**You Can Help Maxwell fix up Ampère’s law!**

James Clerk Maxwell needs to add a term involving to Ampère’s law for the picture shown below.

Area

In this exercise, you’ll help Maxwell find the right value for the constant, so that is the same around either of the dashed loops in the picture. This means setting

1. Rewrite the equation just above, writing the electric flux in terms of the electric field and the area of the plates .

2. If the plates have charge +Q and –Q on them, what is the electric field E between the plates, in terms of and ?

3. Rewrite your equation from (1), in terms of and instead of .

4. What is the relationship between current *I* and charge *Q* (perhaps involving a time derivative)?

5. Rewrite your equation from (3) in terms of *I*.

6. At this point it should be clear what that constant should be. Rewrite the new, fixed-up version of Ampère’s law using the constant you’ve found. Maxwell thanks you!