Airborne Contamination Detection via Optical Waveform Matching

Advantages
• Enables selective contaminant testing
• Features sensitive and conclusive detection

Invention
The invention represents a method for the detection of airborne contaminants by means of optical correlation between a known target response and the sample of question. By spectrally shaping a broadband probe source, this technology may selectively test for specific agents over a broadband range of wavelengths.

Background
In today’s world, airborne chemicals and biological agents, both innocent and malicious, pose real threats to the health and security of citizens. Whether by militant action or through pollution, the ability to test air quality for contamination has become very necessary. Since many harmful agents are effective in small doses and can vary in only minor ways from safe ones, sensitivity and selectivity are critical features that any proposed air sensor must exhibit.

Every molecule vibrates when light of certain wavelengths shine upon it, and each molecule has a different resonant wavelength or set of wavelengths which act as a spectral fingerprint. This is the basis of spectroscopy, and researchers at UCF have developed a very accurate method for detecting airborne contamination based on this physical truth. By collecting a library of target ‘fingerprints’ in the way of reflected waveform spectra, the proposed system may hit a test sample of air, match spectra and determine if the target molecules are present with both high sensitivity and selectivity.

Application
The market for high quality air quality testing devices has grown quickly since fear of attack and awareness of pollution has grown around the world. Customers of this technology will be defense and security agencies as well as environmental regulation and remediation organizations.

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