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Microplasmas for Clinical Breath Analysis PAUL MAGUIRE, JAMES GREENAN, CHARLES MAHONY, JAMES MCLAUGHLIN, DAVIDE MARIOTTI, NIBEC, University of Ulster — Breath analysis is receiving increased attention for clinical diagnosis and microplasmas may offer scope as a lab-on-chip sensor for point of care diagnostics. However metabolite detection and recognition is an extremely challenging problem and will require robust high intensity sources and advanced signal analysis. Using parallel-plate devices and neural nets we previously established distinguishability for various stages of asthma [1, 2]. We present recent systematic analysis of gas detection capability using high intensity RF and DC sources. Data was obtained from optical (visible) emission spectra, infra-red emission spectra (NIR - MIR) and from VI spectra in various current modes at atmospheric or low pressure (<50T) conditions. A number of data analysis techniques were studied in order to determine the most suitable strategies for pattern recognition.

- [1] Hyland, M. et al., Applications & Science of Neural Networks, Fuzzy Systems, and Evolutionary Computation (III) **4120** (2000) 246-252
[2] Mariotti D et. al., Plasma Sources Sci. Technol. **13** (2004) 207–212.

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