

Spitzer/MIPS observations of comet 67P/Churyumov-Gerasimenko in November 2008

J. Agarwal (1), E. Grün (2,3), R. Laureijs (4), W. T. Reach (5), J. A. Stansberry (6) and M. V. Sykes (7)

(1) Max Planck Institute for Solar System Research, Katlenburg-Lindau, Germany, (2) Max Planck Institute for Nuclear Physics, Heidelberg, Germany, (3) Laboratory for Atmospheric and Space Physics, Boulder, Colorado, USA, (4) European Space and Technology Centre, Noordwijk, The Netherlands, (5) Universities Space Research Association, Moffett Field, California, USA, (6) Space Telescope Science Institute, Baltimore, Maryland, USA (7) Planetary Science Institute, Tucson, Arizona, USA (agarwal@mps.mpg.de)

Abstract

We report on mid-IR observations of the dust ejected from comet 67P/Churyumov-Gerasimenko, which allow us to put constraints on the dust production rate and size distribution.

Comet 67P/Churyumov-Gerasimenko is the main target of the European Space Agency's Rosetta mission, which will arrive at the comet in the summer of 2014, deploy a lander to its surface, and follow the comet for more than one year on its way to perihelion.

Comet 67P is a Jupiter family comet with a period of 6.4 years, a perihelion distance of 1.2 AU, and has been on its current orbit since its last close encounter with Jupiter in 1959. The dust ejected from comet 67P appears to be particularly rich in large particles on the order of 100 micron in size. This was inferred from observations and modelling of its dust trail [1, 2, 3], and of the coma [4, 5, 6].

We observed the comet with the MIPS instrument [7] on board the Spitzer Space Telescope at 24 and 70 micron in November 2008, when the comet was at 1.7 AU inbound. Observations at these wavelengths probe the thermal emission from the dust, and are particularly sensitive to grains in the 10- to 100 micron range and larger. The images show the nucleus, coma, developing tail, and old dust trail of comet 67P. We measure the cross-section and colour temperature of the dust and derive constraints for the dust production rate and size distribution.

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