2016 International Cosmic Day
Zenith Angle Distribution of Cosmic Muon Flux

Alan Yang[1], K.L. Chang[1], S.S. Hsiao[2]
[1] Taipei Astronomical Museum, Taipei, Taiwan (http://www.tam.gov.taipei)
[2] QuarkNet-TW, Taipei, Taiwan

Using metal frames purchased from B&Q, a cosmic ray telescope is constructed(Fig.1) with quarknet detector. The DAQ card and a gravity sensor are connected to a credit card size computer raspberry pi 2(Rpi2). The gravity sensor is used to determine the zenith angle to which the telescope is pointed. Our computer programs are written in python. Access to Rpi2 is done remotely via wi-fi connection using VNCviewer. The frame is not balanced such that a attached string can be used to adjust the zenith angle easily.

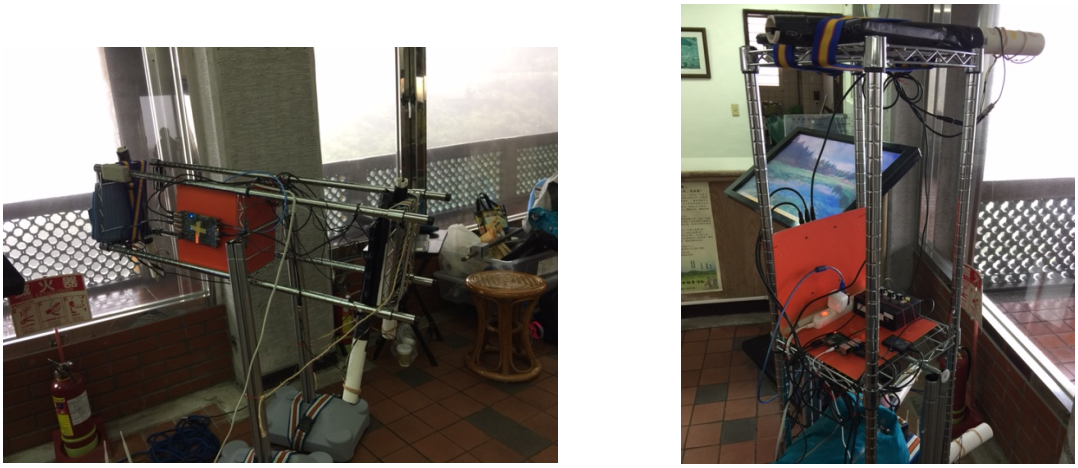

Fig. 1, Our cosmic ray telescope is setup at the visitor center of Xiaoyoukeng where the altitude is 800m and is a scenic spot of Yangmingshan (http://www.ymsnp.gov.tw).

Our telescope consists of one counter at one end separated from two counters at another end by 140cm. Local flux from all direction can be measured by the bottom counters(Fig.2) for the purpose of calibration.

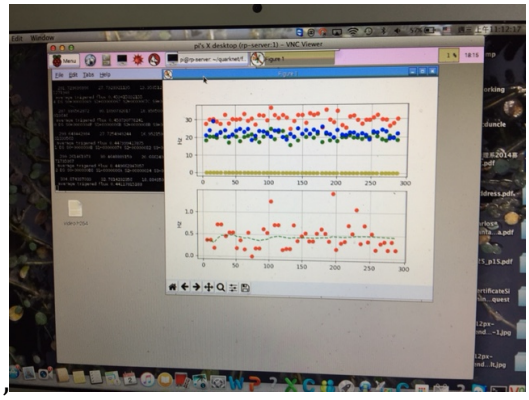

Fig. 2, Local flux calibration.

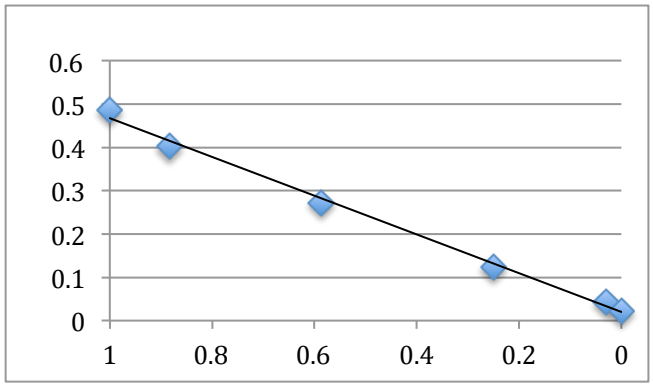

Fig. 3, Cosmic muon flux vs. $\cos(\theta)^2$ where θ is the westward azimuthal angle. The unit of flux is counts/sec.

Our final angular distribution is shown by Fig.3. The linear variation of flux as $\cos(\theta)^2$ is verified.