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Enabling Progress for Single Photon Detection Systems

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Single photon counting and timing devices, such as SiPMs and Photon-to-Digital Converters (PDC—a.k.a. digital SiPM) are playing a key role in breakthrough experiments. From dark matter search and neutrino physics in noble liquids, neutron imaging, medical imaging (positron emission tomography and computed tomography), to quantum sensing devices for quantum key distribution systems, these devices are at the forefront of research for detector systems. This contribution presents the strategic importance to pursue R&D for 3D-integrated PDCs over conventional analog SiPM technology. The presentation also outlines the importance to pursue enabling technologies to implement PDC-based Photon Detection Module for scalability, operations in various environmental conditions (cryogenic and space) and improved performances.

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