

Master's thesis

Electro Static Detector (ESD) Shoes



Motivation

Since electro static discharge (ESD) is well known as a threat in the electronics industry and to electronic systems, the occurrence rate and severity of these small, but in nanoseconds rising currents of up to 100 A needs to be known. This determines the ESD stress, which can be expected by electronic devices in real life conditions. Selecting suitable protection devices, which withstand real discharge events is difficult due to the low number of existing data sets on actual ESD. Providing such a data set which combines the occurrence-rate and probability distribution of the voltages can help manufacturers of electronic devices to protect their devices suitable for the real use case.

Research topic

A system that can record the field strength between a foot and the ground allows to quantify the voltage and can detect discharges by a sudden change in field strength. To realize this, one can implement a field sensor into a shoe, record and analyze data. We envision that it contains the following main building blocks:

- One or multiple electric field sensor. A bandwidth of 10 MHz is sufficient
- A/D conversion
- Limited data processing within a microcontroller
- Communication, e.g., Bluetooth, Wifi

The system should be battery powered with a form factor that enables the integration into a shoe and will be calibrated by actual ESD.

Organizational matters

- Start: as soon as possible
- Workplace: at the institute

Contact/Supervision

IFE: David Pommerenke (david.pommerenke@tugraz.at)