

## J05Q.2 - Charged Particle on a Ring

### Problem

A particle of charge  $e$  is free to move on a circular ring of radius  $R$  centered around a fixed particle of charge  $+e$ . The ring is in the  $x$ - $y$  plane. A uniform electric field  $E$  is applied in the  $x$ -direction.

- a) Compute the ground state energy to leading order in small  $E$ .
- b) Develop an approximation for the ground state energy in the limit of large  $E$ .