INFRARED IMAGES OF WEAK RADIO GALAXIES[1]

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We report near-IR broad-band images of a radio flux density selected sample of 10 B2 interacting radio galaxies, previously observed in optical broad and narrow-band filters (V, R, I, and Hα and [O III]; Carrillo 1995; Carrillo et al. 1996). The J, H and K images were obtained using the IR camera CAMILA (Cruz-González et al. 1994) with a plate scale of 0.48 ″/pix and field size of 2.1′ × 2.1′.

The comparison of optical and near-IR images shows:

a) On large scales, the R and K images are very similar in morphology and orientation (P.A.). The IR and optical images show the same $r^{-1/4}$ surface brightness distributions. Thus, if mergers do in fact result in elliptical galaxies (having $r^{-1/4}$ surface brightness profiles), then the B2 radio galaxy profiles favour the merging possibility.

b) On intermediate scales, most galaxies show differences in the isophotal maps, being more regular (i.e., less disturbed) in the IR.

c) At small scales, there are often great differences in the structure in and around the nuclei and in the patterns of possible star-forming regions.

In general, the differences in structure seem to be due to the differences in obscuration in the near-IR and optical images. In most cases, the IR images give a better view of the nuclear regions. In only a few cases do large H II complexes shown in Hα images appear to have infrared counterparts.

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ABOUT THE INITIAL MASS FUNCTION AND He II EMISSION IN YOUNG STARBURSTS

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We demonstrate that it is crucial to account for the evolution of the starburst population in order to derive reliable numbers of O stars from integrated spectra for burst ages $t > 2 - 3$ Myr. In these cases the method of Vacca & Conti (1992) and Vacca (1994) *systematically underestimates* the number of O stars. Therefore, the current WR/O number ratios in Wolf-Rayet galaxies are overestimated. This questions recent claims about flat IMF slopes ($\alpha \sim 1$–2) in these objects. If the evolution of the burst is properly treated we find that the observations are indeed compatible with a Salpeter IMF, in agreement with earlier studies. Including recent predictions from non-LTE, line blanketed model atmospheres which account for stellar winds, we synthesize the nebular and Wolf-Rayet He II λ 4686 emission in young starbursts.

For metallicities $1/5\,Z_\odot \leq Z \leq Z_\odot$ we predict a *strong nebular* He II *emission due to a significant fraction of WC stars* in early WR phases of the burst. For other metallicities broad WR emission will always dominate the He II emission. Our predictions of the nebular He II over Hβ intensity (with typically $I(\text{He II})/I(\text{H}\beta) \sim 0.01 - 0.025$) agree well with the observations in WR galaxies. They can also explain an important fraction of the giant H II regions where nebular He II is detected. Finally we point out the importance of systematic observations including the expected broad C IV λ5808 emission in young starbursts. Studies covering also high metallicity objects could provide crucial tests for stellar evolution and the understanding of the starburst phenomenon.

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H II REGION POPULATION IN NEARBY GALAXIES WITH NUCLEAR ACTIVITY

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A sample of 55 galaxies with active nuclei (Seyfert 1, Seyfert 2, and LINERs) is analysed. These were observed with the 4.2-m WHT and 1-m JKT in La Palma, in CCD narrow band Hα+[N II] and [O III] to map the distribution of the H II regions and the morphology of the circumnuclear extended emission associated to the active nuclei. The analysis of the extended emission and H II regions is carried out twofold, as a function of the level of activity and of the Hubble type. 69% of the Seyfert 1 and 47%