

Landelijke Natuurkunde Practicumdag (24 januari 2020, Amsterdam)

Abstract for workshop

### **Smartphone apps in physics practicals**

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Smartphones are ubiquitous nowadays and each smartphone (and tablet) is equipped with at least an acceleration sensor so it can rotate the image on the screen in such a way that it is always upright. But many smartphones have more sensors, like a gyroscope, a light sensor, a GPS receiver, a magnetic field sensor, a proximity sensor and a pressure sensor. Every smartphone has a camera and microphone/loudspeaker as well. Whatever the manufacturer's intent, these sensors can be used to observe physical phenomena and measure physical quantities, ranging from for instance infrared rainbows and fourier analysis of sound to detection of cosmic particles. To this end many apps are already available for measuring a single quantity or several quantities simultaneously. Many apps can store data for later analysis (external to the smartphone), but live analysis is also possible, providing more insight into what is happening.

In this workshop some examples of smartphone measurements will be given. In our course Electricity and Magnetism, one of the three more traditional practicals has been replaced with the assignment for students to measure magnetic fields of objects or phenomena at home or in the outdoors and our experiences with this will be discussed. Additionally experiences with students using apps in the Physics Project Practical or in a short homework assignment will be presented.

But since all this is still work in progress for us, your input will be a valuable contribution to this workshop. Therefore please share your information, thoughts and experiences during the workshop. Hopefully we can discuss some practices and see what works well and what may be does not.