

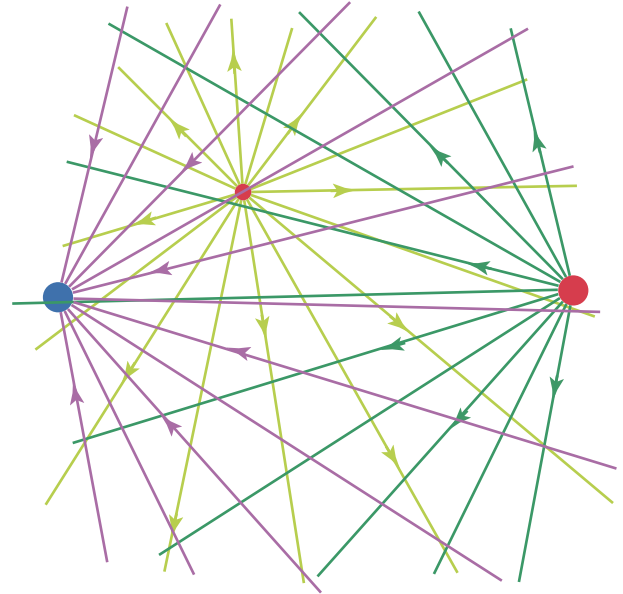
## A charge cannot feel a force from its own electric field.

That's easy enough to say, but sometimes it can be confusing to figure out which electric fields to keep and which to ignore.

Suppose that you have a homework problem involving the picture to the right with three charges (red is positive, blue is negative). Also shown is the electric field from each of the charges. It is important to note that...

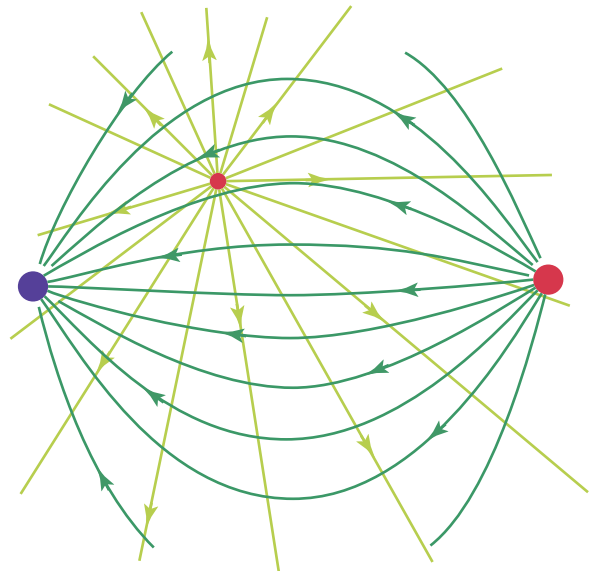
**At this point, you cannot tell which fields you will need to include in the problem!**

You need more information.



Suppose that you read the homework problem further, and find out that the problem wants to know how the smaller charge is affected (maybe the problem asks about the force that charge feels, or how it will move). At that point, you should split all the fields into two groups: the field from the smaller charge, and the fields from all the other charges.

The picture to the right shows the combined field of all the other charges (that is, superposition has been used to combine the purple and dark green fields above). The field from the smaller charge is still there, but it has not been combined with the others.



To find out what force the small charge feels, you would use  $\mathbf{F}=q\mathbf{E}$ , with  $q$  = small charge and  $\mathbf{E}$  = electric field from all other charges. You should completely ignore the light green field lines above.

Of course, if the problem had asked about the force on (or motion of) the negative charge, you would make a different choice of what to ignore. Your treatment depends on what is asked, not just on what the charge arrangement is.

Finally, you often see a problem in which an "external" electric field is given directly, with no particular information about where it come from. For example, the picture to the right shows a positive charge (red dot) in an external electric field (dark green arrows). The picture also shows the field that comes from the positive charge (light green lines).

Those fields are both there. However, for the purposes of figuring out the behavior of the positive charge, you must completely ignore the field that comes from the charge itself.

