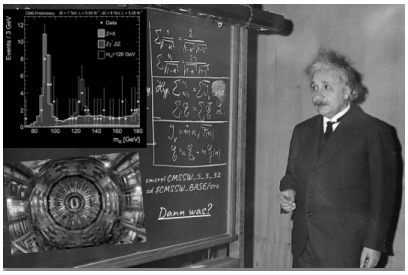

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Async Hands-on lesson: Physics objects I

Wednesday, 30 September 2020 14:30 (1h 30m)

When a physicist approaches an analysis using CMS data, they typically rely on the reconstruction algorithms developed by CMS to interpret detector signals into meaningful physics objects. In code, the result of these recontruction algorithms takes the form of several C++ classes that will be introduced briefly in this lesson. The content of the C++ class reflects the nature of the physics object it represents.

In this lesson we will study several fundamental particles: muons, electrons, photons, and tau leptons. The first three particles are special in CMS, because they are reconstructed as single "particle-flow candidates" . The Particle Flow algorithm (CITE ME) combines detector signals from multiple CMS subdetector systems to categorize all energy deposits as muons, electrons, photons, neutral hadrons, or charged hadrons. Tau leptons are more complex because they are not stable and have several detector signatures that include muons, electrons, photons, and/or hadrons. In the next lesson we will approach even more complex objects such as jet and missing transverse energy.

After exploring the code elements that are common to all CMS physics objects we will look at muons, electrons, photons, and tau leptons in more detail to understand the options for identifying these particles in your analysis. The final episode (MAYBE IN SELECTION LESSON?) will show how an analyzer can combine different identification elements into selection criteria.

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