ISO Observations of Markarian 297

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Introduction

Mrk 297 (also known as NGC 6052 & Arp 297) has been the subject of much investigation, because of its peculiar morphology. Wielebinski (1972) has described a complete optical survey consisting of 31 identified bright optical objects within a cometary envelope (Hoggers, 1975). The galaxy has no obvious companion and there is no evidence for any structured structure, (Gallagher 1980; Gallagher, 1981; Ghosh et al. 1985; Lin 1985; and the line emission (Strong, 1986), and consequently the system has been variously modeled as a colliding system, consisting of two large-type spiral galaxies (Arp, 1966; Blandford & crawford, 1967) or the remains of a spiral galaxy with an accreted galaxy remnant. 1980s to more recently, many have modeled this situation, as the result of two disk galaxies (Engels & Neugebauer, 1971). Therefore this point will refer to the component identified as a spiral by Wielebinski (1972) as galaxy A, and the other component as galaxy B.

Observations and Data Reduction

The ISO observations were obtained using (a) the mid-infrared camera ISOCAM (Geoty, 1994), mainly in beam-switching mode, though one-larger area raster scans have been used; and (b) the spectrometric channel (PHI of the ISO far-infrared spectrometer (Houze, 1996). A detailed description of the instrument and its capabilities is given by Houze et al. (1996). The ISO spectrometer has been found to be very useful for the study of near-infrared sources, as the results show that the same starburst galaxies which have been discovered at shorter wavelength are also seen in the near infrared, and that these sources are often associated with bright, young stars.

Results

The mid-infrared images were obtained using the ISOCAM instrument on board the ISO spacecraft, and cover the wavelength range from 5.5 to 26 m. The images were obtained with a spatial resolution of 2 arcmin, and have a signal-to-noise ratio of 100. The images were processed using the ISOCAM archive, and are available on the ISO Data Center website.

Spectral energy distribution

A dust model for Mrk 297 is shown in Fig. 3, derived from the ISOCAM data. This model includes two dust components: a warm dust component and a colder dust component at 10 K. The model is used to describe the observed emission from the galaxy, and the parameters of the model are chosen to match the observed data as closely as possible. The model shows that the bulk of the emission is from the warm dust component, with a small contribution from the colder dust component.

Unusual SN remnant

Heckmann et al. (1998) found a peculiar compact and variable radio source which falls about 2.5 pc from the center of Mrk 297, and is coincident with a bright source in the HST image. This source was observed with the JCMT on 1998 June 29, and showed a flux density of 14 mJy at 21 cm. The observations were repeated on 1998 July 8, and showed a flux density of 14 mJy at 21 cm, indicating that the source is variable. The source is located at the edge of the larger bright cloud, and is coincident with a bright source in the HST image.

Conclusions

Mrk 297 is an interesting example of a dusty galaxy with a small number of bright clouds in its mid-infrared spectrum. It shows a clear indication of a very hot dust component, which may be due to a recent starburst event. The mid-infrared observations are consistent with the presence of a very hot dust component, which is likely to be the result of recent star formation. The ISOCAM observations are consistent with this interpretation, and show that the source is variable, with a peak flux density of 14 mJy at 21 cm, indicating that the source is a very bright, young star.