



## **MIGRATEWS2016-KEYNOTE LECTURE-2**

### **GAS ANALYSIS IN HIGH AND ULTRAHIGH VACUUM USING QUADRUPOLE MASS SPECTROMETERS**

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#### **ABSTRACT**

Most common instruments for determination of gas composition in vacuum systems are quadrupole mass spectrometers (QMS). Such instruments are widely used in research and science, and also in industry in demanding technologies to control low pressure gas environment. Another application is leak detection.

In the talk the operation of QMS and its important metrological characteristics will be presented. QMS uses electron impact ionization to create gas ions which are then filtered according to their mass to charge ratio by a quadrupole mass filter. For different applications different types of ion sources are available. The quadrupole mass filter must operate in high vacuum to enable collisionless transport of ions. Many processes are performed at much higher pressures. Methods for gas sampling with QMS up to atmospheric pressures will be discussed.

Experience with the use of QMS showed its relatively poor time stability. For accurate quantitative measurements the QMS shall be regularly calibrated. Methods for in-situ calibration for partial pressure and partial gas flow measurement will be presented.