On Detecting Cherenkov Radiation with a Cellphone: A Proposal for a New, Cheaper and Simpler Method for Detection of Cherenkov Radiation

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Cherenkov radiation has multiple application in the most prominent areas of modern research. It is the main contributor in the search for cosmic particles, as can be seen in the detector "Super-kamiokande" in Japan. It also enables optical scanning with the ability to potentially replace procedures such as PET and SPECT, which is of both economical and practical interest, as well as of relevance for medical aspects of space flight. The Cherenkov phenomenon is of great importance; however, very few are aware of its existence. This is only one example on how skew the amount of knowledge in particle physics is in comparison to its great importance. The objective of this project is therefore to begin the development of a method through which particle physics becomes easily accessible and suitable for classroom situated experiments, by investigating whether Cherenkov radiation can be detected with a cellphone. The Cherenkov radiation was created by placing the radioactive isotope strontium-90 in a glass of water, in which the isotope will emit highly energetic B-particles upon its decay. Data was collected of both background- and Cherenkov light, analyzed in terms of blue photons and portrayed in histograms for comparisons and conclusions. Through analysis of how circumstances such as insolation, radioactivity and camera settings affect the intensity of Cherenkov radiation that is to be detected, a system in which a cellphone can be used to detect the Cherenkov light was able to be constructed. From the data collected one can draw the conclusion that the light can indeed be detected; however, it is a fragile system in need of further research to achieve its ultimate goal.

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