On the multiplicity of high-energy clusters

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The workflow

- After the clusterizer identified all clusters in an event, it looks for the beam-particle cluster (a.k.a. the "primary" cluster). It is defined as a highest-energy cluster in this event:

```
128     Double_t maxEnergy = 0.0;
129     for(Cluster * cluster: m_clusters){
130        if(cluster->Energy()>maxEnergy){
131            maxEnergy = cluster->Energy();
132            m_primCluster = cluster;
133        }
134     }
```

- The clusterizer does not throw away any clusters; it does not even know about our energy cut we require our beam-particle clusters to pass (>200 keV) as it happens later, at the analysis stage;

- If there are two or more clusters satisfying the E>200 keV requirement in an event, one of these will be a beam-particle cluster, and the other one(s) will be TR-photon cluster(s).

How often does a TR-photon cluster with E>200 keV show up in runs 45-55 of the 2018 data taking?

There are 2753 such photons out of 361k photons in 253k events

that includes both electron and pion events

Energy spectra of photons from earlier analyses

GaAs, 2018 data
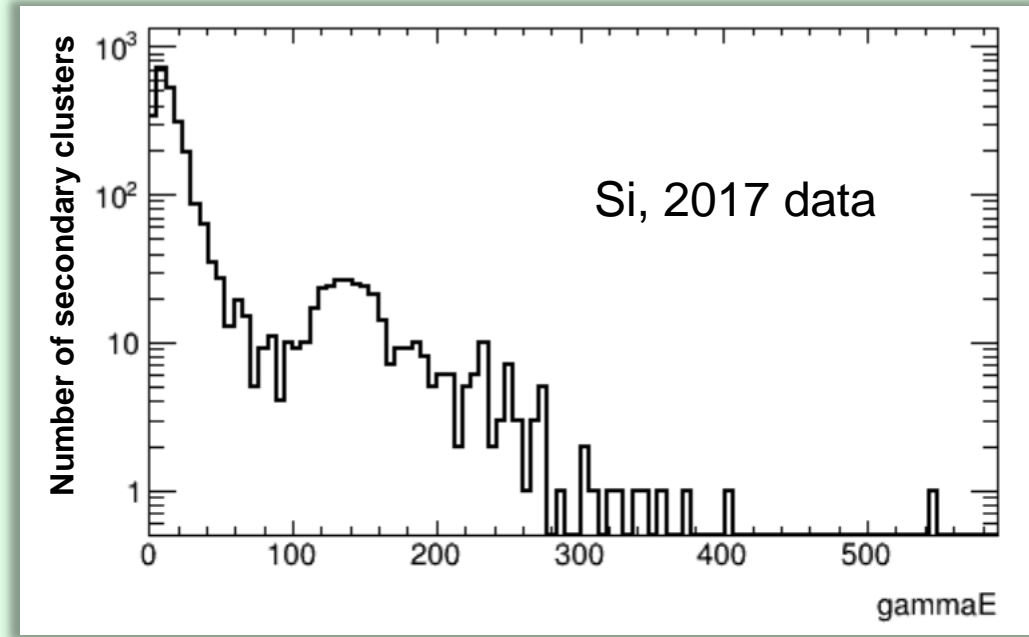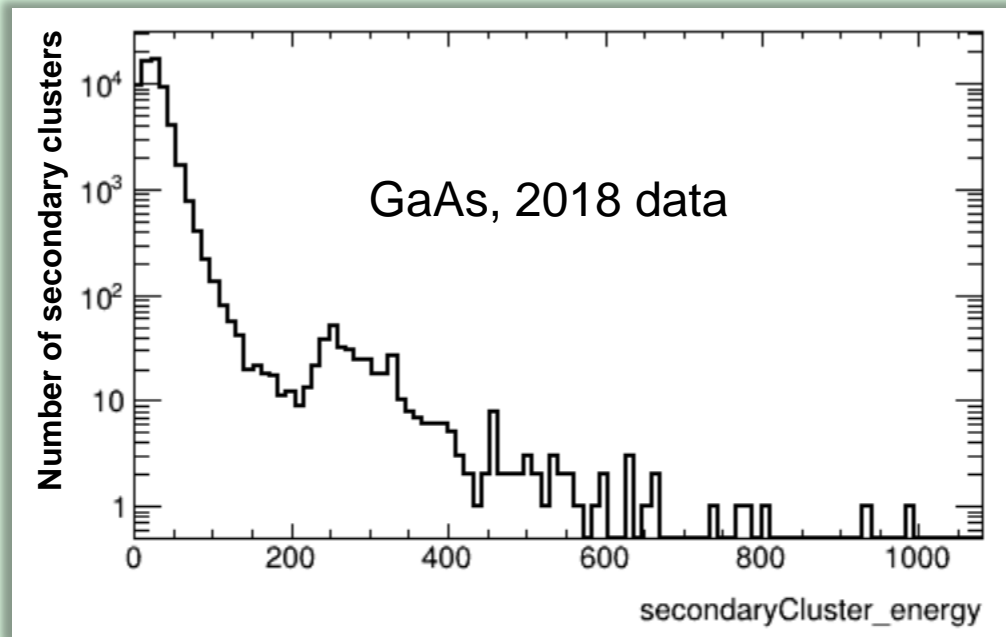
Si, 2017 data

This is straight from TTrees after the clusterization, before the actual analysis was performed.

We have never thrown away high-energy TR-photon clusters at the analysis stage either: I checked my code we used for the analyses of the 2017 data, 2018 data, and the 2021 data.

THANKS!