The ALICE experiment at CERN

Overview

The "ALICE Experiment at LHC" demonstrator, connects students with fundamental research taking place in one of the 4 large experiments of the LHC complex at CERN, ALICE, which reproduces and studies the state of the Universe at a tiny fraction of a second after the Big Bang: The Quark Gluon Plasma. Students learn about the research done at CERN and by working in teams, they explore and analyse real scientific data and search for the Signatures of Quark Gluon Plasma in the ALICE detector.

Learning outcomes:

1. To demonstrate what Quark Gluon Plasma is.

2. To explain that through a high energy particle collision, students can study the Universe at its infancy.

3. To employ the conservation of momentum and energy to understand data produced by subatomic particle collisions.

4. To explain the internal structure of matter and the importance of fundamental particles such as strange particles, which are not part of our everyday world, in understanding the structure and the Laws of the Universe at its infancy.

Prior knowledge:

- Mass – energy equivalence
- Conservation of momentum
- Conservation of energy
- Structure of the atom
- What is a histogram

Concepts introduced:

- Quark gluon plasma
- Strange particles
- Invariant mass
- Antimatter

Learning intentions:

By the end of this descriptor, students should be able to:

- Explain in general terms what Quark Gluon Plasma is and how we can detect it
- Explain in general terms what strangeness is
- Explain in general terms what is the mission of the ALICE experiment at CERN
- Understand that particles and their anti-particles are not the same but have equal masses.

Key activities:

1. Observing histograms and extracting scientific information from them.
2. Identifying particles according to their properties in a virtual detector.
3. Creating histograms.
4. Summary presentation.