X36a Black Hole - Galaxy Coevolution at Cosmic Noon Probed by HETDEX

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We investigate the coevolution of supermassive black holes (SMBHs) and their host galaxies with 43 type 1 AGN at z=2-2.5 that are spectroscopically confirmed by the un-targeted optical spectroscopic survey of Hobby-Eberly Telescope Dark Energy Experiment (HETDEX) via multiple broad (FWHM$>$ 1000 km s^{-1}) emission lines in conjunction with deep Subaru imaging data. Selected from a parent sample of 2126 HETDEX type 1 AGN that cover a wide range of absolute UV magnitude of $-27 \lesssim M_{\rm UV} \lesssim -20$, out sources have black hole masses that are as small as $M_{\rm BH} \sim 10^7 M_\odot$, which is 1 dex smaller than previous results at the similar redshift, allowing us to explore the stellar mass(M^*)-$M_{\rm BH}$ relations down to the low-mass end. Utilizing the archival UV to IR photometric data, we perform the host-nuclear decomposition and estimate M^* by SED fitting. Our results show a positive offset of $M_{\rm BH}$ above the local $M^* - M_{\rm BH}$ relation, indicating SMBHs grow more efficiently at higher redshift. Comparing our results with different models from hydrodynamic simulations, we will discuss the impacts of feedback and seeding mechanisms on the growth of SMBHs and host galaxies during the early stage of their formation.