# Wilson Cloud chamber
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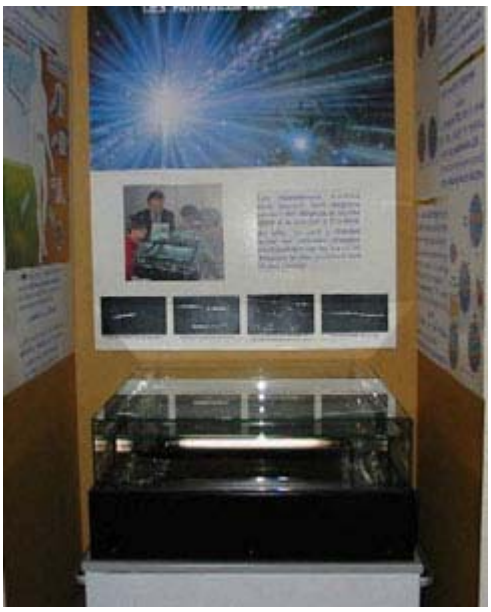
Fiche expérience

Cloud chamber was first demonstrated in the early years of this century (1912) by the Scottish physicist Wilson. It was among the earliest means of making the tracks of ionising radiation visible.



If you visit our museum, you can watch the paths of high speed charged particles as they are traced out by condensing clouds in this Wilson chamber.

*How does it work*

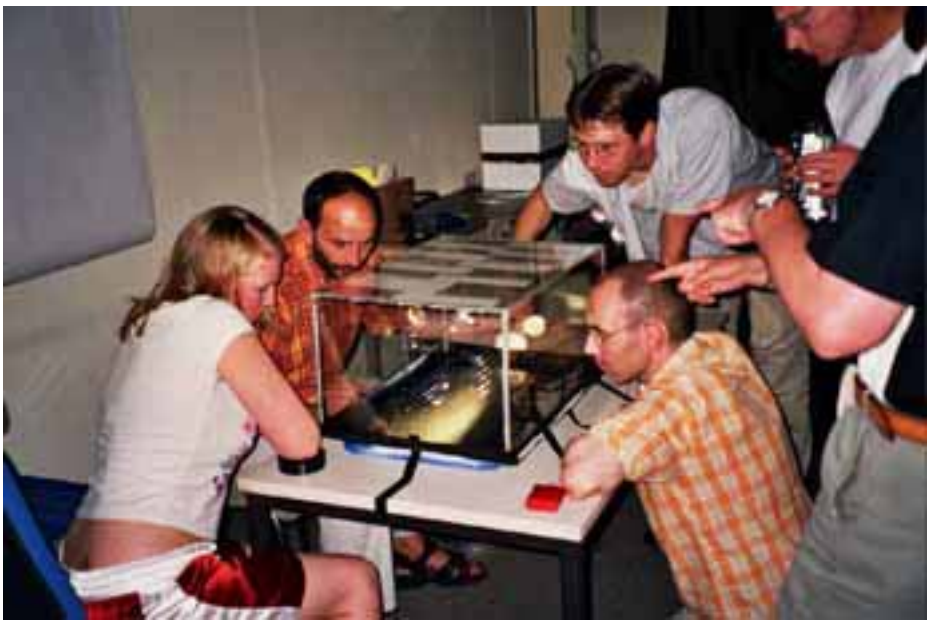
The source of ions in the chamber is a combination of the normal background cosmic rays and the natural radiation of the local environment.
Inside the cube, an industrial refrigeration unit cools the baseplate of the viewing chamber at - 28 Celsius degrees while heating units warm the upper volume to maintain the temperature gradient and keep the hood free of condensation.

The controlled atmosphere created by the automatic temperature controls is full of the vapour of the chamber's working fluid , isopropanol. As it cools, the alcohol vapour falls toward At a certain distance of the baseplate, the baseplate where it condenses to a liquid and returns to a reservoir.
The vapour is just ready to condense into tiny droplets, the trigger for this to happen is given by the ionising cosmic radiation particles which are continually passing through.
These radiations provide a constant supply of ions spread like a wake along the paths of the individual particles of which it is made. Droplets of liquid formed along this wake make tiny "contrails", tracing the path of the particle.

*What can we see ?*

The radiations incident on the upper atmosphere from outside the solar system. There is a creation of a "cosmic rays shower". So the ground level receives more or less 100 muons per m2 each second.
You can see muons, pions, and electrons. High speed charged particles are produced by cosmic rays. They ionize the air along their tracks. The ions in the air then act as condensation nuclei for the alcohol. So droplets of isopropanol form a cloud along the tracks of the charged particles. The "form" of these trails depends on their energy. The thick tracks are the low energy cosmic rays. These low energy cosmic rays were recorded in a Supersaturated Environments Cloud Chamber.
If we can place radioactive sources in the chamber. Then we can see high protons, electrons, alpha particles (the nucleus of a helium atom) that leave trails of electrically charged air molecules behind them as they pass through the chamber.

## *How to build a cloud chamber in the classroom ?*



A cloud chamber build during the HST2003 at CERN

http://www.masc.ulg.ac.be/divers/hst2003/visits.htm

It's possible to build a cloud chamber. You need isopropanol and dry ice. Look at the following website for more details:

http://www.lns.cornell.edu/~adf4/cloud.html

## *More informations*

Pictures

http://www.cloudchambers.com/CosmicRays.htm

http://www.unibas.ch/physikdidaktik/TEILCHEN_97/NEKAFILM.HTML

References of our cloud chamber

http://www.phywe.de/frames.php?ref=main&reftxt=1000228&refnav1=20&refnav2=35&reffach=son&txtnr=1000230