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**Use of plasma sensors combined with artificial intelligence in the diagnostics and monitoring of plasma processes.** MICHAEL HOPKINS, CLIODHNA HARRISON, PAUL SCULLIN, DAVID GAHAN, Impedans Ltd. — In processes using plasma the general practice is to use limited diagnostics to analyze the plasma in the development phase. Plasma measurement is not generally used to monitor the process during production when the plasma is manufacturing product. The main reason appears to be linked to the cost and complexity of the plasma measurement systems. With the growth of big data there is a renewed interest in applications where internet enabled sensors are deployed to monitor the performance of high cost capital equipment and improve productivity and reduce cost. In this paper we examine data measured from plasma processes and analyzed automatically. The measurement data is combined with context data which defines the state of the plasma processes, type of chamber, gas type, pressure, power and any other relevant parameter. The data is collected and stored in a data base. Software scripts can read the data base and display the data using complex visualization techniques. A model of each process is developed and stored. Subsequent out of sample data is then analyzed, stored and an automatic report generated describing the plasma state and any deviation from expected values. The report is designed to be read by an engineer, who is not necessarily a plasma expert and contains text and graphs. This is an attempt to create an expert system to implement plasma diagnostics as part of routine monitoring of plasma processes. We will outline in more detail the concept and techniques and report our initial outcomes and show examples of the reports generated.

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