A NEAR-INFRARED STUDY OF THE LUMINOUS MERGING GALAXIES NGC 2623 AND ARP 148*

MARSHALL JOY† AND PAUL M. HARVEY†
Astronomy Department, University of Texas at Austin
Austin, Texas 78712

ABSTRACT

As part of an investigation of the physical mechanisms which produce large infrared luminosities in interacting systems, we have obtained multicolor near-infrared maps of the long-tailed galaxy NGC 2623 and the ring galaxy Arp 148. We decompose the near-infrared broadband spectrum to obtain the contributions of four processes: emission from evolved stars, nebular continuum emission, thermal reradiation, and extinction. This multicolor analysis, along with 2 μm maps and 10 μm measurements, is used to determine the structure of these interacting galaxies and to delineate regions of star formation.

Previous optical studies have suggested that both NGC 2623 and Arp 148 are in the process of merging. Although much of the optical structure in the nuclear regions is found to be an artifact of obscuration, our infrared analysis confirms that these galaxies are coalescing. Theoretical models indicate that the pair of narrow tails in NGC 2623 are the result of a tidal interaction between two spiral galaxies whose orbits are destined to decay within several revolutions; since a single nucleus is observed in the infrared, we conclude that the merger is complete. The ring galaxy Arp 148 is found to be the product of a close collision of two galaxies, and our multicolor analysis implies that this system is in a very early stage of coalescence. The nuclear regions of Arp 148 and NGC 2623 are extremely luminous in the infrared (~3.5 x 10^{11} $L_{\odot}$); evidence indicates that recently formed stars are the source of the infrared emission in NGC 2623.

* Manuscript submitted to the *Astrophysical Journal*, 4 June 1986.

†Visiting astronomers at the Infrared Telescope Facility, which is operated by the University of Hawaii under contract from the National Aeronautics and Space Administration.

Carol J. Lonsdale Persson (Editor)
Star Formation in Galaxies