Cosmic rays begin initially as protons or nuclei traveling through space at extremely high speeds. When these particles collide with molecules in the atmosphere, other subatomic particles are produced which then quickly decay into other particles, etc. The particles which strike the surface of the earth are typically muons and neutrinos.

The muon detector consists of one square meter of plastic scintillator viewed by a photomultiplier tube. The muon produces a flash of light in the scintillator and the photomultiplier tube (a sophisticated photoelectric cell) produces an electronic signal which is proportional in amplitude to the amount of light. The output signal from the tube goes to a piece of electronic circuitry (a discriminator) which senses whether the signal is the right size to be due to a muon passing through the detector. If this is so, the muon is counted. The total count for each 15 minute interval (about 100,000) is recorded in a data file and also displayed using LabView as an hourly average.

Adelaide Muon Monitor: August 2003

A similar daily cycle occurs for University of Rochester cosmic ray data (see graph above). The peak rate seems to occur at roughly the same local time (14:00).