

ACCELERATOR SIMULATION

Particle Accelerators provide the means to explore the laws of nature, and enable scientific discoveries and important technological advances. Accelerator modeling via computer simulation is essential for their design and cost optimization.

Accelerators are crucial to advances in High Energy and Nuclear Physics, Materials Science, and Bioscience. The technological advances made possible by accelerators have many applications that benefit the nation's health, environment, & economy.

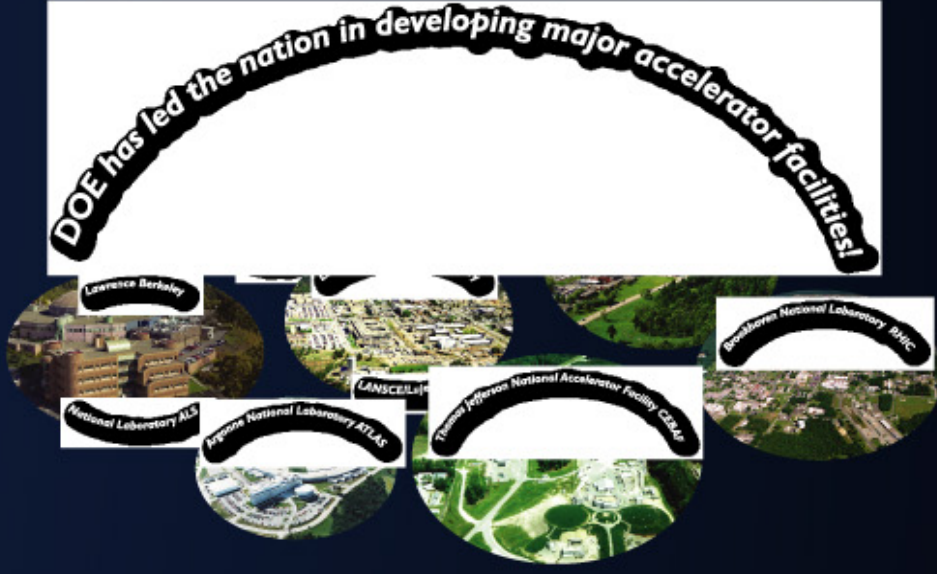
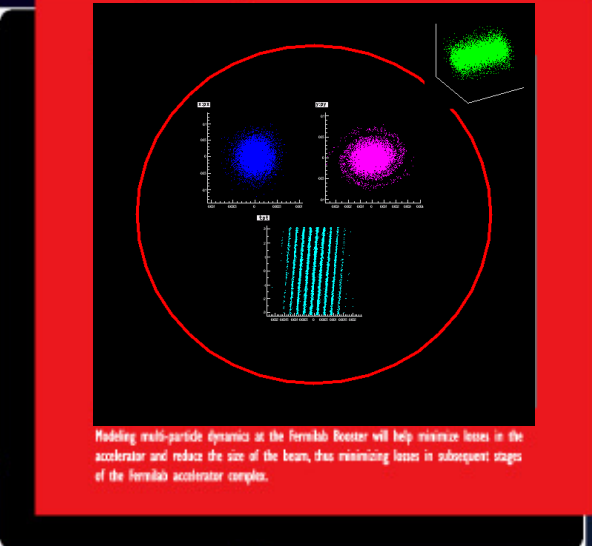
Observation of CP-violation in the B-sector at PEP-II

Imaging biomolecular structures using synchrotron light sources

Proton Therapy

Advanced Computing is Being Used to Address the Challenges of Proposed Next-Generation Accelerators

The DOE Office of High Energy and Nuclear Physics and Office of Advanced Scientific Computing Research, under SciDAC, are supporting a project in Advanced Computing for Accelerator Science and Technology. The project's goal is to develop a comprehensive, terascale Accelerator Simulation Environment and apply it to the design and optimization of DOE's next and current generation accelerators.



The Next Linear Collider (NLC) will be much larger and more complex than its predecessor the SLC.

First Two Dipole Bands & Manifold Modes

Quadrant of the RDDS 6-cell Stack for NLC

Simulation Performed on NERSC's IBM SP2: Elements = 275K, DOP = 1.7M, # of Processors = 48

