

POSEIDON: Plasmonic-based automated lab-on-chip Sensor for the rapid In situ Detection of LegiONella

Roberto Pierobon¹, Bruno Bellò², Isella Vicini³, Massimo Rinaldi³

¹Veneto Nanotech, Italy ²CLIVET Spa, Italy

³Warrant Group, Italy

e-mail: roberto.pierobon@venetonanotech.it

The POSEIDON project adopts a multidisciplinary approach involving key enabling technologies (KET) in photonics, aiming at the exploitation of the Surface Plasmon Resonance (SPR) phenomenon to develop a fully automated platform for fast optical detection of *Legionella pneumophila* pathogens. SPR sensors provide an extremely sensitive and versatile tool for miniaturized label-free sensing platforms integrated into lab-on-chip systems for potential applications in environmental monitoring, biotechnology, medical diagnostics, drug screening, food safety and security [Ref 1]. Detection and investigation of viruses, bacteria and eukaryotic cells is nowadays becoming a rapidly growing field in SPR biosensing [Ref 2], but the detection was only achieved in laboratory settings. In this project an innovative sensing device architecture will be used to create a platform to yield reliable measurement readouts of legionella bacterial cells that would be driven and entrapped on a custom sensing surface specifically designed with opportune positive and negative controls. The detection platform will be implemented as a prototype in which water and air samples are sequentially concentrated, injected into a microfluidic system, and delivered to the SPR sensor for analysis. The system will be designed to allow for its future integration in water distribution and HVAC (heating, ventilation and air conditioning) for prevention of *L. pneumophila* outbreaks.

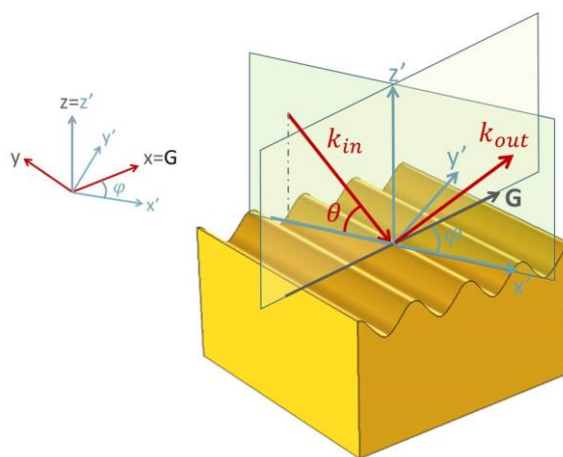


Fig.1 Scheme of the SPR sensing platform of POSEIDON project. The classic GC-SPR detection ($\varphi=0^\circ$) and the azimuthally controlled GC-SPR detection ($\varphi\neq 0^\circ$) are shown.

References

1. Homola et al., Chem. Rev. 108, 462–493 (2008).
2. Abadian et al., Anal Chem. 18; 86(6):2799-812 (2014).