

Accelerator Physics: Present and Future

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Accelerators are devices that control and manipulate the motion of charged particles. Accelerators are workhorses of modern society and have been actively used in medicine, industry, and discovery sciences. From the recent study on the influence of accelerators on physics research, it is estimated that accelerators have influenced almost 1/3 of the whole physicists and physics studies, and on average contributed to physics Nobel Prize-winning research every 2.9 years. For example, the Noble prize in physics 2013 was awarded for the discovery of the Higgs boson, which was made possible due to a gigantic particle smasher called the Large Hadron Collider (LHC) at CERN. Recent trends in accelerator community are moving toward much more intense beams needed for advanced applications, such as diffraction-limited storage rings, future colliders, intense neutron sources, and accelerator driven systems. In this talk, I will go over important physics issues to be addressed to design, build, and operate such accelerator systems.