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100μPET: Ultra-high-resolution PET imaging with MAPS

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The 100μPET project, led by the University of Geneva, the University of Luzern, and the École Polytechnique Fédérale de Lausanne, aims at the development of a small-animal positron-emission tomography (PET) scanner with ultra-high-resolution molecular imaging capabilities. This is achieved through the use of a compact, modular stack of multiple thin layers of monolithic pixel detectors and flexible printed circuits (FPC), resulting in unprecedented scanner depth-of-interaction and volumetric granularity. Performance simulations have shown a point-spread-function of 0.2 mm, free of parallax effect, leading to a volumetric spatial resolution of about 0.015 mm3, one order of magnitude better than current PET scanners. Additionally, research and development on production methods have demonstrated the feasibility and reliability of the thin stack through cost-effective flip-chip bonding of the ASIC to the FPC using conductive adhesives. The recent developments in simulation and hardware prototyping will be presented in this contribution.

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