

# New Structures and Measurements of a Planer Integrated Micro Mass Spectrometer (PIMMS) with Integrated Micro-Channel

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New measurements with a planar integrated micro mass spectrometer (PIMMS), firstly described by Hauschild et. al. (HEMS 2007), are presented. The small (70mm<sup>2</sup>) PIMMS chip contains all essential components of a mass spectrometer. These are etched in a 300  $\mu\text{m}$  thick silicon wafer and bonded to a glass substrate with metal structures. Some of these components haven been changed and improved. The system modifications include: optimization of the plasma chamber, implementation of a clamp for a micro-channel plate (MCP) and extension of the mass separator.

By inserting the MCP into the clamp, the measured current increases up to two orders of magnitude. The extension of the mass separator improves the resolution of the spectrum, which agrees with theoretical calculations. This, combined with the application of a new control device of the mass separator (synchronous ion shield - SIS) results in an increase of the total resolution from  $R = 10,8$  (old structures) to  $R = 32$  (new structures)(measured at Full Width Half Maximum). The measurements became faster and less sensitive to ambient noise by improving the periphery. It is now possible to measure a spectrum of 150 amu in 4.5 seconds. Measurements with air confirm the higher resolution and current. The air spectrums show low concentrated gases like argon at 0.9% and carbon dioxide at 0.04%.