Geophysical Research Abstracts, Vol. 9, 05953, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-05953

MOMA, the Martian Organic Molecule Analyser; current Developments and Capabilities of a combined GC/MS and LD-MS Instrument

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MOMA, the Martian Organic Molecule Analyser, is one of the instruments of the Pasteur payload of the European ExoMars mission. The instrument team comprises members from Europe as well as the USA. It is part of a group of instruments for the detection of organic molecules. While the other instruments look for specific molecules with extremely high sensitivity, MOMA can, in principle, detect the presence of any organic molecule and identify it, although with lower sensitivity.

The central part of the instrument is an ion-trap mass-spectrometer. It is used for the identification and quantification of molecules. Two major ion sources for the MS are envisaged: The first is the classical gas-chromatography / mass-spectrometry (GC-MS) approach where solid soil samples are pyrolysed and the volatile fraction is separated by a GC and analysed by the MS. This channel also allows for chiral separation of enantiomers. The second is Laser Desorption (LD-MS) where larger and likely less volatile molecules are ionized via short laser flashes, transferred to the MS and anal-

ysed. In order to aid the identification of intricate molecular mixtures it is possible to run the ion-trap in an MS-MS mode where a particular mass can be pre-selected and its fragments further investigated. Direct atmospheric sampling is also intended.

The hardware development phase of the instrument has started and we will present details and the measurement possibilities of the instrument.