Cloud Chamber

Absolute Physics

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A Wilson Cloud Chamber is a particle detecting system used to visualize the path of ionizing radiation. It comprises of a sealed environment containing a supersaturated vapor of alcohol. The interaction between the vapor and ionizing radiation forms streaks in the cloud chamber which help to visualize the passage of ionizing radiation.

Aim

Build a cloud chamber to visualize the path of ionizing radiation

Resources

1. Glass tanks/containers
2. Hot bag
3. Black felt
4. Dry ice
5. Metal Sheet
6. 99% >propanol/ethanol
7. Light Source
8. Radioactive Sources

Experiment 1

1. Attach black felt to underside of glass tank by using plasticine as supports on sides of the tank
2. Spray ethanol/propanol on felt
3. Crush dry ice and compact it between 2 metal trays
4. Place glass tank upside-down on the metal tray, which should be cold due to the dry ice
5. Shine a light through and observe the cloud

Observations

1. No Cloud observed
    - Problems
        - Rate of evaporation
        - Contact of felt with top surface of glass tank
        - Felt keeps falling
2. Ethanol present in liquid form on metal tray obscuring observations
3. Lustrous surface of metal tray makes it difficult to observe the presence of a cloud

Improvements made based on observations from Experiment 1

1. No Cloud observed
    - Problems
        - Hot bag placed on top of the glass tank to increase the rate of evaporation
        - Use of glue to achieve contact with surface
        - Use of glue to permanently attach felt to the tank surface
2. Continually wipe the tray and glass to prevent condensation from obscuring observations
3. Painted metal tray matte black to better observe the cloud

Experiment 2

1. Black felt attached to underside of glass tank by using glue.
2. Spray ethanol/propanol on felt
3. Crush dry ice and compact it between 2 metal trays
4. Place glass tank upside-down on the metal tray, which should be cold due to the dry ice
5. Place hot bag on top of the tank to increase the rate of evaporation of ethanol.
6. Shine a light through and observe the cloud
7. Before repeating experiment clean surface of metal tray

Observations

1. Cloud Observed
2. Faint streaks observed