LUMINOSITIES OF Hα EMITTING REGIONS IN A PAIR OF INTERACTING GALAXIES IN THE BOOTES VOID

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Abstract: Luminosities of Hα emission from a pair of interacting galaxies in the low density environment of the Bootes void are presented. CG 692 (IRAS 1519+5050) has an Hα luminosity of 2 x 10^{42} ergs s^{-1}, indicating a star formation rate of 18.4 $M_\odot$ yr^{-1}. Individual extranuclear Hα regions have luminosities of approximately 10^{40} ergs s^{-1}. These luminosities are similar to those found for H II regions in bright, late-type galaxies in more densely populated parts of the Universe.

Based on spectroscopy and imaging data, we have recently identified a pair of interacting galaxies within the Bootes void (Weistrop *et al.* 1991, Weistrop *et al.* 1992). The brighter galaxy, CG 692 (IRAS 1519+5050) is a spiral undergoing large amounts of star formation, while its companion, CG 693, is a previously unidentified Seyfert 1 galaxy (Figure 1). The galaxies are at the same redshift within the uncertainties of the measurements, z = 0.0574, and have a projected separation of 34 kpc, (H_0=50 km $s^{-1}Mpc^{-1}$ assumed throughout). The galaxies are within the boundaries of the Bootes void as defined by Kirshner *et al.* (1987). We investigate the luminosity of the Hα emission in CG 692 and between the galaxies, to compare with galaxies in denser environments. Almost all the Hα emission from CG 693 arises in the nucleus, and is not considered further here.

Images were obtained at the redshifted Hα wavelength of the galaxies and a nearby continuum band, using the Goddard Fabry-Perot Imager on the University of Arizona's 90-inch telescope located at Kitt Peak (Weistrop *et al.* 1992). Flux calibration was obtained from observations of HZ 44. The total Hα flux for CG 692 is 1.38 x 10^{-13} ergs cm^{-2} s^{-1}, with an estimated $\pm$ 25% error due to the uncertainty in the conversion from count rate to flux. Since the galaxies are located at b = 53°, absorption within our galaxy is about 0.02 mag and has been ignored (Kennicutt & Kent 1983). For q_0 = 0, the total Hα luminosity of CG 692 is L = 2.06 x 10^{42} ergs s^{-1}, similar to the Hα + [NII] luminosities of the brightest interacting galaxies (Kennicutt *et al.* 1987). The star formation rate in CG 692 is 18.4 $M_\odot$ yr^{-1} using the conversion given by Kennicutt (1983).

We have determined the luminosity of several extranuclear Hα features in this system (Table 1). These regions are not spatially resolved. B and C, which are between the galaxies and may be the result of the interaction, have Hα luminosities similar to the luminosities of the brightest H II regions in field spiral and luminous irregular galaxies (Kennicutt 1988). (Values must be converted to H_0=75 km $s^{-1}Mpc^{-1}$ for comparison with Kennicutt's results.) J and K, the features beyond the end of CG 692's spiral arm, have luminosities similar to those of 'giant' or 'supergiant' H II regions found in late-type normal or peculiar galaxies. The knots within the

Table 1. Hα Luminosities[1]

Feature	log[L(Hα)]
B	39.78
C	39.86
J	40.47
K	40.55
	log[L(Hα) arcsec^{-2}]
D	39.74
F	39.69
G	39.57
H	39.75

[1] H_0=50 km s^{-1}Mpc^{-1}

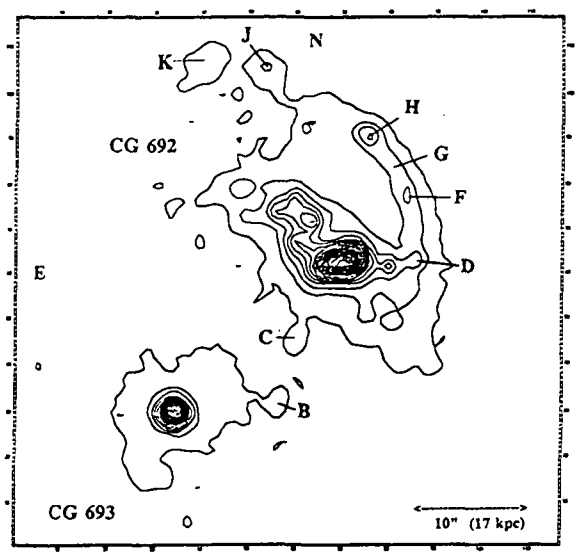

Fig. 1. Contour plot of the Hα image. The outermost contour represents a flux of 8.3x10^{-17}ergs cm^{-2} s^{-1}arcsec^{-2}. Successive contours increase in intervals of 2.76x10^{-16} ergs cm^{-2}s^{-1}arcsec^{-2}.

spiral arm are concentrations of emission embedded in an area of strong, extended Hα emission. In Table 1 we give the luminosities per square arcsec for several locations along the spiral arm. The total Hα emission from the strongest knot, H, is about 5.3 x 10^{40} ergs s^{-1}.

Kennicutt (1988) finds a relationship between the average luminosity of the brightest H II regions in a galaxy and that galaxy's absolute magnitude and Hubble type. M_B for CG 692 can be calculated from the apparent magnitude estimate given by Sanduleak & Pesch (1987). For CG 692, B = 15, giving M_B = -22.8. A discussion of the accuracy of the Case magnitudes is given by Weistrop & Downes (1991). Kennicutt's relationship predicts the mean luminosity of the brightest H II regions to be $\geq 10^{40}$ ergs s^{-1} for late type field or Virgo cluster spirals with M_B = -22 (H_0=75 km s^{-1}Mpc^{-1}). This is similar to the luminosity we obtain for the brightest extranuclear H II regions in CG 692.

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