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Simulation study of betatron radiation for perturbed beams in plasma

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Plasma wakefield acceleration (PWFA) is a method for accelerating charged particles using large electric fields sustained by plasma waves (up to hundreds of GV m⁻¹) for the accelerating longitudinal fields. In this project, we will evaluate the impact of perturbations on basic particle motion. These perturbations are affected by any number of terms of the equations of motion. The most important perturbations derive from the fact that the particle beams are not quite monochromatic, the finite spread of energies about the nominal energy. We will discuss the hosing which is a transverse instability due to perturbations. The prototypical parameter set was perturbed in several ways. The main goal of this research is to be able to diagnose the parameters of a beam from the spectral and angular distribution of the betatron radiation which encodes information about the beam-plasma interaction.

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Footnotes

I have read and accept the Privacy Policy Statement

Yes

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