Geophysical Research Abstracts, Vol. 9, 08853, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08853

SARIM: A mission for SAmple Return of Interstellar Matter

R. Srama (1) and The SARIM Team

(1) MPI Nuclear Physics, Heidelberg, and IRS, Univ. Stuttgart, Germany

Interstellar dust grains travel through space and time and they are messengers from the remote sites where they were formed. Interstellar grains enter our solar system as star-dust and they got their initial elemental and isotopic signatures in the cool atmospheres of giant stars or in nova or super-nova explosions. About 15 years ago galactic dust has been discovered by the dust detector onboard the Ulysses spacecraft. The motion of interstellar grains through the solar system is parallel to the flow of neutral interstellar gas and it is modulated by the interaction with the interplanetary magnetic field. Interstellar grains constitute the dominant known particulate component in the outer solar system, but recent data analysis has shown that a significant amount of interstellar dust can be detected at 1 AU distance from the Sun.

We describe an interplanetary Dust Astronomy mission which includes both, in-situ dust detection and sample return of interplanetary and interstellar dust.

Novel dust collectors combine in-situ methods (determining the particle origin, speed and trajectory) with aerogel collector plates which preserve the grains for sample return. In-situ compositional measurements of selected individual particles are combined with laboratory results of returned samples. This combined information distinct cometary, asteroidal and interstellar particles and determines their relative fluxes in interplanetary space.

NASA's successful Stardust mission broad back cometary particles and the sample return of asteroidal and interstellar dust is a next logical step in Dust Astronomy providing new insights into the evolution of our solar system.