

[KGC-15] **The black hole mass–stellar velocity relation of the present–day active galaxies.**

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To investigate whether the present–day active galaxies follow the same black hole mass vs. stellar velocity dispersion ($M_{\text{BH}} - \sigma_*$) relation as quiescent galaxies, we measured the velocity dispersions of a sample of local Seyfert 1 galaxies, for which black hole masses were measured via reverberation mapping. We measured stellar velocity dispersions from high S/N optical spectra centered on the Ca II triplet region ($\sim 8500 \text{ \AA}$), obtained at the Keck, Palomar, and Lick Observatories. For two objects, in which the Ca II triplet region was contaminated by nuclear emission, we used high–quality H–band spectra obtained with the OH–Suppressing Infrared Imaging Spectrograph and laser–guide star adaptive optics at the Keck–II Telescope. Combining our new measurements with data from the literature, we assemble a sample of 24 active galaxies with stellar velocity dispersions and reverberation M_{BH} in the range of black hole mass $106 < M_{\text{BH}} / M_{\odot} < 109$, to obtain the first reverberation mapping constraints on the slope and intrinsic scatter of the $M_{\text{BH}} - \sigma_*$ relation of active galaxies. Assuming a constant virial coefficient f for the reverberation M_{BH} , we find a slope $\beta = 3.55 \pm 0.60$ and the intrinsic scatter $\sigma_{\text{int}} = 0.43 \pm 0.08$ dex in the relation $\log(M_{\text{BH}}/M_{\odot}) = \alpha + \beta \log(\sigma_*/200 \text{ km s}^{-1})$, which are consistent with those found for quiescent galaxies. We derive an updated value of the virial coefficient f by finding the value which places the reverberation masses in best agreement with the $M_{\text{BH}} - \sigma_*$ relation of quiescent galaxies; using the quiescent $M_{\text{BH}} - \sigma_*$ relation determined by Gültekin et al. we find $\log f = 0.72 + 0.09$ (or 0.71 ± 0.10) with an intrinsic scatter of 0.44 ± 0.07 (or $0.46 + 0.07$) dex. No correlations between f and parameters connected to the physics of accretion (such as the Eddington ratio or line–shape measurements) are found. The uncertainty of the virial coefficient remains one of the main sources of the uncertainty in black hole mass determination using reverberation mapping, and therefore also in single–epoch spectroscopic estimates of black hole masses in active galaxies.