

# Virtual prototyping of pixel detectors with PixESL framework in High Energy Physics

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PixESL pioneers a virtual prototyping framework for future particle detectors in high-energy physics. Developed at CERN under the EP R&D Work-Package 5, this framework enables high-level abstraction, simulating the full detector chain from particle interaction to data packet readout. It facilitates early optimization of chip and system architecture, which is critical for meeting experiment specifications. PixESL models crucial components such as analog front-end, digital circuitry, and data readout networks, empowering designers to analyze interactions and optimize performance. Leveraging SystemC, PixESL offers rapid simulation runtime and above-RTL abstraction, presenting a pivotal tool for advancing particle detector design and verification.

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