

First Millimeter Observations of Comet Austin 1989ci

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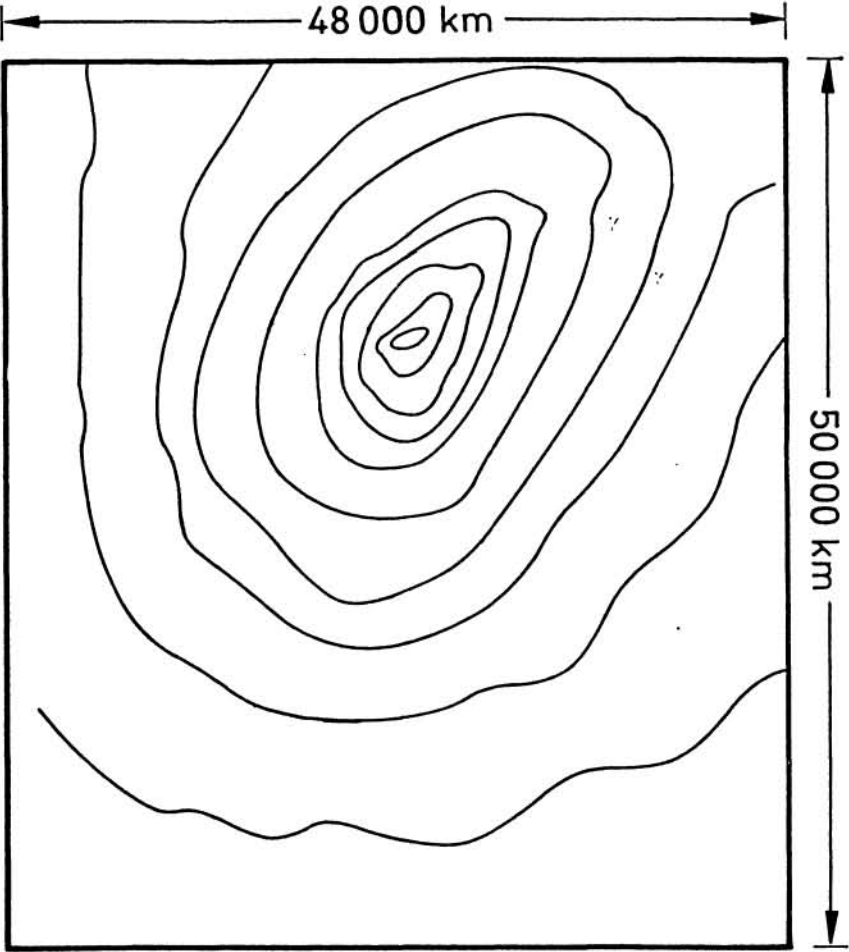
Abstract

Comet Austin was observed at 1100 and 1300 microns using JCMT and parallel 10 micron photometry was also performed on the comet using the NASA IRTF telescope at Mauna Kea. For millimeter observations point-to-point photometry maps were generated and these were used in conjunction with the 10 micron measurements, to determine various physical parameters such as the equilibrium temperature, dust production rate and gas to dust ratio for this comet. Using the millimeter maps we estimate the number of larger cometary dust grains (a 100microns) and when comparing to the total number of dust particles in the coma we find that most of the mass lies within these particle ranges.

A new concept in studying the dust in comets were conceived when dust detectors on board the spacecraft to encounter Halley's comet discovered noticeably large particles (McDonnell et al. 1987). The existence of these particles was also confirmed by the change in Giotto velocity due to particle impacts (Edenhofer et al. 1987). The fly-by experiments also found considerable number of small particles, typically of the order of sub-micron in size; the type of grains which was normally associated with interstellar dust. The concept is that these large particles may be formed of small grains of sub-millimeter size which are loosely held together by perhaps some volatile glue (Greenberg 1986). When studying the dust in comets using remote sensing techniques, the theory predicts that the large particles (of order of cm or bigger) are detectable mainly in the millimeter or cm regions, where the the wavelength of observations is of the same order as the particle size. Photometry maps were generated of 5X5 pixels of 10arcsec X 10arsecs wide cells, for 1100 micron and 1300 micron were obtained. Figures 1 shows the map of the comet at 1100 microns.

Figure 1) Contour map of Comet Austin observed at 1100 micron, using UKT14 at JCMT. Maximum value is 0.4 Jy and the consecutive levels fall by 10%.

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