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From particle physics technologies to society

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Particle physics has revolutionized our understanding of the Universe, and it is the epitome of basic research: seeking answers to fundamental questions. In its pursuit of knowledge, particle has also played a role in developing innovative technologies: frontier instruments like the Tevatron at Fermilab or the Large Hadron Collider (LHC) at CERN, and their detectors, require frontier technologies, well beyond the industrial know-how at the time the accelerators and the experiments were conceived. The tools of the trade of particle physicists –accelerators, detectors, computing and simulations –have found applications in a variety of fields outside physics research. In some cases, these software and hardware tools have been adopted by scientists working in entirely different research areas: Geant4, Scientific Linux, synchrotron light sources. Innovations such as the World Wide Web have profoundly changed society, and there are many prominent examples in healthcare, from accelerator-based cancer therapy to medical imaging instrumentation. But there is also a myriad of lesser-known applications that have an impact in aerospace, cultural heritage, industry 4.0, food safety. This talk will explain how advances in particle physics-related technologies have had a positive impact in many fields of society, and in particular in medical and biomedical technologies and research.

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