

## ***Micro-Raman spectroscopy of single bacterial cells***

**Petra Rösch<sup>1</sup>, Stephan Stöckel<sup>1</sup>, Susann Meisel<sup>1</sup>, Anja Boßecker<sup>1</sup>, Angela Walter<sup>1</sup>,  
Valerian Ciobota<sup>1</sup>, Wilm Schumacher<sup>1</sup>, Jürgen Popp<sup>1), 2)</sup>**

<sup>1)</sup> Institute of Physical Chemistry, Friedrich-Schiller-Universität Jena, Helmholtzweg 4,  
D-07743 Jena, Germany.

<sup>2)</sup> Institute of Photonic Technology Jena, Albert-Einstein-Straße 9, D-07745 Jena, Germany

Bacterial identification is a critical subject in various medical and hygiene fields. Here, a fast and reliable identification is required, since time delay may lead to either a delay in appropriate medication or to high cost due to spoiled products or even the shutdown of the assembly line. The identification of bacteria without the need of cultivation would be a timesaving technique.

Lately the application of micro-Raman spectroscopy on single bacteria cells fulfills this requirement of a fast analysis method without prior cultivation step [1]. In this field various approaches for both vegetative cells [2] and endospores [3] were successful. Nevertheless, single cell analysis leads to its own technical challenges, since the bacterial cells have to be localized in complex matrices prior to the identification step.

This localization step can be performed by active fluorescence staining as long as the fluorescence dye do not absorb in the range of the Raman excitation laser. Still the Raman spectra of fluorescence labeled bacteria can be used for identification [4]. This approach not only allows for the localization of bacteria inside complex matrices like e.g. soil samples but also to differentiate between living and dead microorganisms which is essential for medical applications.

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