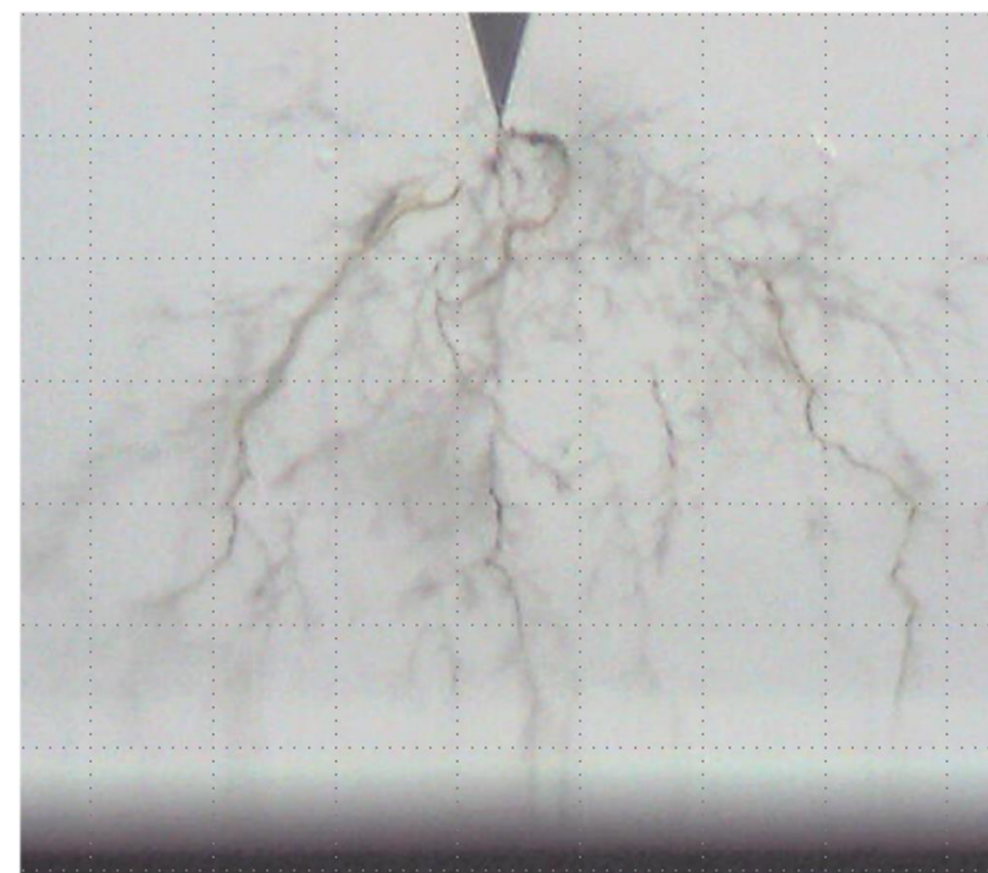


## Relevance of passive components

Passive components such as capacitors and PCBs are important basic components of an electrified society. In light of recent – and still ongoing – developments like electricity grid expansion, e-mobility and Industry 4.0, the demands on the reliability of passive components are increasing. Their wear process is dependent on multiple influencing factors. These influences trigger further damaging mechanisms, e.g. partial discharges.



Partial discharge through an insulation layer



Temperature



Voltage amplitude



Humidity



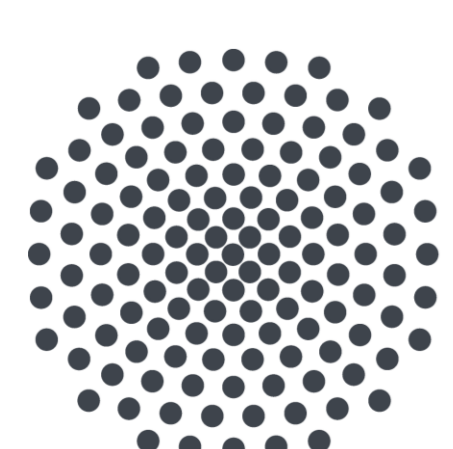
Switchings frequency



Electrical pre-ageing

## Research meets Industry

The project is being carried out in cooperation with the Institute of Power Transmission and High Voltage Technology (IEH), which is responsible for the test conduction. Further cooperation partners are companies from the German Federation of Industrial Research Associations (AiF). The project is funded by the BMWK.

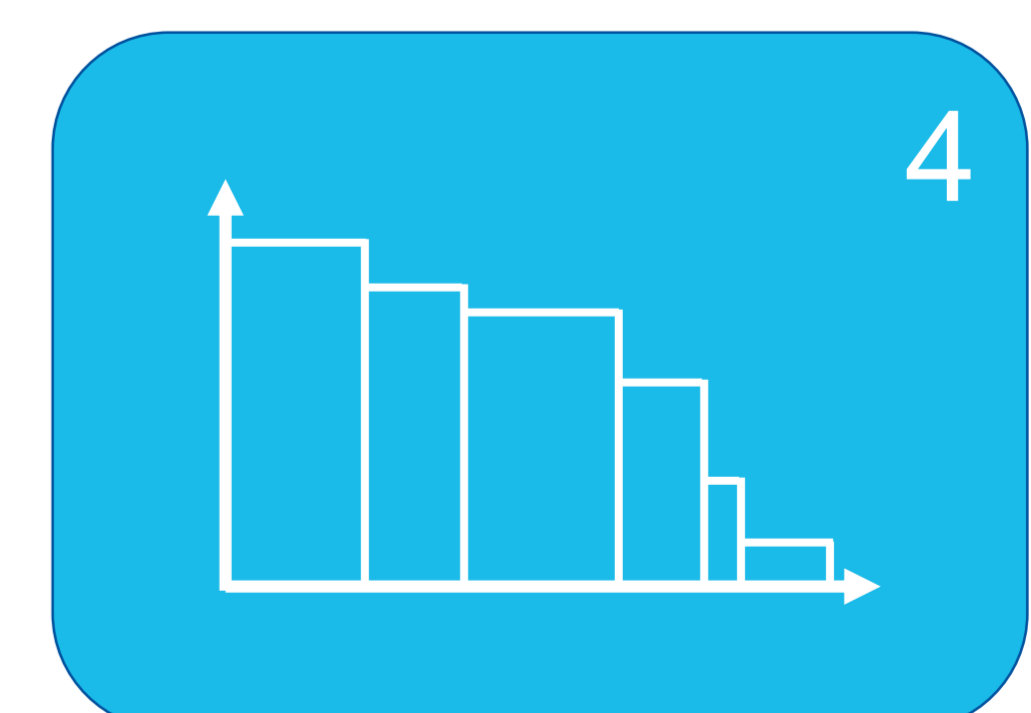
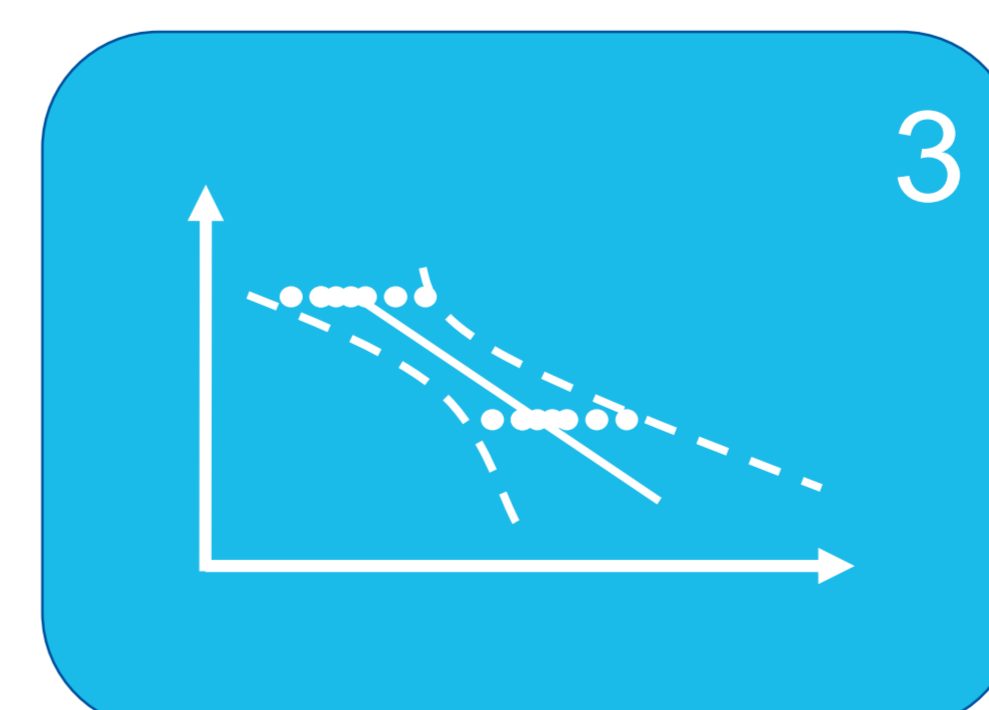
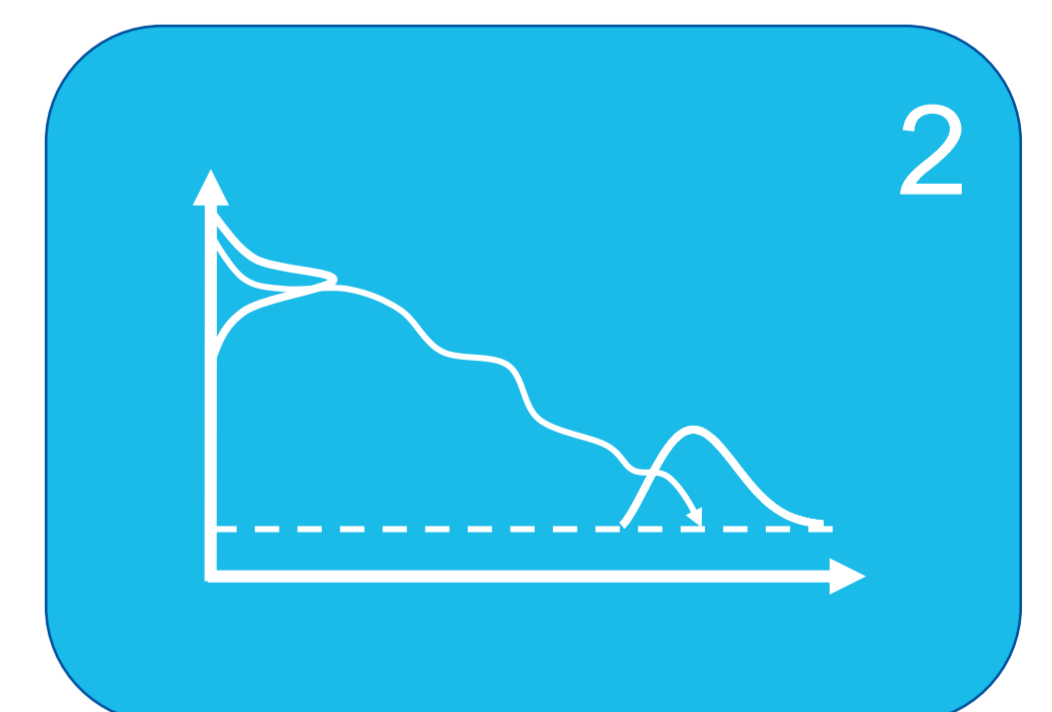
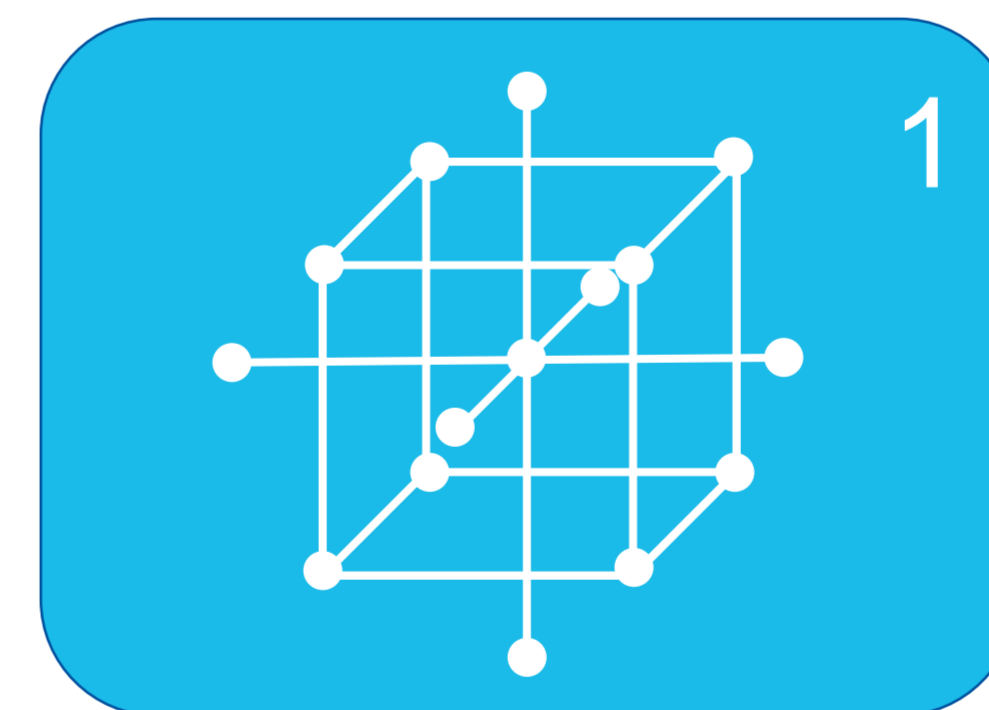


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## Lifetime model

The influence of varying environmental conditions and loads on passive components is mapped in an empirical lifetime model. In order to be able to generate this, careful statistical test planning (1) is required to derive a test plan which is based on DoE (Design of Experiments) principles. Utilizing degrading electric characteristics (2) within the framework of accelerated reliability tests (3), the test effort is reduced. The test bench results are used to parameterize a lifetime and degradation model. With this, it is possible to predict the lifetime and reliability of passive components on the basis of known field loads (4).



Gefördert durch:



Bundesministerium  
für Wirtschaft  
und Klimaschutz

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aufgrund eines Beschlusses  
des Deutschen Bundestages