Block 11 — Influence and Displacement Field

Student Group

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Block 11 — Influence and displacement field

Learning objectives

> After this 90-minute block, you can
>
> - ...

Preparation at Home

Well, again

- read through the present chapter and write down anything you did not understand.
- Also here, there are some clips for more clarification under 'Embedded resources' (check the text above/below, sometimes only part of the clip is interesting).

For checking your understanding please do the following exercises:

- ...

90-minute plan

1. Warm-up (x min):
    1. ....
2. Core concepts & derivations (x min):
    1. ...
3. Practice (x min): ...
4. Wrap-up (x min): Summary box; common pitfalls checklist.

Conceptual overview

> 1. ...

Core content

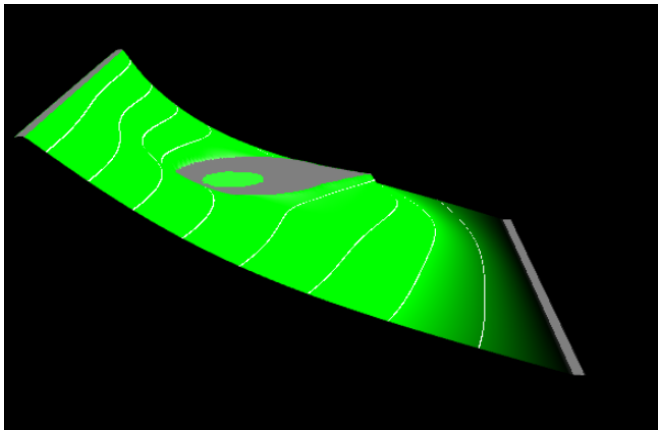
Electric Field inside of a conductor

As seen in Block10, any hole inside a conductor does neither show field lines nor an electric field. This is called Faraday cage or Faraday shield.

Wo we want to have a look onto an uncharged object in an external field. Also here any hole inside does not show an electric field
The reason for that is, that the outer field gets cancelled out by an opposing inner electric field.

A charge displacement on the external surface (induced by the external field) is the reason for that opposing inner field.
Please have a look onto the yellow and blue collor in figure 1 to see this charge displacement

Fig. 1: field of a pointy object in an external field (field line density is not correct)



Note:

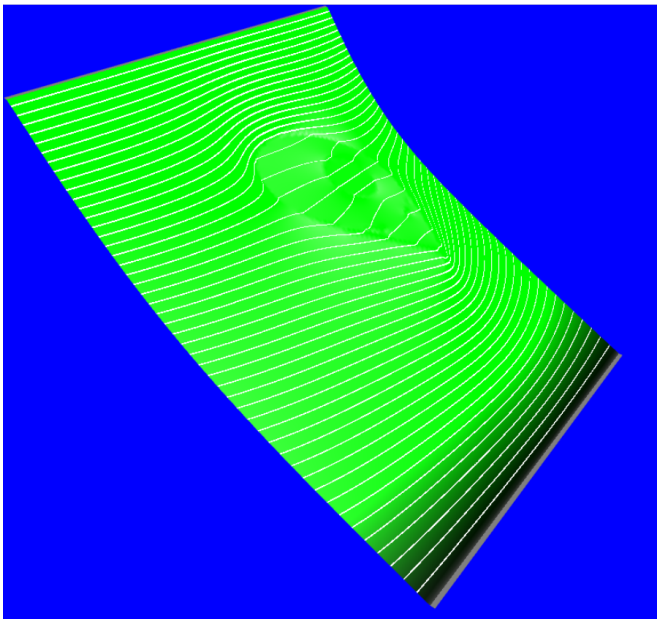
Any external electric field causes a charge displacement on an conductor in such a way, that there in no internal field inside the material (neither in holes nor in the material itself)

Electric Field inside of an Isolator

But how is it like for an isolator in an external field?
There are no free charges in an isolator - so, is there no compensation of the external field inside the isolator at all?

As an example, let us have a look intowater as an isolator:

Fig. 1: field of a pointy object in an external field (field line density is not correct)



Common pitfalls

- …

Exercises

Worked examples

…

Embedded resources

Explanation (video): …