SIMULATION OF SPACE-CHARGE EFFECTS IN AN FFAG USING PTC

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Abstract

At low current, accelerators are dominated by their independent, separated-function magnets, and hence essentially all accelerator simulation codes have used not time but longitudinal distance, s, as the independent variable. The simulation of space-charge effects within this approach has been at best ad hoc, as it requires a (thoroughly approximate) transformation between a pancake of space charge at fixed s to a particle bunch at fixed t. We shall describe recent modifications to the accelerator simulation code PTC that make it possible to, in effect, perform time-based particle tracking in a code that correctly handles the full geometry and wide dynamic range of current designs for FFAGs. In addition, we shall describe the associated space-charge computation and present initial results from simulations that cover a large energy gain in a model non-scaling FFAG.

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