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INDUCED NUCLEAR ACTIVITY IN GALAXY PAIRS

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RESUMEN

Analizamos espectros del núcleo de 893 galaxias entre pares de galaxias y galaxias aisladas de la muestra SLOAN (DR7). Estos pares pueden ser divididos en tres grupos: S+S, E+E y E+S de acuerdo con el catálago de pares aislados de galaxias de Karachentsev (KPG). También analizamos dos muestras de galaxias aisladas: el catálogo de galaxias aisladas de Karachentseva (CIG) y la muestra de galaxias aisladas en el hemisferio norte de Varela. Estudiamos la incidencia de la actividad nuclear en cada grupo. Nuestros resultados muestran que la incidencia de actividad nuclear es significativamente mayor en galaxias pares que en las aisladas. Más aún, mostramos que esta incidencia es mayor para galaxias con morfología de tipo temprano. La presencia del bulbo parece ser crucial para explicar cómo se alimenta el hoyo negro supermasivo en AGN. También confirmamos que los AGN de tipo 1 están casi ausentes en toda la muestra. Este resultado no es posible explicarlo tomando sólo en cuenta un modelo unificado.

ABSTRACT

We analized the nuclear spectra of 893 galaxies in isolated pairs from the Sloan Digital Sky Survey (DR7). These pairs can be divided into three groups: S+S, E+E, E+S according to the catalogue of isolated galaxy pairs (KPG) by Karachentsev. We also analyzed two samples of isolated galaxies: the catalogue of Isolated Galaxies by Karachentseva (CIG) and Varela's sample of northern isolated galaxies. We studied the incidence of Nuclear Activity in every group. Our results show that the incidence of AGN activity is significantly higher in most galaxies in pairs as compared to isolated. Most importantly, we show that this is stronger for earlier morphological types. The presence of a bulb appears to be crucial in explaining the feeding of super massive black holes in AGN. We also confirm that Seyfert type 1 nuclei are almost absent. This result cannot be explained with the unified model for Seyferts only.

Key Words: H II regions — ISM: jets and outflows — stars: mass loss — stars: pre-main sequence

1. INTRODUCTION

The first studies of the extragalactic influence on AGN, were devoted to investigate the difference in the environment between active and non-active galaxies, without distinguishing activity type. More recently, the importance of making a difference between close and large scale environment, has become clear. The first studies were affected by the lack of clear definitions, statistical biases and also biases introduced by sample selection effects. All these methodological problems have yielded contradictory results that can be found in the literature for over more than 20 years. One of the first discussions of these effects is given in Dultzin-Hacyan et al. (1999). As more refined studies have been performed, it has become clear that Seyfert 2 galaxies are in interaction with the same frequency than Star-Forming Galaxies (SFG) (e.g., Storchi-Bergmann et al. 2001; Krongold et al. 2001), while Seyfert 1 galaxies are in interaction less frequently.

In the present paper we adopt a complementary approach. We study the incidence of nuclear activity in a well defined sample of interacting galaxies in pairs and compare with a two samples of true isolated galaxies.

2. SAMPLE

Our study consists on three galaxy samples. The catalog of Isolated Pairs of Galaxies (CPG; Karachentsev 1972) from which we obtained three groups of pairs E+E, E+S and S+S including S0 galaxies as elliptical. The control samples are: The Catalog of Isolated Galaxies (CIG; Karachentseva 1973) and a Northern Isolated Galaxy catalogue compiled by Varela et al. (2004). We obtain all available spectra from the Sloan Digital Sky Survey Data Release 7 (SDSS-DR7) for all the samples.

A total of 893 nuclear spectra of galaxies have been extracted from (both paired and isolated galaxies). We focus in measuring the intensity of the strongest emission lines: Hα, [OIII] λ5007, Hβ, [NII] λ6584, with a signal to noise ration (S/N) > 3. Host

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