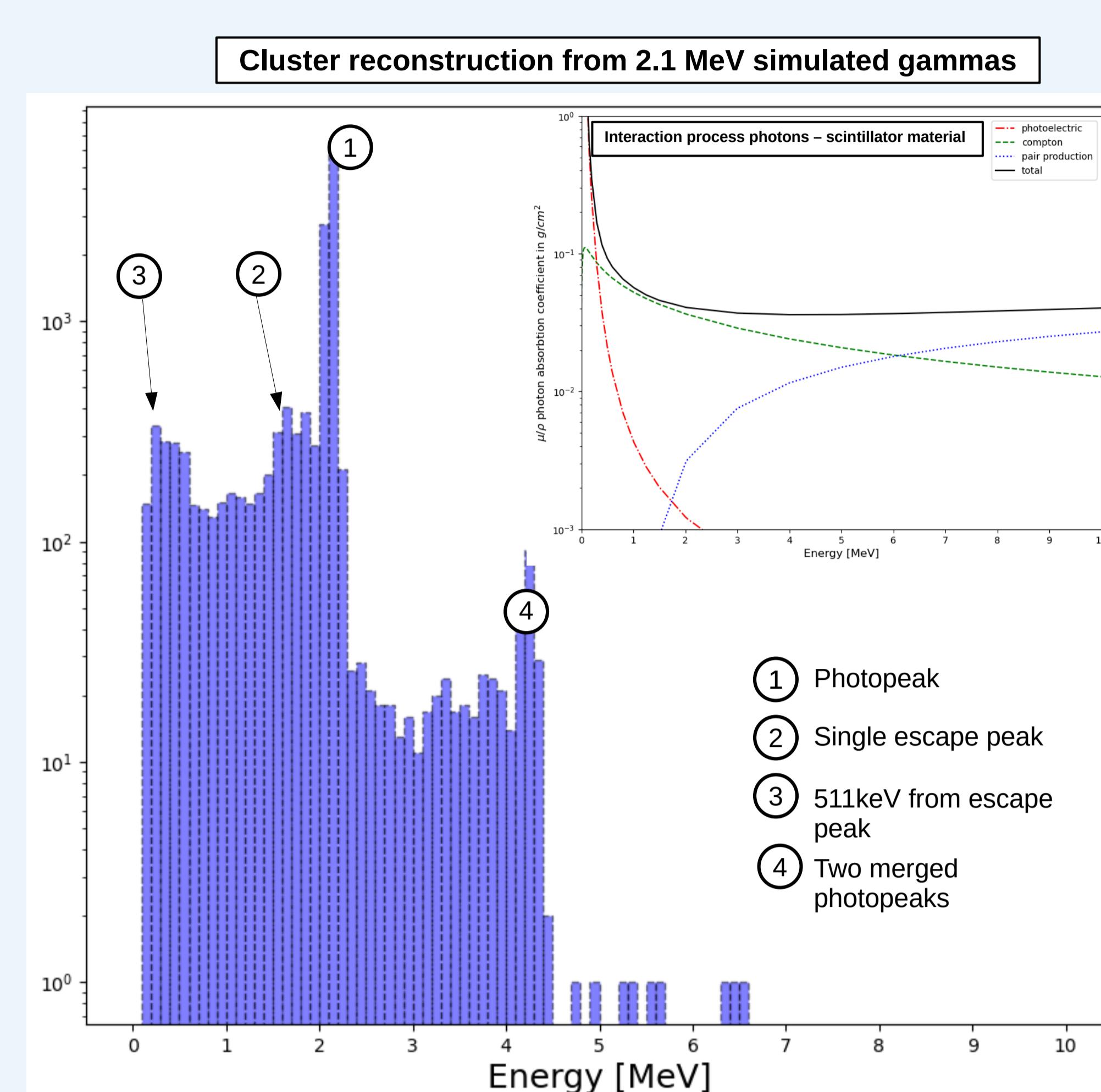
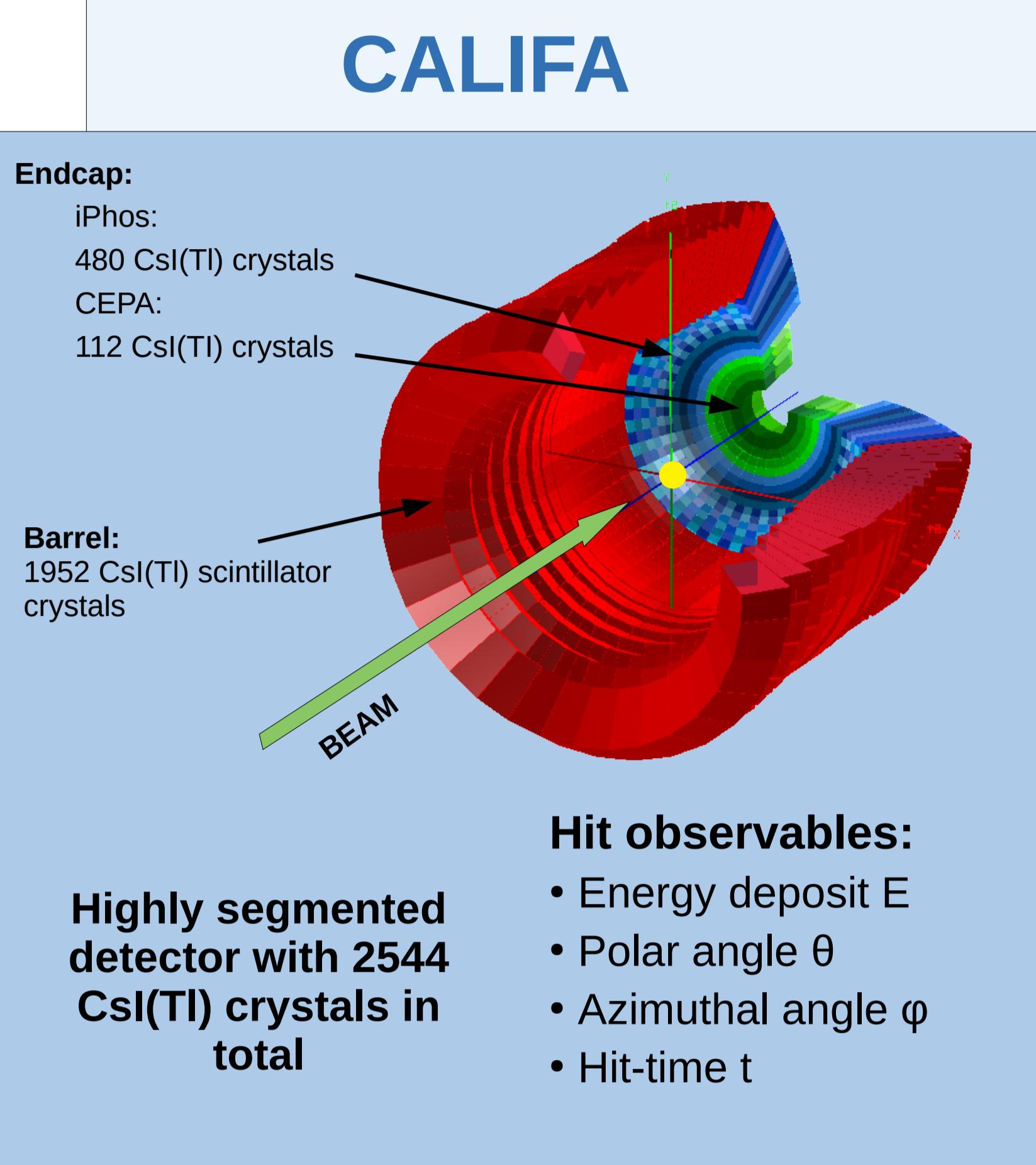
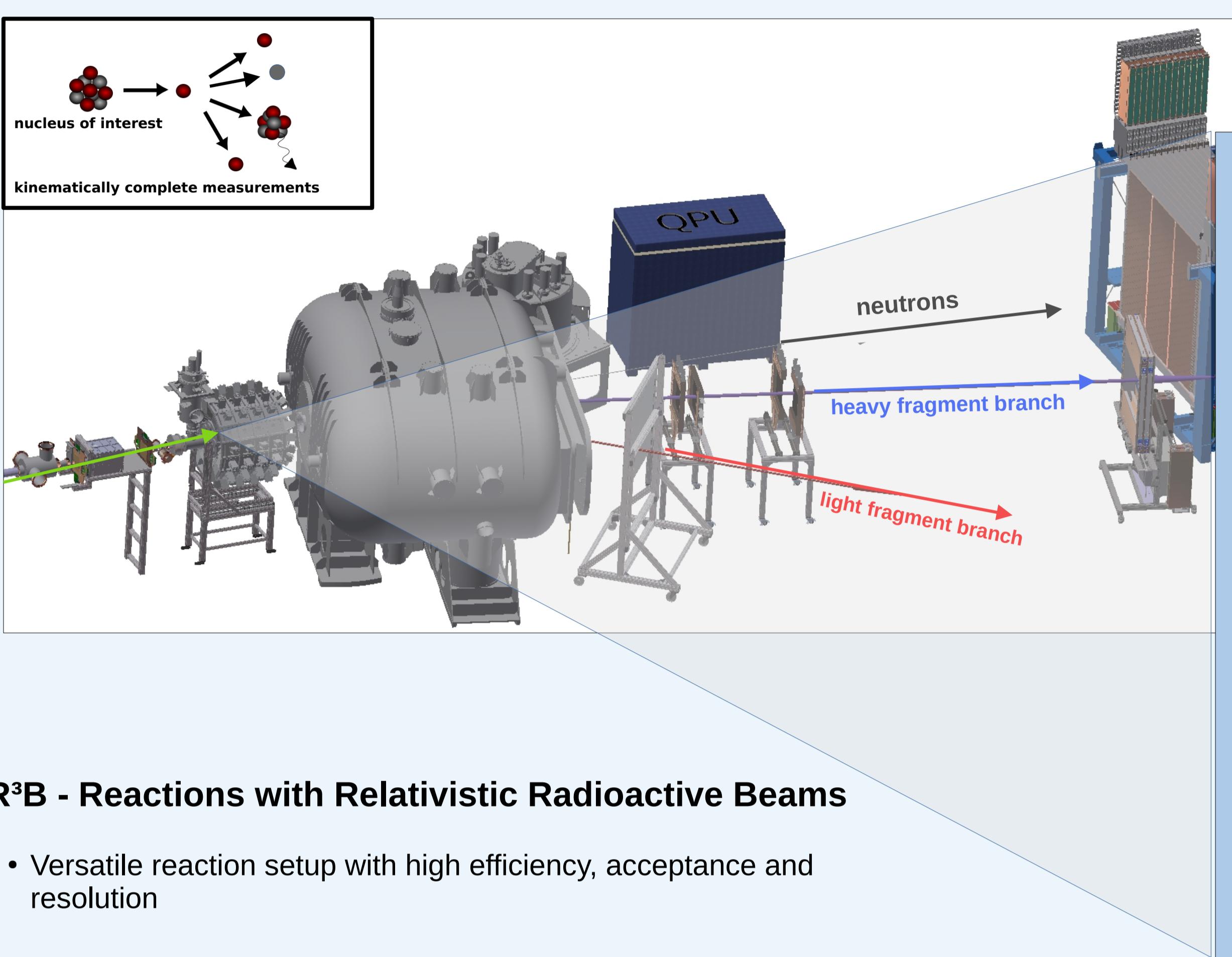
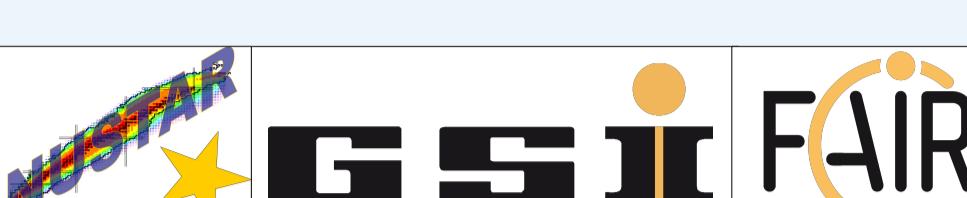


T. Jenegger, R. Gernhäuser for the R³B Collaboration

TUM School of Natural Sciences, Physics Department, E62, Technical University of Munich, Garching, Germany

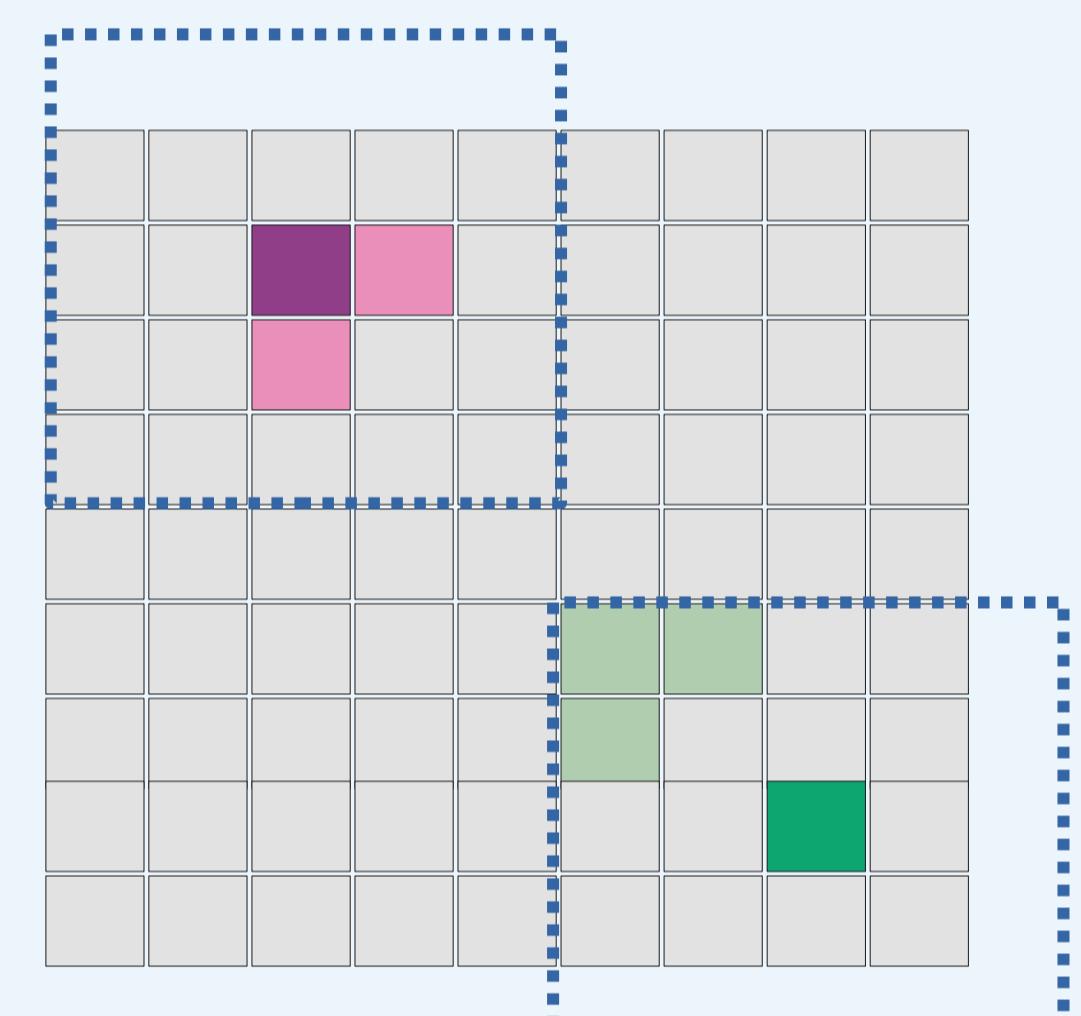
CALIFA – Detection of gammas and light charged particles @ R³B



Standard R3B Clustering

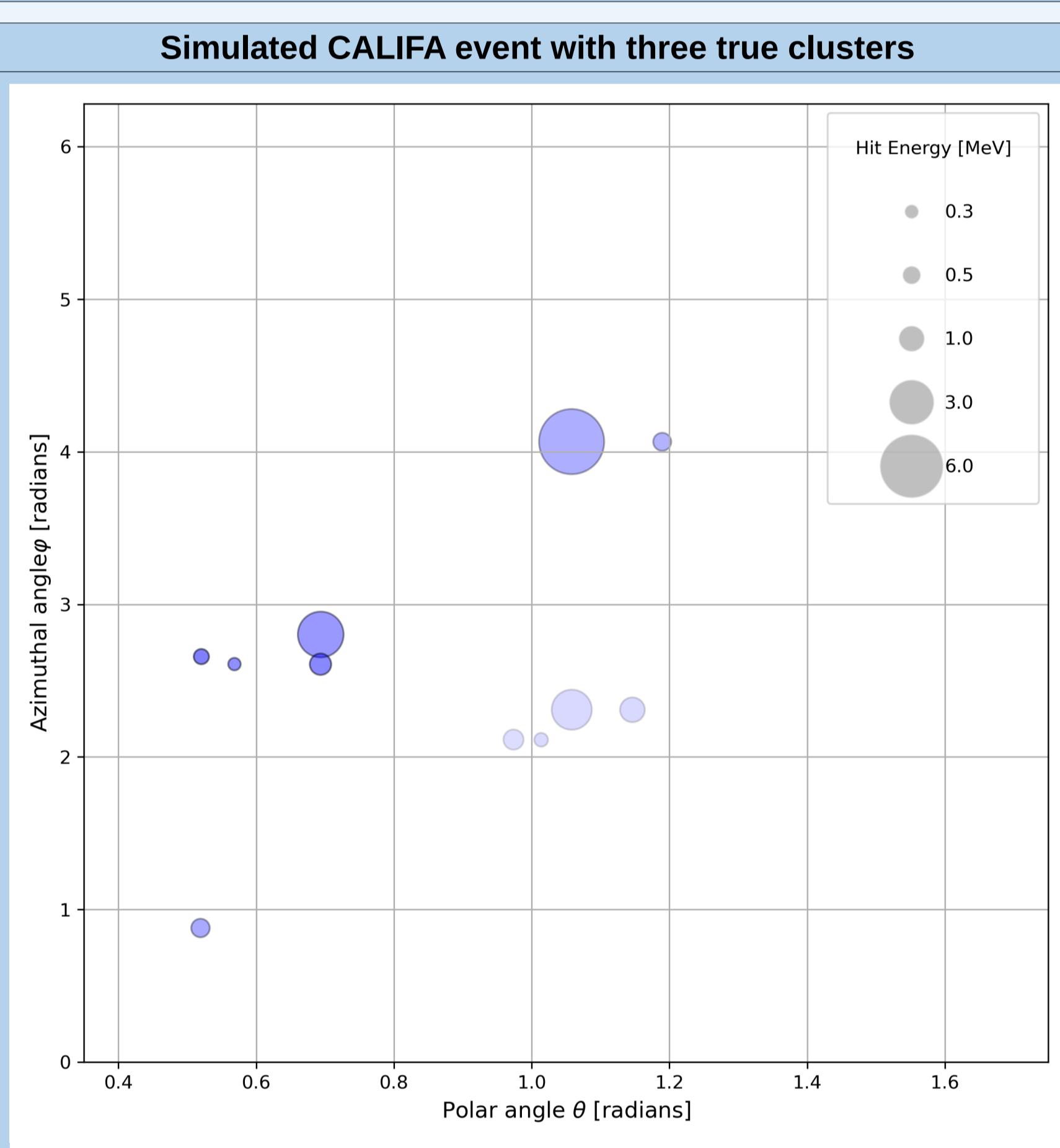
CALIFA Standard Method for Cluster Recognition

User defines shape and size of cluster:

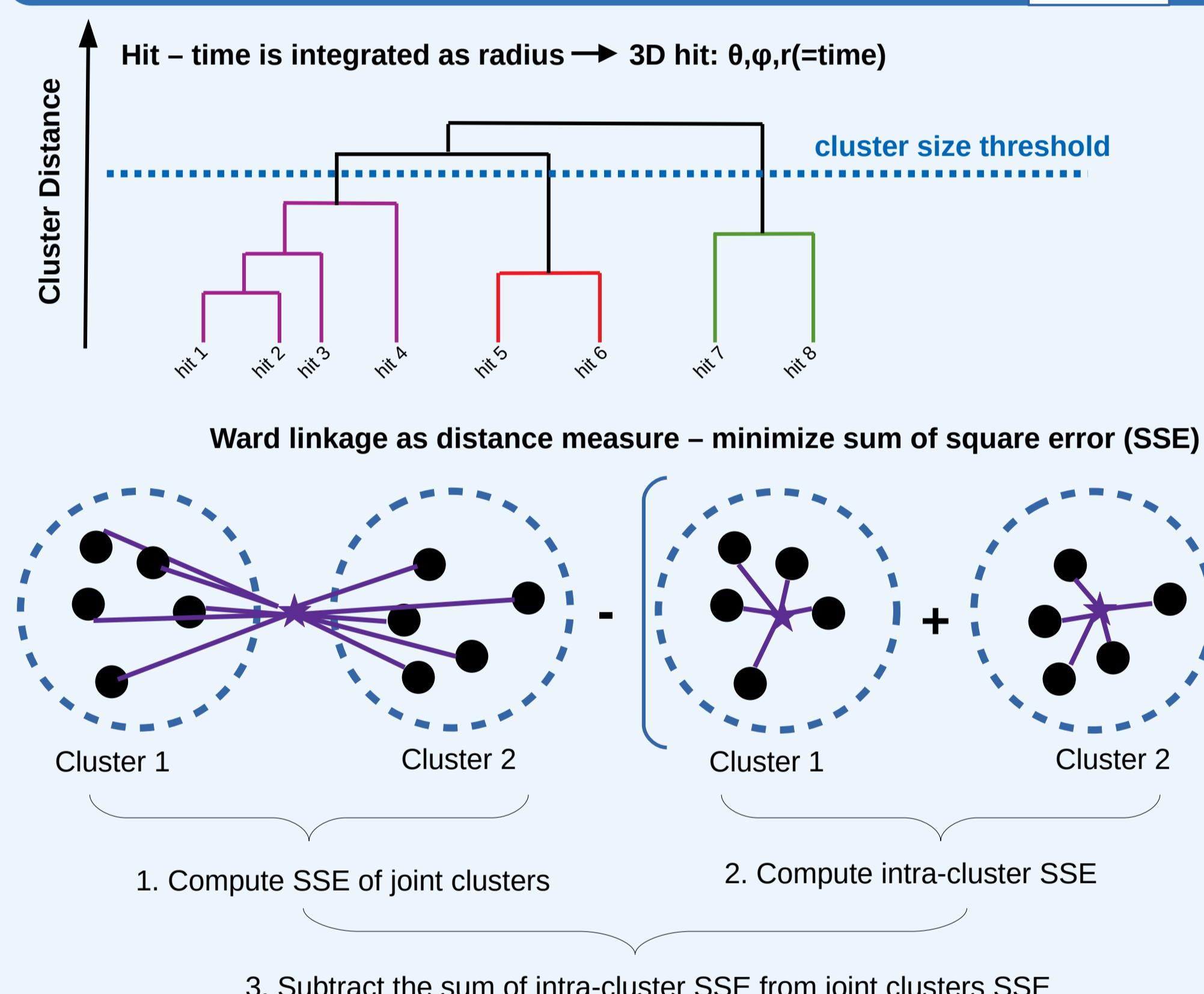


Sort the hit list according to their energy

1. create cluster centered around first hit
2. loop over all hits in list
→ if hit inside cluster add it and remove it from the list
3. Do this procedure until list is empty



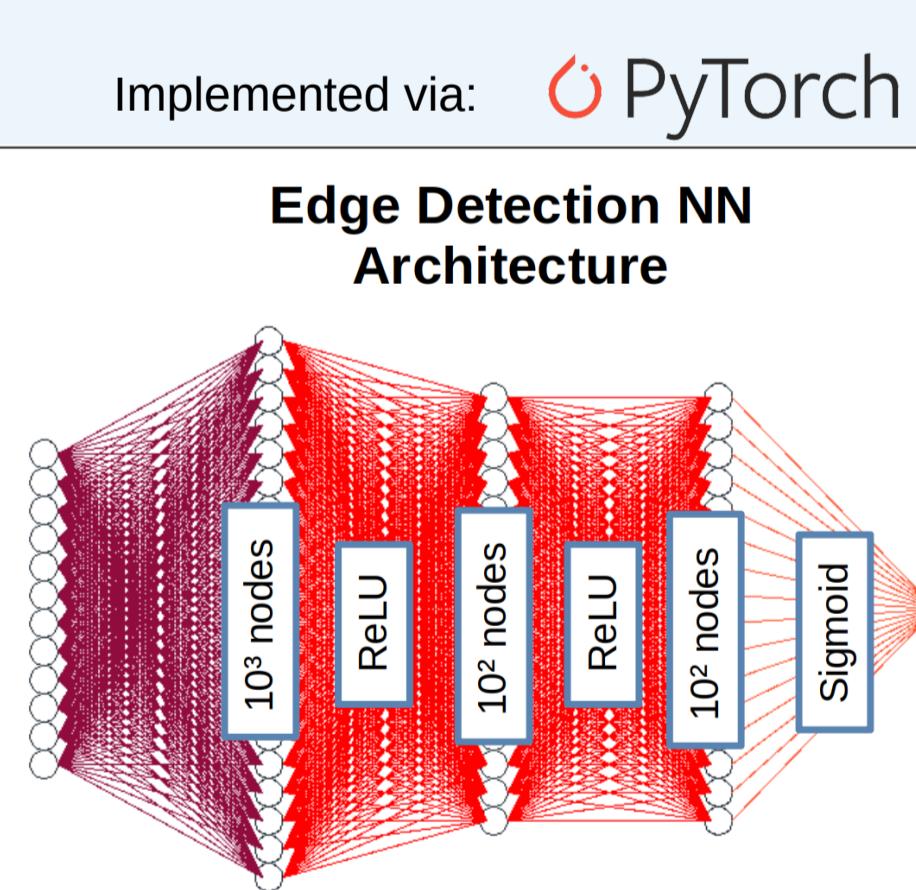
Agglomerative Clustering



Edge Detection Neural Network

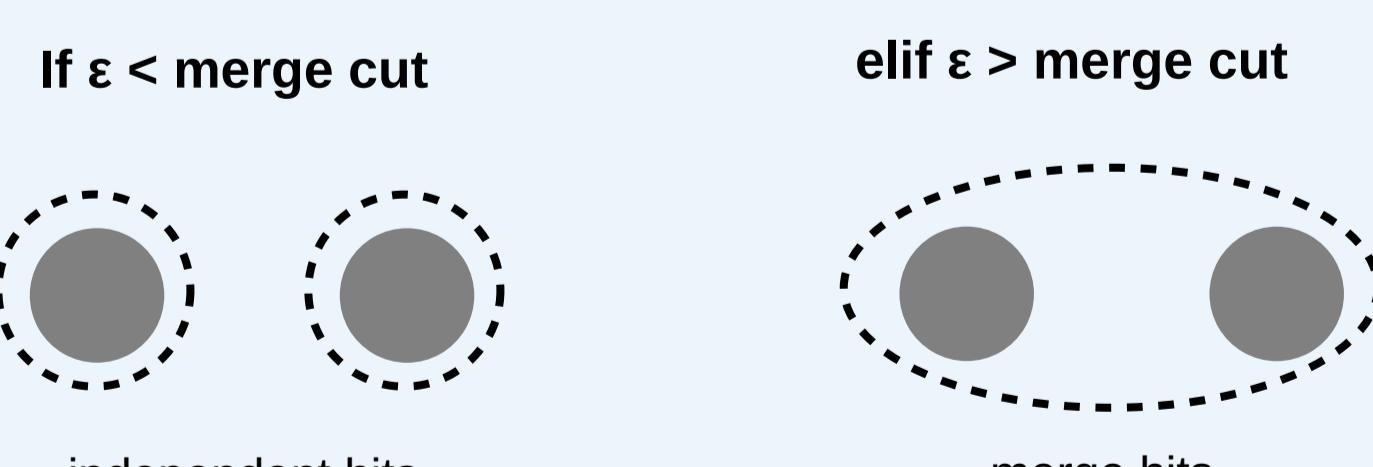
Pairwise hit comparison (i,j)

12 input features:
 $E_{ij}, \theta_{ij}, \phi_{ij}, t_{ij}, \Delta E_{ij}, \Delta \theta_{ij}, \Delta \phi_{ij}, \Delta t_{ij}$



- Architecture:**
- Three fully connected hidden layers
 - Two ReLU activation functions
 - Sigmoid function

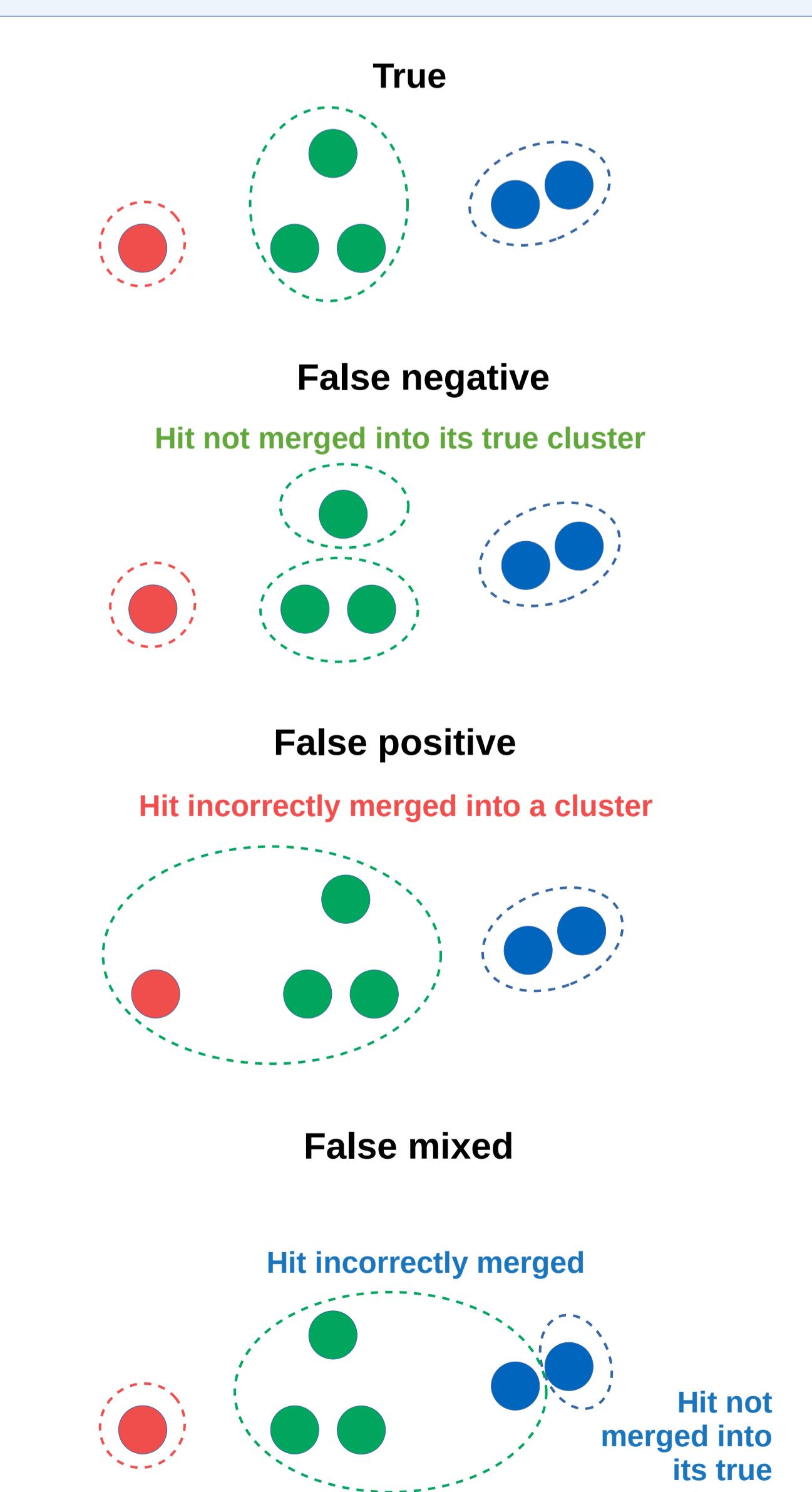
Single node output layer with score ϵ within [0 , 1]



Various Edge Detection NN models analyzed:

- Edge model without time information
- Edge Model with time information
- R3B + Edge (without time)
- Data preclustered via Standard R3B Clustering → input into the Edge model
- Aggro + Edge (with time)
- Data preclustered via Agglomerative Clustering → input into the Edge model

Metrics



RESULTS

