Spark Chamber Encyclopedia Article

Spark Chamber

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Spark Chamber

A spark chamber is a means of detecting particles moving through **matter**. When particles are released through **radioactivity** or **acceleration** and move through matter such as a gas field, they leave a trail of **ions**. The purpose of **particle detectors** is to make the ion trail observable. The spark chamber was developed in the 1960s as a response to the deficiencies of **bubble chambers** and cloud chambers. These conventional particle detectors encountered problems such as **background radiation** interfering with the reaction under study. Particle detectors are important to better understand the nature of **subatomic particles**, the process of nuclear decay, and the effect of external influences (such as magnetic field) on those particles.

The important components of the spark chamber are a field of inert gas and parallel metal plates through which high **voltage** is intermittently passed. When the voltage charges the ions, small, elongated sparks appear and the trail can be detected. The inert gas field usually consists of a neon and **helium** mixture with 90% neon. The metal plates are made up of grids that are synchronized to send out electrical charges as the ions pass. The synchronization of electric charges is coordinated by scintillation counters that detect the presence of the charged particles and trigger the electric discharges in the appropriate place at the appropriate moment.

Although the thin foil parallel plate spark detector is the most common, cylindrical and thick metal plate spark chambers have also been developed for the study of specific phenomena. For example, the thick metal spark chamber can be use to measure the range and energies of ionization loss. All spark chambers maintain a gap of 2-15 mm.