

## Cosmic Rays

Cosmic rays are subatomic particles that reach the Earth and originate from collisions of galactic and extra-galactic particles with atmospheric molecules. The cosmic rays can be detected and measured with a scintillation detector connected to a data acquisition system. In particular, students can measure the speed of cosmic rays with two detectors and the rate of cosmic rays with one detector. The cosmic ray rate depends on the atmospheric pressure, and this dependence can be measured.

The following lists some learning outcomes and developed skills:

- Learning about the origin, composition, rate, and energy range of primary and secondary cosmic rays
- Operating a cosmic ray detector connected to a data acquisition system to collect cosmic ray timing data and atmospheric pressure data.
- Analyzing data to measure the average speed of cosmic rays or to determine the dependence of cosmic ray rate on atmospheric pressure
- Preparing a short report describing the equipment, data collection, data analysis, and results which can be presented as a talk. The report should include graphs (prepared with Excel or a similar graphing program) which clearly show the results.

