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THE [L-σ] RELATION FOR LOCAL HII GALAXIES

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We present our most recent calibration of [L-σ] relation from a homogeneous sample of about 80 local HII galaxies. This calibration may be used as a distance indicator for galaxies well beyond the local supercluster, since HII galaxies are easy to find at great distances.

A central issue to the evolution of HII galaxies is the validity of the interpretation, and use of the empirical correlations, of size and luminosity vs. their supersonic line widths (Terlevich & Melnick 1981, Melnick etal 1988, Telles & Terlevich 1993) for high redshift galaxies. These dwarf galaxies with strong emission line spectra seem to define a **Fundamental Plane** that closely resembles that of Elliptical galaxies. This striking similarity strongly suggests that the same mechanism, gravity, is at play in HII galaxies and ellipticals. In Telles, Muñoz-Tuñón & Tenorio-Tagle (2001) we found that: (i) enhanced spectral and spatial resolution seems to unveil an intricate structure in HII galaxies. (HII galaxies are very blobby). (ii) HII galaxies when resolved present several emitting knots with a variety of shapes, luminosity and line widths. (iii) the intrinsic properties (luminosity, velocity dispersion) of a galaxy are dominated by the central (**core**) component. (iv) the [L-σ] relation may have the effect of a secondary parameter associated with surface brightness, much like the Fundamental Plane for ellipticals again. Here we present our most recent calibration of [L-σ] relation.

With the knowledge that the core of the star forming region in a HII galaxy dominates the intrinsic properties (luminosity, velocity dispersion), we measured core velocity dispersion and luminosities for about 80 local HII galaxies. Our results confirm and extend the empirical correlations found for giant HII regions and HII galaxies. The coefficients of the linear fits to the data are very similar among different works (Figure 1). Their strong and narrow emission lines make it possible to study HII galaxies in considerable detail out to distances of prime cosmological interest (Melnick, Terlevich & Terlevich, 2000). The precision to which distances can be determined is limited by the intrinsic scatter of this relation which may be due partially to the effect of

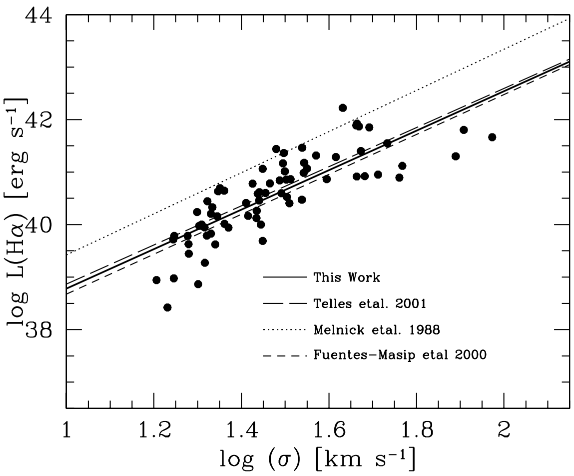

Fig. 1. The luminosity line width relation.

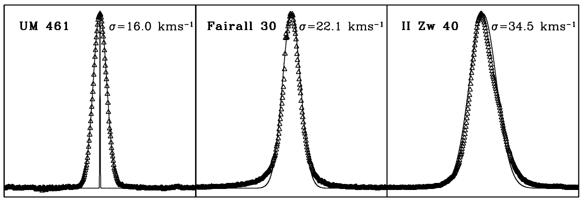

Fig. 2. We have been using the fiber-echelle spectrograph FEROS (R=48000) to obtain excellent emission line-profiles of our sample of about 80 galaxies and the B&C spectrograph for line fluxes on the ESO 1.52m telescope at La Silla (Telles et al. 2002). Examples of emission line profiles of HII galaxies on the Hα line and Gaussian fits (solid lines) to derive the final gas velocity widths.

a second parameter (surface brightness, O/H, evolutionary state) and partially still by observational errors. The result of our full analysis will be published in the near future in a forthcoming paper.

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