Upper limits on supermassive black holes from STIS archival data

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1. INTRODUCTION

The census of supermassive black holes (SMBHs) is large enough to probe the back peaks between mass and redshift, already portraying the SMBH mass, and the importance of the host galaxy, the mass and luminosity of the host galaxy, the central velocity dispersion, the light distribution, the gas accretion, and the black hole growth. The presence of SMBHs in the host galaxy is a test of accretion and the black hole growth, and this can be explored in the host galaxy. These limits will be derived from the modeling of the central emission-line widths (Hβ,[OIII]8800 Å), and (Hβ,[OIII]8740 Å) observed over an aperture of 0.1 - 0.5 arcsec. In this paper, we present our preliminary results about a subsample of 20 galaxies with type disk galaxies (S0-III), within 50 Mpc.

2. SAMPLE SELECTION AND ARCHIVAL DATA

Here we analyze a subsample of 23 galaxies. They have been selected to be 50% of the galaxies with a central velocity dispersion (σ0) available in the literature. All the galaxies were observed in part of the STIS archive in 1998 and 2000. The QSO and galaxies were not included. The integrated spectra were obtained by Sarzi et al. (2001, ApJ, 557, 277) and Verdoes-Klein et al. (2000, astro-

3. DATA ANALYSIS

Basic data reduction, wavelength, and flux calibration were performed with the STIS pipeline, which has been applied to the cosmic rays and the photoelectric effects. This is achieved by extracting a [OIII]-Hβ gap from the continuum peak. The data for the gas velocity dispersion (σ0) was measured by the fitting Gaussians with a high signal-to-noise ratio. The gas velocity dispersion was then derived from the fitting Gaussians with a high signal-to-noise ratio.

4. RESULTS

We assumed that the sample gas is an object and moves under the influence of the central MBH. To derive the upper limits on Mbh, we first build the gas velocity field and project it onto the plane perpendicular to the gas flow. Then we observed the simulations of the black hole migration in the disks with a tilt of 10 degrees. The model for the radial profile of the gas galaxy by fitting either an exponential or a Gaussian function to the data containing the center. Figure 2 shows the model profile as a function of MBH and disk orientation.

5. CONCLUSIONS

The resulting upper limits on Mbh are given in Table 1 for both the exponential (col. 10) and Gaussian (col. 11) fits. Figure 3 shows three consistent within a factor of 2-3 as derived by Sarzi et al. (2002) for the 2000 sample. Our limit on the mass of the central MBH is somewhat lower than that found by Ferrarese & blonde (2000) by modeling the result of the gas disk component. The major axis and the minor axis of the galaxy are also included in the table. This approach is applicable to the galaxy for which we obtained a STIS/POMI spectrum. This will allow us to derive the gravitational effects of the central MBH on the galaxy and identify promising candidates for further investigations.

Figure 1: Comparison between our upper limits on the mass of SMBHs (col 10) and the Gaussian (col. 11) fits. Figure 2 shows the model profile as a function of MBH and disk orientation.

Figure 2: Line profile of the [OIII]-Hβ emission line, with a Gaussian (grey line) and a non-Gaussian (black line) fit. Figure 3 shows the weighted averaging of the MBH (black column), for 10-0.1, 0.1-10, and 10-100. Figure 4 shows the model profile as a function of MBH and disk orientation.

Table 1. Observed and derived properties for the sample galaxies.

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