Title
25 Years of Accelerator Modeling

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Abstract
Particle accelerators are among the most complex and versatile instruments of scientific exploration. They have enabled remarkable scientific discoveries and important technological advances that span all programs within the DOE Office of Science (DOE/SC). The importance of accelerators to the DOE/SC mission is evident from an examination of the DOE document, "Facilities for the Future of Science: A Twenty-Year Outlook." Of the 28 facilities listed, 13 involve accelerators. In this talk I will discuss the tools and techniques of accelerator modeling from the historical perspective of my own career. First I will discuss several key developments relevant to 20th century accelerator simulation, including transfer map methods, Lie methods, and symplectic integration techniques. Next I will focus on 21st century accelerator modeling and the methods for large-scale accelerator simulation on parallel computers. Lastly I will describe the new generation of accelerator codes developed under SciDAC and future opportunities in the petascale era.

Biography
Dr. Robert D. Ryne has been involved in computational accelerator physics for 25 years. He received his B.S. in Physics from UC Berkeley and his M.S. and Ph.D. in Physics from the University of Maryland, College Park, under the direction of Prof. Alex J. Dragt. Dr. Ryne has worked at Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and is currently a program leader in the Center for Beam Physics at Lawrence Berkeley National Laboratory. He was co-PI of a DOE SciDAC project and is past Chair of the Executive Committee of the NERSC User Group.