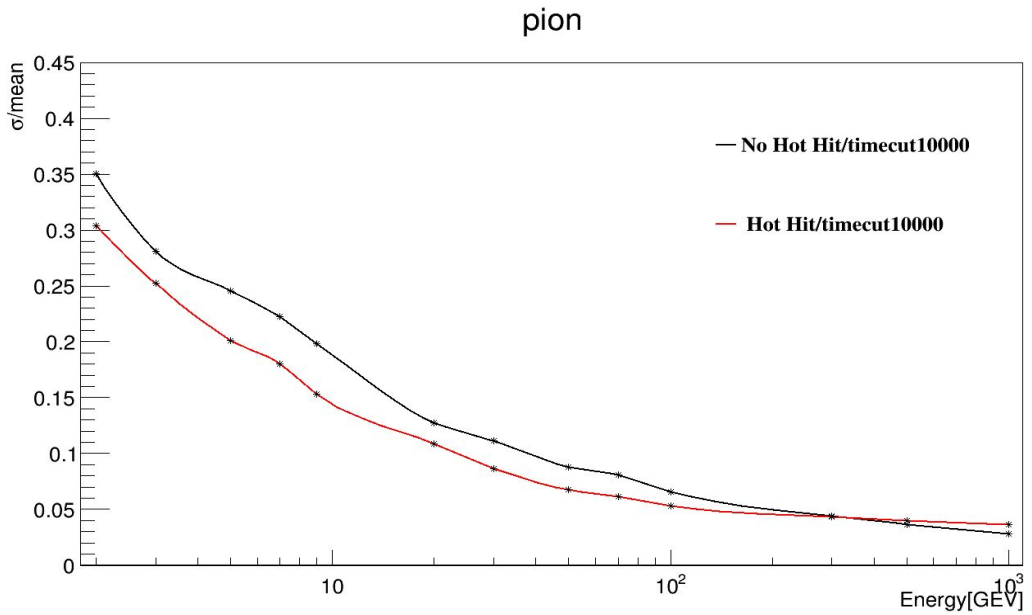
能量线性度和分辨率

选择条件： HitE>0.45,Neighbor = 0,则HitE= 0.028(1mip)

结论：进行hot hit cut 之后能量在低于100GeV能量分辨率有较大改善

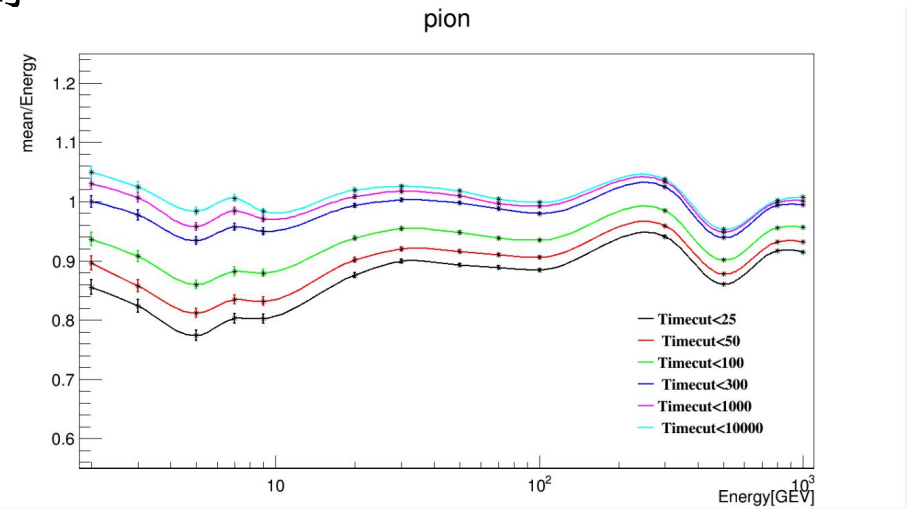
高能时能量测量变差， 甄别需要考虑其他算法

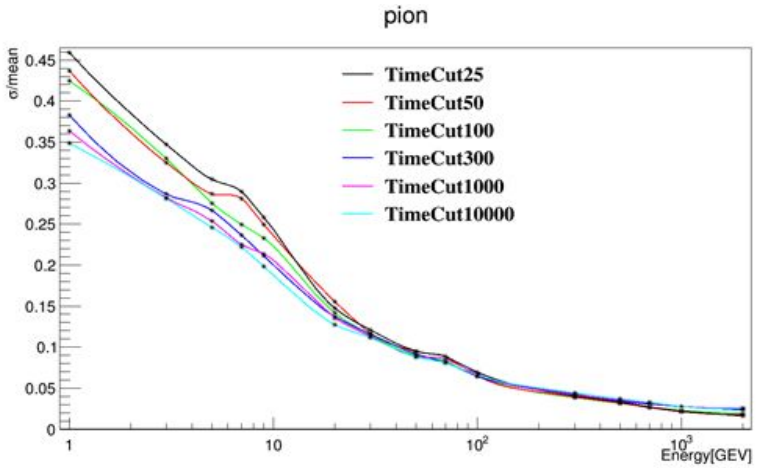


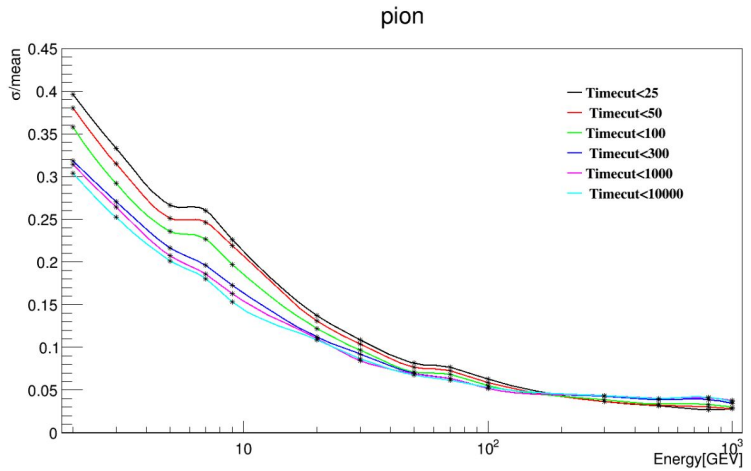


Hot hit cut 下的Timecut

结论：进行hot hit cut后Timecut图像更符合预期，能量不高时，选择时间越长，能量分辨率越好

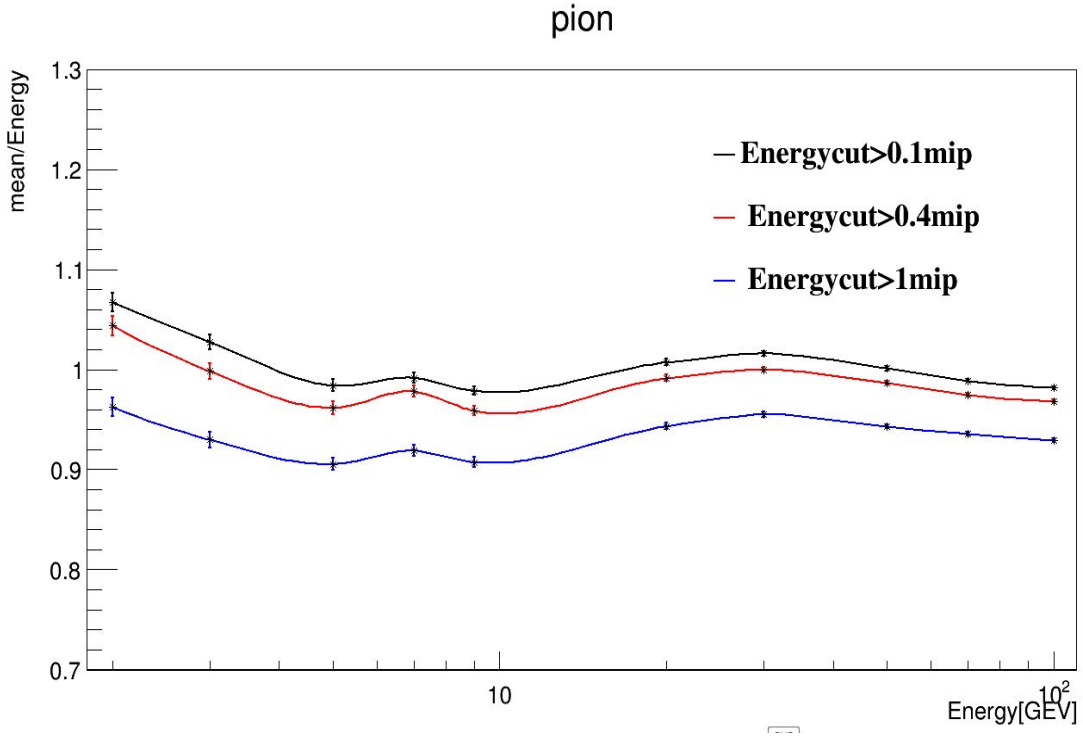


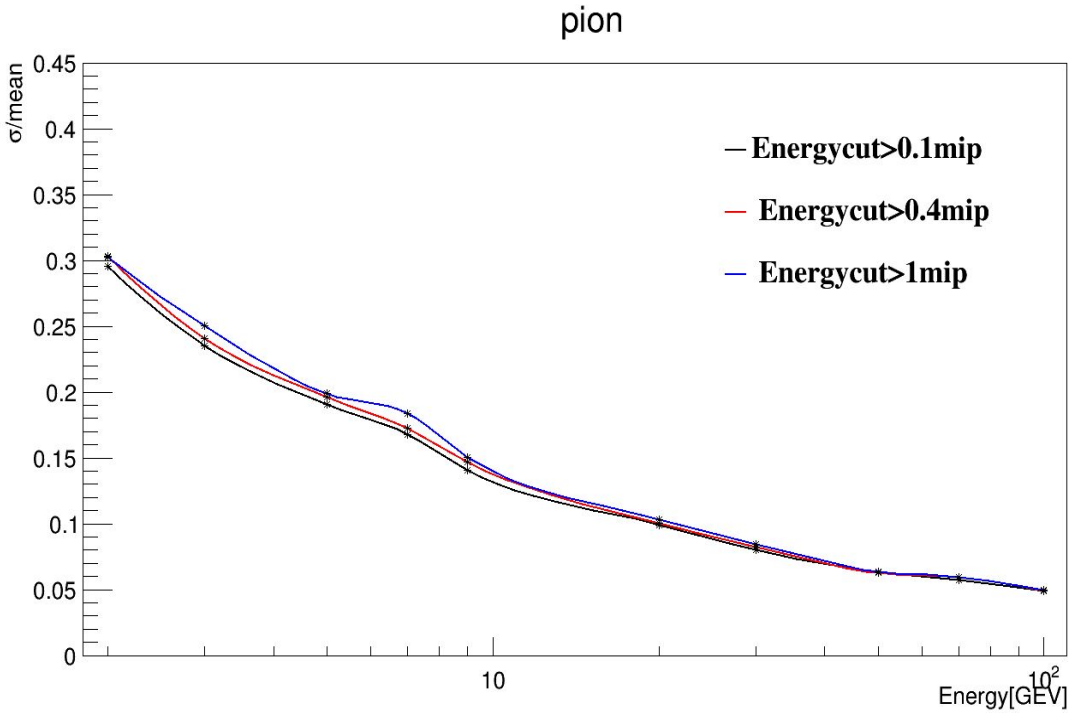




hot hit cut 下的Energycut

timecut<10000ns





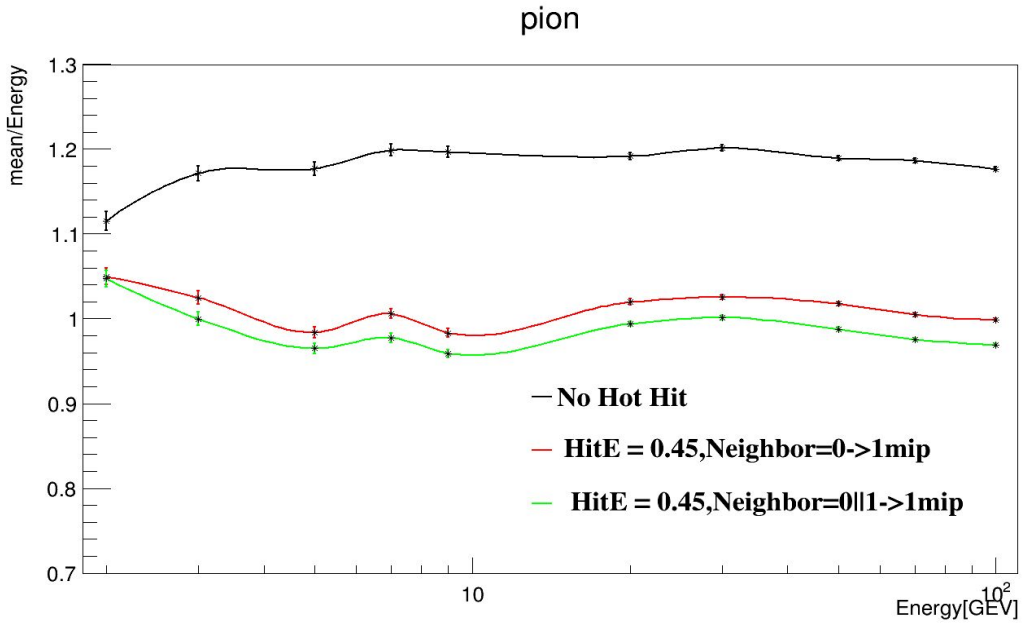
结论

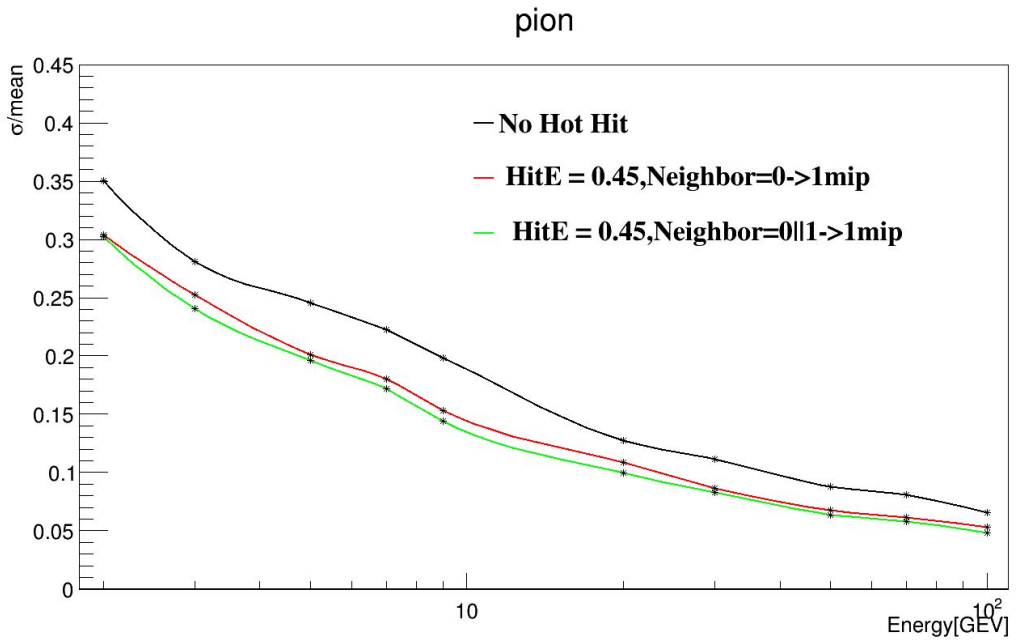
强子簇射能量响应对时间、能量的选择条件敏感，其敏感度随能量升高而减弱。低能时能量分辨率变化幅度可达（15% - 50%）。需慎重设计电子学积分时间及能量阈值

hot hit 选择条件优化

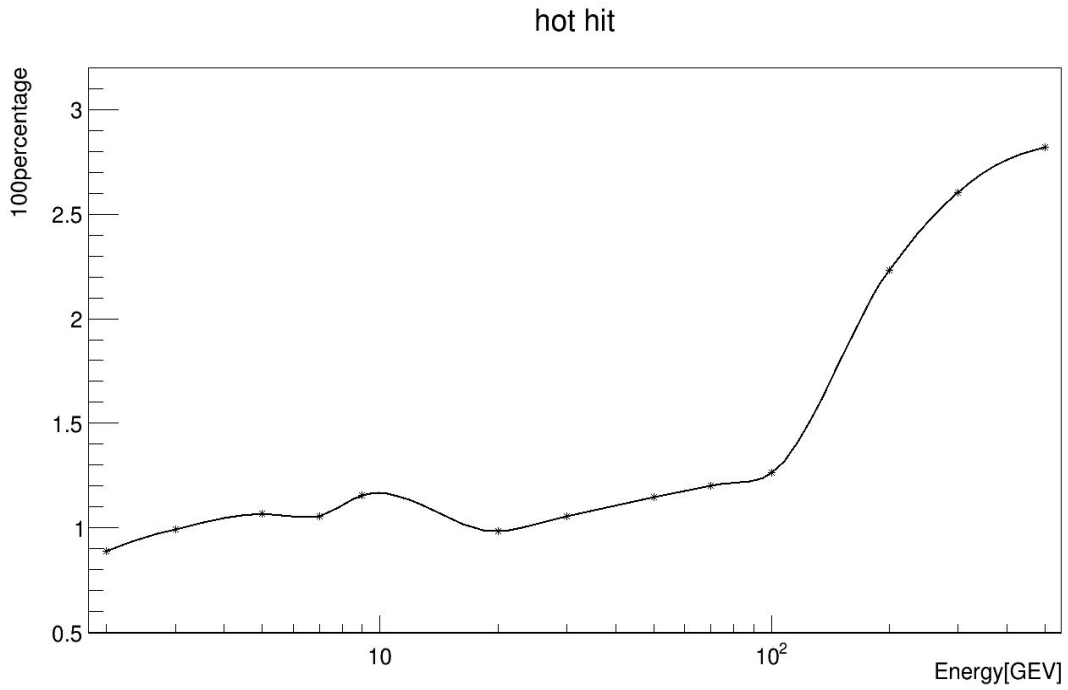
```
    //    if (HitE > 0.3 && Neighbor == 0  )
  //  {
 //                    HitE=0.028;
//                             }
         if (HitE1 > 0.45 && (Neighbor == 0 ||Neighbor == 1) )
    {
                    HitE1=0.028;
                           }
    /*
        if (HitE2 > 0.45 && (Neighbor == 0 ||Neighbor == 1||Neighbor == 2)  )
    {
                    HitE2=0.028;
                           }

         if (HitE4 > 0.45 && (Neighbor == 0 ||Neighbor == 1||Neighbor == 2||Neighbor == 3) )
    {
                    HitE4=0.028;
                           }
                 if (HitE5 > 0.45 && NeisumHitE<0.25 )
    {
                    HitE5=0.028;
                           }
                if (HitE6 > 0.45 && NeisumHitE<0.15 )
    {
                    HitE6=0.028;
                           }
                 if (HitE7 > 0.45 && NeisumHitE<0.1 )
    {
                    HitE7=0;
                           }

                  if (HitE9 > 0.45 && Neighbor == 0  )
    {
                    HitE9=0;
                    }
        */
```

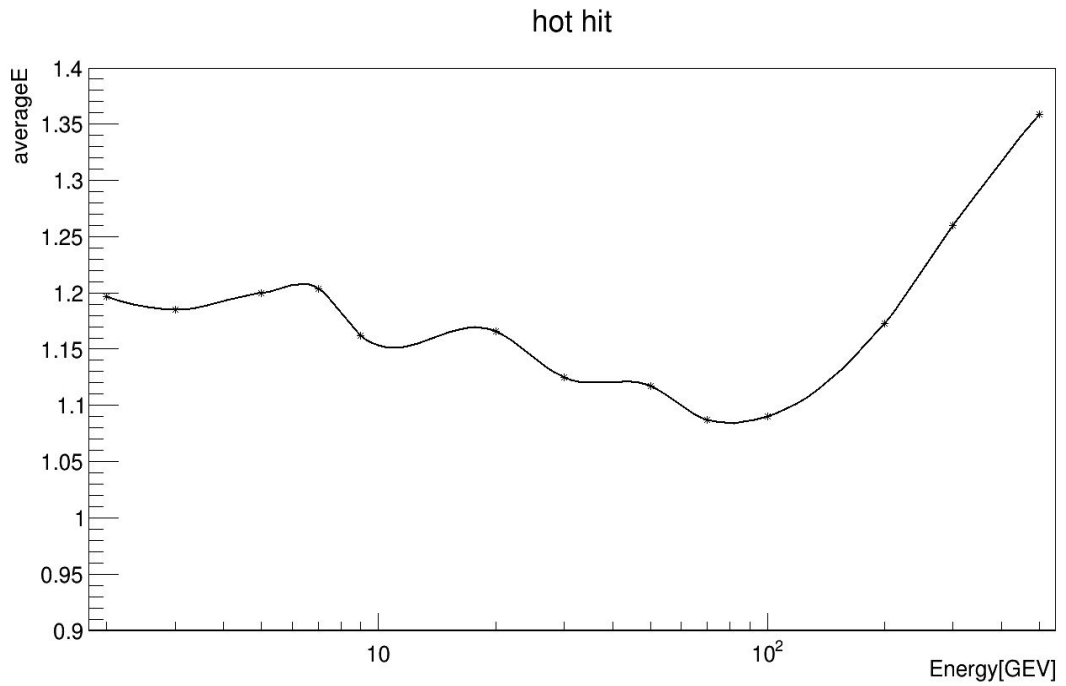
hot hit 选择条件优化





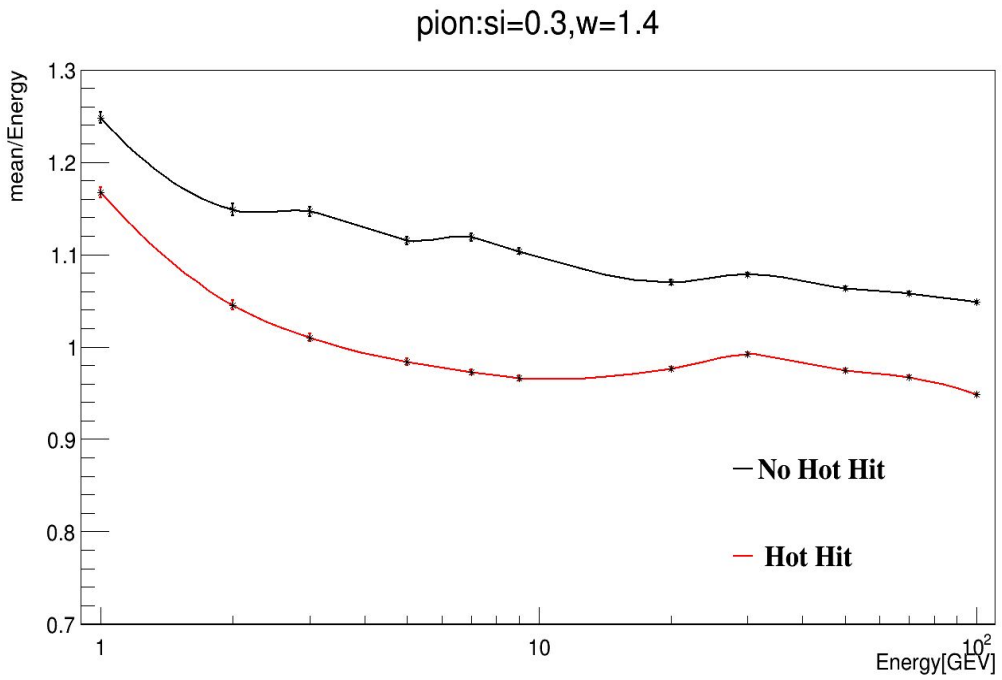
hot hit 的percentage and averageE

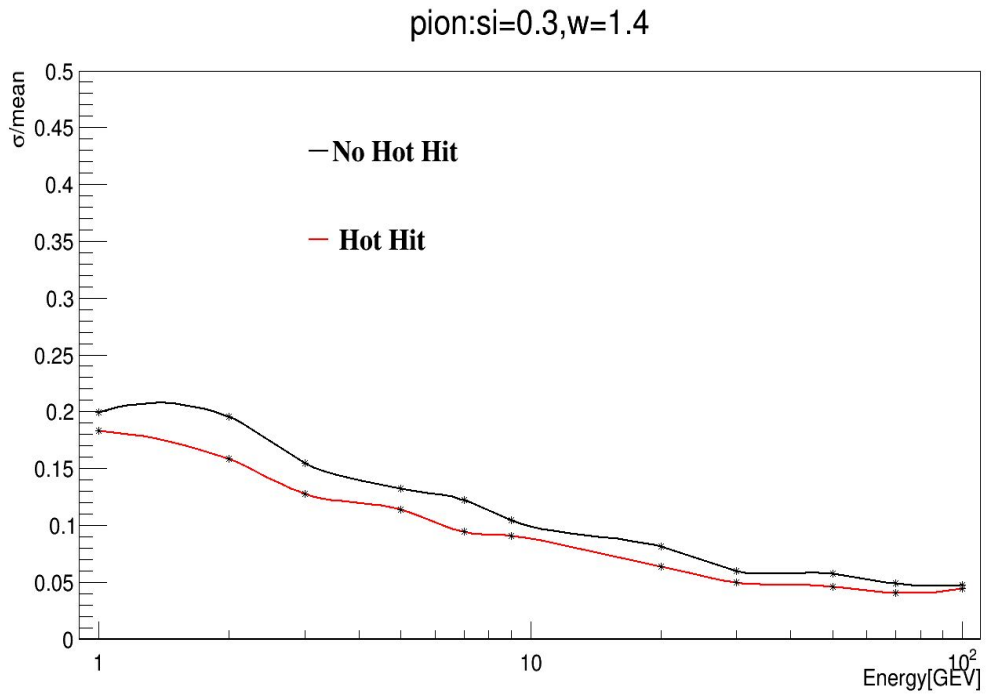




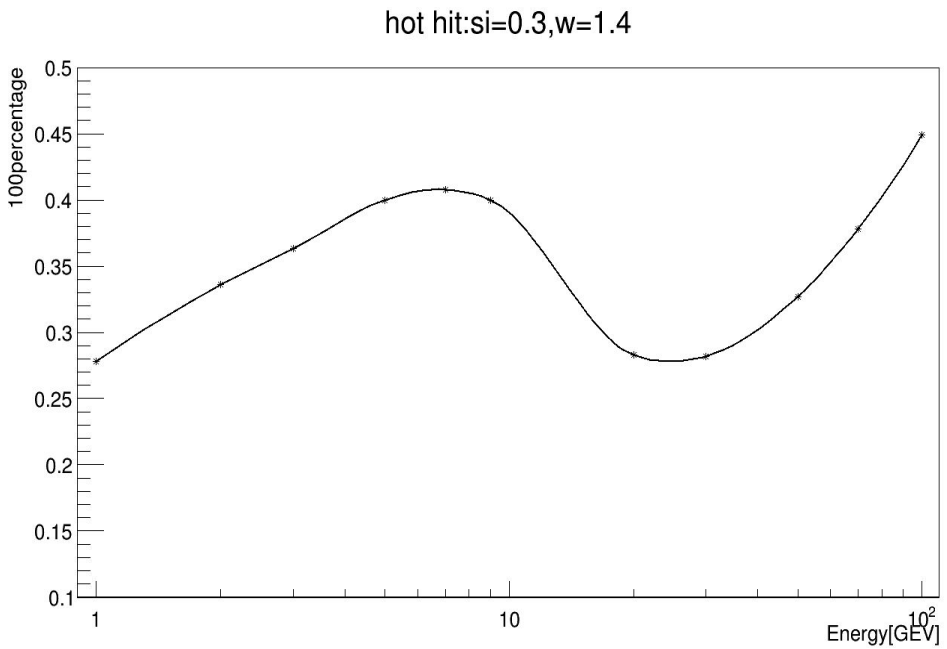
si=0.3mm,w=1.4mm

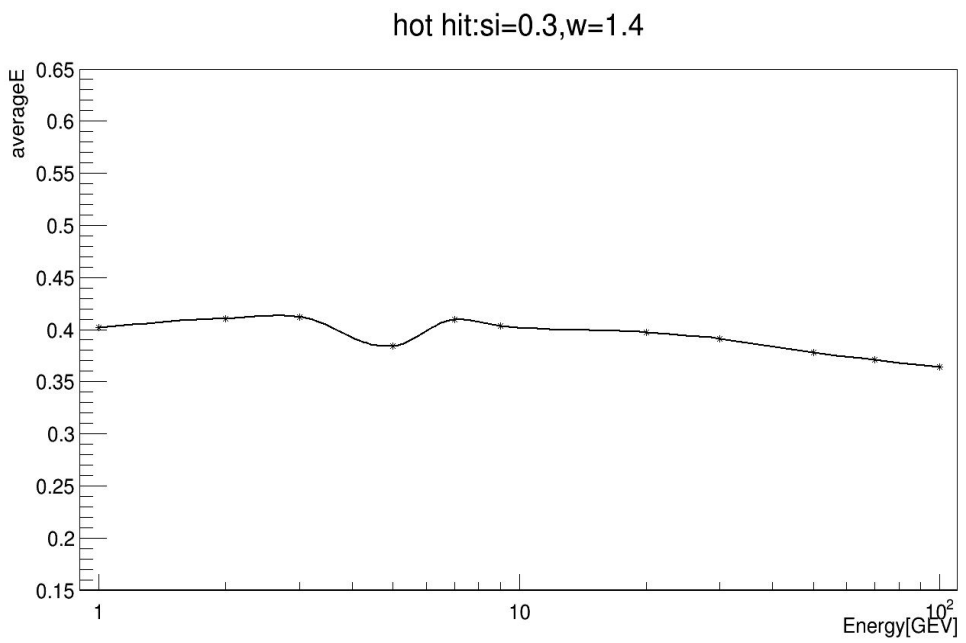
- if HitE>0.20(40mip),Neighbor=0||1,Then HitE=0.005(1mip)





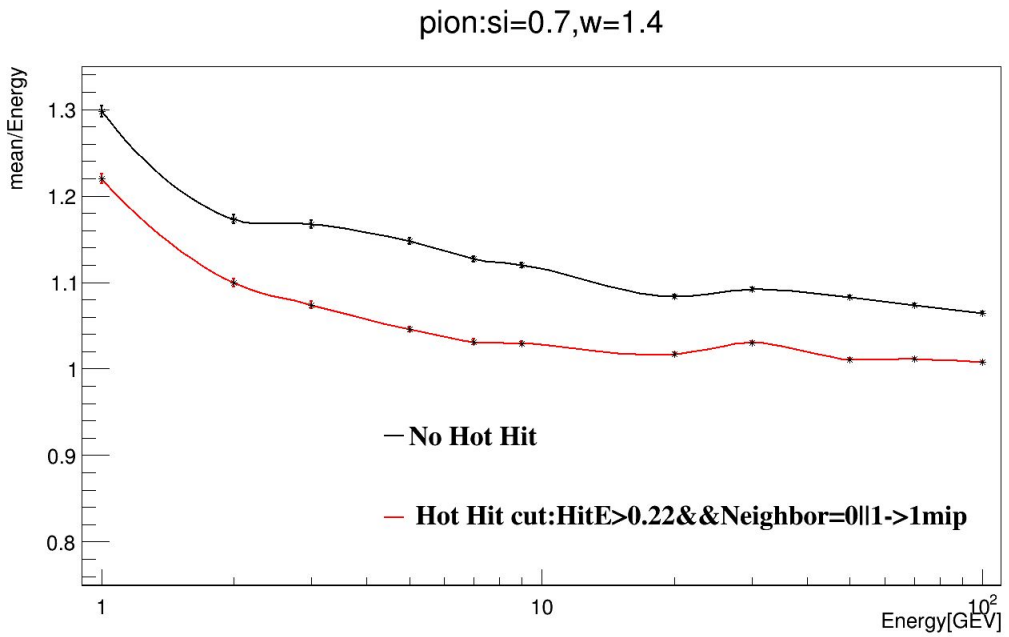
hot hit 的percentage and averageE

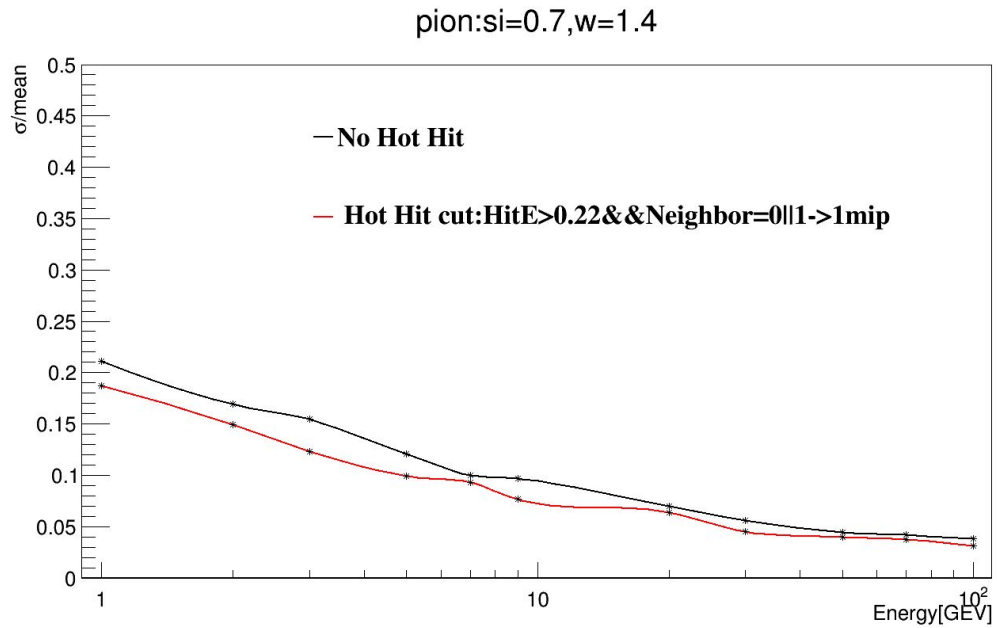




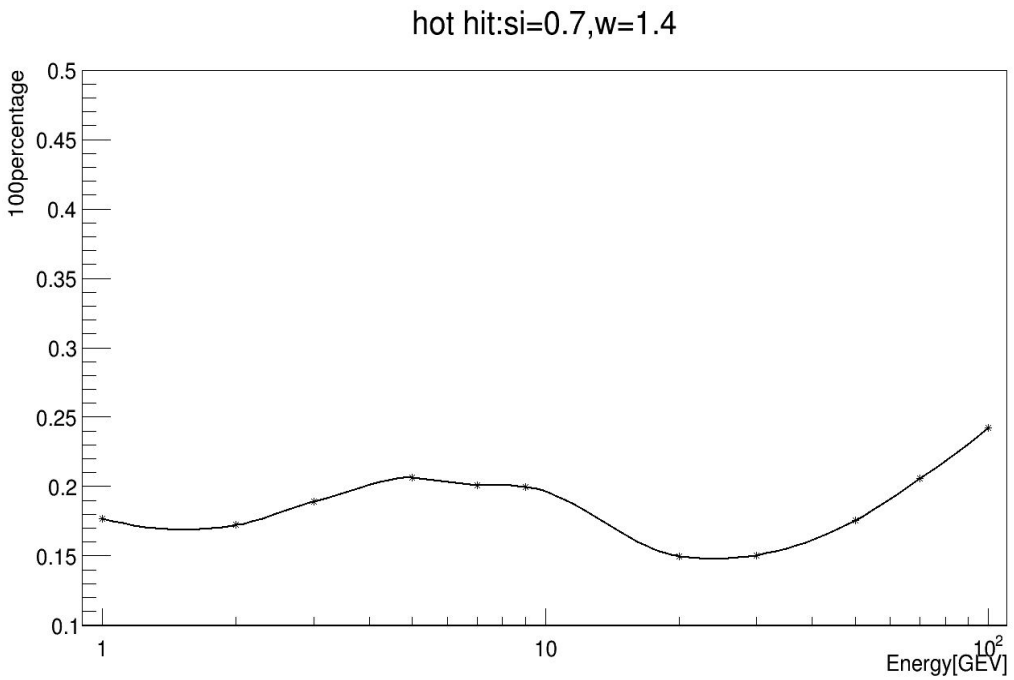
si=0.7mm,w=1.4mm

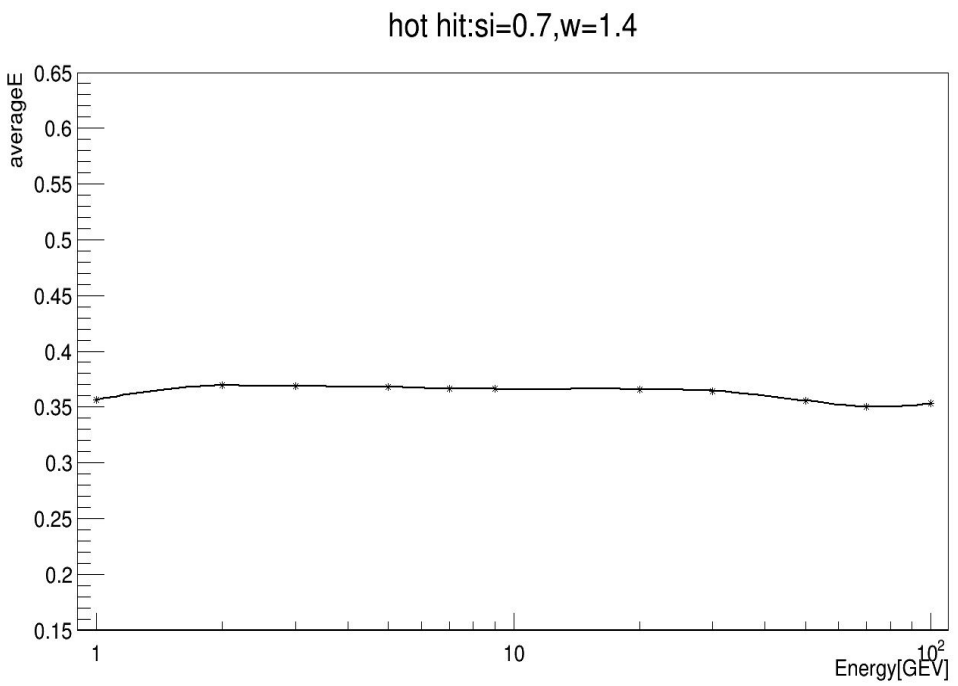
- if HitE>0.22(40mip),Neighbor=0||1,Then HitE=0.005(1mip=0.0549)





hot hit 的percentage and averageE





hot hit 的percentage and averageE

si=0.5mm,w=1.4mm