

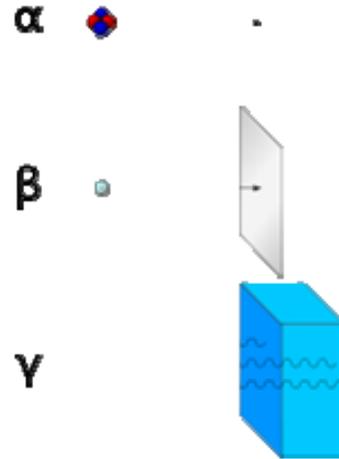


## Cloud Chamber Lab

Three important forms of ionizing radiation are alpha and beta particles and gamma rays.

Ionizing radiation cannot be detected using our senses. However, a cloud chamber allows you to see the tracks it leaves in a dense gas. When charged particles pass through the chamber, they leave a track much like the vapor trail of a jet plane. Cloud chambers are constructed by placing a radioactive source in a clear container that is saturated with alcohol vapor.

The basic idea of this experiment is that it allows you to see visual evidence of alpha, beta and gamma radiation. You will not see radiation itself, of course, but will see the path it makes in the form of vapor trails.



Alpha, Beta, Gamma Particles

### Materials:

- Clear container with tight-fitting lid.
- Black construction paper.
- Radiation source (uranium-rich pebble, single small strand from a mantle lantern, numeral from a luminous dial, or a purchased source).
- Flashlight.
- Dry ice (**never** handle dry ice with your hands; use tongs and wear gloves).
- Denatured ethyl alcohol.



### Instructions:

- Develop your hypothesis: draw a picture of what you expect the radiation tracks to look like.
- Soak some construction paper in alcohol and place it on the sides of the clear container.
- Cover the container with plastic wrap and place it on dry ice.
- After about five minutes, shut off the lights so that the room is dark.
- Shine a flashlight through the top of the container to see the vapor trails.

### What you'll learn:

- This experiment will help you learn about ionizing radiation. Your background research for the project will teach you that Alpha particles are identical to the nucleus of a helium atom. They have a double positive charge (two protons) and are relatively large. Beta particles are much smaller. They carry a single negative charge (one electron). Gamma rays have no mass or charge.

**Topics to include in a report:**

- Why are alpha particles easy to view with the chamber?
- Why is dry ice needed?
- Why is alcohol needed?