A Possible Thin Disk-Wind Mechanism of Broad-line Emission in AGN

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Abstract

Following on the work of Chiang and Murray (1996) and Waters et al (2016) we explore new regimes in the so called "disk-wind" mechanism for explaining the broad-line region in active galactic nuclei (AGN), which requires only the classic thin accretion disk geometry with the addition of a magnetohydrodynamic "wind" to well match observed spectra. This alternative to the classic "puffy disk" model yields statistically significant differences in both the assumed size of the underlying accretion disks as well as the masses of the supermassive black holes, motivating a search for future observables that could help identify which class of AGN models are correct. While we can easily obtain similar flux profiles as those observed with our model, we show that the phase profiles still look similar to those we would expect from purely Keplerian rotation of a thin-disk, albeit with a much smaller amplitude that is currently beneath the resolution of instruments like GRAVITY, which notably does not show any phase profile in observational data.

References

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