



## **Capacitive Soil Moisture Sensor for Plant Watering**

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How can you realize a water saving and demand-driven plant watering device?

To achieve this you need a sensor, which precisely detects the soil moisture. Designing such a sensor is the topic of this poster. We approached this subject with comparing several physical properties of water, e.g. the conductivity, permittivity, heat capacity and the soil water potential, which are suitable to detect the soil moisture via an electronic device.

For our project we have developed a sensor device, which measures the soil moisture and provides the measured values for a plant watering system via a wireless bluetooth 4.0 network. Different sensor setups have been analyzed and the final sensor is the result of many iterative steps of improvement. In the end we tested the precision of our sensor and compared the results with theoretical values. The sensor is currently being used in the Botanical Garden of the Friedrich-Alexander-University in a long-term test. This will show how good the usability in the real field is. On the basis of these findings a marketable sensor will soon be available.

Furthermore a more specific type of this sensor has been designed for the EU:CROPIS Space Project, where tomato plants will grow at different gravitational forces. Due to a very small (15mm x 85mm x 1.5mm) and light (5 gramm) realisation, our sensor has been selected for the space program. Now the scientists can monitor the water content of the substrate of the tomato plants in outer space and water the plants on demand.