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A method to design a fast hybrid photodetector based on the RPC structure

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The idea of using gaseous detectors to amplify photo-electrons emitted by an embedded photocathode has been declined in may ways in the last decades, using different gaseous detector structures, including RPCs. Moreover, coupling such structures with a radiator element, enables these devices to detect charged particles, though the radiated photons.

There are at least two main challenges in building such structures: the combined yield of the radiator and the photocathode may be too low to gain high detection efficiency; high yield photocathode materials, also sensitive to a wider photon spectrum are very fragile and easy to oxidize, quickly degrading under the ionic flow typically generated in gaseous detectors.

In this paper we will present a method to exploit the most significant aspects of RPC physics to design an efficient hybrid detector, significantly enhancing most of the present gaseous detectors features and limitations.

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