

## Photon/Particle to Digital Converter

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The Photon to Digital Converter configuration was introduced by the universite de Sherbrooke (EC, Canada) to label their single photon detector composed of an array of Single Photon Avalanche Diode (SPAD) array and a CMOS electronics chip assembled in 3D. In this talk we show an extension of the PDC concept to the detection of charged particles as well as single photons relying on a back-side illuminated avalanche diode array. The thickness of the diode array and avalanche gain are tailored to the detection of the particle of interest: single Ultra-violet to infra-red photons, keV scale electrons, minimum ionizing particles, or even heavy ionizing particles. The central element of the concept is the molecular bonding used to fuse the sensor and electronics chips enabling processing of the sensor backside post bonding. In this conceptual talk, we will argue that the development of 3D integrated digital SPAD array and Low Gain Avalanche Diodes can strongly benefit from cross-development.

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