Physics 606: Homework #8

Due Friday May 9, 2008

Jackson: Problems 7.22, 7.26, 8.3, and 8.4

Consider N particles of charge q that travel on a circular path of radius a at constant speed v. At t=0 the particles are located by the N angles θi, i=1,N. Following the approach of problem 9.1b derive expressions for the current density and total power radiated at frequency \( \omega_m = m \frac{v}{a} \), by the rotating charges. Take the small a limit if need be. Now consider two different possibilities: 1) the initial angles are equally spaced between 0 and 2π and 2) the initial angles are independent, identically, and uniformly distributed by 0 and 2π. Compare the dependence on N in the two cases.