Interactive Physics: Remote Experiments in Real Time

Luis Manuel Villaseñor Cendejas
Centro Interdisciplinario de Investigación y Enseñanza de la Ciencia
BUAP, México

We describe several web-based applications designed for teaching Particle Physics, Cosmic Ray Physics, and General Physics. These tools allow users to interact in real time either with simple, easy-to-build experimental setups or with laboratory equipment located at the CIIEC facilities. Such experiments can help inspire and guide young students in elementary, middle, and high school to pursue scientific careers.

Among other experiments, we present the real-time measurement of muon decays and the real-time measurement of the secondary cosmic ray muon f lux, both performed with a liquid scintillator detector. We also show the detection of muon tracks using a cosmic ray telescope based on Resistive Plate Chambers. We also describe an experiment to measure the speed of secondary muons in real-time. These detectors operate continuously (24/7) at the CIIEC facilities, and their data are displayed in real time through the CIIEC web server.

Additional projects include the construction and use of a light spectrometer, a photoplethysmograph, and a simple digital oscilloscope, as well as web applications that illustrate a quantum computer simulator and a simple example of parallel computing.