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In Situ Mass Spectrometry of Planetary Surfaces

P. Wurz(1), J.A. Whitby(1), M. Managdze(2)

(1) Physics Institute, University of Bern, Switzerland, (2) Space Research Institute (IKI), Moscow, Russia

Knowing the chemical, elemental, and isotopic composition of planetary objects allows the study of their origin and evolution within the context of our solar system. Exploration plans in planetary research of several space agencies consider landing spacecraft for future missions. Although there have been landers in the past, more landers are foreseen for Mars and its moons, Venus, the jovian moons, and asteroids. Furthermore, a mass spectrometer on a landed spacecraft can assist in the sample selection in a sample-return mission and provide mineralogical context, or identify possible toxic soils on Mars for manned Mars exploration. Given the resources available on landed spacecraft mass spectrometers, as well as any other instrument, have to be highly miniaturised. We will present our instrumentation developed for the Mercury and Phobos-Grunt landers.