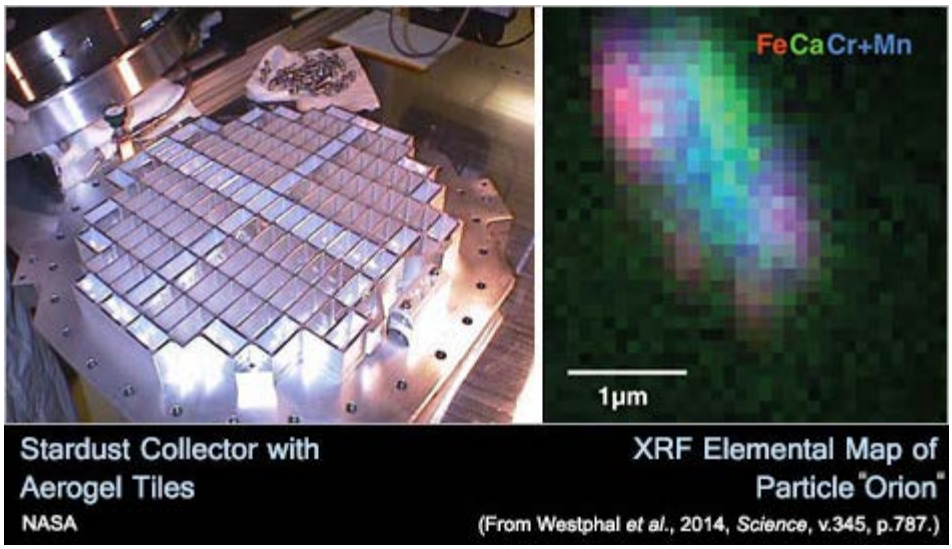
PLANETARY SCIENCE RESEARCH DISCOVERIES
CosmoSparks

Quick Views of Big Advances

Contemporary Interstellar Dust in the Lab

Andrew Westphal (University of California at Berkeley) and 66+ coauthors (including the volunteers of the Stardust@home project*) present the first round of evidence that seven dust particles returned by NASA's Stardust Mission came from the contemporary interstellar dust stream.



[LEFT] The Stardust Interstellar Dust Collector is composed of two sides of aerogel tiles set in aluminum framing. One side collected dust from Comet Wild 2 and the other side collected particles as the spacecraft flew through the interstellar dust stream. **[RIGHT]** Elemental map derived from X-ray fluorescence data of one of the candidate interstellar dust particles, named Orion, found in aerogel.

The seven ≤ 4-picogram particles identified in the Stardust Interstellar Preliminary Examination consitute a new collection of extraterrestrial material. Though interstellar and ***presolar grains*** have been found and studied in ***primitive meteorites*** (see the list below of **PSRD** articles for examples), the newly identified seven candidates are young in comparison. Co-author Anna Butterworth (Univeristy of California at Berkeley) describes the dust as "relatively new, since the lifetime of interstellar dust is only 50 to 100 million years, so we are sampling our contemporary galaxy."

Three of the dust particles were identified by their tracks in the aerogel and four particles were identified in the aluminum foils. The dust particles, while not identical, are generally aggregates of oxides, sulfides, and silicates, some iron-bearing. The researchers found both crystalline and amorphous phases. Westphal and coauthors present a complete table of sizes, compositions, and structures of these seven exquisite dust particles. Additional papers covering further details will be published in *Meteoritics & Planetary Science* (see the ***related CosmoSparks Report***).

"We can see this material with the naked eye as a black zone running along the center of the Milky Way. These particles contain the heavy chemical elements that originated in the stars. Since every atom in our bodies came from the inside of stars, by studying these interstellar dust particles we can learn about our cosmic roots."

— Dr. Donald Brownlee (University of Washington), Principal Investigator for Stardust, co-author on the paper, and friend of **PSRD**.

See:

· Westphal, A. J. and 66+ others (2014) Evidence for Interstellar Origin of Seven Dust Particles Collected by the Stardust Spacecraft, *Science,* v. 345, p.786-791, doi:101126/science.12. [***abstract***]

· Saunders, R. (2014) Seven Tiny Grains Captured by Stardust Likely Visitors from Interstellar Space, ***UC Berkeley News Release***.

* ***Stardust@home*** citizen science project.

See also **PSRD** articles:

· Clayton, D. D. (1997) Moving Stars and Shifting Sands of Presolar History. *Planetary Science Research Discoveries.* ***http://www.psrd.hawaii.edu/July97/Stardust.html***

· Taylor, G. J. (2003) A New Type of Stardust . *Planetary Science Research Discoveries.* ***http://www.psrd.hawaii.edu/Aug03/stardust.html***

· Taylor, G. J. (2004) Silicate Stardust in Meteorites. *Planetary Science Research Discoveries.* ***http://www.psrd.hawaii.edu/June04/silicatesMeteorites.html***

Written by Linda Martel, Hawai'i Institute of Geophysics and Planetology, for ***PSRD***.