Simulation and Measurement of an Electron Beam in a Wiggler Magnetic Field

by

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ABSTRACT

Sources of high quality beams of spinning electron beams are critical to efficient free electron devices including FELs, CARMs and gyrotrons. Bifilar helical wiggler can take a beam with little perpendicular momentum and add perpendicular momentum, spinning up the beam. The effect of the electron beam self fields on the beam quality will be important. A computer simulation has been written which can simulate the behavior of electron beams in the wiggler region including the effects of the beam self-electric fields. The equations used in the code are described. Several tests of the code are presented. Results of simulation of a bifilar helical wiggler are described. Measurement of beam parameters is also necessary. A design for a capacitive axial velocity probe is presented. The probe has been built but is still untested due to problems with a leaky flange.

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