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Wireless sensor technology for in-situ plasma process monitoring

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There is an increasing demand for plasma measurement and control solutions to cope with the growing complexity of integrated circuit manufacture in the semiconductor industry. Standard plasma diagnostic instruments used in research, such as the Langmuir probe, are not suitable for use in the production environment for myriad reasons – contamination of the process being one of the main concerns. Silicon wafer based wireless sensors, which measure temperature during the process, have gained the most traction with tool manufacturers and chip makers – albeit during process development or the PM cycle rather than live production. In this presentation we will discuss two novel wireless technologies that have the potential for use in process tools. The first is an ion detector embedded in a silicon wafer. The sensor measures the average ion flux and the maximum ion energy during the process. This information is stored and is downloaded later for analysis. The second technology consists of a wireless sensor that sits inside the process and communicates data in real time to a detector installed on the rf power line. This platform is similar to RFID technology and can be combined with various sensor types to transmit data to the user during the process.