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NEXT GEN FPGA IN PARTICLE DETECTORS: A REVIEW OF EMERGING TECHNOLOGIES

Field Programmable Gate Array (FPGA) are integrated circuits that can be programmed or reconfigured by the user after manufacturing, allowing the hardware to be tailored for specific tasks according to the developer's needs. This makes them highly flexible and adaptable to different applications, including particle detectors, due to their ability to process large volumes of data in real-time with low latency, while maintaining high energy efficiency and flexibility. These factors are essential to ensure that complex experiments can capture, process, and analyze rare events in high-energy environments. This work presents a comprehensive review of major technological innovations in FPGAs, such as the Kria K26 SoM, and their practical applications in particle physics experiments.

Keywords: FPGA; detectors; particle physics; technology

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