

INFRARED IMAGES OF WEAK RADIO GALAXIES¹

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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 $H\alpha$ 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 $2.1' \times 2.1'$.

The comparison of optical and near-IR images shows:

- 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.
- On intermediate scales, most galaxies show differences in the isophotal maps, being more regular (i.e., less disturbed) in the IR.
- 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 $H\alpha$ 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 $H\beta$ intensity (with typically $I(\text{He II})/I(H\beta) \sim 0.01 - 0.025$) 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 λ 5808 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 $H\alpha + [N II]$ 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%