

26. Let R be the radius of a capacitor plate and r be the distance from axis of the capacitor. For points with $r \leq R$, the magnitude of the magnetic field is given by

$$B = \frac{\mu_0 \varepsilon_0 r}{2} \frac{dE}{dt} ,$$

and for $r \geq R$, it is

$$B = \frac{\mu_0 \varepsilon_0 R^2}{2r} \frac{dE}{dt} .$$

The maximum magnetic field occurs at points for which $r = R$, and its value is given by either of the formulas above:

$$B_{\max} = \frac{\mu_0 \varepsilon_0 R}{2} \frac{dE}{dt} .$$

There are two values of r for which $B = B_{\max}/2$: one less than R and one greater. To find the one that is less than R , we solve

$$\frac{\mu_0 \varepsilon_0 r}{2} \frac{dE}{dt} = \frac{\mu_0 \varepsilon_0 R}{4} \frac{dE}{dt}$$

for r . The result is $r = R/2 = (55.0 \text{ mm})/2 = 27.5 \text{ mm}$. To find the one that is greater than R , we solve

$$\frac{\mu_0 \varepsilon_0 R^2}{2r} \frac{dE}{dt} = \frac{\mu_0 \varepsilon_0 R}{4} \frac{dE}{dt}$$

for r . The result is $r = 2R = 2(55.0 \text{ mm}) = 110 \text{ mm}$.