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Modern detector and trigger electronics

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The past two decades have provided a wealth of experience in highly integrated front-end electronics for high energy physics. The SLHC and ILC, however, pose formidable challenges, not so much to technology, but to optimum utilization of existing technology. The increased radiation load at the SLHC drives detectors to higher segmentation, which exacerbates the problems of reducing power and material. Vertex and tracking detectors at the ILC are driven by position resolution and material, also linked to power dissipation. Power constraints also limit the readout rate, which affects the choice of trigger architectures. One path to more efficient trigger systems is the use of hardware trigger processors, which will become more powerful as the technology of FPGAs and other digital hardware progresses. Following a review of current systems, I will discuss various paths to attack these challenges.

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