

Topic 1:
Progress in the understanding of
physical phenomena and materials for
use in DC

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- **Development status, roadmap, characterisation and criteria of choice for new materials including thermoplastic insulation, nanotechnology, XLPE low by-product**
- **Environmental impacts of materials, carbon footprint, pollution and recyclability**
- **Understanding of ageing mechanisms and polarity reversals constraints**
- **Evaluation of electrical fields at triple points**
- **Behaviour of DC cables operated in AC for flexible electrical systems**



**Development status, roadmap, characterisation and
criteria of choice for new materials
including thermoplastic insulation, nanotechnology,
XLPE low by-product**

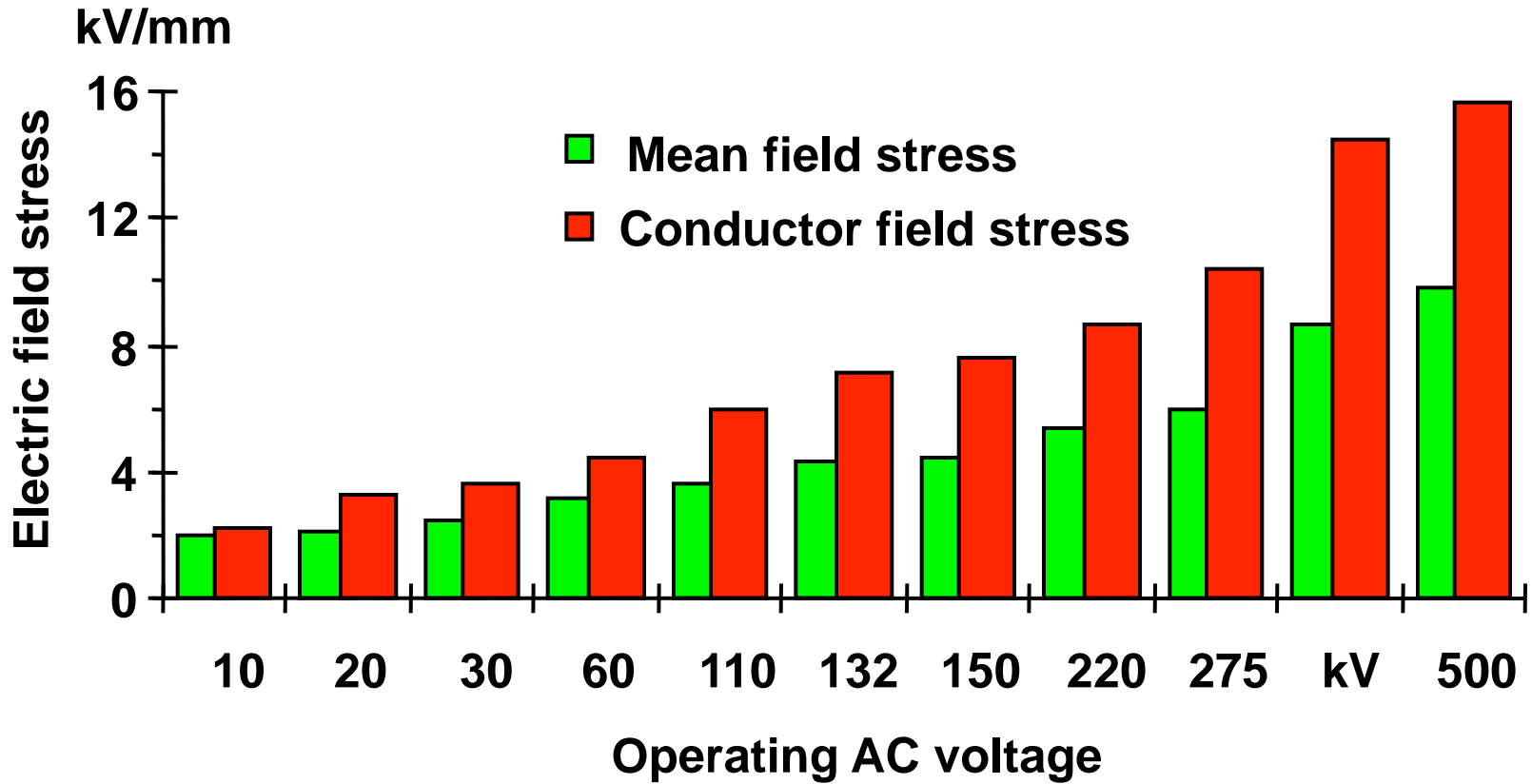
Questions and comments

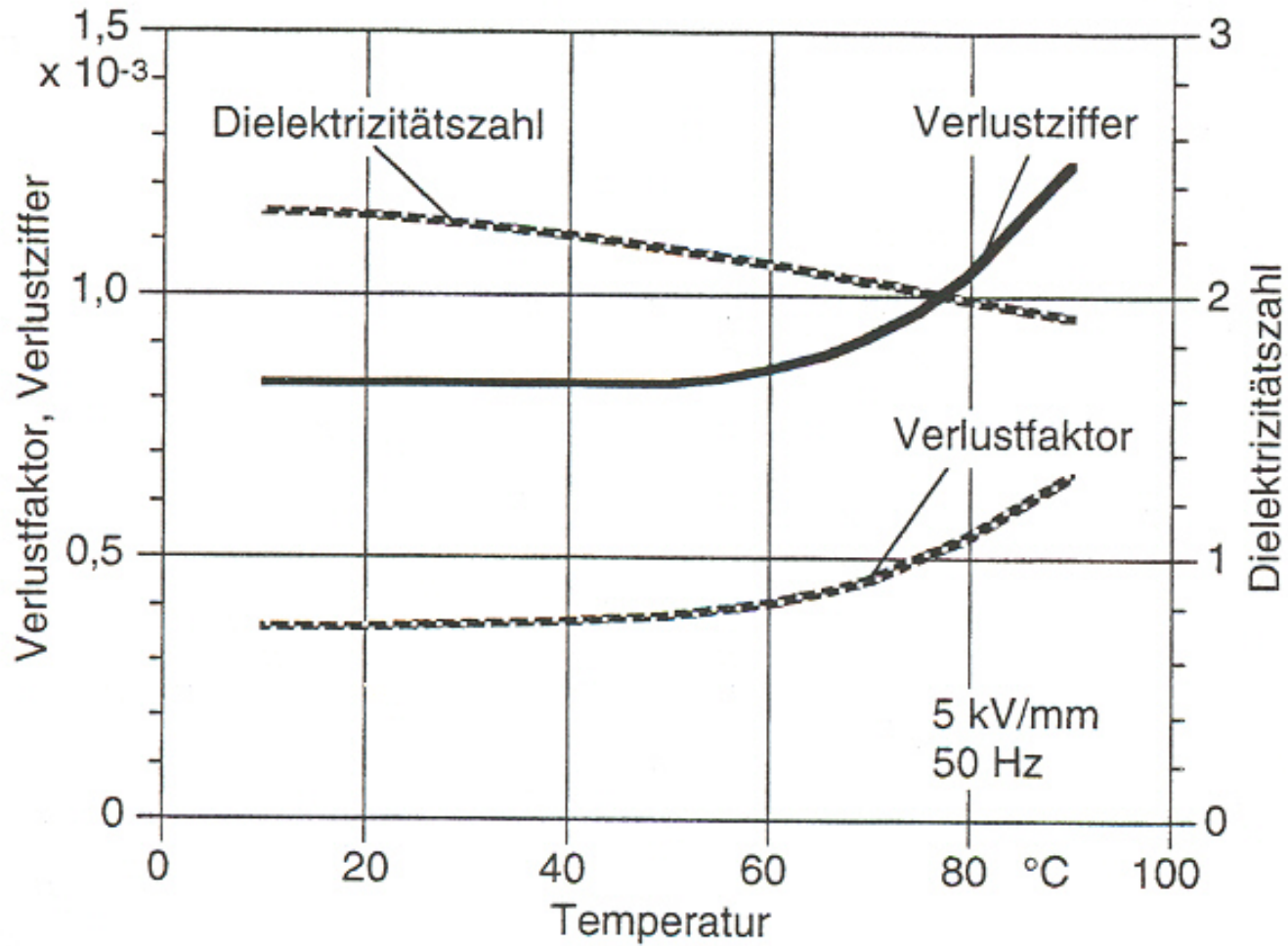
New materials available?

Voltage limits?

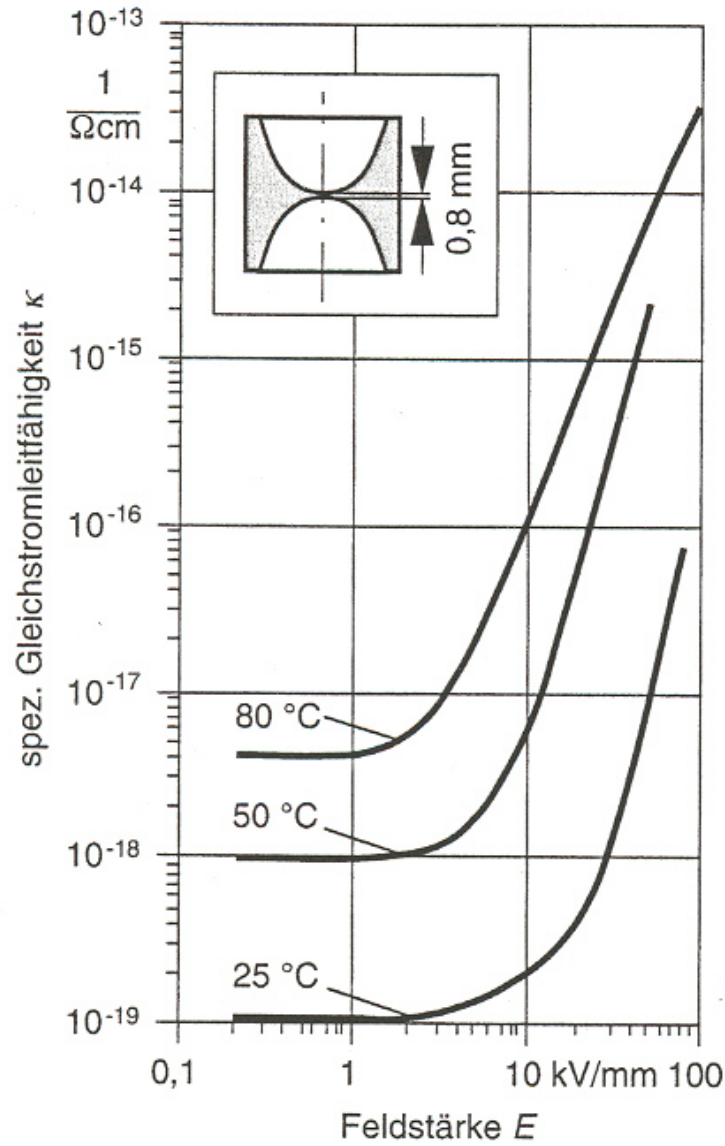
Experience?

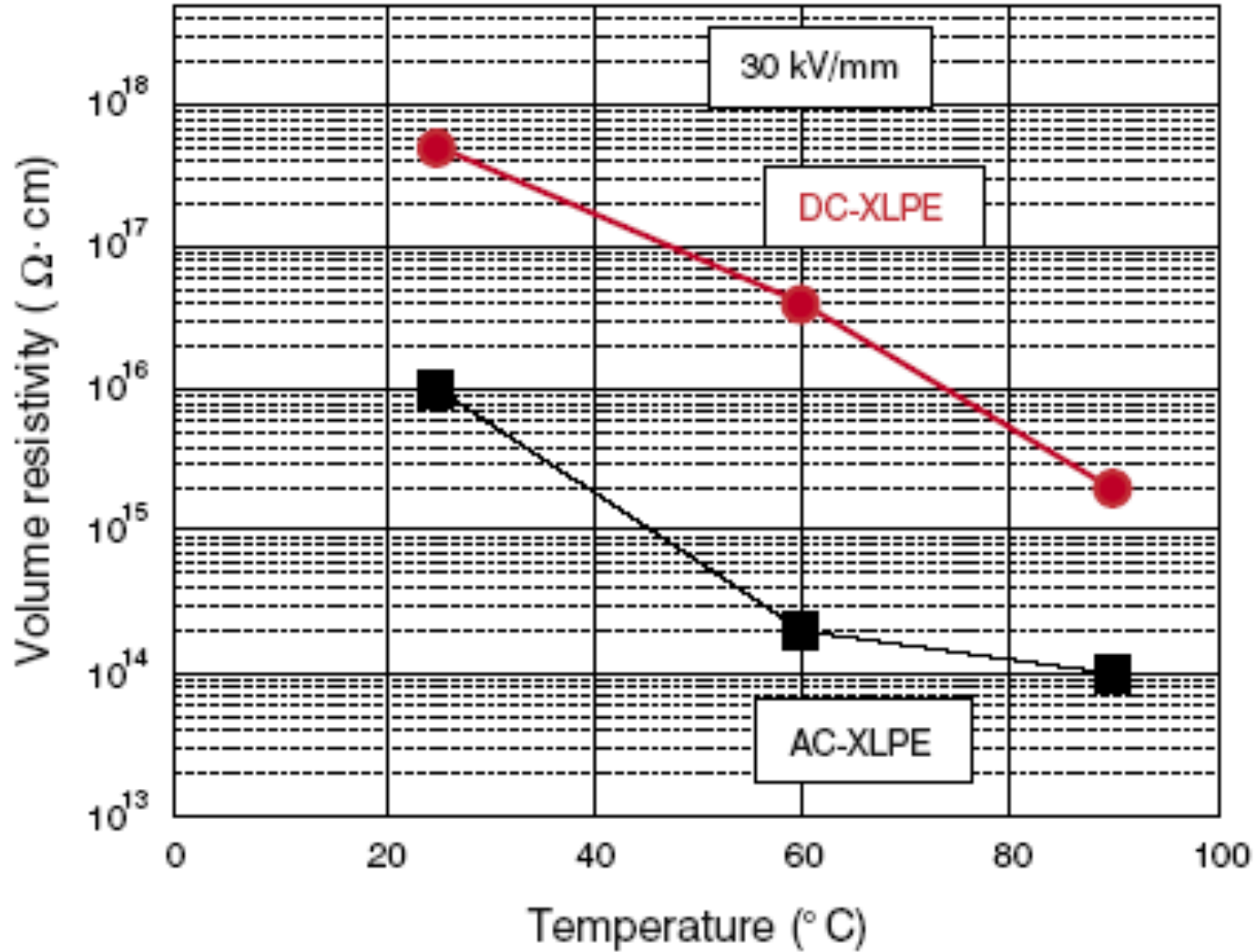




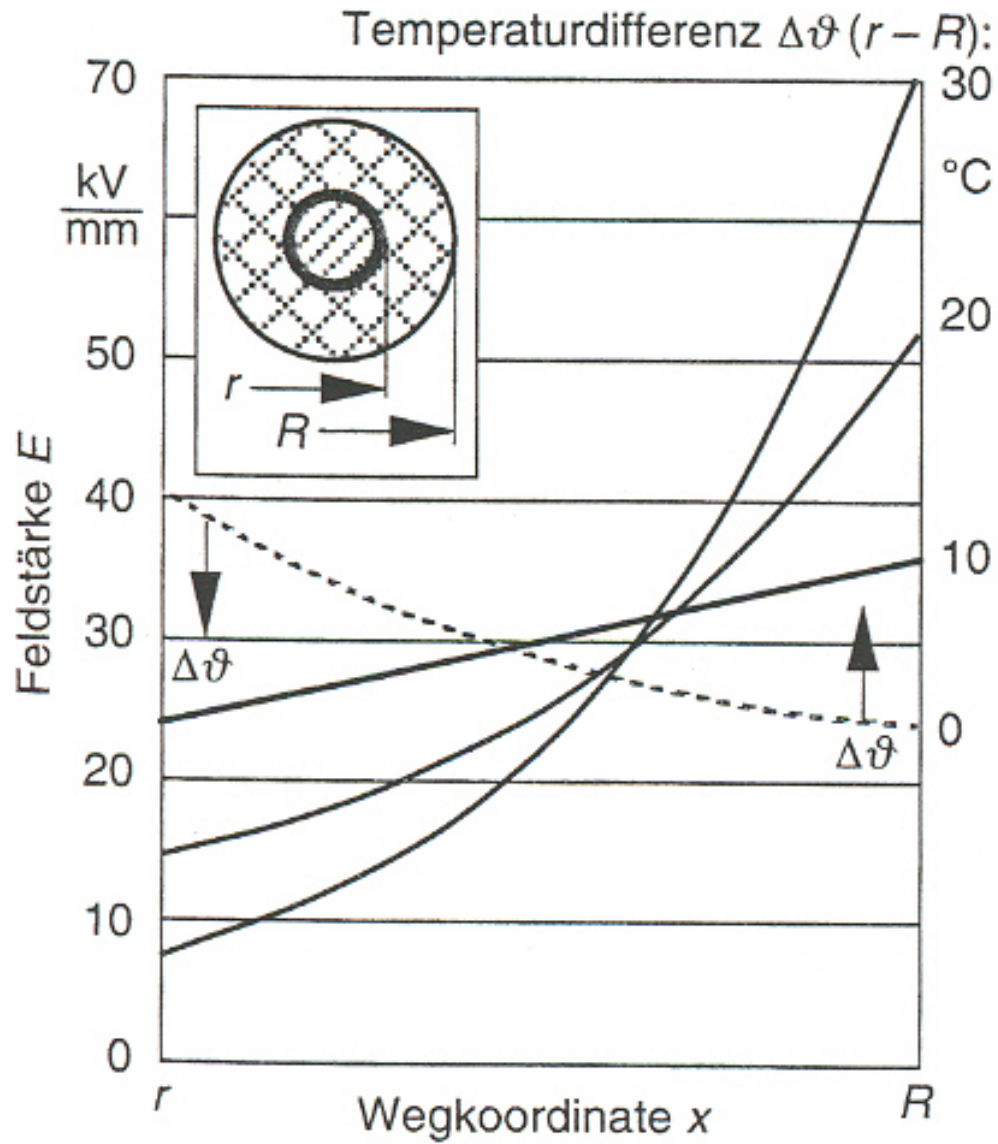


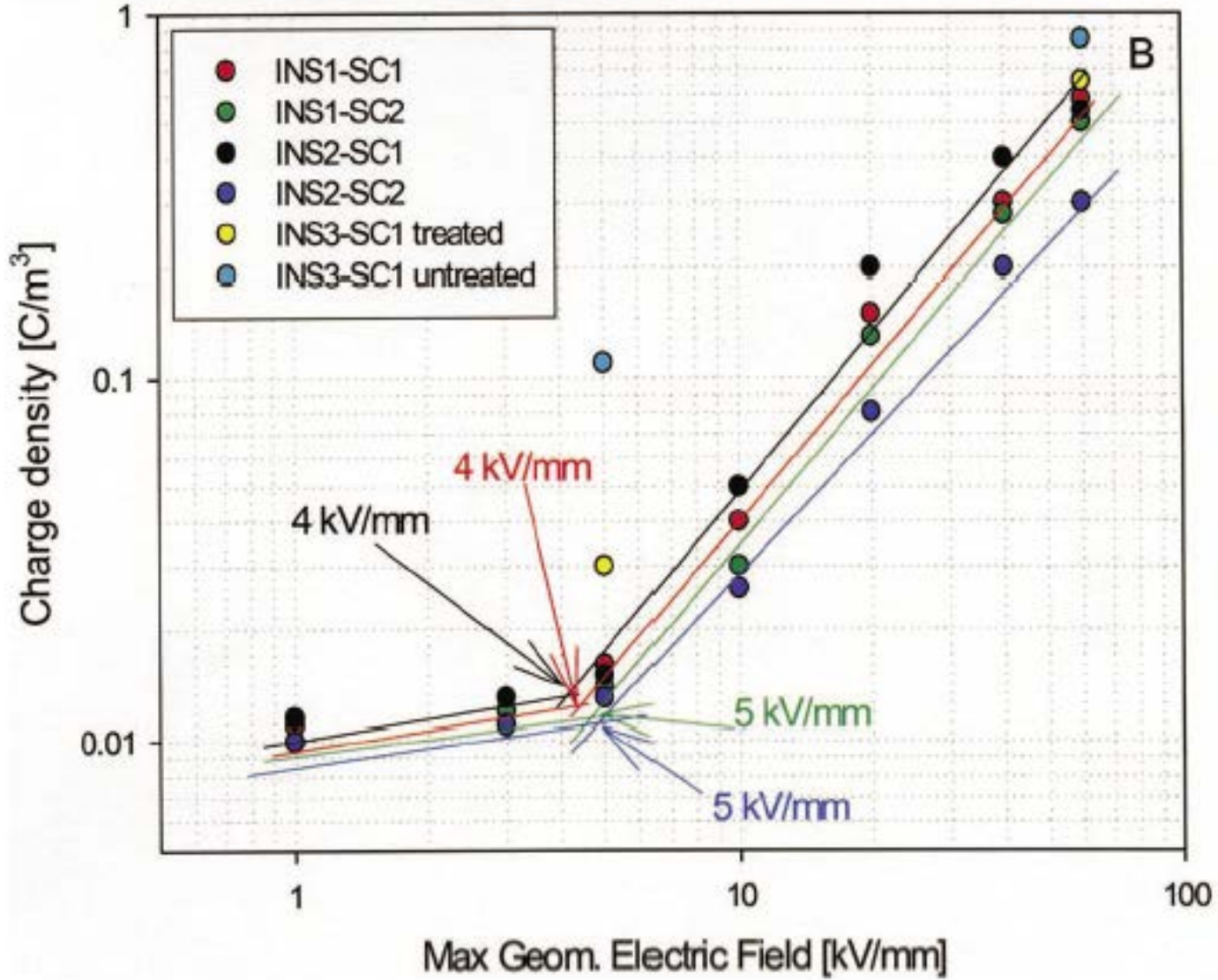
Source: Kabelanlagen für Hoch- und Höchstspannung
E. Peschke, R. v. Olshausen





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Environmental impacts of materials, carbon footprint, pollution and recyclability

Questions and comments

Fluid impregnation material?

Recycling of XLPE?



Understanding of ageing mechanisms and polarity reversals constraints

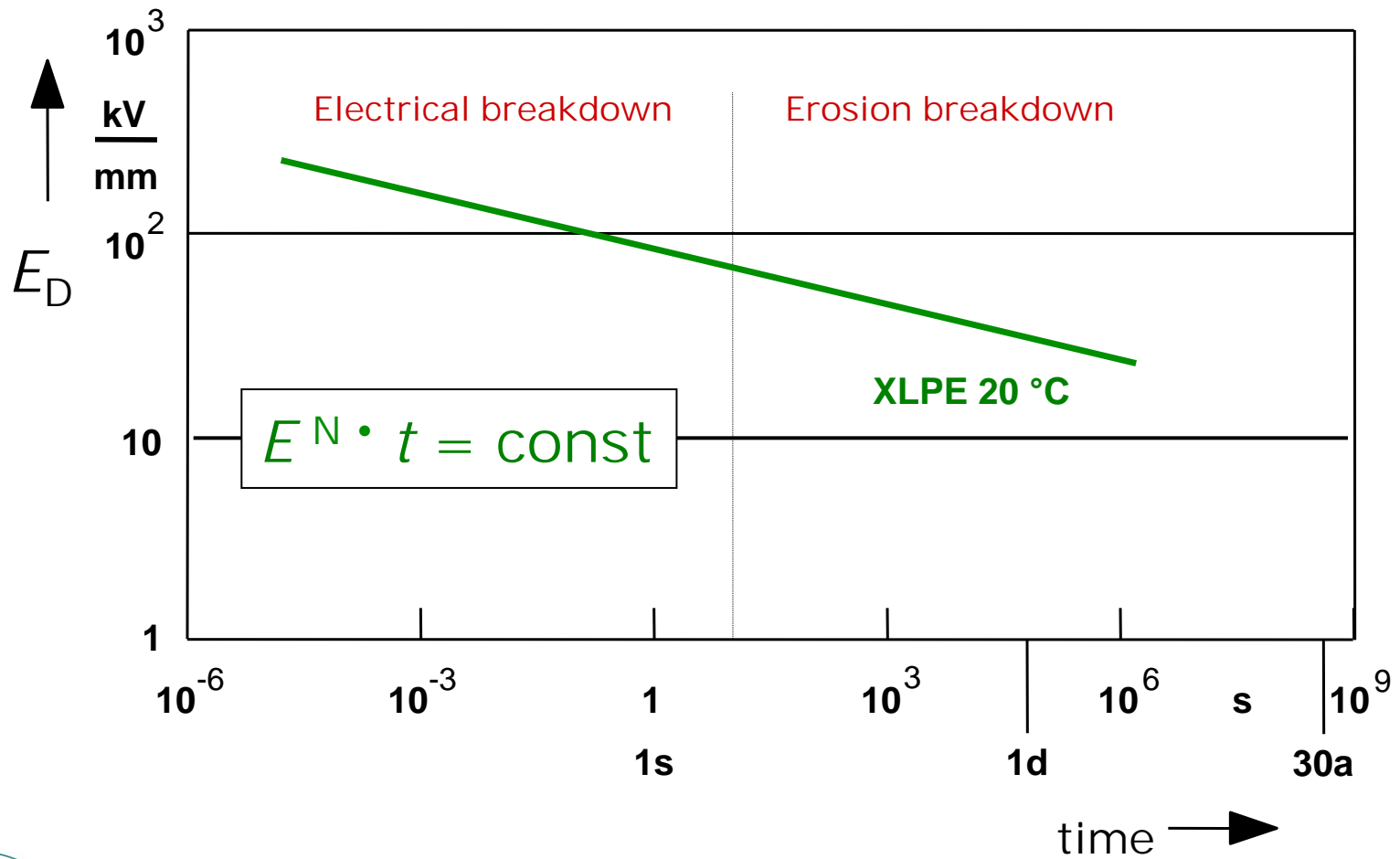
Questions and comments

Ageing: thermal, electrical, mechanical, chemical?

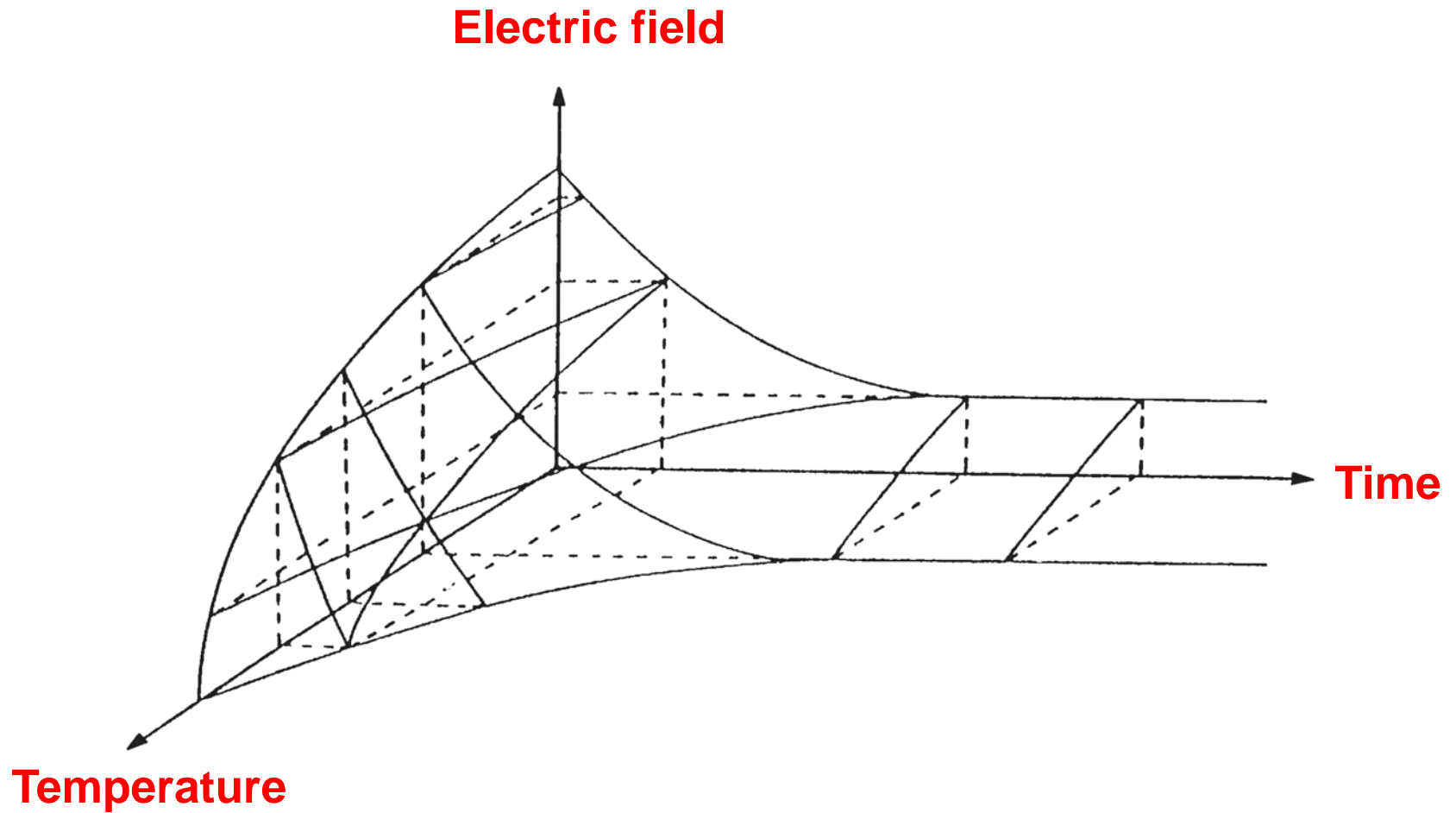
Polarity reversal: space charges?



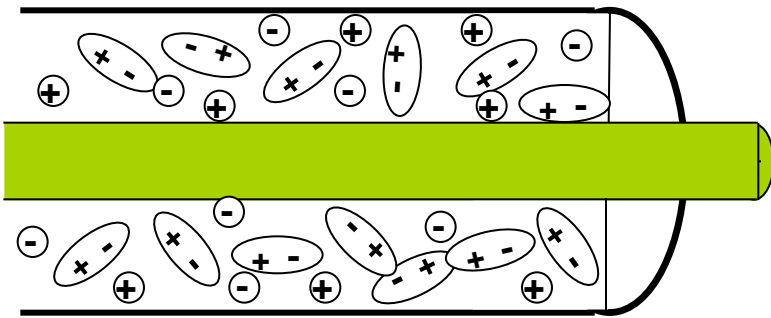
Long time behaviour



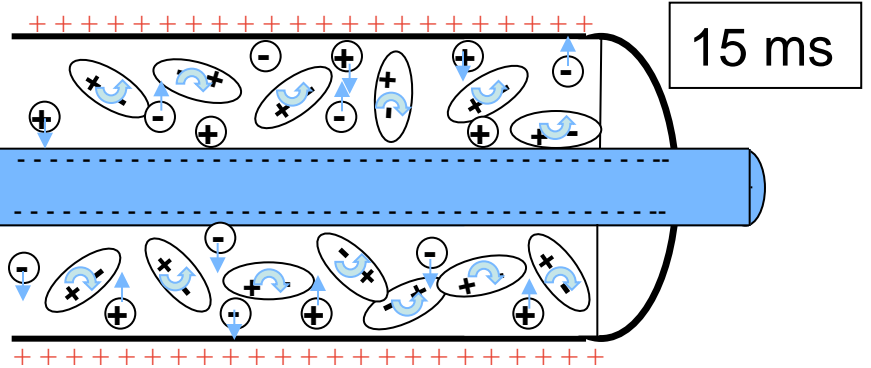
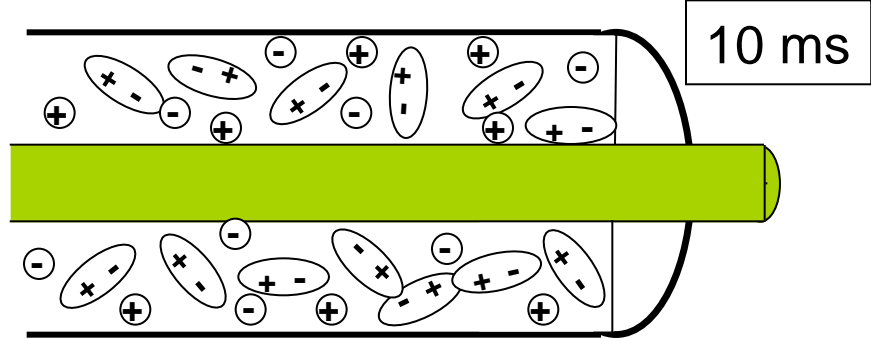
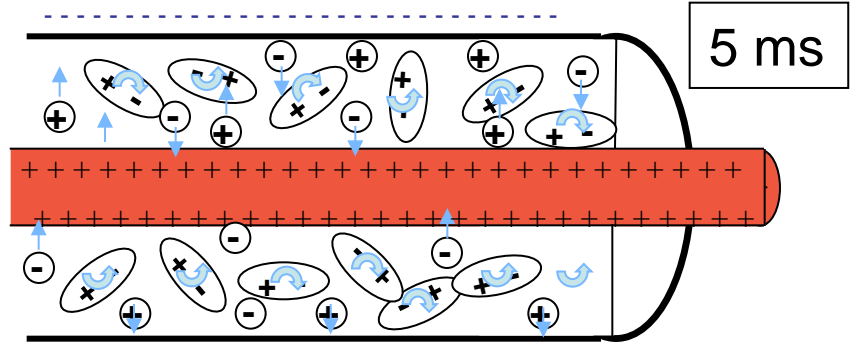
Ageing parameter and life time volume



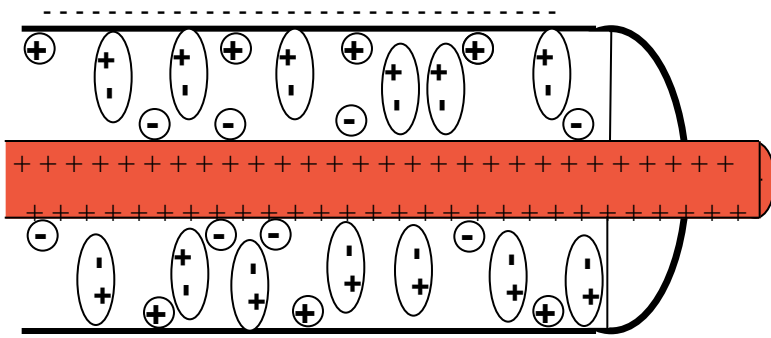
De-energized AC Cable



50 Hz AC Cable



DC Cable



Evaluation of electrical fields at triple points

Questions and comments

Specific for cables?

Methods?



Behaviour of DC cables operated in AC for flexible electrical systems

Questions and comments

System voltage change AC – DC - AC?

What are the determining parameters?

