

## A SIMPLE, COST EFFECTIVE RAMAN-FLUORESCENCE SPECTROMETER FOR USE IN LABORATORY AND FIELD EXPERIMENTS

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Research, design, construction, and operation of a portable mixed Raman and Fluorescence type spectrometer implemented by the Missouri University of Science and Technology's Mars Rover Design Team will be presented. This spectrometer has been built for the team's annual competition. The spectrometer, completely built by undergraduates, is designed to use a 50 mW, 532 nm constant waveform laser to probe a sample of soil to find bacteria or bio-markers. However, initial tests of the spectrometer were carried out in a laboratory environment making the spectrometer also suitable for simple undergraduate physical chemistry or chemical physics laboratory experiments. The final cost of the device is roughly \$2100, weighs 1.4 kg, and is 22.9 cm x 22.6 cm in size. Integrating the spectrometer with a computer database, results from the competition, complications of fitting mixed Raman-Fluorescence spectra, and future ideas/improvements will also be discussed.

