LABORATORIES

- **Hydrogen and fuel cell laboratory**

  Investigation of electrically controllable fuel cell membranes
  Investigation of an internal methanation in the exhaust pipe of an electrolyzer
  Test benches for the development and investigation of new fuel cell and hydrogen technologies

- **Aircraft electrical on-board system laboratory**

  Analysis and evaluation of new power grid topologies and development of smart power management for aircraft electrical on-board power systems

- **Medium voltage laboratory**

  Investigation of the electric strength of power electronics up to 30 kV

- **Electric vehicles**

  Mitsubishi iMiev
  eSmart
  Segways
  eBikes

Prof. Dr.-Ing. habil. Detlef Schulz

NEIS Conference – international conference on sustainable energy supply and energy storage systems

neis-conference.com

Academy of Sciences and Humanities in Hamburg
Implementation of the Student Energy Lab

IEEE PES German Chapter

Associate of
Energy Research Network Hamburg

Partner of Cluster
Renewable Energies Hamburg

Research Network Energy – Power Grids

Research Association Wind Energy and other Distributed Energies – FGW e.V.

Network Hydrogen Economy Hamburg

Cooperation with research institutions and industrial companies

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Distributed Energy Laboratory
DLab
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Electrical Power Systems

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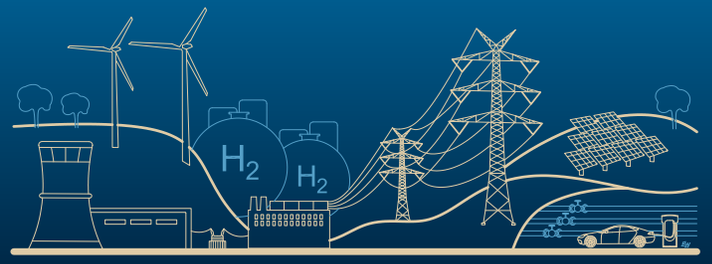




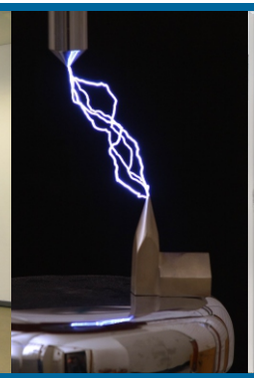

RESEARCH AREAS and scientific SERVICES

- **Electrical power grids**
  - Grid modeling and calculation
  - Network planning and operation
  - Design and operation of smart grids
  - Grid integration of distributed converters
  - Power Quality
  - Islanding detection in power grids
- **Grid identification by grid impedance measurement**
  - Modeling and simulation
  - Development of measuring instruments for low, medium and high voltage level
  - Implementation of on-site and off-site measurement campaigns
  - Application-specific measurement equipment
- **Electro-mobility**
  - Technical concepts and meta-studies
  - Investigation of infrastructure concepts
  - Integration into the electrical power grid
  - Connection requirements and alternative solutions
  - Charging infrastructure and management

RESEARCH AREAS and scientific SERVICES

- **Hydrogen and fuel cells**
  - Modeling and simulation
  - Investigation of infrastructure concepts
  - Future application scenarios of hydrogen
  - Fuel cells for aircraft applications
  - New types of internally controllable fuel cells
  - Development of internal methanation
- **Aircraft electrical on-board systems**
  - Modeling and concept development
  - Weight optimization of aircraft on-board networks
  - Power management
  - Future voltage levels
  - Switching and protection concepts
  - Fuel cells in flight operations
  - Usage and testing of 3-D additive manufacturing parts for electrical systems

www.hsu-hh.de/ees/en/research

LABORATORIES

- **Grid laboratory**

  Emulation and investigation of power systems and stand-alone grids with high share of renewable energies, as well as development of innovative grid protection devices

- **Wind energy laboratory**

  Test benches for the investigation of wind turbines with double-fed asynchronous machine and permanently excited synchronous generator

- **High voltage laboratory**

  Laboratory set-ups in a modular design for experiments with alternating current, direct current and withstanding voltage up to 140 kV, as well as measurement of partial discharge

- **Grid impedance measurement container**

  Development and validation of measuring instruments for the identification of frequency-dependent grid impedance for low voltage, medium voltage up to 20 kV and high voltage up to 110 kV