

# Even more Physics experiments using your smartphone



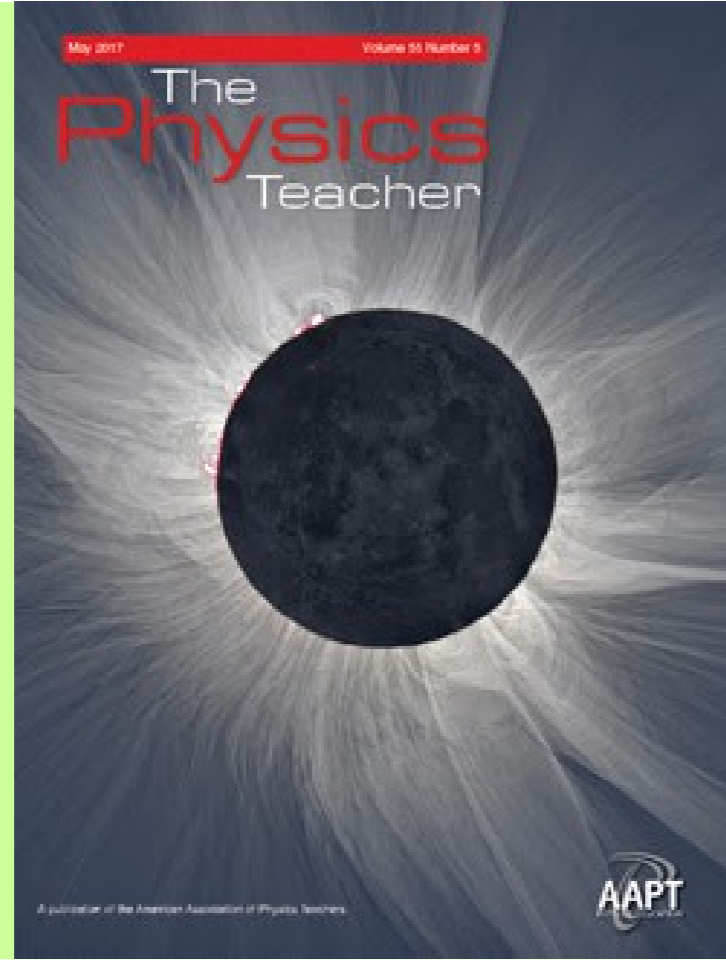
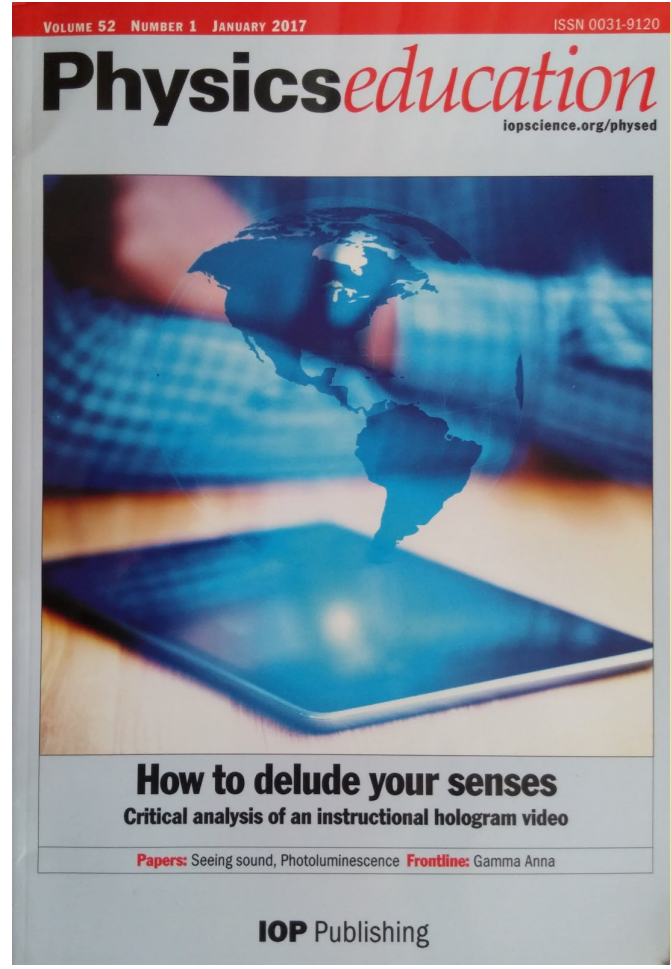
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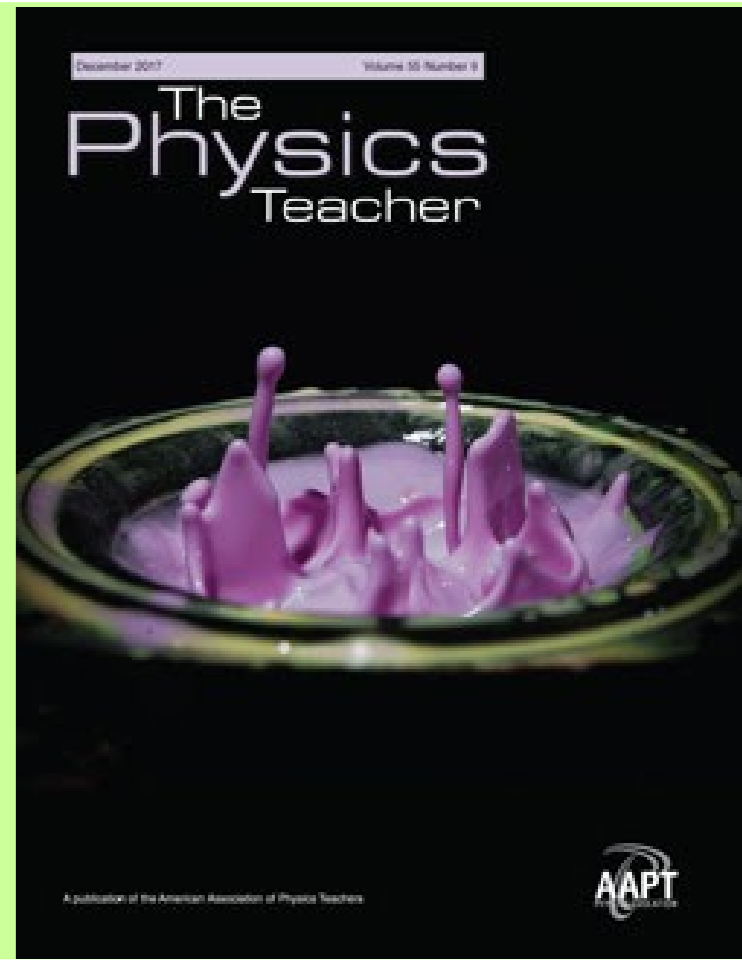
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Smartphones usually incorporate several sensors.

BYOD - Bring your own device, every time and everywhere.

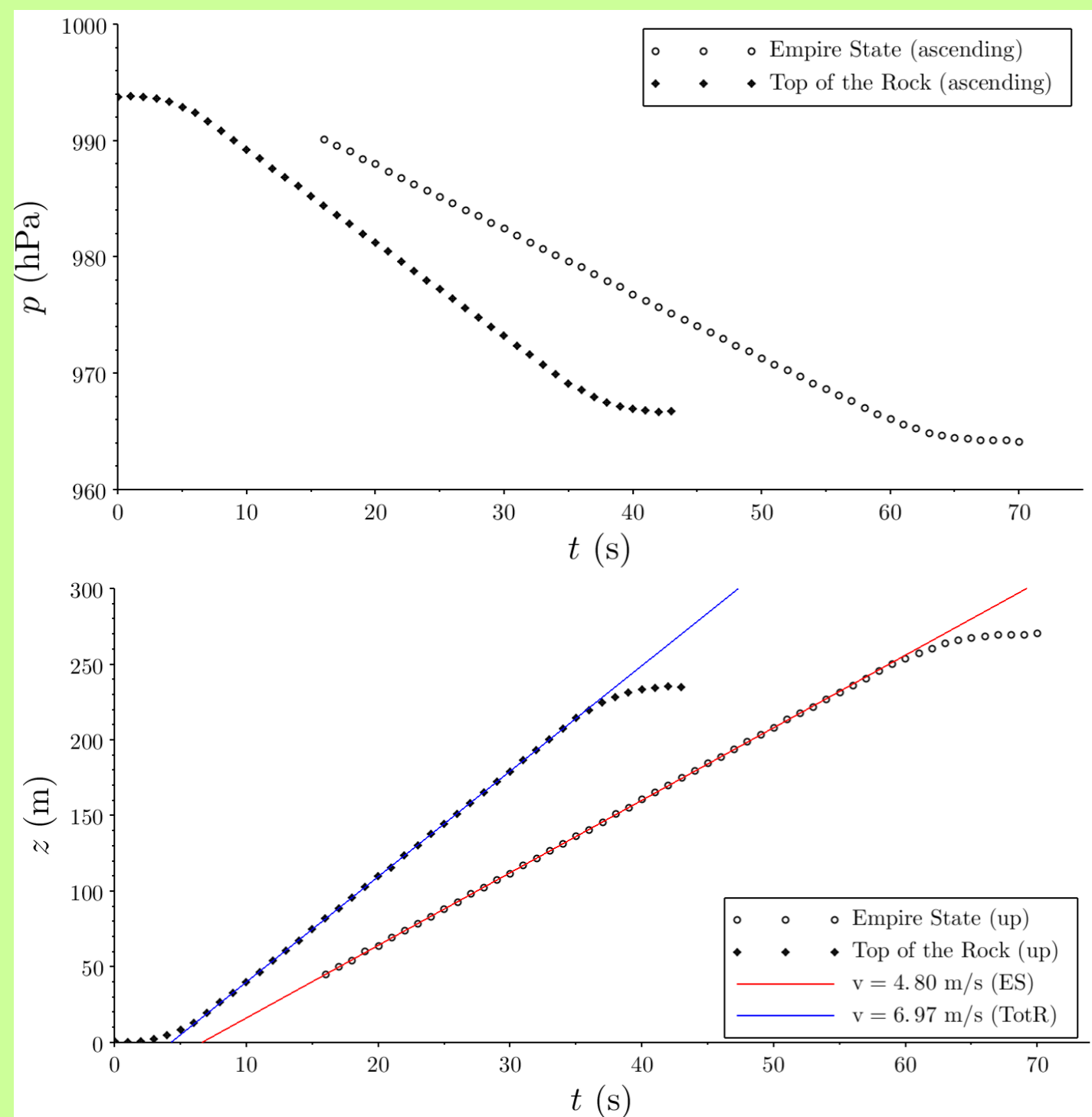
Experiments with smartphones can be easily performed in non-traditional places as playgrounds, gyms, travel facilities, among many others.



## KINEMATICS & HIDROSTATICS: VERTICAL VELOCITIES OF ELEVATORS

PRESSURE SENSOR (BAROMETER)

Measuring height and speed by means of atmospheric pressure change.

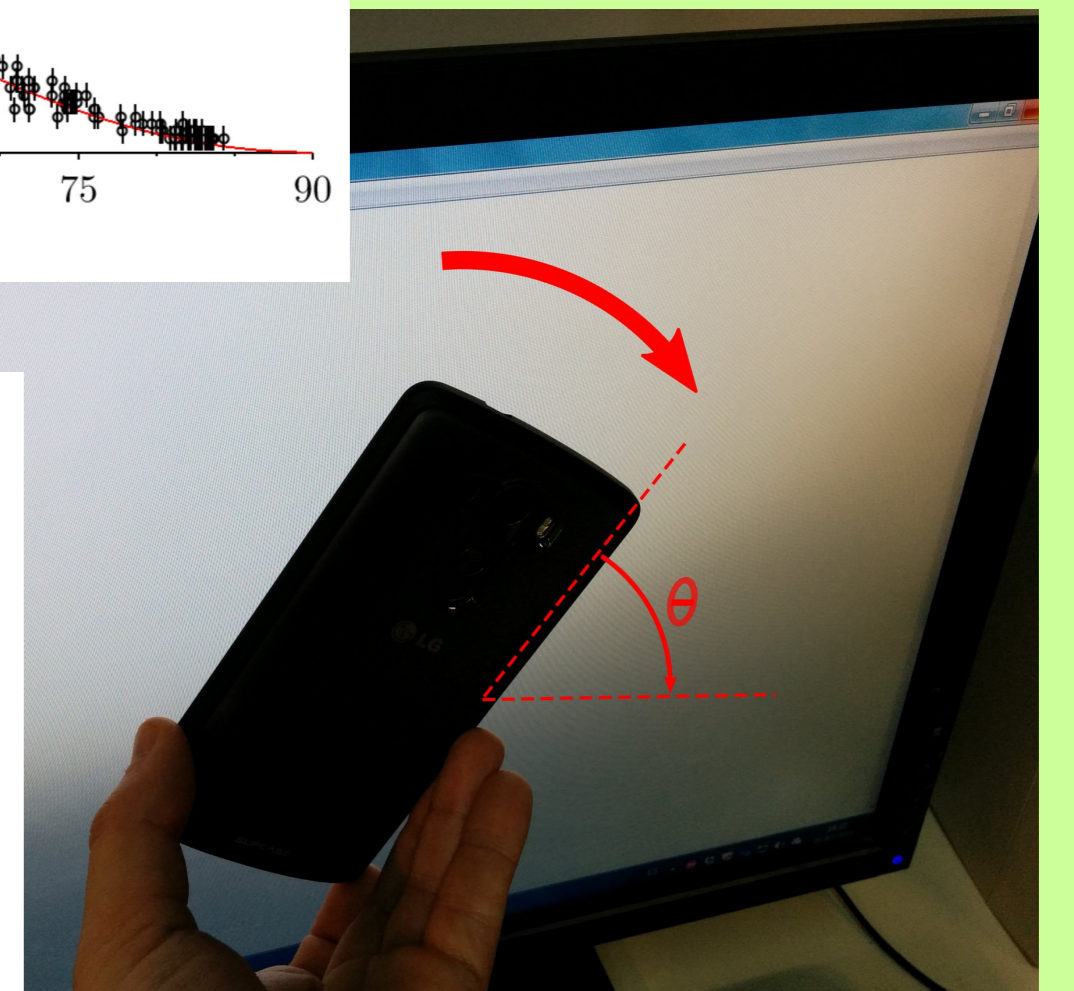
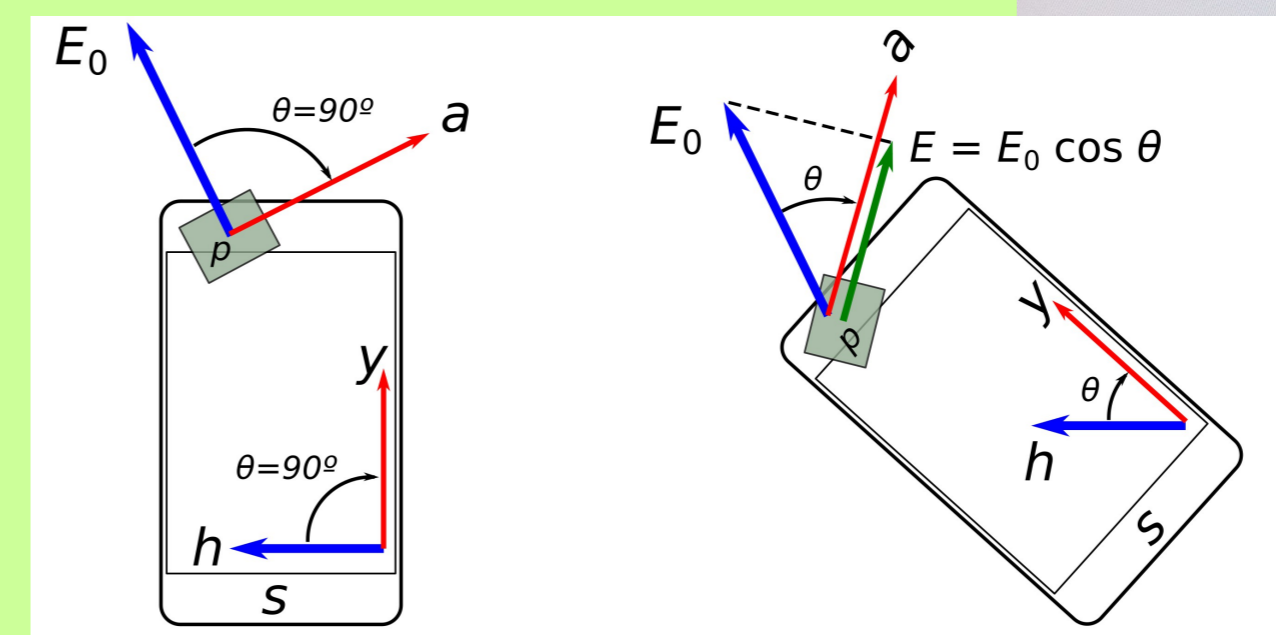
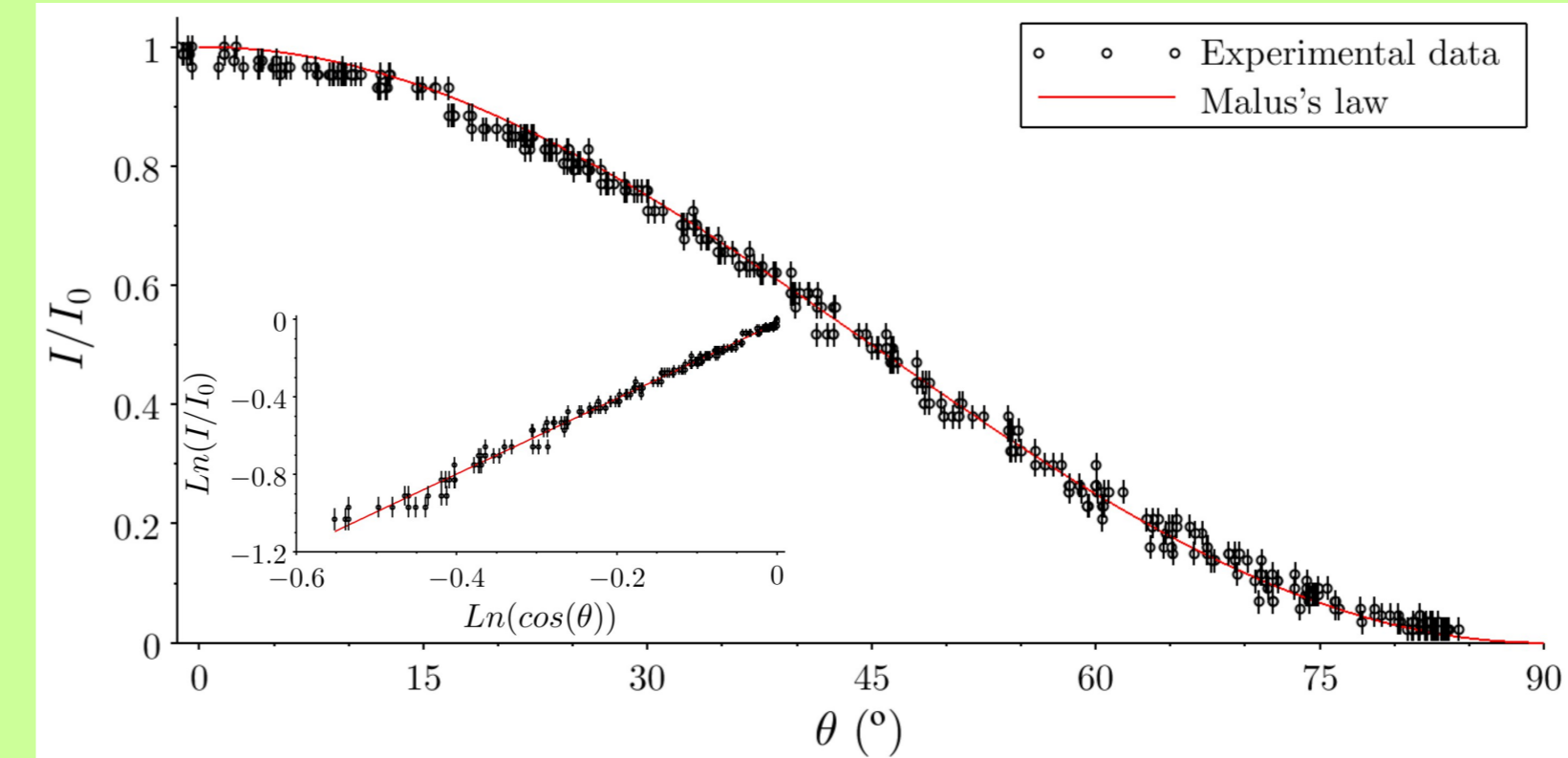


Martín Monteiro and Arturo C. Martí (2017)  
"Using smartphone pressure sensors to measure vertical velocities of elevators, stairways, and drones"  
*Physics Education*, 52(1), 015010.

## OPTICS: POLARIZATION OF LIGHT

SIMULTANEOUS USE OF LIGHT SENSOR AND ORIENTATION SENSOR

Verification of a fundamental law about the nature of light.

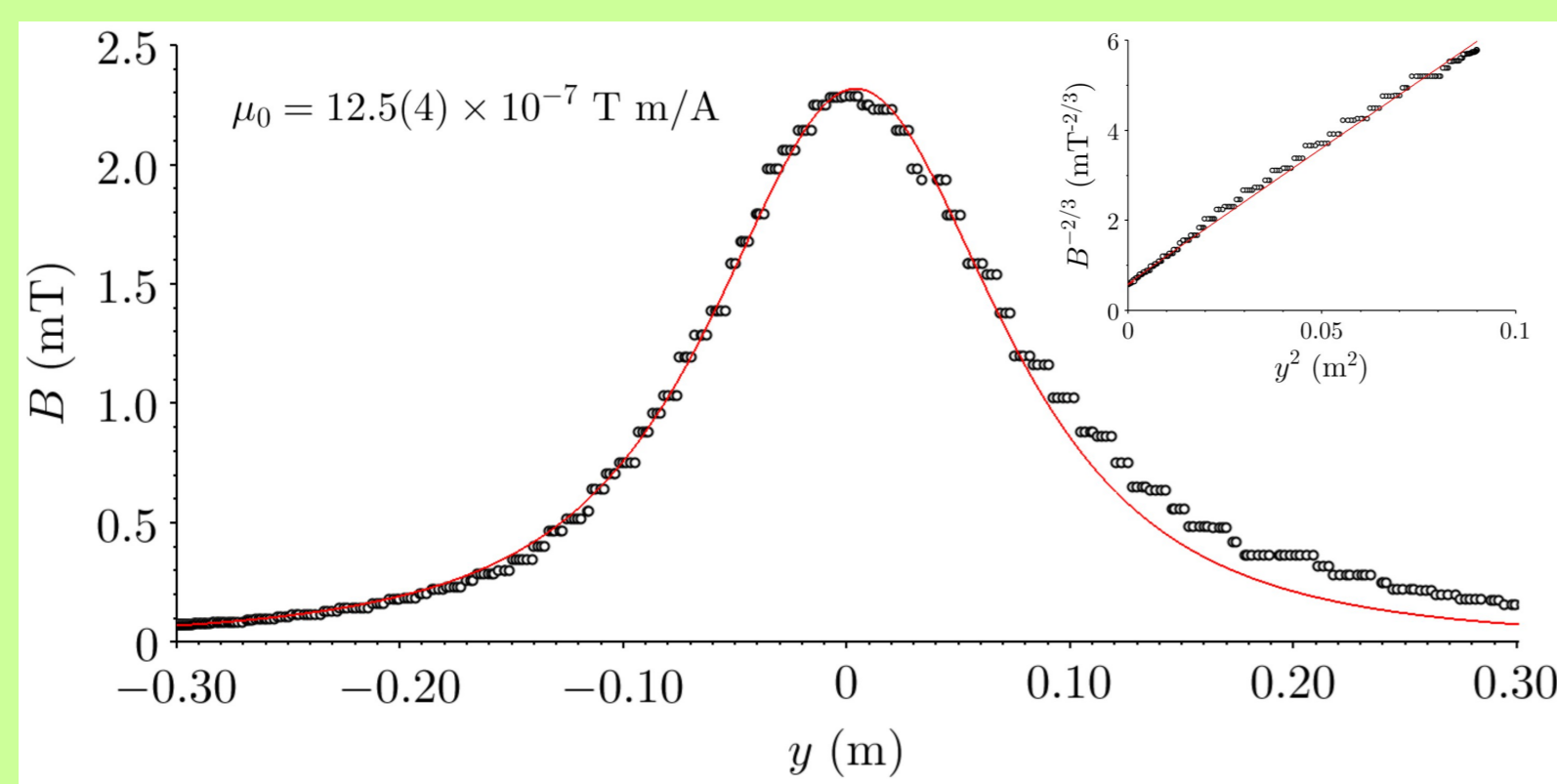


Martín Monteiro, Cecilia Stari, Cecilia Cabeza and Arturo C. Martí (2017)  
"The Polarization of Light and Malus' Law Using Smartphones"  
*The Physics Teacher*, 55(5), 264.

## ELECTROMAGNETISM: MAGNETIC FIELD OF COILS

SIMULTANEOUS USE OF MAGNETOMETER AND ACCELEROMETER

Magnetic field as a function of the distance obtained by integration of the acceleration.

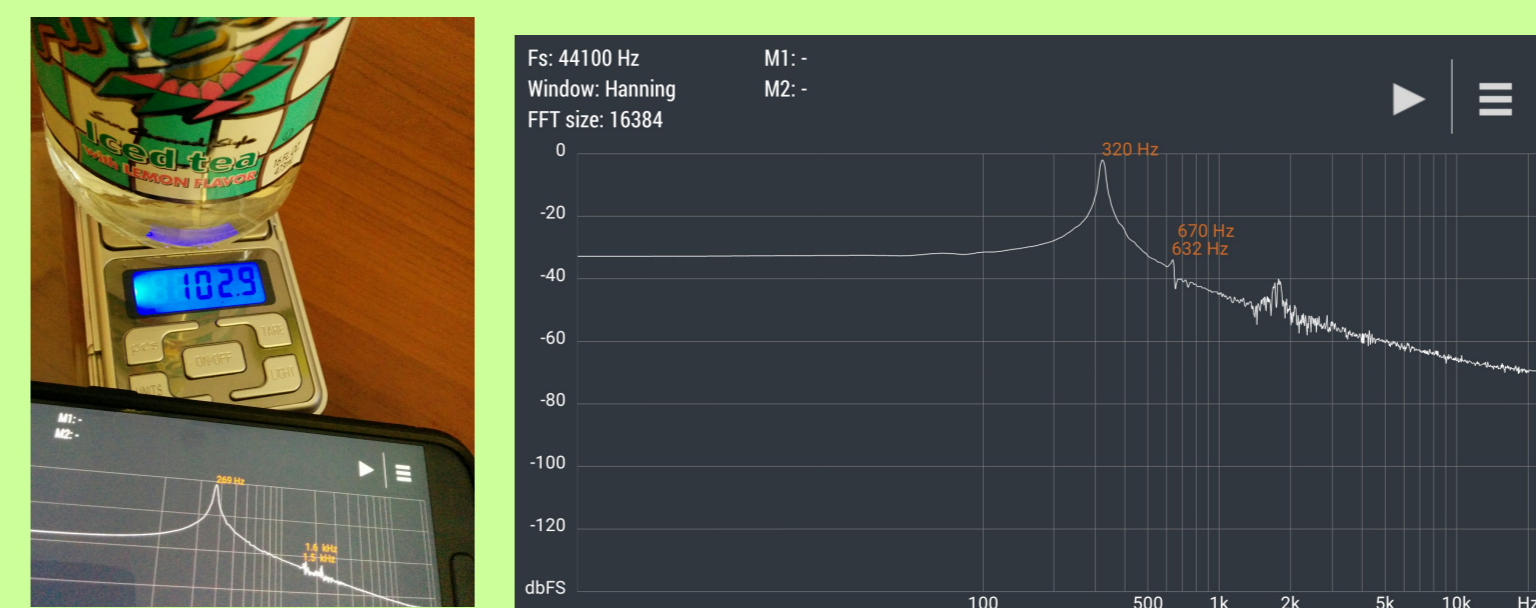
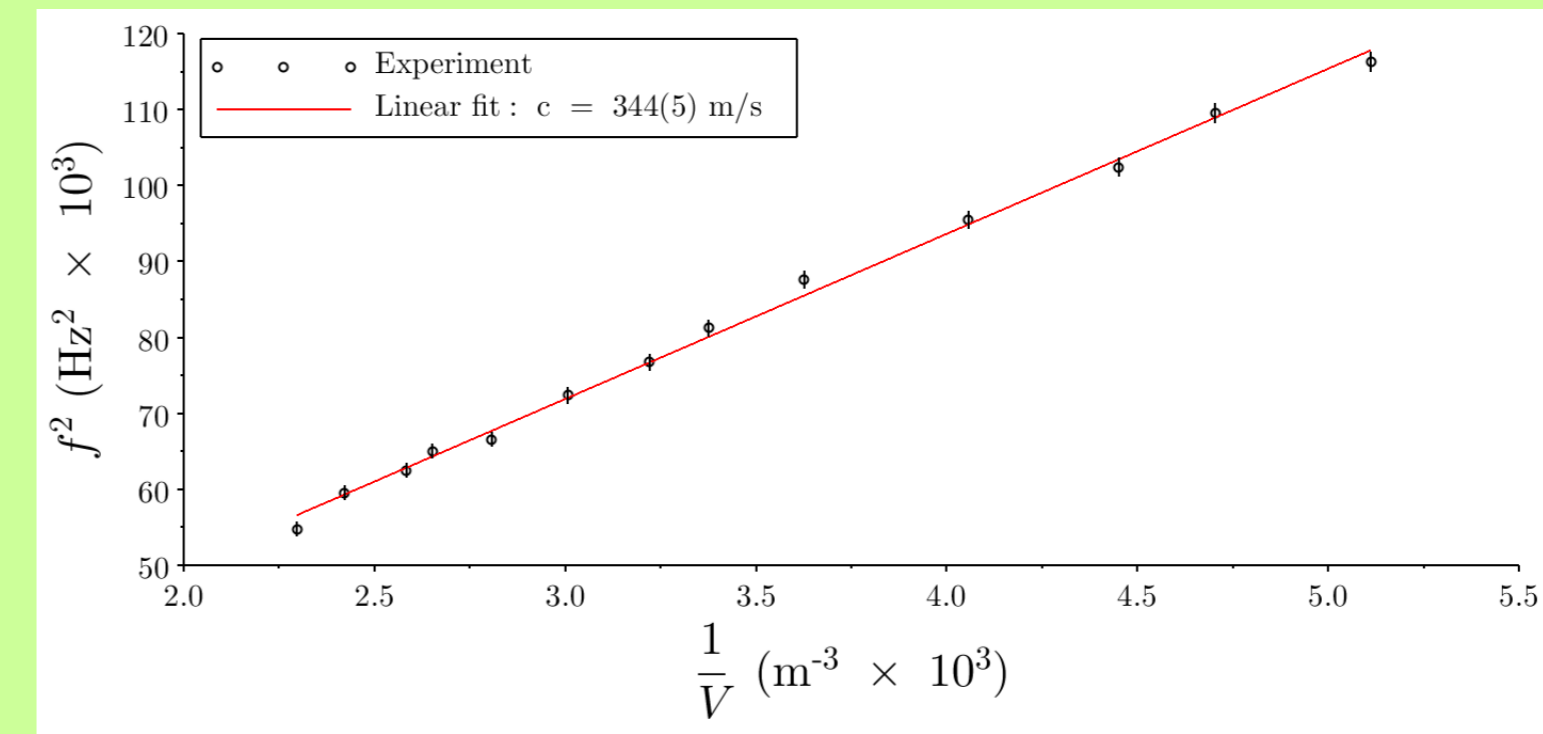


Martín Monteiro, Cecilia Stari, Cecilia Cabeza and Arturo C. Martí (2017)  
"Magnetic field 'flyby' measurement using a smartphone's magnetometer and accelerometer simultaneously"  
*The Physics Teacher*, 55(9), 580.

## ACOUSTICS: HELMHOLTZ RESONATOR

SMARTPHONES AS SOUND SPECTRUM ANALYZERS

Pocket computers that are able to perform real-time FFT to analyze sound.



Martín Monteiro, Cecilia Stari, Cecilia Cabeza and Arturo C. Martí (2018)  
"A bottle of tea as a universal Helmholtz resonator"  
*arXiv preprint*: 1805.04014

Additional information:

<http://smarterphysics.blogspot.com>

