

Homework #2

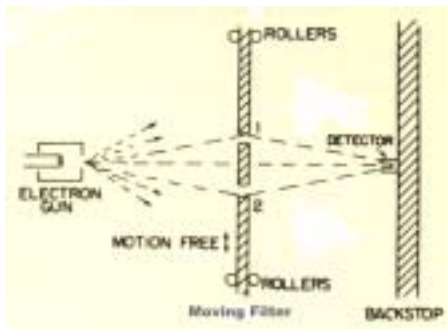
Due 10/11

1. The power, that is, the energy radiated per unit time by an accelerated charge e is classically given by the formula

$$P = \frac{2}{3} \frac{e^2 a^2}{c^3} \text{ erg/sec}$$

where a is the acceleration. In a circular orbit $a = v^2/r$. Calculate the power radiated by an electron in a Bohr orbit characterized by the quantum number n . When n is very large, this should agree with a proper quantum mechanical result according to the corresponding principle.

2. Consider a double slit electron interference/diffraction experiment as shown in the figure



on the left. The moving filter with mass M is designed to distinguish which slit the electron passes through. The separation between the two slits is d ; and the distance between the filter and the backstop is L . Show that the electron interference pattern would be completely destroyed if we can distinguish the slit that the

electron passes through.