

AGN Feedback efficiency of line-locked absorption systems in the quasar HE0151–4326

OLIU QIANG¹ Misawa Toru¹ Noboriguchi Akatoki¹ Kobu Satoshi^{1, 2} Horiuchi Takashi³ Charlton Jane C.⁴ Eracleous Michael⁴ (1.Shinshu University 2.Nagano Prefectural Institute of Technology 3.Toyama University 4.Penn State University)

AGN outflows are widely believed to contribute to the co-evolution of supermassive black holes (SMBHs) and their host galaxies. Among them, line-locked absorbers provide useful constraints on outflow geometry because their velocity directions are expected to be almost parallel to our line of sight, reducing uncertainties in estimating their velocities.

We analyze four VLT/UVES spectra of a quasar HE0151-4326 that have been obtained over a time span of approximately 20 years. This is the only quasar in the SQUAD sample that hosts clear line-locked C IV systems in the SQUAD sample. We detect a significant variability in the coverage fractions of the absorbers. After careful consideration of the “gas motion scenario” and “ionization state change scenario” as possible origins of the variability, we conclude the latter is more promising since time variations of absorption strength and quasar luminosity are synchronized. The former scenario that requires all absorbers to cross our line of sight simultaneously is less likely. Based on photoionization models, we constrain the physical properties of the line-locked systems and discover that their feedback efficiency, a ratio of kinetic luminosity and Eddington luminosity, is not enough to contribute to AGN feedback.