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Using a particle-in-cell model for accelerator control room applications

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Many accelerator control rooms rely on envelope models to simulate beam dynamics because they are fast and accurate at tracking the beam core. Particle-in-Cell (PIC) models, however, can track particles inside and outside the core and, with the improvements of computers, are now fast enough to be used in control rooms. The Spallation Neutron Source (SNS) at Oak Ridge National Laboratory is currently developing a tool to use a Particle-in-Cell model for control room applications. This report covers the progress so far and the future goals of using PyORBIT, a Particle-in-Cell simulation model, in the SNS control room.

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