RevMexAA (Serie de Conferencias), **14**, 81–81 (2002)

TRIGGERING AGN'S: AN EVOLUTIONARY SCENARIO

T. Storchi-Bergmann[1], R. Cid Fernandes[2], R. González Delgado[3], H.R. Schmitt[4] and T. Heckman[5]

One long-standing problem in the study of nuclear activity in galaxies is the feeding of the central supermassive blackhole (SMBH).

In the scenario in which the SMBH are ubiquitous in galaxy bulges, having been formed when the bulges themselves where formed, the active nuclei in the near Universe are the ones in which the SMBH is being presently fed. The large amounts of gas and dust observed on the nuclear region of these galaxies suggests that this gas comes from galactic scales, and a mechanism is thus necessary to explain how the gas looses its angular momentum. One of these mechanisms is the interaction between galaxies, but previous works have not found a significant excess of interactions in Seyfert galaxies when compared with control samples. Here we argue that this negative observational result is due to evolution of the evironment of the active nucleus (AGN). The delay between the interaction and the onset of the activity, and the fact that the activity cycle is longer lived than the signatures of interaction, would lead to many cases of AGN observed in galaxies in which the latter signatures have already disappeared.

This evolutionary scenario is supported by the results of two recent works in which we investigated the relation between the age of the circumnuclear stellar population and the properties of the host galaxies for a sample of 35 Seyfert 2 nuclei. In Cid Fernandes et al. (2001) we found that the Seyfert 2 galaxies with the youngest stellar populations are the ones with largest infrared luminosities. The most extreme cases are also evidently distorted and in interaction. In Storchi-Bergmann et al. (2001) we found that the galaxies with young circumnuclear stellar population (about 40% of the sample) tend to have late-type morphologies in HST images of the nuclear region, and that the incidence of interactions is much larger in these galaxies, as illustrated in the figure.

The above results are consistent with interactions being the mechanism for sending gas inwards, which will trigger not only the AGN activity but also circumnuclear star formation. The age of the circumnuclear stellar population would thus be a "clock" counting the time elapsed since the interaction. For ages of this stellar population younger than 500 Myrs, it is still possible to observe the signatures of the interaction, both in the inner morphology of the galaxy and in the proximity of companions. For older ages, the signatures of interaction are gone, but the nuclear activity is still observed because it is longer lived.

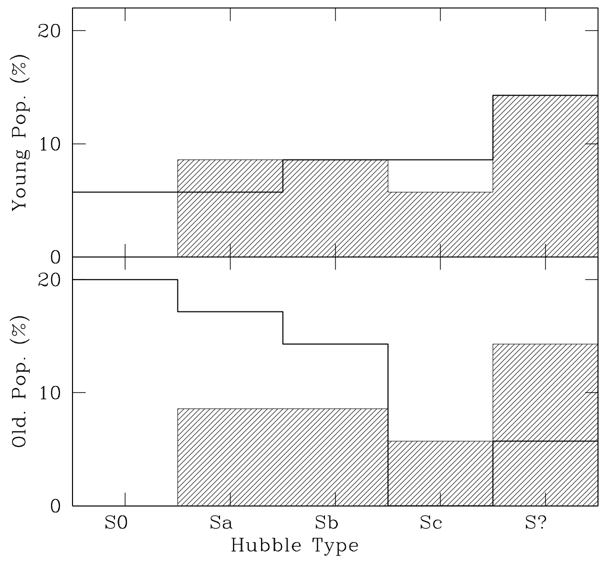

Fig. 1. The Hubble type distribution of interacting galaxies (hatched histograms) in a sample of 35 nearby Seyfert 2 galaxies, as compared with the distributions of the sample separated according to the age of the circumnuclear stellar population (open histograms). Top: population younger than 100 Myr; bottom: older population.

REFERENCES

Cid Fernandes, R. et al. 2001, ApJ, 558, 81
Storchi-Bergmann, T. et al. 2001, ApJ, 559, 147

[1]Instituto de Física, UFRGS, Porto Alegre, Brazil (thaisa@if.ufrgs.br)
[2]Dep. de Física, CFM, UFSC, Florianópolis, Brazil
[3]Inst. de Astrofísica de Andalucía, Granada, Spain
[4]National Radio Astronomy Observatory, Socorro, NM, USA
[5]Johns Hopkins University, Baltimore, MD, USA