

Hybrid pixel detectors like Timepix3 can capture gigabytes of data on various particles in a second. However, in such measurements, a vast majority of these particles represent already well-known particles. Distinguishing between the types of particles is the first step in searching for extraordinary particles. It is a non-trivial task often done by physicists.

Source data consists of clusters that are groups of pixels of the detector hit by a particle or its secondary particles when the particle decays. Manual processing of the data to such an extent is inefficient. We created a set of tools for visualizing clusters, computing properties of clusters, filtering clusters based on their properties, and training neural network classifiers. Trained classifiers can be merged into a tree structure, offering a better utilization of unevenly distributed types of clusters.

Based on simulated labeled data, we trained multiple classifiers and evaluated their performance on the test dataset of clusters.