Detection of Cosmic Particles Using Balloons

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Inspired by the experiment which allowed Mr Hess, an Austrian physicist to discover the cosmic origin of what he called cosmic radiations, we sent an helium balloon equiped with a Geiger counter, a pressure sensor, a camera and a GPS tracker. The balloon reached an altitude of 32 km. The data were collected and plotted on a graph giving the altitude versus the number of ionisations detected per surface unit and per second. The graph shows first a slight decrease followed by a sharp increase of ionisations detected up to an altitude of 20km. From 20 to 32 km, the number of ionisations decreases. The number of ionisations detected as well as the maximum around 20 kms has been compared and confirmed by a great number of previous scientific expeditions. We reconsidered Hess's reasoning taking into account the knowledge physicists had at that time and we came up with the idea that if his balloon had risen to a higher altitude, he might not have drawn the same conclusion about the origin of the radiations. Our results led us to a better understanding of small energy particle showers as well as to a critical analysis of cosmic shower graphic representations. Then, we got interested in detecting cosmic particles of higher energy.The Auger detector is dedicated to the detection of very rare and energetic cosmic particles. It is located at an altitude of 1400 m in order to detect the base of the showers created by primary particles. It costs a lot. We developed a miniaturised balloon experiment which will allow a large based collection of data at the same altitude but at lower cost.

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