The Interplay among Black Holes, Stars and ISM in Galactic Nuclei
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Stellar velocity dispersions in AGN - I. Observational results

L. R. Vega Neme[1], R. Cid Fernandes[1], A. Garcia Rissman[1], N. Vale Asari[1], R. M. González Delgado[2] and H. Schmitt[3]

[1]Universidade Federal de Santa Catarina, Florianópolis-SC, Brazil
[2]Instituto de Astrofísica de Andalucía, Granada, Spain
[3]National Radio Astronomy Observatory, Charlottesville, VA22903, USA

Abstract. We carried out a spectroscopic survey of a sample of 59 Seyfert nuclei (observed both in the northern and in the southern hemisphere) around the stellar absorption lines of Calcium II at 8498.02, 8542.09 and 8662.14 Å (CaT). Our main goal is to determine their stellar velocity dispersions. These measurements, along with photometric information, will allow us to obtain the M/L ratio, useful to determine the nature of the ∼33% of "ambiguous" Seyfert 2.

1. Introduction

The CaT lines are formed in the photospheres of asymptotic giant branch, red giant, and red super-giant stars (Terlevich, Diaz & Terlevich 1990). These lines provide two independent diagnostics of the presence of intermediate/young stars (10-100 Myr): (a) the stellar velocity dispersion, which, combined with precise luminosity estimates, yields the stellar M/L ratio, and (b) the equivalent width (EW). Both quantities, specially the M/L ratio, are very sensitive to the presence of red super-giant stars, hence constraining the dominant population. The goal of this work is to present nuclear spectra for ∼60 Seyfert galaxies both in the Northern and in the Southern Hemisphere; also, to measure the nuclear velocity dispersion through a Syntheses Model. Other methods and results are discussed in "Poster 2" (Vale Asari *et al.* these Proceedings).

2. Observations and Velocity Dispersion measurements

The observations were carried out with the KPNO (4m Mayall telescope, Ritchey-Chrétien spectrograph and 2" slit along the paralactic angle) by Dr. R. González-Delgado and the ESO-La Silla (1.52m Telescope, Boller & Chivens spectrograph and 2" slit along p.a. 90^0). Besides the Seyfert galaxies of the sample, we have obtained spectra of some stars used later as templates for velocity calibrations. The reduction of the spectra was performed using standard reduction techniques of IRAF.

The total sample comprises 59 galaxies. Some of the galaxy spectra are shown in Figure 1, along with a star (template) spectrum obtained in each run of observation. These are nuclear extractions made adding 5 pixels centered at the spatial light peak, which corresponds to ∼700 pc (Northern sample) and ∼1.1 kpc (Southern sample). For the stars the extraction was made including the whole spatial light profile. In all cases, the spectra corresponding to different exposures of the same object were averaged.

We performed the measurements of the CaT velocity dispersions using a Population Syntheses Program. In this code, the population corresponds to spectra of the velocity standard stars observed in each run, and to some power-law′s. The spectral range of the input spectra was 8000 Å to 9200 Å, in order to take into account the continuum around

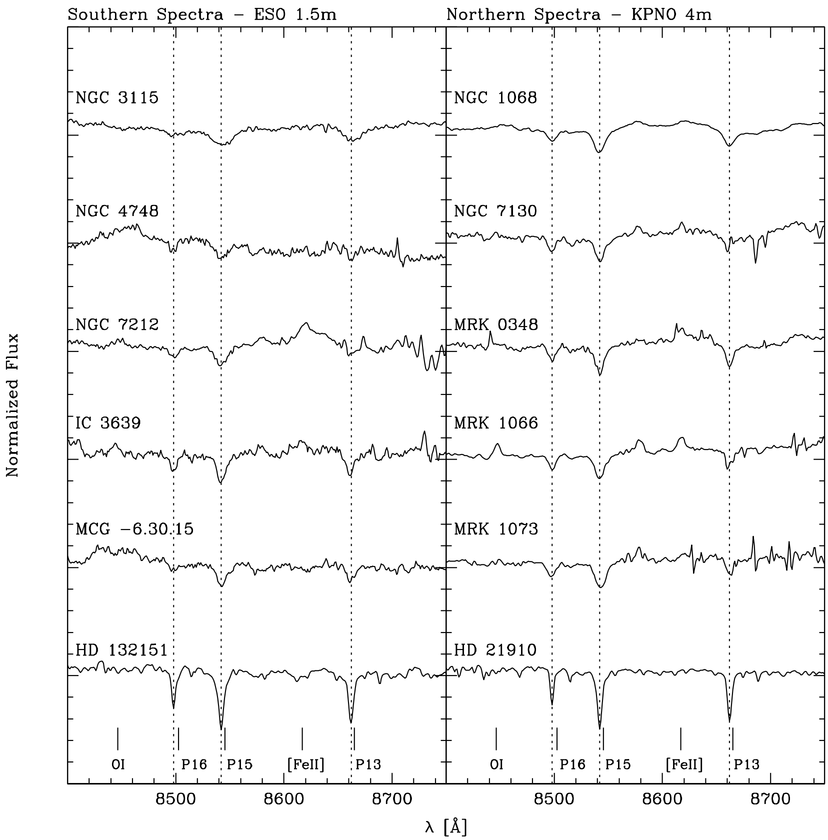

Figure 1. Galaxy and velocity star spectra around the stellar absorption lines of the Calcium triplet; they are marked with dotted lines across the figure at 8498.02, 8542.09 and 8662.14 Å. Other emission features (OIλ8446 and [FeII]λ8617) are marked at the bottom of the figure, as well as the Paschen lines P16, P15 and P13, at 8502, 8545 and 8665 Å, respectively; though close to the CaT, the Pa lines do not affect the final values of the velocity dispersions.

the Ca II triplet. Some preliminary values of the velocity dispersions obtained here are in good agreement with those from the literature. We also obtained velocity dispersion values by other techniques; these values, as well as the errors involved in the different measurement, are discussed in Vale Asari's contribution (this volume).

We are now working on (a) measuring the EW of the CaT lines in the nuclear extracted spectra, (b) getting Black Hole masses through the velocity dispersion measures, and (c) calculating nuclear luminosities and therefore the M/L ratio for the whole sample.

Acknowledgements

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References

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