

**[7GC-09] Revisiting the virial factor with the updated  $M_{\text{BH}}-\sigma_*$  relation**

Daeseong Park, Jong-Hak Woo

*Astronomy Program, Department of Physics and Astronomy, Seoul National University*

Determining the virial factor of the broad-line region (BLR) gas is crucial in calibrating AGN black hole mass estimators, since the measured line-of-sight velocity needs to be converted into the representative velocity of the BLR gas. The unknown virial factor has been empirically calibrated based on the  $M_{\text{BH}}-\sigma_*$  relation of non-AGN galaxies, but the claimed values are different by a factor of 2 in recent studies. We investigate the origin of the difference by measuring the  $M_{\text{BH}}-\sigma_*$  relation using the most updated nearby galaxy sample, and explore the dependence of the virial factor on the various fitting methods. We find that the discrepancy is mostly caused by the sample bias while the difference stemming from various regression methods is marginal. Based on the best-determined virial factor, we present the updated  $M_{\text{BH}}-\sigma_*$  relation of local active galaxies.

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**[7GC-10] Weighing the most massive black holes in the Universe**

Hyunsung Jun and Myungshin Im

*CEO/Dept. of Physics and Astronomy, Seoul National University*

According to the correlations between galaxy and black hole mass, the most massive galaxies harbor the most massive black holes, with a current mass limit of