http://www.helsinki.fi/acm2014/index.shtml

Marina Congress Center, Helsinki, June 30th – July 4th 2014

ACM'2014
Department of Physics
P.O.Box 64
FI-00014 University of Helsinki
Finland

Asteroids, Comets, Meteors focuses on the research of small Solar System bodies. Small bodies are the key to understanding the formation and evolution of the Solar System, carrying signals from pre-solar times. Understanding the evolution of the Solar System helps unveil the evolution of extrasolar planetary systems. Societally, small bodies will be important future resources of minerals. The near-Earth population of small bodies continues to pose an impact hazard, whether it be small pieces of falling meteorites or larger asteroids or cometary nuclei capable of causing global environmental effects.

The **conference series entitled "Asteroids, Comets, Meteors"** constitutes the leading international series in the field of small Solar System bodies. The first three conferences took place in Uppsala, Sweden in 1983, 1985, and 1989. The conference is now returning to Nordic countries after a quarter of a century. After the Uppsala conferences, the conference has taken place in Flagstaff, Arizona, U.S.A. in 1991, Belgirate, Italy in 1993, Paris, France in 1996, Ithaca, New York, U.S.A. in 1999, in Berlin, Germany in 2002, in Rio de Janeiro, Brazil in 2005, in Baltimore, Maryland, U.S.A. in 2008, and in Niigata, Japan in 2012. ACM in Helsinki, Finland in 2014 will be the 12th conference in the series.

Poster session P1, Monday

...

Cite as: Karri Muinonen, Antti Penttilä, Mikael Granvik, Anne Virkki, Grigori Fedorets, Olli Wilkman, and Tomas Kohout (eds.). *Asteroids, Comets, Meteors — Book of Abstracts, Helsinki, Finland, 2014*. ISBN 978-952-10-8962-6. Published at http://www.helsinki.fi/acm2014/pdf-material/ACM2014.pdf, University of Helsinki (2014).

http://www.helsinki.fi/acm2014/pdf-material/Day-1/Posters-1/STENZEL-06C3.pdf

Characterisation of meteoritic samples with the Rosetta Cosima TOF-SIMS laboratory reference model — a covariance approach

O. Stenzel[1], K. Varmuza[2], C. Engrand[3], L. Ferrière[4], F. Brandstätter[4], C. Koeberl[4], P. Filzmoser[2], and M. Hilchenbach[1]

[1]Max Planck Institute for Solar System Research, Justus-von-Liebig-Weg 3, 37077 Göttingen, Germany
[2]University of Technology, Department of Statistics and Probability Theory, Vienna, Austria
[3]Centre de Sciences Nucléaires et de Sciences de la Matière - CSNSM, Bat. 104, 91 405 Orsay, France

[4]Natural History Museum, Burgring 7, A-1010 Vienna, Austria

The time-of-flight secondary ion mass spectrometer Cosima onboard Rosetta will analyze cometary grains ejected off the nucleus of comet 67P/Churyumov-Gerasimenko from September 2014 onwards. In our effort to understand the composition and the history of these cometary grains, we study the characteristics of different meteorite samples with the Cosima reference instruments at the Max Planck Institute for Solar System Research in Göttingen, with the goal to separate individual compounds and their fragmentation patterns.
Different types of meteorite samples are prepared in the laboratory. Among these are one ordinary chondrite H4 (Ochansk), one unequilibrated ordinary chondrite H3 (Tieschitz), one carbonaceous chondrite CR (Renazzo),
and a martian shergottite (Tissint). Grains of sizes up to 100 µm are pressed into a blank gold metal target. The grains are identified with the instrument microscope and positive and negative secondary ion mass spectra are accumulated on different positions on selected grains. The mass spectra are accumulating all secondary ions up to mass 300 with reasonable detection efficiency and a mass resolution of 1400@ 100 amu. This mass resolution is sufficient to separate organic (hydrogen-rich) molecule peaks from minerals or elemental mass peaks.
We are trying to assess how the covariances of count rates between different parts of the mass spectra, i.e., specific atomic and molecule peaks of a single meteorite, can be used to infer some properties of its constituents and how this differs between the different meteorites that show varying degrees of alteration.
In a first step, we look at the covariance and the correlation matrices S of the mass spectra for individual meteorite samples. The elements s_{ij} of S are the covariances/correlations of the mass spectra at the masses i and j for a given meteorite sample.
This will help us, after future analysis, to place the cometary grains into the proper compositional and evolutionary context within the solar system.
