

# The *Cosmic DUNE* Dust Astronomy Mission

Eberhard Grün (1,2), R. Srama (1,3) and the Cosmic DUNE Team

(1) MPI-K, Heidelberg, Germany, (2) HIGP, Honolulu, USA, (3) Univ. Stuttgart, Germany

A dust astronomy mission aims at the simultaneous measurement of the origin and the chemical composition of individual dust grains in space. Interstellar dust traversing the solar system constitutes the galactic solid phase of matter from which stars and planetary systems form. Interplanetary dust, from comets and asteroids, represents remnant material from bodies at different stages of early solar system evolution. Thus, studies of interstellar and interplanetary dust with *Cosmic DUNE* (Cosmic Dust Near Earth) will provide a comparison between the composition of the interstellar medium and primitive planetary objects. *Cosmic DUNE* will prepare the way for effective collection in near-Earth space of interstellar and interplanetary dust for subsequent return to Earth and analysis in laboratories.

*Cosmic DUNE* establishes the next logical step beyond NASA's Stardust mission, with four major advancements in cosmic dust research: (1) Analysis of the elemental and isotopic composition of individual cosmic dust grains, (2) determination of the size distribution of interstellar dust, (3) characterization of the interstellar dust flow through the planetary system, and (4) analysis of interplanetary dust of cometary and asteroidal origin. This mission goal will be reached with novel dust instrumentation. A dust telescope trajectory sensor has been developed which is capable of obtaining precision trajectories of sub-micron sized particles in space. A new high mass resolution dust analyzer of  $0.1\text{m}^2$  impact area can cope with the low fluxes expected in interplanetary space. *Cosmic DUNE* will be proposed to ESA in response to its upcoming call for mission ideas.