| Typ:	Bachelorarbeit (B) / Forschungspraktikum (FP) / Masterarbeit (M)
Thema:	Development and application of a FPGA-based partial discharge measurement system

Betreuer:	M. Sc. Müller, Stephan
Kontakt:	stephan.mueller@fau.de – Raum 1.134, LEES

Keywords: Partial discharge measurement, FPGA, High voltage test, RedPitaya

Description

One of the challenges in high-voltage (HV) engineering is the identification and quantification of partial discharges (PD). PDs are small electrical discharges occurring within insulating materials, indicating potential insulation degradation. PD measurement technology is an indispensable testing method to assess and ensure the quality of HV insulations. Although commercial test equipment is widely available, the aim of the thesis proposal at hand is to design a PD test system from scratch using the Redpitaya FPGA-SoC platform. The ultimate goal is to obtain an easily extendable, freely programmable, PD measuring system.
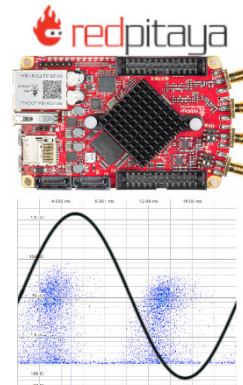
Scope

- Getting started with PD measurement and the pitfalls of high frequency, low current measurements in HV environments.
- Understanding of PD measurement systems and the various methods of charge estimation.
- Design and implement the PD measurement software on the RedPitaya STEMlab 125-14, which is already available at the Institute, using the quasi-peak detection method.
- Design and test calibration procedures, data flows and a GUI.

The scope of the thesis can be adjusted according to the type of the thesis (bachelor/master)

Requirements

- Independent, structured way of working.
- Solid programming abilities in Xilinx Vivado 2020.1 and C# or the willingness, stamina, and engineering skills to obtain these.

Datum: 03.11.2023