



GMOS+Gemini: the chemical evolution of the Local Group dwarf galaxies¹

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IC10 and NGC147

This contribution highlights the GMOS-Gemini spectroscopy of NGC147 and IC10, two dwarf galaxies of the Local Group (LG). The former is a dwarf spheroidal galaxy (dSph) and the latter is a dwarf irregular galaxy (dIrr), thus being opposite in terms of their present star formation rate, gas and dust content, as well as dominant stellar population.

The Strong Line Emitters of IC10 and NGC147

Our aim is to reconstruct the SFH of both galaxies and to derive their age-metallicity (AM) relationships using young (HII regions) and intermediate to old-age stars (planetary nebulae, PNe). The direct availability of the electron temperature in our emission-line (HII regions plus PNe) spectra allows an accurate determination of the NGC147 and IC10 metallicity maps at two different epochs.

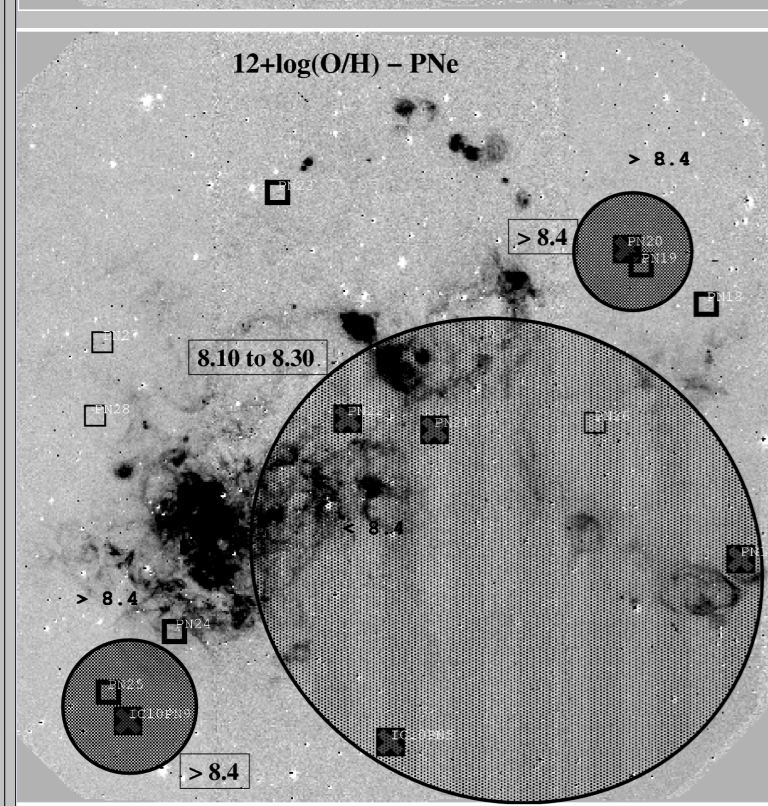
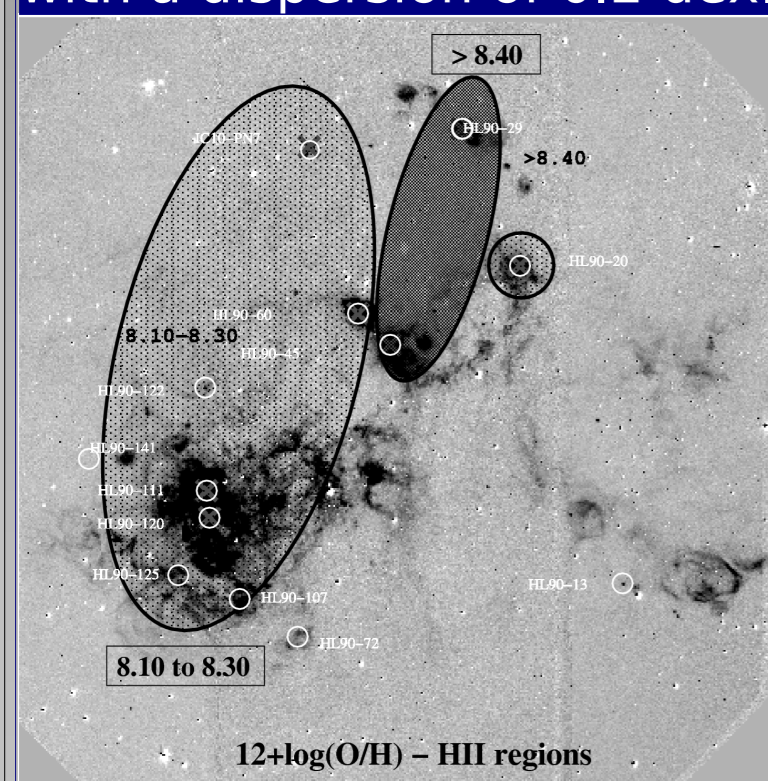
IC10 Multi-Object Spectroscopic



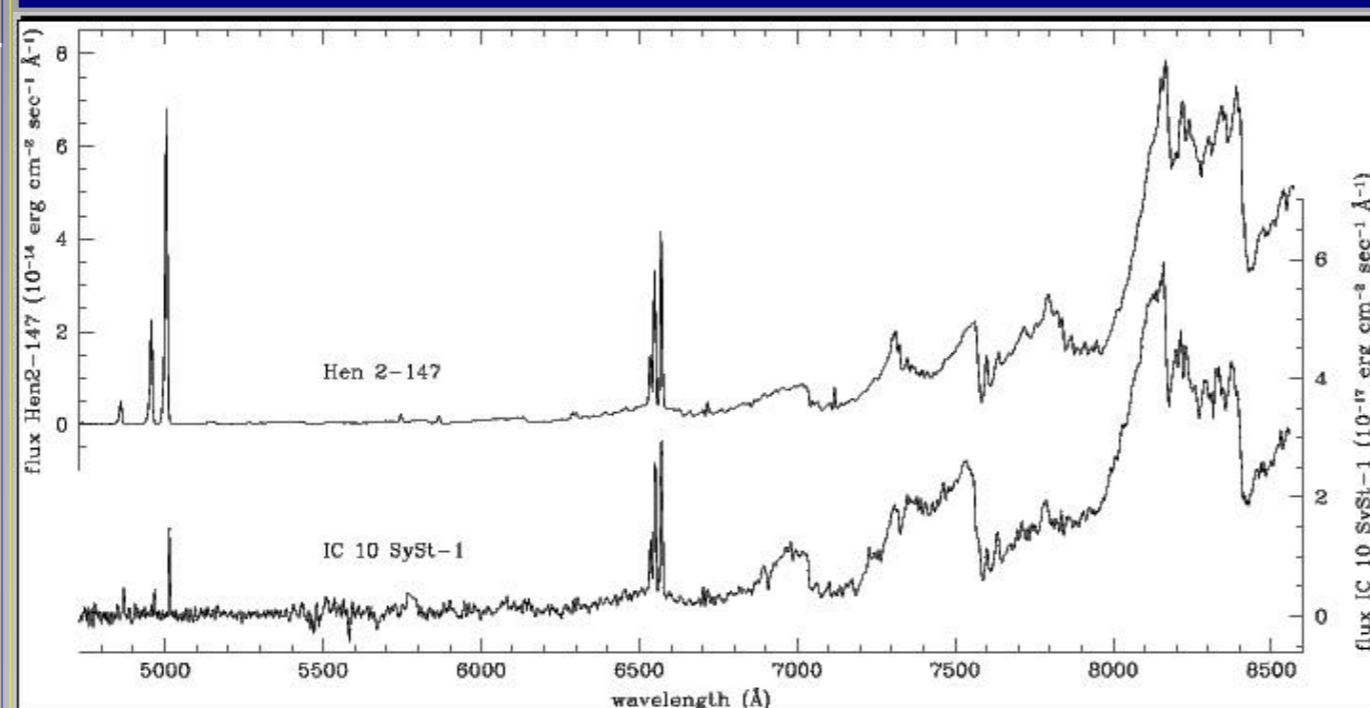
New PNe	12	Faint
Known PNe	3	(Magrini et. al. 2003; Kiniyazev et al. 2008)
Known HIIr	15	(Hodge & Lee 1990)
Symbiotic	1	IC10 SySt-1



The inhomogeneous metal distribution for HII region and PN populations of IC10, with a dispersion of 0.2 dex.



IC10 StSy-1—the farthest known symbiotic star—as compared with the Galactic symbiotic star and Mira Hen 2-147



IC10 Chemical Modeling

Our modeling suggest that: i) IC10 was formed by a slow gas accretion process, with an infall timescale of ~8Gyr; ii) it passed through from 4 to 6 bursts of star formation, each lasting much more than the inter-burst time. Our modelling also points out that metal-enhanced supernova winds are crucial to account for the IC10 present time metallicity.

COLLABORATORS:

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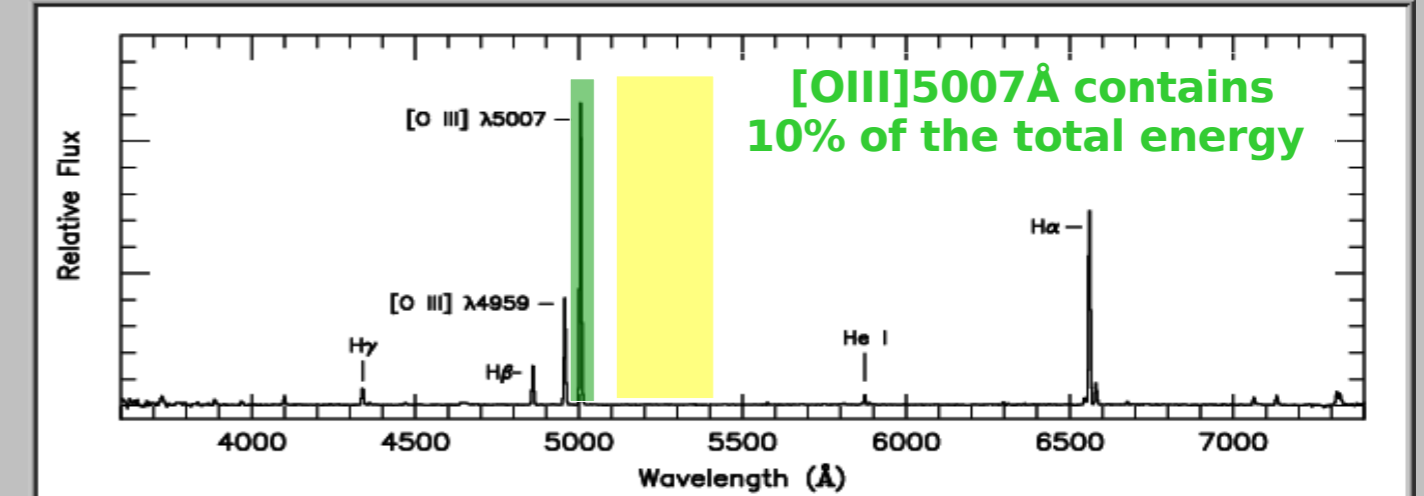
REFERENCES:

Gonçalves et al. 2007 (MNRAS 375, 715); Gonçalves et al. 2008 (MNRAS 391, L84); Magrini & Gonçalves 2009 (MNRAS 398, 280); Yun et al. (in prep.)

¹Based on two Gemini programs: GN-2005B-Q-26 and GN-2007B-Q-15

PNe and HII regions as tracers of the Local Group chemical evolution

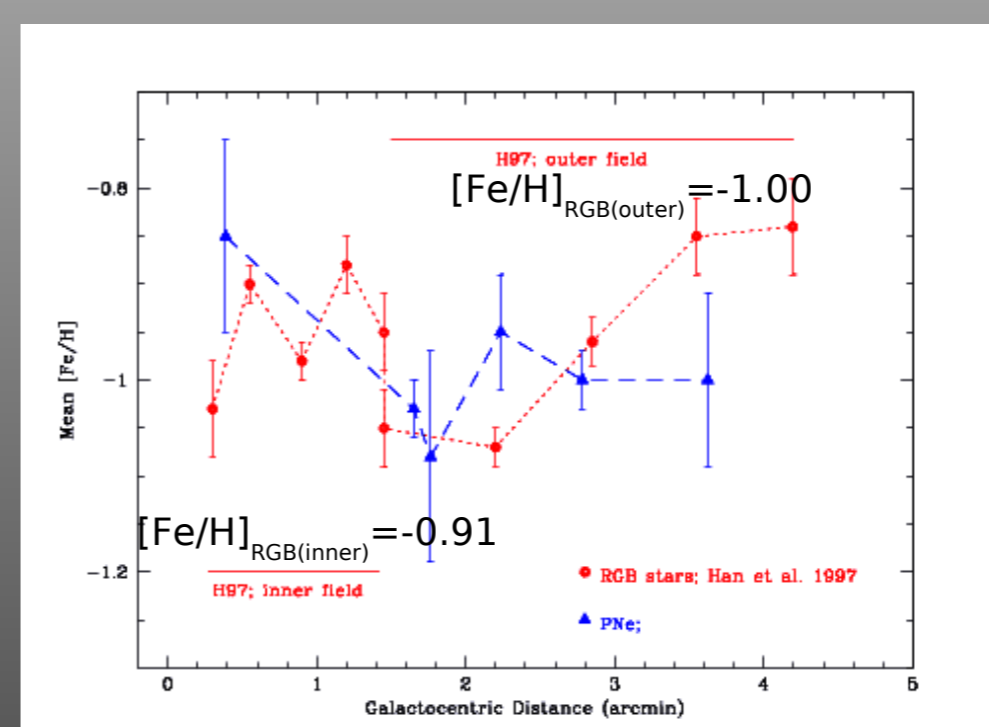
- PNe are present in early- and late-type galaxies
- PNe emission lines are very bright
- PNe chemistry provides information about the past of the galaxy (intermediate and old stellar population)
- HII regions inform about the present time chemistry



NGC147 GMOS Spectroscopic



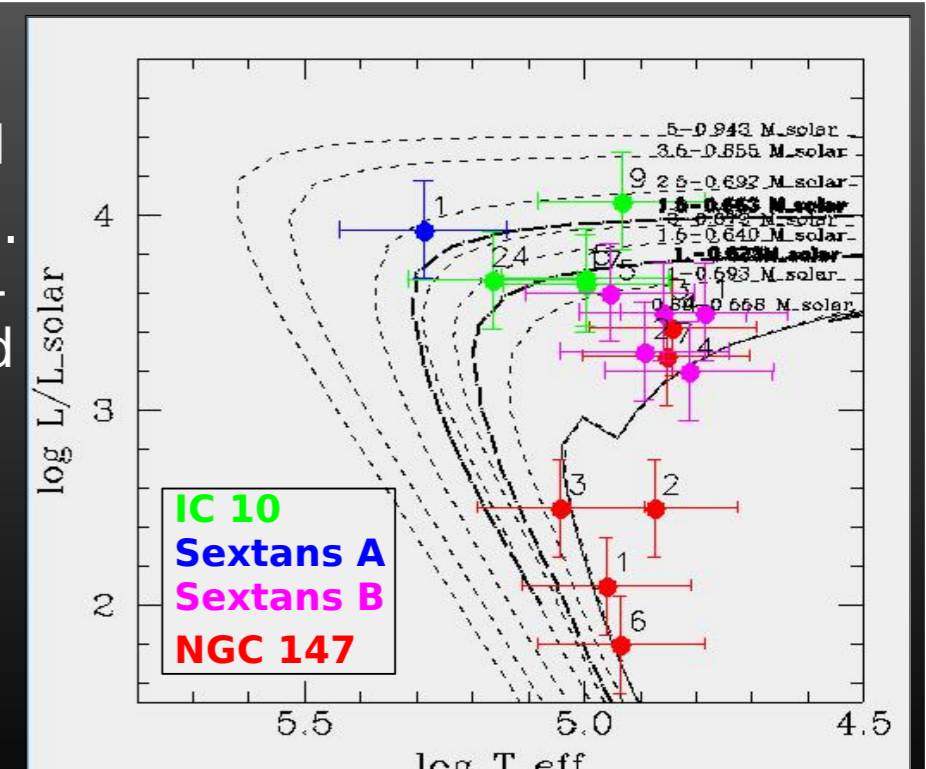
RGB vs. PNe metallicities of NGC147



In NGC147, which does not possess HII regions, we studied the 6 brightest PNe. We find that the old stellar population metallicity is similar to the PN metallicity, so suggesting a negligible chemical enrichment during a substantial amount of time.

HR Diagram of the PNE

- Central stars T_{eff} and L_* were obtained following Kniazhev et al. (2005) method.
- H- and He-burning tracks for $Z=0.004$ (continuous line) and $Z=0.001$ (dashed line) from Vassiliadis & Wood (1994).
- Ages of the PNe progenitors:
 - 10 to 1 Gyr for IC 10;
 - 10 to 7 Gyr for NGC 147;
 - < 1 Gyr for Sextans A;
 - 10 to 2 Gyr for Sextans B.



PNe M-L RELATION OF DWARF GALAXIES

The metallicity-luminosity relationship of dIrrs and dSphs shows that the present time dIrrs cannot give rise to the dSphs, since the differences in their metallicities are already present in their older populations, PNe!

