**Diffusion Cloud Chamber Demonstration**

**Set-Up**

1. Thoroughly soak the felt strip around the top edge of the cloud chamber with 70 – 90% pure denatured ethanol (EtOH). **Do not use any other liquid.** Cover the bottom of the chamber with EtOh (about ½L). Replace lid.
2. Wipe all exterior glass surfaces of the cloud chamber with the anti-fogging solution.
3. Fill each of the aluminum cooling trays to within ½-inch from the top with liquid nitrogen (LN2). Place the cloud chamber over the trays.
4. Wrap the elastic skirt around the four aluminum posts on the base of the chamber. Secure it (with several alligator clips, paper clips, etc.) so that it is snug. Slide it down over the aluminum posts so that it rests on the base.
5. Place the dedicated fluorescent light-source lamp about 12 – 18” from the blackened wall of the cloud chamber. Turn off all other lights except the dedicated light source.
6. Tracks will begin to appear within about 5 minutes. **Do not remove the glass lid of the chamber;** doing so will allow the alcohol vapor to escape.

**Post-Demonstration**

1. Turn off the high voltage source (if used). Remove cables.
2. Drain alcohol from bottom of cloud chamber. Dry chamber with soft cloth and allow to thoroughly air dry.

**Demonstrations**

*Cosmic Rays:*

Ambient radiation can be demonstrated without using any of the included sources. After the chamber has cooled, cosmic ray tracks can be seen within the vapor.

* Activity:*

The -particle source is the long, thin rod attached to the white plastic cylinder, usually stored in the red-capped plastic tube.

To use the -particle source, slide the rod into the source port until the white cylinder at the rear of the source is seated securely in the source port. Tracks will be emitted radially outward.

**Note:** For the ,  and X-Ray sources, the printed label should face *away from* the interior of the cloud chamber.

* Activity:*

 particles are emitted from the 14C source. Evidence of the particles will be seen as a *short*, narrow cone of ‘large’ white droplets emanating from the source port opening.

* Activity:*

 ray activity is demonstrated with the 137Cs source. Evidence of the particles will be seen as a *long*, narrow cone of ‘large’ white droplets emanating from the source port opening.

*X-Ray Source:*

Photoelectric absorption is demonstrated with the 55Fe X-ray source.

***Ionization***:

The corona probe demonstrates ionization.

1. The corona probe fits very snugly into the source port so it will be necessary to work it *gently* into place. Insert the corona probe into the source port, located along the bottom of the right wall of the cloud chamber. Slide the probe in until the tip just enters the chamber. (The cylinder can be pushed in farther but, the probe will be more difficult toremove.)
2. Attach the high-voltage source to the corona probe; be sure to ground the source by connecting the banana plug to the ground port, also on the right side of the chamber.
3. Adjust the voltage output on the high-voltage source to about ¾ - 1 full turn. ‘Puffs’ of vapor will appear, indicating ionized particles.