

Abstract Submitted
for the TSS14 Meeting of
The American Physical Society

Cost-Effective Construction of a Cloud Chamber PALMER WILSON, APS Member — A cloud chamber is a device that contains supersaturated vapor that is used to detect charged particles by the condensation trails that they produce. The build described in this presentation utilizes Peltier elements to cool the system, while conventional cloud chambers use liquid nitrogen or dry ice. The use of Peltier elements allows for the device to run without the continued purchase, use, or storage associated with liquid nitrogen or dry ice. The materials used to construct the cloud chamber itself includes low-cost ABS plastic, aluminum support tubes, a clear glass vase, Peltier elements, a CPU heat sink, and an ATX computer power supply. The low-cost construction of this cloud chamber allows for resources to be spent elsewhere while providing a productive, responsive, and effective experimental apparatus. While the minimum operating surface temperature achieved using liquid nitrogen or dry ice is lower than that achieved using Peltier elements, an operational surface temperature of $-20\text{ }^{\circ}\text{C}$ was reached using the apparatus described in this presentation, allowing for adequate resolution of the paths of charged particles inside the chamber. Future plans include increasing the viewing area, optimization of the power grid, and a dynamic Peltier microcontroller sub-system.

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Date submitted: 28 Feb 2014

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