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A general expansion for electromagnetic fields, using spherical coordinates, is developed in this chapter.

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Chapter 7: ENERGY AND MOMENTUM IN MULTIPOLAR FIELDS 63

In this chapter, the net radiated power, momentum, and angular momentum are found in terms of field parameters. An incoming plane wave is next added and the boundary conditions met. The result is a nearly complete expression for the radiated dynamic properties. One boundary condition is that the ratio of radiated energy to momentum be c . A result of that condition is that radiated energy and angular momentum are in the ratio of the

angular frequency. The first condition is commonly taken to require quantized radiation. The second condition is well known but thought to arise only from quantum mechanical processes.

Chapter 8: THE ELECTRON 75

The known properties of an electron are discussed and tabulated. Next we show that two opposite, paired, and isolated charges, with the appropriate energy, will spiral into each other and should therefore be unstable. However, we next show that charge configurations do exist which are stable in the sense that no power is radiated into the far field. We solve for several such possible charge distributions and then show that others exist as well.

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We take the results of Chapter 8 to show that stable charge configurations can occur in isolation which are in equilibrium with their own reactive field, as discussed in Chapters 5-7. We then assume that some type of stable charge configuration exists and treat the problem as a thermodynamic one. The result is that the charge configuration obeys Schrödinger's equation, with Planck's constant as an undetermined parameter. Then we treat the same problem in accordance with the techniques of statistical mechanics, and a model of a point charge being driven by a reactive field. Once again the result is Schrödinger's equation, but this time Planck's constant is given in terms of other parameters.

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