



SACRAMENTO STATE
Department of Physics & Astronomy Spring 2006

Physics Colloquium Series *~ Student Talks ~*

Modernization of Muon Lifetime Experiment

The muon is a subatomic particle which is produced in the upper atmosphere by cosmic rays and travels at velocities near the speed of light. Muons are of great practical interest in physics education because they are semi-stable particles with a well-known lifetime which can be measured, and because their high velocities combined with their well-known unstable behavior make them ideal for demonstrating relativistic effects. In CSUS Advanced Physics Lab, students utilize a novel setup to measure the lifetime of muons in their rest frames using only a single detector. However, problems with the analysis software prompted the construction of a new program written in LabVIEW, a programming tool whose visual user interface and modular nature make it powerful and easy-to-use.

Jason Forrest

The Future of Ion Propulsion

Although researched extensively since the 1960s, only recently has ion propulsion begun to emerge into the realm of feasibility as a practical means of exploring the solar system. Recent developments include the successful flight of Deep Space 1, launched by NASA in 1998, and the launching of ESA's SMART1, which continues to orbit and photograph the moon at present time. These spacecraft serve as a launching platform for this technology's complete development. Further improvements on the traditional ion thruster, the hall thruster, and more exotic types of ion engines will be required, as well as the consideration of nuclear energy for powering the engines beyond the range of solar energy. Ultimately, this technology may provide a fast, efficient means of powering spacecraft throughout the solar system and possibly beyond.

Kristoffer Karas

Thursday, May 11, 2006

4:00-5:20 PM MND 1015

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