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Computation of the matched envelope of the Danilov distribution AUSTIN HOOVER, University of Tennessee, NICK EVANS, JEFF HOLMES, Oak Ridge National Lab — Self-consistent beams are those which give rise to linear internal electric fields and maintain this property under any linear transport. Their analytic tractability provides valuable insights into space charge effects, and they would possess a number of ideal properties if realized in practice. Although the KV distribution is the most famous example, a larger class of self-consistent beams exists. Here we focus on a particular case which we call the Danilov distribution. The dynamical behavior of this beam is more complicated than that of the KV distribution due to the fact that it tilts in real space as it transports through the lattice. There is current interest in generating the Danilov distribution experimentally; however, the beam dynamics have not yet been studied in detail. We present an iterative method to calculate the matched envelope of the Danilov distribution in both coupled and uncoupled lattices using an existing parameterization of coupled transverse motion. We demonstrate the method in a few simple lattices and study the resulting matched beam properties, thus laying the groundwork for future calculations to optimize the injection of a self-consistent beam in more complicated lattices.

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