

1988 US PARTICLE ACCELERATOR SCHOOL

August 1 - August 12

The 1988 US Particle Accelerator School is sponsored by the Floyd R. Newman Laboratory of Nuclear Studies, the Cornell Physics Department, the US Department of Energy, and the National Science Foundation. It is the eighth in a series of schools held under the auspices of the national accelerator laboratories and associated universities. The school offers courses in accelerator physics and technology taught at the level of graduate work in physics and engineering. The courses are intended for individuals with professional interests in accelerator physics and technology and for those working in accelerator-based sciences.

Physics 686 Theory, Simulation, and Observation of Beams in Storage Rings

3 Semester Hours

Prof. Robert H. Siemann - Cornell University

This course presents the phenomenology of particles and beams in storage rings from an experimental viewpoint. Topics to be covered include single particle motion and the effects of magnetic field nonlinearities, coherent motion, including instabilities and wakefield calculations, and beam-beam interactions.

Physics 687 Physics of Particle Accelerators

3 Semester Hours

Dr. Donald A. Edwards - Fermilab

Topics in the design and performance of particle accelerators, with emphasis on the basic physics involved. Single particle dynamics of linacs and synchrotrons, including nonlinear motion. Intensity dependence, including space charge effects, coherent instabilities, and statistical phenomena. Examples of current accelerator research and development, chosen from large synchrotron (SSC/LHC) and linear collider activity.

Physics 688 Introduction to Synchrotron Radiation Sources

3 Semester Hours

Dr. Claudio Pellegrini - Brookhaven National Laboratory

The small beam emittances characteristic of synchrotron radiation sources dominate their design and performance. Description of the basic linear and non-linear electron dynamics in a storage ring optimized for the generation of synchrotron radiation. Discussion of the basic properties of synchrotron radiation production from bending magnets and undulators.

Physics 689 Introduction to Free Electron Lasers

3 Semester Hours

Dr. Charles A. Brau - U.C. Santa Barbara and Los Alamos National Laboratory

Free Electron Lasers are finding wide application as sources of high power, tuneable electromagnetic radiation. This course covers the theory and experimental development of free electron lasers, including time dependent and three-dimensional effects. The basic physics of wigglers, laser optics, radio frequency and induction linacs, storage rings, and other accelerators will also be discussed.