

ELECTRODYNAMICS  
PROBLEM SET 10  
*due May 6<sup>th</sup> , before class*

**I. RADIATION FROM SPINNING ELECTRIC DIPOLE**

An electric dipole of size  $p_0$  lying on the  $x - y$  plane rotates around the  $z$ -axis with angular velocity  $\omega$ . Calculate the power radiated per solid angle and the total radiated power.

**II. CLASSICAL ATOMS DON'T EXIST**

In a classical model of atoms, the electron spins around the nucleus in a circular orbit. Classically, it should radiate, lose energy and, eventually, fall into the nucleus.

- a) Calculate how much energy the electron radiates per turn.
  - b) Estimate how long it'd take for the electron in the ground state of a hydrogen atom to hit the nucleus (order of magnitude only).
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