

# Detecting Gas Outflows in Type-2 AGNs Selected from the Sloan Digital Sky Survey

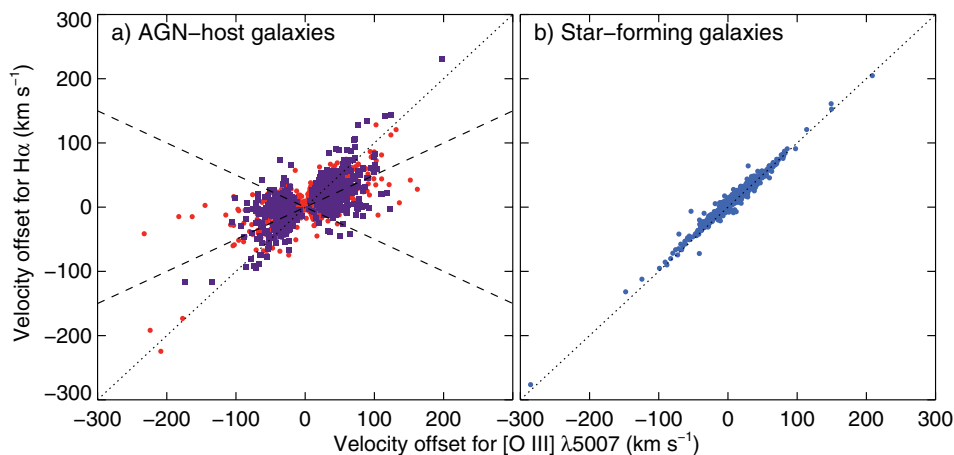
Hyun-Jin Bae<sup>1</sup>, Jong-Hak Woo<sup>2</sup>, and Semyeong Oh<sup>2</sup>

<sup>1</sup>Dept. of Astronomy, Yonsei University, Seoul 120-749, Republic of Korea  
email: hjb@galaxy.yonsei.ac.kr

<sup>2</sup>Astronomy Program, Dept. of Physics and Astronomy, Seoul National University, Seoul 151-742, Republic of Korea

**Abstract.** Energetic outflow from active galactic nuclei (AGNs) may play a critical role in galaxy evolution (e.g., Silk & Rees 1998). We present a velocity diagnostic for detecting gas outflow in the narrow-line region of Type-2 AGNs using line-of-sight velocity offsets of the [O III]  $\lambda 5007$  and H $\alpha$  emission lines with respect to the systemic velocity of stars in host galaxies (See Figure 1). We apply the diagnostics to nearby galaxies at  $0.02 < z < 0.05$ , 3775 AGN-host and 907 star-forming galaxies as a comparison sample, which are selected from the Sloan Digital Sky Survey DR7. After obtaining a best-fit stellar population model for the continuum and a systemic velocity based on stellar lines, we subtract the stellar component to measure velocity offsets of each emission line. We find a sample of 169 AGN-host galaxies with outflow signatures, displaying a larger velocity shift of [O III] than that of H $\alpha$ , as expected in a decelerating outflow model (Komossa *et al.* 2008). We find that the offset velocity of [O III] increases with Eddington ratio, suggesting that gas outflow depends on the energetics of AGN.

**Keywords.** galaxies: active — galaxies: ISM



**Figure 1.** Velocity-offset diagnostic diagrams for a) AGN-host galaxies, i.e. Seyferts (circles) and LINERs (boxes), and b) star-forming galaxies, using velocity offsets for [O III] and H $\alpha$  lines with respect to the systemic velocity. In both panels, dotted lines indicate the same velocity offsets for both emission lines. The AGN-host galaxies within dashed lines are likely to exhibit an outflow, which is possibly due to a decelerating wind in the narrow-line region along the central black hole.

## References

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Silk, J. & Rees, M. 1998, *A&A*, 331, L1