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The Path of a Rigid Electron Which Moves in a Magnetic Field of Constant Strength Rotating with Constant Angular Velocity

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THE PATH OF A RIGID ELECTRON WHICH MOVES IN A MAGNETIC FIELD OF CONSTANT STRENGTH ROTATING WITH CONSTANT ANGULAR VELOCITY

E. O. HULBURT

Abstract

Equations of motion of a rigid electron in a uniformly rotating magnetic field of constant strength rotating with a frequency $\omega/2\pi$ in the XZ plane are obtained. The reactions on the motion due to finite size, radiation from the electron and the field, and the variation of mass with velocity are neglected. If initially the velocity of the electron has components only along the X-axis or the Z-axis the path of the electron is a wavy curve inside an annular space whose axis is parallel to the Y-axis. If the initial velocity of the electron has components only along the Y-axis the path is a rather complicated type of spiral winding in the general direction of the Y-axis. It is found that a high frequency of rotation of the magnetic field, of the order of 10^6 , such as may be produced by electron tube circuits, would not impart a great velocity to the electron.

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PHENOMENA IN GASES EXCITED BY RADIO FRE- QUENCY CURRENTS

E. O. HULBURT

Abstract

The spectra from hydrogen, oxygen and air excited by currents of the frequency of the order of 10^6 alternations per second produced by an oscillating fifty-watt electron tube were photographed with a grating spectrograph in the spectral region from 5000 Å to 3500 Å. These spectra were found to be identical with the spectra of the same gas stimulated by sixty-cycle current of the same strength as the radio frequency current.

The potentials just sufficient to set up luminosity in hydrogen and in oxygen were measured for direct and radio frequency, i.e.,