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## PARTICLE-IN-CELL CODE INVESTIGATION OF MAGNETIC FIELD EFFECT ON AXIAL VIRCATOR

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Vircator can generate GW class microwave power and is the preferred device in certain military application due to its simple structure and lighter weight because no magnet is used. Previous investigation [1] leads to the conclusion that applying a magnetic field on vircator is going to decrease its output power, to the extent eventually a total cutoff. However, previous study was conducted analytically on a radially fired coaxial vircator with an axially directed magnetic field, the natural property of the magnetic field is to deflect the electron beam, and therefore the performance decrease is expected. On the other hand, magnetic field is used in many microwave tubes with electron beam parallel to the magnetic field and achieves beam confinement thus a more stable operation of the tube is obtained. In this article we investigate the effects of magnetic field on an axial vircator with a particle-in-cell code. We simulate with three scenarios: the externally applied magnetic field is larger, equal, or smaller than the beam current equivalent magnetic field, and observe its influence on the output power, spectrum, and particle dynamics.

Ref:

[1]. Peter A. Lindsay, Wee Kian Toh, and Xiaodong Chen, "The influence of an axial magnetic field on the performance of a coaxial vircator," IEEE Trans. on Plasma Sci., vol. 30, no. 3, June 2002.

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