

Abstract Submitted  
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**Low-cost handheld filter spectrometer for water quality measurements** THEODORE A. CORCOVILOS, Dept. of Physics, Duquesne University, Pittsburgh, PA 15282 USA, ERIN BAIR, Dept. of Chemistry and Biochemistry, Duquesne University, Pittsburgh, PA 15282 USA, THOMAS R. AUMER, SPENCER GRAVES, Dept. of Physics, Duquesne University, Pittsburgh, PA 15282 USA, MICHAEL J. VAN STIPDONK, Dept. of Chemistry and Biochemistry, Duquesne University, Pittsburgh, PA 15282 USA — Many common chemical sensors for environmental contaminants are based on a change in optical absorbance. The gold standard for measuring optical absorbance is UV/VIS spectrometry, but this typically requires an expensive bench-top instrument. Here we present a handheld low resolution filter-based spectrometer that measures optical absorbance in six wavelength bands of the visible spectrum, built for less than \$100. This is sufficient to quantify the absorbance of several common color-based chemical sensors used for the detection of contaminants in water. We demonstrate our device by measuring fluoride concentrations in drinking water samples using an EPA-approved protocol (EPA-NERL 340.1) and show that our 6-channel device outperforms single-wavelength photometric measurements taken with an industry-standard commercial photometer in both detection threshold and sensitivity.

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