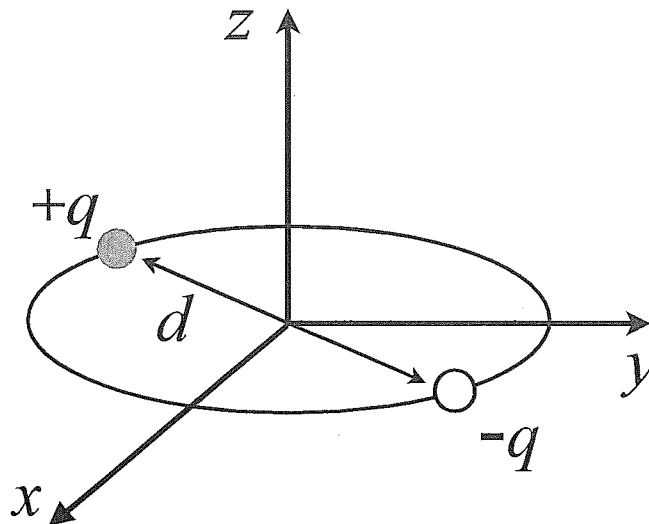Charges $+q$ and $-q$ orbit around each other in the $x-y$ plane ($z = 0$) at the frequency ω – see Fig. 1. The distance between the charges d is known and is such that $d \ll c/\omega$.

Figure 1:

1. (50 points) What is the angular distribution of the radiated power?

2. (25 points) What is the total power radiated?

3. (25 points) The plane $z = -b$ (where $b \ll c/\omega$) is now filled with a perfect conductor. Explain qualitatively how this will affect the total radiated power.

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