Study of the Dynamics of a Particle in a Constant Homogeneous Magnetic Field and a Transverse Electric Field for the Development of an X-Ray Source, A. BOURDIER, C.E.A., Centre d'Etudes De Bruyéres-Le-Châtel, PTN, BP 12, 91680 Bruyéres-Le-Châtel (France); M. VALENTINI and J. VALAT, LPMI, Ecole Polytechnique, CNRS, 91128 Palaiseau (France) - The relativistic motion of an electron in a constant homogeneous magnetic field and a transverse electric field is studied. This problem has already been explored by other authors[1,2]. One of the aims of this paper is to bring some enlightenment to their discussion by using Hamiltonian formalism. Another aim is to derive a simple approximate expression for the maximum energy that the particle can reach in the interesting physical situation when the electron is initially resonant and at rest. This can give the order of magnitude of the upper limit in frequency of the X-rays emitted when the electron hits an high-Z material.

1   C.S. Roberts and S.J. Buschbaum, Phys. Rev. 135, A381 (1964).
2   H.R. Jory and A.W. Trivelpiece, J. Appl. Phys. 39, 3053 (1968).