

PHYSICS

@ Buffalo State

Monday-Thursday
August 6-9, 2018

8:30 AM – 12:00 PM

The Physics Department at SUNY Buffalo State and the New York State Master Teacher Program are excited to offer three physics mini-courses this summer! The courses are free and open to high school juniors and seniors and high school teachers. Each course will be lead by experienced physics professors and will include significant time doing laboratory or programming work. Space is limited, and priority will be given to students interested in STEM fields and student/teacher pairs.

Mini-Course Descriptions

Introduction to Computational Physics

Open-source Linux makes it possible to introduce and do computational physics with simple resources. Using an Ubuntu open source Linux system, the calculation of projectile motion will be introduced using the C programming language. Examples of projectile motion include the trajectory of a launched rocket or the path of a baseball. Starting from a simple program, the effects of air resistance on the range of motion, different models of air resistance and elevation of trajectories can be calculated and analyzed. Finally, the results will be presented using open source graphics software-Grace and Gnuplot. Additional projects which can be investigated with extensions of the background developed here will be discussed.



Exploring High Temperature Superconductors

Superconductivity is one of the most fascinating phenomena in physics. A superconductor cooled below its transition temperature shows zero electrical resistance, making superconductors desirable materials for many technological applications. Another unique property of superconductors is that they completely expel the magnetic fields so they can be used for magnetic levitation and maglev trains. This mini-course will focus on investigating the superconductivity of yttrium barium copper oxide (YBCO): a bulk pellet and a thin film. We will study a magnetic levitation with the YBCO pellet. We also use a ring of YBCO thin film with two weak junctions, called "Superconducting QUantum Interference Device (SQUID)." Finally, we will measure the resistance as a function of temperature from room temperature to the boiling point of liquid nitrogen, to measure the superconducting transition temperature.

Neutron Activation and Atomic Bombs

Buffalo State has a Plutonium Beryllium source which produces neutrons. In this mini-course we will irradiate Indium foils targets with neutrons from this source and produce a small amount of radioactivity. The radiation emitted and likewise the radiation dose from these targets is low, but it is large enough to be measured. The decay and half-life of transformed Indium(^{116m}In) nuclei will be observed by the count rate of the gamma rays using a Germanium or NaI detector. This will enable the study of the decay scheme of ^{116m}In . The first atom bombs were either Plutonium or Uranium based bombs. We will explore and study the structure of fission and fission bombs and discuss the process of making proper isotopes that are fissionable. Both North Korea and Iran are engaged in these processes at this time



BUFFALO STATE
The State University of New York

To Register complete the following application by June 22, 2018:

<https://tinyurl.com/ya2qss32>

We will contact all applicants by the end of June with the admission decision.

Questions? Contact Dr. David Henry at

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