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Determining Stellar Velocity Dispersion in Active Galaxies: Is the [OIII] Width a Valid Surrogate? KELSI FLATLAND, VARDHA N. BENNERT, Cal Poly San Luis Obispo, MATTHEW W. AUGER, Instituted of Astronomy, University of Cambridge, UK, TOMMASO TREU, University of California, Santa Barbara — The tight empirical relation between the stellar velocity dispersion (σ) of the bulge and the mass of the supermassive black hole (BH) at its center indicates a close connection between galactic evolution and BH growth. The evolution of this relation with cosmic time provides valuable clues to its origin. While the mass of the BH can be easily estimated using the Doppler broadening of the Hβ emission line in type-1 active galactic nuclei (AGNs), measuring σ simultaneously is challenging, since the nuclear emission outshines the host galaxy. Thus, it is highly desirable to find an alternative way to estimate σ. In the literature, the width of the [OIII] emission line has been used as a surrogate, assuming that the narrow-line region follows the gravitational potential of the bulge. While the [OIII] line has the great advantage of being easily measurable in AGNs out to large redshifts, it is also known to be affected by outflows and jets. For a sample of about 100 nearby active galaxies, we determine the width of the [OIII] line using two Gaussians to exclude any outflowing component. The resulting width is compared to σ measurements previously compiled from Keck spectroscopy for the entire sample to determine the method's viability.

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