Zachary Sussman

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Editors

Journal of Chemical Education

February 28, 2016

Dear Editors,

I am pleased to submit my original research paper, “Automatic Particle Detection in Cloud Chambers,” for consideration for publication in the Journal of Chemical Education.

A cloud chamber is a cost-effective subatomic particle detector that can be built by and is accessible to students and scientists. However, its use in serious scientific research is limited because there is no simple and affordable way to automatically detect and analyze the particles. I built my own cloud chamber, took hours of video, and created a program to detect and evaluate particles that appear in the video. Then, I designed original algorithms for analyzing the particle tracks. My program removes a major barrier to more widespread use of cloud chambers for research and educational purposes.

This paper is appropriate for publication in the Journal of Chemical Education because it makes a laboratory experiment more accessible to STEM enthusiasts. For example, a teacher would be able to provide a hands-on experience for a class learning about nuclear chemistry. As a high school student, it was very exciting to conduct this experiment, and I thank you for considering my paper for publication.

Sincerely,

Zachary Sussman

Saint Andrew’s School

Dear Editor

I am pleased to submit my original research paper, “Automatic Detection of Particles in

Cloud Chambers” for consideration in the Journal of Chemical Education. As a high

school student, it is very exciting to conduct and hopefully publish real research.

In this paper, I present a novel algorithm for detecting subatomic particles in cloud

chamber. A cloud chamber is an inexpensive and accessible subatomic particle

detector; its main drawback is the inability to automatically detect particle events,

instead requiring careful watching. By analyzing video from the cloud chamber, I was

able to successfully automate this process.

The results of this paper should allow educators and researchers alike to make better

use of this wonderfully simple particle detector. For example, a high school teacher

would be able to provide a hands-on experience for a class learning about nuclear

physics or nuclear chemistry.

Thank you for considering my paper.

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