

Development of a MEMS Mass Spectrometer Based on TOF Architecture for Gas Analysis

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The main purpose of our project is to develop a small dimensions mass spectrometer for gas analysis suitable for harsh environment on the field applications. The mass spectrometer will be connected to a gas micro-chromatograph that has been developed specially for this project. Due to their high operating rate, Time Of Flight (TOF) mass spectrometers have been used efficiently in gas analysis. In its basic form, TOF architecture is made of an ion source, an acceleration zone and a drift zone where ions are separated by the ratio of mass to charge (m/z). Some parasitic dispersion, such as ion's energy dispersion or ion's spatial dispersion, could reduce drastically the mass spectrometer's global performances. The TOF architecture's efficiency could be enhanced by adding a reflectron. It is a challenge to downscale the electrostatic mirror and design it using MEMS technology.