

# Block 14 - The steady Conduction Field

## Student Group

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## Table of Contents

<b>Block 14 - The steady Conduction Field</b> .....	2
<i>Learning objectives</i> .....	2
<i>Preparation at Home</i> .....	2
<i>90-minute plan</i> .....	2
<i>Conceptual overview</i> .....	2
<i>Core content</i> .....	2
Summary on the Electric Field .....	3
<i>Common pitfalls</i> .....	6
<i>Exercises</i> .....	6
Worked examples .....	7
<i>Embedded resources</i> .....	7

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## 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

In the discussion of the electrostatic field in principle, no charges in motion were considered. Now the motion of charges shall be considered explicitly.

The current density here describes how charge carriers move together (collectively). The stationary current density describes the charge carrier movement if a **direct voltage** is the cause of the movement.

A constant direct current then flows in the stationary electric flow field. Thus, there is no time dependency on the current:

$$\frac{\partial \rho}{\partial t} = 0$$

Also important is: Up to now was considered, charges did move through a field in the past or could be moved in the future. Now, the exact moment of moving the charge is considered.

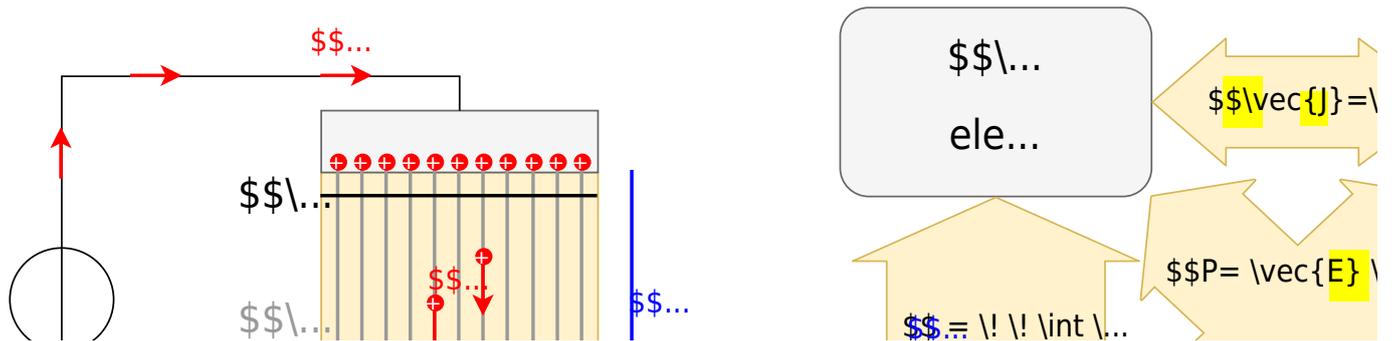
## Summary on the Electric Field

Fig. 1: summary of electro static field





Fig. 2: summary of conduction field



### Common pitfalls

- ...

### Exercises

## Worked examples

...

## Embedded resources

Explanation (video): ...

The online book 'University Physics II' is strongly recommended as a reference for this chapter. Especially the following chapters:

- Chapter [9.3 Model of Conduction in Metals](#)

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