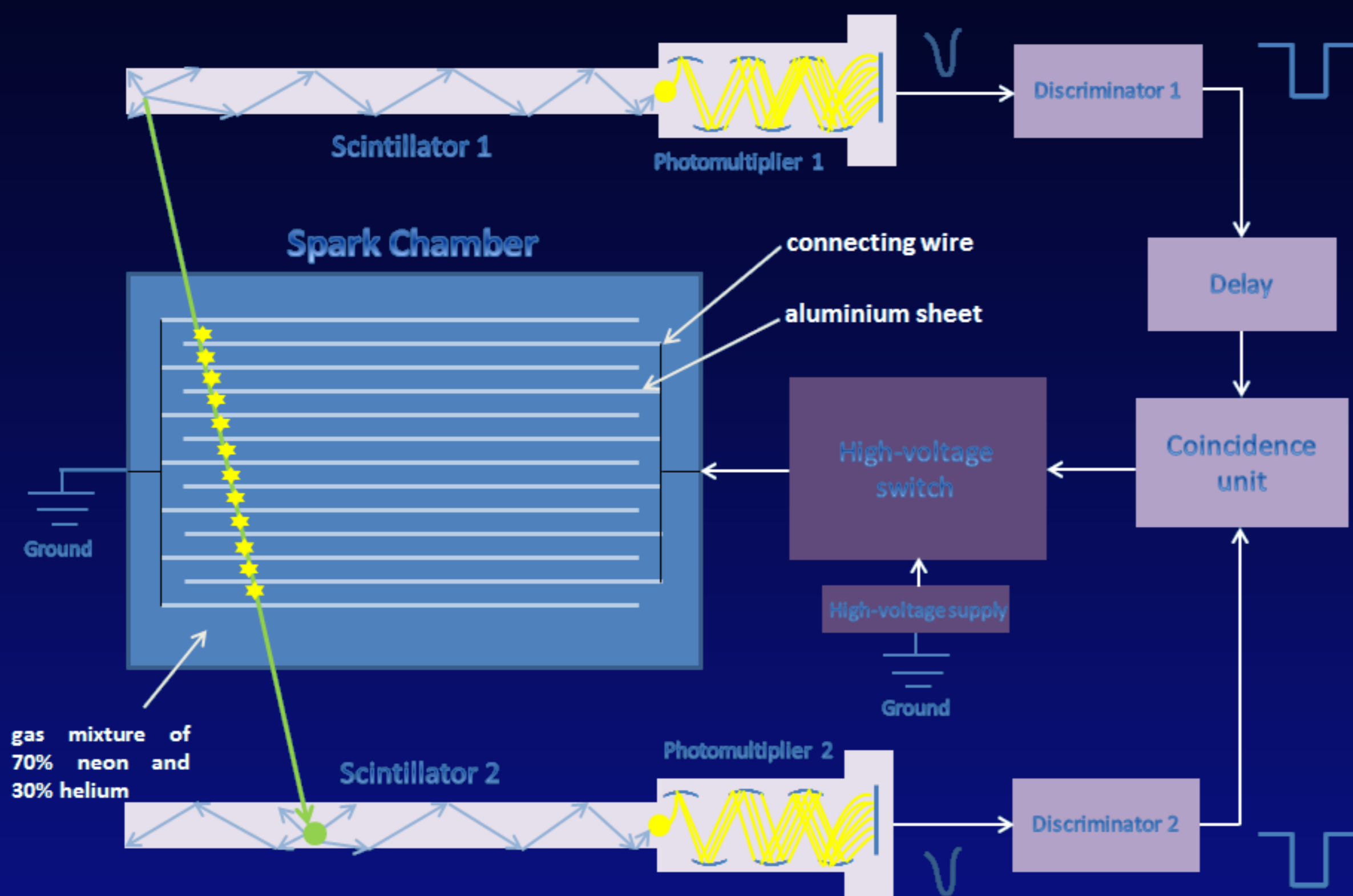


Spark Chambers



What is a Spark Chamber?

A spark chamber is a type of particle detector. Particle detectors observe high-energy particles including those produced in particle accelerators.

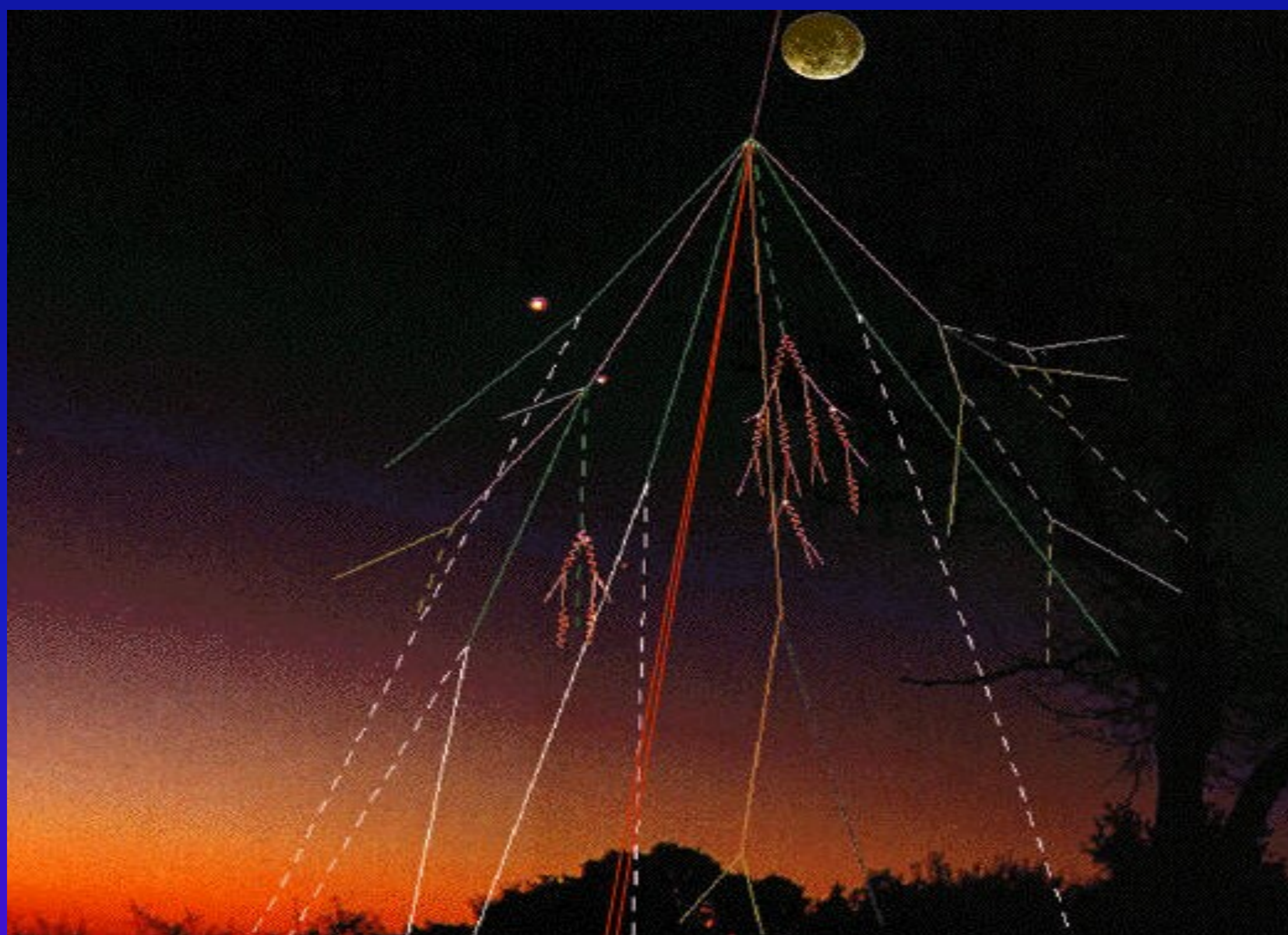
Spark chambers are rarely used as research tools in modern physics and have been replaced with more advanced detectors such as silicon detectors, which can also be used as calorimeters to measure the energies of particles.



http://www.hep.phy.cam.ac.uk/~lester/teaching/SparkChamber/IMG_0082.jpg

How does it work?

A spark chamber consists of a sealed box filled with a stack of metal plates. The box is filled with helium or neon gas or a mixture of both. When a charged particle moves through the box, it ionises the gas between plates. A series of electronics are used in order to detect when a charged particle has moved through the spark chamber, with signals from both scintillators arriving simultaneously at the coincidence unit. A high voltage is then applied to the plates, and sparks temporarily appear along the trail of ionisation left by the charged particle.



http://abyss.uoregon.edu/~js/images/cosmic_rays.jpg

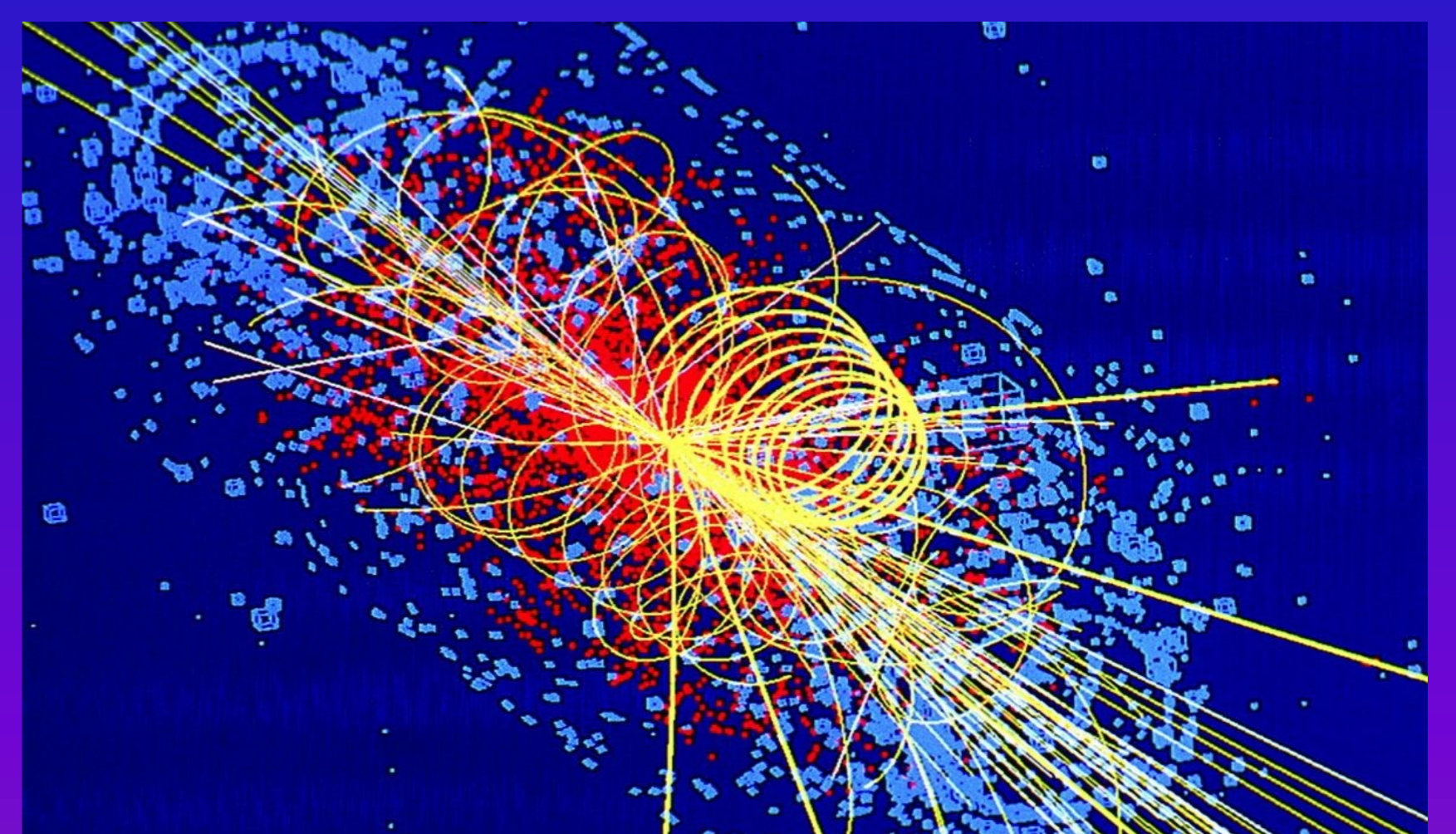
What do spark chambers show us?

A spark chamber can show the reality of particle physics by demonstrating the existence of sub-atomic particles. It also allows the observer to visualise these cosmic rays in real time and link these cosmic rays in space to earth, thus showing the link between astrophysics and particle physics.

What is the importance of spark chambers and other particle detectors?

Between the 1930s and 1960s, spark chambers were key research tools in particle physics. They are less frequently used now as spark chamber pictures lack the resolution and detail of other detectors such as cloud chambers.

Particle detectors are important to scientists for the study of high-speed particles and understanding the concept of matter, for example the search for the Higgs Boson particle.



<http://cms.web.cern.ch/sites/cms.web.cern.ch/files/styles/large/public/field/image/Lucas-Higgs-CE0047H-nice2.jpg?itok=z5EPJkD->

sources: http://en.wikipedia.org/wiki/Spark_chamber <http://dwb.unl.edu/Teacher/NSF/C03/C03Links/www.fwkc.com/encyclopedia/low/articles/p/>

<http://www.hep.phy.cam.ac.uk/~lester/teaching/SparkChamber/chaosProject.html>