ample, in the Seyfert 1, where we can distinguish broad emission line components akin to what is observed in quasars (Osterbrock 1989; Weedman 1986; Krolik 1999), the presence of a SMBH seems indubitable. However, a significantly larger fraction of AGNs show only narrow emission lines. Also, many researchers have alluded to different characteristics for these Narrow Line AGNs (NLAGNs) by separating them into two main groups, the high ionization galaxies, generally called Seyfert 2 (Sy2), and the low ionization ones, called LINERs, which stands for Low Ionization Nuclear Emission-line Regions (Heckman 1980; Coziol 1996; Kewley et al. 2006). As a consequence, the source of ionization of NLAGNs, although clearly distinct from SFGs, is still an actively debated subject, and there is presently no consensus about their nature or evolutionary status.

It is usually admitted that both Sy2 and LINERs are phenomena that occur in early-type (Sa and Sb) spiral galaxies in the field, that is, galaxies forming in relatively low galactic density environments (Heckman 1980). On the other hand, there is growing evidence that NLAGNs in clusters and compact groups of galaxies differ from those in the field by their earlier morphological types and intrinsic low luminosities (Phillips 1986; Coziol et al. 1998a; Miller et al. 2003; Wake et al. 2004; Martínez et al. 2008, 2010; Torres-Papaqui et al. 2011). These differences seem to point to distinct formation mechanisms for galaxies in different environments, which could have also affected the formation and evolution of their black holes. For example, the Low Luminosity AGNs (LLAGNs) found in compact groups and clusters of galaxies appear to prefer massive bulge spiral galaxies or elliptical galaxies–galaxies which are poor in gas–and it is this actual scarcity of matter that can be accreted that is assumed to explain the low luminosity of these objects (Martínez et al. 2008; Torres-Papaqui et al. 2011). This explanation is fully consistent with the starving quasar model (Richstone et al. 1998; Gavignaud et al. 2008; Martínez et al. 2008, 2010), according to which a SMBH that had accreted at high rates in the past, producing a quasar-like activity, evolved as its reservoir of gas was depleted into a slowly accreting SMBH producing a LLAGN.

In order to test the idea of a variation of the AGN phenomenon in different environments we considered important to study galaxies for which the influence of their environment was minimal. These are galaxies that are relatively isolated–that is, they formed in low galactic density environments and evolved without major interactions with other galaxies.

2. DESCRIPTION OF THE SAMPLE AND DATA USED FOR ANALYSIS

Our sample of isolated galaxies was selected from the 2 Micron Isolated Galaxies catalogue (hereafter 2MIG), as compiled by Karachentseva et al. (2010). The 2MIG catalogue contains 3227 galaxies, covering the entire sky. All the galaxies have a near-infrared magnitude brighter than $K_s = 12$, and a projected image that extends across an angular diameter $a_K \geq 30''$. The isolation criterion used in this catalogue is the following: a galaxy is considered isolated when its nearest neighbor has a size within a factor 4 of the major-axis diameter of the target galaxy, and lies more than 20 diameters away from it. This criterion assures that a galaxy with a typical diameter of 20 kpc and peculiar velocity of the order of 150 km s^{-1} was not influenced by a similar type of galaxy during the last ∼3 Gyr (Turner et al. 1979).

To produce our sample, we have cross-correlated the positions of the galaxies in the 2MIG catalogue with spectroscopic targets in the Sloan Digital Sky Survey Data Release 7 (SDSS DR7) database (Abazajian et al. 2009). This resulted in 445 galaxies, which represents 88% of the galaxies in the 2MIG catalogue covered by the SDSS DR7. The remaining 12% are galaxies for which spectroscopic data were not obtained by SDSS, because they were too nearby or too bright.

Color images of the galaxies were obtained using the tool CHART of SDSS[3]. After visual inspection, we eliminated 28 galaxies with morphological peculiarities or possible faint companions, in apparent contradiction with the isolation assumption.

A preliminary examination of the spectra reveals that all these galaxies except one show emission lines. The only non-emission "isolated" galaxy is identified as SDSS J072635.39+431746.8. This is a nearby galaxy, $z = 0.0105$, with a possible E or S0 morphology. Being the only galaxy of its kind it was excluded from our study.

Also excluded from our analysis were two extremely blue S0-like galaxies, with spectra typical of late-type spirals–showing a recent and extremely intense level of star formation. A careful examination of their images suggested that they are low mass irregular or morphologically peculiar galaxies. Their positions in the standard diagnostic diagram reveal that they are HII galaxies–small mass and low gas metallicity starburst galaxies (see Coziol 1996).

Only five galaxies in our sample were found to have broad emission line components. The spectra

[3] http://cas.sdss.org/dr7/en/tools/chart/chart.asp.