



## **Readout architecture based on the use of Silicon PhotoMultiplier (SiPM, or MMPC)**

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The DIAPHANE project is pluri-disciplinary collaboration between particle physicists and geophysicists to perform the tomography of large geological structure mainly devoted to the study of active volcanoes. The detector used for this tomography, hereafter referred to as *telescope*, uses a standard, robust, cost-effective and well-known technology based on solid plastic scintillator readout by photomultiplier(s). The first generation of those telescopes, presently running in the Mont-Terri underground laboratory (St-Ursanne, Switzerland) and on the active volcano of La Soufrière (Guadeloupe, Lesser Antilles, France), uses Hamamatsu H8804-200mod photomultipliers. We present an upgrade of the readout architecture based on the use of Silicon PhotoMultiplier (SiPM, or MMPC) which allows to simplify the optical connections w.r.t. the present design and to benefit from the high photo-detection efficiency of the SiPM. To ensure an effective increase in the muon detection efficiency one has to optimize the first trigger level and find the best compromise between photostatistics and the tails of the dark noise contributions. Several readout architectures, based or not on dedicated ASICs, are discussed and compared in this article.