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The MBH - σ Relation of 105 Months SWIFT-BAT AGNs

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We present central stellar velocity dispersion measurements for 158 type 1 AGNs from the second data release of the Swift/BAT AGN Spectroscopic Survey (BASS DR2) with a redshift cut-off z < 0.08. A total number of 297 type 1 AGN spectra are fit for obtaining two independent measurements from the Ca II H+K + Mg I region (3880 - 5550°A) and the calcium triplet region (8350-8750°A). The resulting σ CaT estimates are found to be in the range: $73 \le \sigma$ CaT ≤ 278 km s-1, whereas the σ CaH+K+M gI estimates are found to be in the range: $82 \le \sigma$ CaH+K+M gI ≤ 272 km s-1, for our AGN sample. We show that both σ estimates are very consistent with each other with an average difference of 0.03 dex. Using the BASS DR2 MBH archive and our σ measurements, we present one of the largest MBH - σ relation investigations for type 1 AGNs. We demonstrate that extinction in BLR causes under-estimation of black hole masses (MBH), accordingly, over-estimation of Eddington ratios (log λ Edd). We do not find a significant trend between the offset from the MBH - σ relation versus star-formation and the core radio AGN luminosities. Interestingly, we report that AGNs with relatively higher log λ Edd show higher offset implying that their super-massive black holes still need to grow to keep up with their host-galaxy growth. We conclude that the offset from MBH - σ relation is still strong for AGNs relative to elliptical/classical bulge-hosting galaxies, and using a specified AGN MBH - σ relation is a better approach for obtaining black hole masses of AGN populations.

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