



# SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

## Marsh W. White Award Proposal

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Project Proposal Title	Shooting for Clouds: The New Mexico State University Cloud Chamber and Outreach Development Project
Name of School	New Mexico State University
SPS Chapter Number	4749
Total Amount Requested	\$300.00

### Abstract

The New Mexico State University Chapter of Society of Physics Students proposes a request for funds for the purchase of materials related to the design and fabrication of a cloud chamber for outreach demos. In addition further funds are requested for printing of student designed posters illustrating certain fundamental aspects of Physics.

# Proposal Statement

## **Overview of Proposed Project/Activity/Event**

The Society of Physics Students at New Mexico State University has been an expansive promotional group for Physics, and all things science and engineering. We take great pride in our outreach programs for local high schools, our involvement in extracurricular activities around the university, as well as, promoting our own members and inspiring them to be more involved and to reignite the passion of science and discovery back into their hearts.

Physics is not a simple subject to understand, however it is one whose phenomena are awesome to observe and we do our best to convey our curiosity onto the future students of the next generation. By showing them, first hand - the simple, yet complex experiments we are shown in our introductory courses; experiments like the double slit experiment, a magnet falling down a copper tube, or a simple rudimentary hovercraft being a few examples of the experiments we bring to the high schools we visit.

We are continuously making new experiments to bring to schools, and for our own personal amusement. Recently, we began construction on a bubble cloud chamber to detect cosmic rays; by making a cloud of isopropyl alcohol, the muons create an ionization trail as they pass through the cloud. We were very excited once we finished the construction of the chamber; however we had to do some troubleshooting because we were having an issue creating the actual cloud. We finally came to the conclusion that the heat source was too weak, for this we plan to invest in a higher intensity bulb for our heat lamp.

## **How Proposed Activity Promotes Interest in Physics**

The fabrication of a cloud chamber and printing of student designed posters illustrating fundamental Physics concepts will aid in outreach endeavors in which our chapter participates, i.e. high school outreach. The illustration of basic everyday Physics concepts via demonstration is highly valuable in terms of enhancing understanding of a complex ideal; as a result our chapter proposes the fabrication of a cloud chamber for demonstration of particle Physics concepts.

The Physics posters will be hung in class rooms and portable so we can take with us to outreach programs, they will be simple yet informative, as well as, interesting so that even someone who is not well educated in physics will understand. We plan on constructing 2-4 posters that will cover interesting and basic ideas.

Both of these projects promote interest in physics among students as well as the general public; The Marsh W. White award would be very beneficial to the success of our projects.

## Plan for Carrying Out Proposed Project/Activity/Event

The chapter officers will make sure that there are regularly scheduled meetings in which they will work on said projects. The Target audience is mainly high school and middle school students; we will present these materials during our outreach to regional schools and take regular inventory on the satisfaction of these projects. Participation of the production is mandatory for all officers; however, general members are encouraged to participate.

Each one of our members in SPS provides a unique set of skills that contributes to the production of current and future projects. We feel that all of our members are equally valuable and can offer something different to the construction of our projects. We are very confident in the success of these projects and feel that the Marsh W. white award would help to secure its success.

## Project/Activity/Event Timeline

Production of cloud chamber is currently in planning and design phases with a small scale model built as a proof of concept. We intend to investigate this small model as a basis for the proposed final chamber, which we expect to have fully completed by the end of the academic year. We have set floating completion guidelines beside the hard deadline of completing the chamber by the end of the academic year which is listed below:

Design of proof of concept model: End of September 2013

Completion of proof of concept model: Early November 2013

Design of final model: January 2014

Collection of materials: January-February 2014

Begin fabrication of final model: February 2014

End fabrication of final model: End of April 2014

Likewise we have proposed a request for funding of a poster project in which Undergraduates design and print posters related to general aspects of Physics or certain interesting Physical phenomena which are of current popular interest, i.e. Higgs-boson, nanotech, etc. There is a similar series of floating completion guidelines related to completion of this project.

Decision on topic of posters: December 2013

Formation of groups for design of individual posters: End of December 2013

Initial proof of concept design: End of January 2014

First draft of posters: End of February 2014

Peer review: March 2014

Second draft of posters: End of March 2014  
Review via interested faculty and peers: April 2014  
Hard deadline for completion: End of April 2014

## Activity Evaluation Plan

Determination of success of the projects will be determined by number of participants in the planning and design of projects. In addition the measure of successful outreach at high schools and middle schools will be determined by the number of individuals present at regional academic outreach activities in addition to the number of actual events held. A generalized survey will be provided to the academic host (teacher, principal, etc.) to be reviewed as a measure of the success of the event.

## Budget Justification

\$100.00 cloud chamber

- Galvanized steel plate, 22 gauge or thinner
- Sheet insulating foam.
- Aquarium sealant (100% silicone)
- Disposable rubber gloves
- Double stick tape One roll
- Clear plastic corner guard with sticky strip
- Heavy-duty scouring pad
- Black duct tape
- Black felt
- Flat black spray paint or primer
- Terry-cloth hand towel and 1-gallon Ziploc
- Isopropyl or ethyl alcohol, 200 proof (100%)
- Precut picture glass
- \*Optional: large shop lamp with spring clamp
- Dry ice Slab
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\$200.00 for printing and production of 2-4 posters

- Posters will be designed with Microsoft PowerPoint
- Posters will be printed at approx. 3x3 (size dependent on quantity of posters)
  - o Roughly \$50-100 per poster
  - o The Posters will be constructed within PowerPoint and possibly printed at a local Kinkos poster printing. The precise cost is entirely dependent on the quantity of posters produced. One 4x4 ft poster with lamination will cost \$176.40 not including taxed. One 3x3 poster with lamination is \$99.23. We are working on finding a printer on campus that would cost much less, however so far

have not been able too. \$200.00 is the proposed amount for aide in this project and will most likely not pay for the entire project, however, the Marsh W. White award would be a great help in the success and completion of these posters.