Star Formation and Dust Extinction in Major Mergers from Ultraviolet and Infrared data

F. -T. Yuan, T. T. Takeuchi, Y. Matsuoka,
Devision of Particle and Astrophysical Sciences, Nagoya University, 464-8602
yuan.fangting@g.mbox.nagoya-u.ac.jp

V. Buat, D. Burgarella,
Laboratoire d'Astrophysique de Marseille, OAMP, Université Aix-Marseille, CNRS, 38 rue Frédéric Joliot-Curie, 13388 Marseille cedex 13, FRANCE
and

J. Iglesias-Páramo[1]
Instituto de Astrofísica de Andalucía (IAA - CSIC), Glorieta de la Astronomía s.n., 18008 Granada, SPAIN

ABSTRACT

Merger process plays an important role in galaxy formation and evolution. In order to study whether and to what degree the merger process affects the evolution of dust properties and cosmic star formation rate, we investigate a local sample of major merger galaxies and their control sample of isolated galaxies using GALEX ultraviolet (UV) and Spitzer infrared (IR) images. Through a statistical study of dust attenuation in these galaxies, we find that the dust attenuation of merger galaxies is enhanced in comparison with isolated galaxies. The enhancement is found to be contributed mainly by spiral galaixes in spiral-spiral (S-S) pairs, and increases with increasing stellar mass of the galaxy. Combining the FIR and UV indicated star formation rates (SFRs), the total SFRs and specific star formation rates (SSFRs) are then calculated. The SSFRs are found enhanced in merger galaxies. The dependence of the enhancement on galaxy stellar mass, morphology, component mass, and separations are examined, and the results are consistent with previous study based on only IR images. In addition, the nuclear properties of dust attenuation and SSFRs are also investigated. The infrared emissions in pair galaxies are more concentrated in the central part than isolated galaxies; However, UV emission does not show this trend. The IRX-β study shows that the nuclear parts of pairs resemble ULIRGs most. Our results are consistent with the previous work, and give more direct observational evidences.

[1]Centro Astronómico Hispano Alemán, C/ Jesús Durbán Remón 2-2, 04004 Almería, SPAIN