CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

J1730

Project Title

Cosmic Rays: Determination of the Relative Contributions from the Sun and the Universe

Abstract

Objectives/Goals

I wanted to find out how much of the cosmic rays are coming from the Sun and how much are coming from outside of the solar system. My hypothesis is that the cosmic ray count should decrease at night compared to daytime because at night the Earth will act to shield the contribution coming from the Sun leaving only the contribution coming from the rest of the Universe.

Methods/Materials

First, I measured the cosmic ray count during both the day and night at ground level using a Geiger counter. Next, I flew my Geiger counter on a weather balloon on both day and night flights.

Results

At ground level the cosmic ray count did not vary appreciably over a 24 hour period. Furthermore, the cosmic ray counts measured as a function of altitude were the same during day and night time weather balloon flights.

Conclusions/Discussion

The hypothesis was not confirmed since the daytime and nighttime cosmic ray counts were the same. This result was found both at ground level and at altitudes up to about 30 kilometers. I think that this result means that my Geiger counter is only picking up a signal coming from outside the solar system regardless of whether it is day or night. Since the day and night signals were the same, I was not able to determine how much of the cosmic rays are coming from the Sun and how much is originating from outside the solar system. However, I did learn that my Geiger counter is detecting a cosmic ray count coming from outside the solar system. Also, after five balloon flights I have been able to greatly improve the reliability of my equipment and improve my flight path prediction and tracking techniques.

Summary Statement

Although, my goal to measure the relative contributions to the cosmic ray count coming from the Sun and from outside the solar system was not met, I did learn that my Geiger counter must be detecting a signal from outside the solar system.

Help Received

My father taught me how to solder so that I could build a Geiger counter and a GPS radio. He also helped me study so that I could pass the amateur radio exam and get my technician license.