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The future of particle physics – A Higgs Factory

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Abstract: The future of accelerator-based particle physics is becoming clear. After a US and soon to be completed European bottoms up planning process, a clear picture is emerging -- the top priority is to study the Higgs boson in exquisite detail. The Higgs is unlike any other particle. Given sufficient statistics, it can be a potential unique window into new physics present at the earliest moments in the universe. There are no clear clues as to what physics will emerge. We do know however it will require enormous detectors, giant accelerators, international partnerships, and impactful spin off technologies that will convince the public the required significant investment is worth it. A truly global effort will be required to build an electron-positron Higgs Factory, that will likely span a ~100 km in circumference. Over 100 countries are expected to participate, and more than 10,000 physicists will be engaged. I will discuss some of the remarkable technologies that were invented, directly or indirectly, while pursuing more powerful accelerators in the past, and their impacts as a part of a supporting argument for designing and building yet another very ambitious one. Next generation accelerators could impact medical science, microchip manufacturing, satellite communications, toxic waste remediation, agriculture, and energy production.

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