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A radiation detector is usually segmented in many independent sensing channels, each of which requires its own front-end amplifier and, in many cases, a full signal processing chain performing functions like filtering, sampling, A/D conversion, hit discrimination, time stamping and others. Such complex front-end electronics can only be implemented in the form of application-specific integrated circuits. The high level of parallelism, the coexistence on the same substrate of very low-noise amplifiers and high-speed digital circuits, the often large chip dimensions are among the key challenges the designers of these systems have to face. In the presentation, the critical issues and the recent trends involved in the implementation of such peculiar and complex ASICs will be reviewed and recent developments will be illustrated. Examples of technology transfer opportunities will also be discussed.

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