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Development of a hybrid single-photon imaging detector with embedded CMOS pixelated anode

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The development of a single-photon detector based on a vacuum tube, transmission photocathode, microchannel plate and CMOS pixelated read-out anode is presented. This imager will be capable of detecting up to 1 billion photons per second over an area of 7 cm^2, with simultaneous measurement of position and time with resolutions of about 5 microns and few tens of picosecond, respectively. The detector has embedded pulse-processing electronics with data-driven architecture, based on the Timepix4 ASIC, producing up to 160 Gb/s data that will be handled by a high-throughput FPGA-based external electronics and data acquisition system. These performances will enable significant advances in particle physics, life sciences, quantum optics or other emerging fields where the detection of single photons with excellent timing and position resolutions are simultaneously required.

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No, this is an entirely new submission.

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