

# Ultra-fast and Ultra Sensitive Multiplexed Pathogen Detection

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In recent years the IoF has described in over 150 peer-reviewed publications and 2 books, the favorable interactions and outcomes of both plasmon supporting particles and substrates with fluorophore / luminophore excited states. These favorable effects have included enhanced fluorescence emission from singlet states,  $S_1$  and  $S_2$ , (MEF), as well as enhanced phosphorescence yields from triplet,  $T_1$ , states (MEP). In addition, we have observed and described plasmon enhanced chemiluminescence intensities (MEC), as well as highly directional emission from continuous thin films (SPCC and SPCF) to name but just a few.

These favorable influences on the photophysical properties of close proximity excited states (fluorophores) to plasmon supporting particles has led to a wealth of biochemical applications, most notably for the *ultra fast* and *sensitive* multiplexed detection of pathogens, with little to no up-front sample preparation. Our Microwave-Accelerated Metal-Enhanced Fluorescence (MAMEF) technology can detect < 10 copies of a pathogen within 20 seconds, which is significantly faster than the gold standard PCR approach.

In this presentation, we describe recent progress with the MAMEF technology and show how Bacillus Anthracis spores, STD organisms such as Chlamydia Trachomatis, Listeria and Salmonella can be detected at the 1 CFU/ml sensitivity level, also within 20 seconds.