The Creation of a Portable Detector for Recording Extensive Air Showers

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The task of the project is to create a cluster of 4 portable scintillation counters for recording extensive air showers (EAS) of elementary particles, suitable for placement in open areas, in residential and industrial premises. To register the electromagnetic component of the EAS in the counters, a scintillator is used. The light that was born in it is converted into an electrical signal by means of a photoelectric multiplier. Equipment for reading, signal processing and information transfer is carried out using the Arduino Uno electronic platform with a wi-fi module. The amplifier-shaper converts the signal into digital and extends it to the required duration of 10 microseconds. The power supply of the detector components is provided by a battery with an output voltage of + 12V. As a result of this research, four portable scintillation counters were assembled and tested, forming a cluster for recording atmospheric showers of elementary particles over a wide range of energies. The developed design does not require the use of additional external equipment, it is easy to transport and place. According to the data obtained during the testing of the detector, the average recording frequency of EAS is 3.4 per minute. The obtained experimental data indicate the high efficiency of the developed means of recording extensive air showers of elementary particles.

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