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TEACHSPIN
Instruments Designed For Teaching

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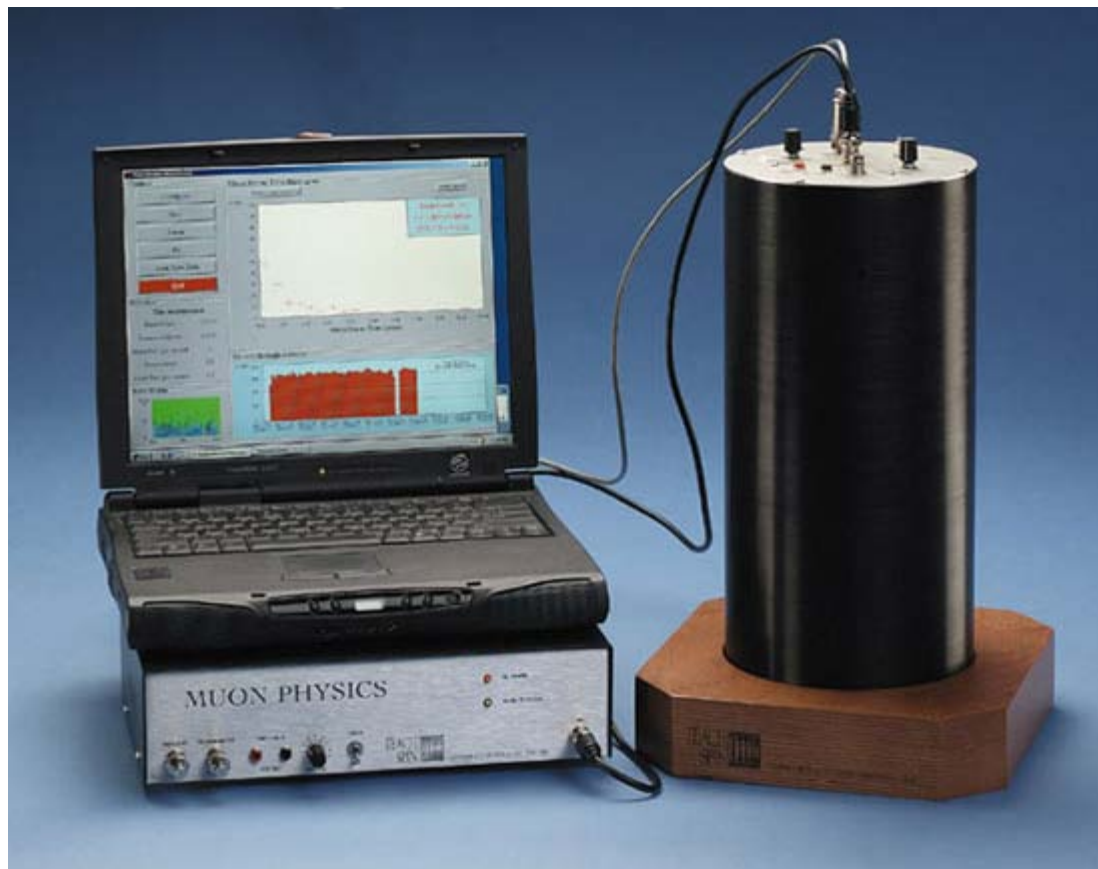
Muon Physics

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"Catching" Cosmic Rays

- Measure Muon Lifetime
- Demonstrate Relativistic Time Dilation
- Measure Local Muon Flux
- Measure Sea Level Muon Charge Ratio
- Convenient Source of Genuinely Random Numbers
- Create Simulated "Muons" and Measure their Lifetime
- Study Processing of Photomultiplier Signal

The muon is one of Nature's fundamental particles. Its discovery in 1937 by Carl Anderson marked a radical departure in physicists' understanding of the building blocks of matter. Although it was first assigned a place in theory of nuclear forces which was incorrect, it is now understood to be an important member of the lepton family of particles. TeachSpin, in collaboration with Thomas Coan and Jingbo Ye of Southern Methodist University, has made the first commercial teaching instrument for students to determine some of its physical characteristics.

The muon is produced copiously in Earth's atmosphere by interactions between cosmic rays and atmospheric air molecules, and its flux at sea level is sufficient for student investigations. The muon's lifetime can be measured with our apparatus using experimental techniques

common to nuclear and particle physics. The stopping rate of muons, as a function of depth in the atmosphere, can be used as a demonstration of the time dilation effect of special relativity. Since the decay times of individual radioactive particles are randomly distributed, they are a convenient source of genuinely random numbers. These can be used to demonstrate common probability distributions.

With this new TeachSpin Apparatus You Can:

- Measure Muon Lifetime
- Measure Local Muon flux
- Measure Sea-level Muon Charge Ratio
- Demonstrate Relativistic Time Dilation
- Convenient Source of Genuinely Random Numbers
- Raw Data Accessible for Student Analysis

Detailed technical information and a copy of the user's manual for Muon Physics can be found at www.matphys.com. The website is maintained by Professors Thomas Coan and Jingbo Ye of Southern Methodist University, with whom TeachSpin collaborated in developing this exciting apparatus.

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