

S25a **Time-dependent behavior of broad emission line profiles of rotating disks in a binary supermassive black hole system**

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The existence of unusual double (or multiple) peaked broad line objects has been successively reported recently by the Sloan Digital Sky Survey (SDSS). Two main theoretical models have been so far proposed; namely, the double peaked nature of broad line regions can be explained either by (1) the motion of the rotating disk around a supermassive, single black hole or (2) the superposition of the emission from broad line region around each black hole in a binary supermassive black hole system.

In this paper, we propose a third model as described below. We consider the emission line profiles of two rotating disks in the binary supermassive black hole system. Due to the tidal interaction, the disk around the primary black hole becomes eccentric, if the black hole mass ratio is approximately less than 0.33. As the disk precesses, it produces temporal variations, the most noticeable of which is the appearance of a hump in the center of the broad emission line profile. This hump appears periodically, depending on the shape of the rotating disk. We also discuss the behaviors of emission line profiles by superposition of the emission from each rotating disk in the binary system.