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Recent advances in the use of laser-induced breakdown spectroscopy (LIBS) as a rapid point-of-care pathogen diagnostic[1] STEVEN REHSE, DANIEL TROJAND, RUSSELL PUTNAM, DEREK GILLIES, RYAN WOODMAN, KHADIJA SHEIKH, ANDREW DAABOUS, Department of Physics, University of Windsor, Windsor, Ontario, Canada — There is a well-known and urgent need in the fields of medicine, environmental health and safety, food-processing, and defense/security to develop new 21st Century technologies for the rapid and sensitive identification of bacterial pathogens. In only the last five years, the use of a real-time elemental (atomic) analysis performed with laser-induced breakdown spectroscopy (LIBS) has made tremendous progress in becoming a viable technology for rapid bacterial pathogen detection and identification. In this talk we will show how this laser-based optical emission spectroscopic technique is able to sensitively assay the elemental composition of bacterial cells in situ. We will also present the latest achievements of our lab to fully develop LIBS-based bacterial sensing including simulation of a rapid urinary tract infection diagnosis and investigation of a variety of autonomous multivariate analysis algorithms. Lastly, we will show how this technology is now ready to be transitioned from the laboratory to field-portable and potentially man-portable instrumentation. The introduction of such a technology into popular use could very well transform the field of bacterial biosensing – a market valued at approximately $10 billion/year world-wide.

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