

Abstract Submitted  
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**Evolution in the Black Hole - Galaxy Scaling Relations and the Duty Cycle of Nuclear Activity in Star-Forming Galaxies** MOUYUAN SUN, J.R. TRUMP, W.N. BRANDT, D. ALEXANDER, K. JAHNKE, D.J. ROSARIO, S.X. WANG, Y.Q. XU, B. LUO, Pennsylvania State Univ and USTC — We measure the location and evolutionary vectors of 70 Herschel -detected broad-line active galactic nuclei (BLAGNs) in the MBH – M\* plane. BLAGNs are selected from the COSMOS and CDF-S fields, and span the redshift range  $0.2 \leq z < 2.1$ . We find our sample is consistent with no evolution in the MBH – M\* relation from  $z \sim 2$  to  $z \sim 0$ . BLAGNs and their host-galaxies which lie off the black hole mass–galaxy total stellar mass relation tend to have evolutionary vectors pointing back to the relation. We also use the measured growth rates to estimate the preferred AGN duty cycle for our galaxies to evolve most consistently onto the local MBH – MBul relation. Under reasonable assumptions of exponentially declining star formation histories, the data suggest a non-evolving (or weak-evolving) BLAGN duty cycle among star-forming galaxies of  $\sim 6\%$  (1 sigma range of 0.05 – 30% at  $z < 1$  and 0.6 – 25% at  $z > 1$ ).

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