

Beam Dynamics Simulation Code for the Oak Ridge Spallation Neutron Source Ring*, J. BEEBE-WANG, A.U. LUCCIO, Brookhaven Natl. Lab.; J. GALAMBOS, J. HOLMES, Oak Ridge Natl. Lab.; S.Y. LEE, University Of Indiana - The SNS Accumulator Ring is a space-charge dominated 1-GeV proton machine. To simulate beam dynamics, in order to minimize losses and match beam quality to the requirements of the neutron generating target, we are developing a new computer code that: (a) uses C++ under the supervision of a "SuperCode", and (b) merges, in a 6-dimension simulation in phase space, a Particle-In-Cell (PIC) approach with a Core model. (a) Allows a more natural and fast development of a code by a team of people working in parallel, as done in the Industry. A C++ code is easier to be made modular and to maintain than a Fortran code. (b) Allows one to track a number of MonteCarlo macroparticles with reference to a beam core whose evolution is described by the solution of theoretical equations. In first approximation the beam behaves as Core prescribes, whereas details are simulated by PIC. Core also insures that integrals of motion and other quantities are correctly calculated. For the PIC part we freely used algorithms and formulation from pre-existing codes, like Fermilab Esme and TRIUMF Accsim. Preliminary results of the simulation of the SN will be presented.

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