

Custom Partial Discharge Tester

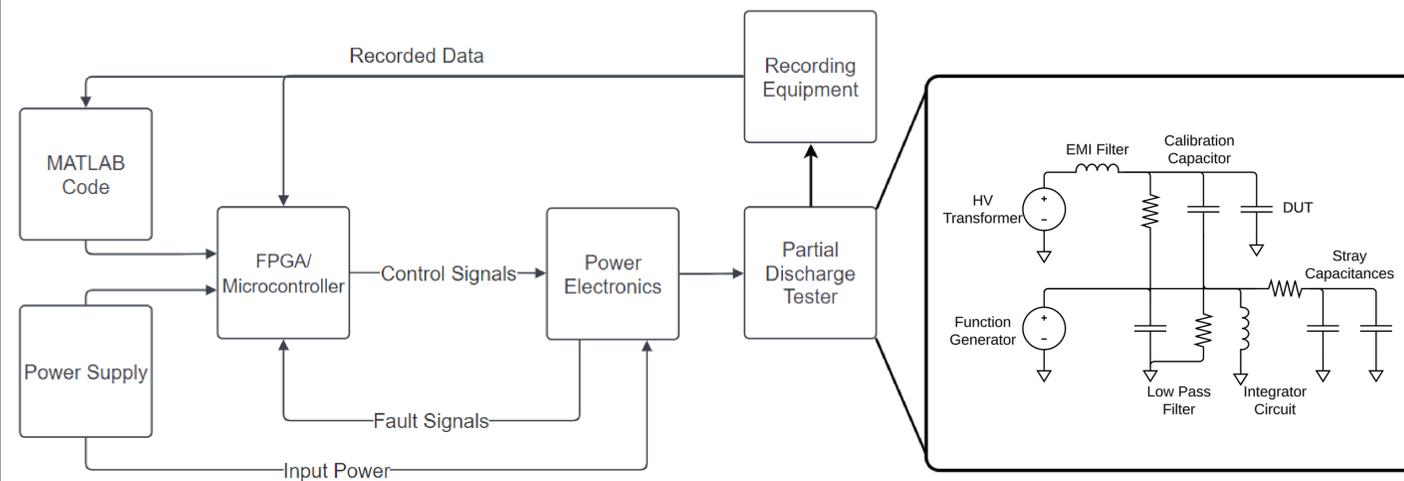
Problem and Solution

Routine testing of high voltage systems is important to ensure safety and reliability of components over time. Methods to test are expensive to buy or rent. A low-cost custom partial discharge tester can help solve this problem. This was the topic of my research conducted through the Engineering Undergraduate Research Scholars program.

Objectives:

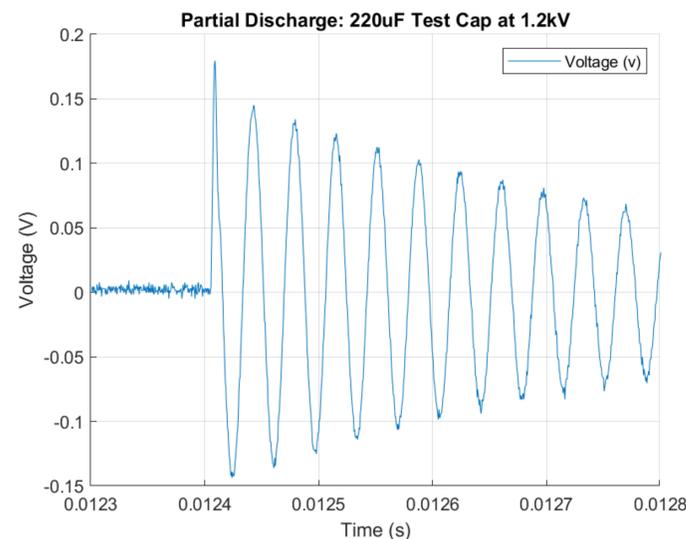
- Develop testing circuit of testing partial discharge of materials
- Investigate cost of materials and create test circuit
- Verify testing circuit does not produce corona up to 10kV
- Test materials/components up to maximum isolation voltage

System Diagram



Methods

- Developed testing circuit of testing partial discharge using vacuum tube capacitors to ensure a “corona free” testing circuit
- Utilized High Voltage transformer and variac to achieve voltages required for complete testing of different materials and components
- Used oscilloscopes and other testing equipment to capture partial discharge inception voltages



Conclusion

- Testing up to 3.5kV was achieved using vacuum tube capacitors
- System allowed for calibration as needed for accurate measurement of partial discharge spikes
- Continued research into impulse generation testing in conjunction with partial discharge testing will be necessary to show changes in partial discharge through material stressing and prolonged exposure
- Continued development of system can be made for routine testing of a variety of materials and components