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Office of Science Detector R&D Programs[1]

H. MARSISKE, U.S. Department of Energy, Office of Science

Innovation in instrumentation is central to any discovery science. Scientific progress in many fields has been achieved largely through technological advances in instrumentation. The technologies developed for accelerators and detectors, often driven by the needs of high energy physics, have frequently benefited other fields of the physical and applied sciences, medicine, security, and industry. In turn, detector development is increasingly informed by advances in the understanding of the underlying science coming from fields like material science, photonics, and nanotechnology. Technology research and development (R&D) needs to take place across a spectrum of time scales and levels of risk, i.e., from focused short-term low-risk R&D that provides incremental improvements to existing technologies to generic long-term high-risk R&D that can result in transformative advances that are broadly applicable. This presentation describes the current detector R&D programs within the Offices of High Energy Physics, Nuclear Physics, and Basic Energy Sciences; notable technological achievements in these fields as well as applications outside; and efforts needed to continue progress into the future.

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