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Trends in front-end ASICs for particle physics

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The complexity and resolving capability of detectors for high energy physics experiments have been steadily increasing. The front-end electronics, which provides the readout of signals from the sensing elements of these detectors, has observed a corresponding increase in complexity, functionality, and transistor count. A major breakthrough came with the advent of front-end Application-Specific Integrated Circuits (ASICs) which have enabled new classes of detectors to be built. By their nature, front-end ASICs tend to integrate more and more of the required signal processing and communication circuits, frequently with extensive programming capabilities and with requirement to meet some standards. The progress in front-end ASICs greatly alleviates the detector design. But it also opens a number of questions and challenges, discussed in this presentation.

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