Nuclear Activity in Galaxies Across Cosmic Time
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Probing black hole - host galaxy scaling relations with obscured type II AGN

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Abstract. The scaling relations between supermassive black holes and their host galaxy properties are of fundamental importance in the context black hole-host galaxy co-evolution throughout cosmic time. Beyond the local universe, such relations are based on black hole mass estimates in type I AGN. Unfortunately, for this type of objects the host galaxy properties are more difficult to obtain since the AGN dominates the observed flux in most wavelength ranges. In this poster I will present a new correlation we discovered between the narrow L([OIII])/L(Hβ) line ratio and the FWHM(broad Hα). This scaling relation ties the kinematics of the gas clouds in the broad line region to the ionization state of gas in the narrow line region, connecting the properties of gas clouds kiloparsecs away from the black hole to material gravitationally bound to it on sub-parsec scales. This relation can be used to estimate black hole masses from narrow emission lines only, and thus brings the missing piece required to estimate black hole masses in obscured type II AGN. Using this technique, we estimate the black hole mass of about 10,000 type II AGN, and present, for the first time, M(BH)-sigma and M(BH)-M(stars) scaling relations for this population. These relations are remarkably consistent with those observed for type I AGN, suggesting that this new method may perform as reliably as the classical estimate used in non-obscured type I AGN. These findings open a new window for studies of black hole-host galaxy co-evolution throughout cosmic time.

Keywords. galaxies: active, galaxies: black holes, galaxies: main relations