

N14a Wind-disk interaction in single and binary Be stars

Atsuo T. Okazaki (Hokkai-Gakuen University)

A Be star has two components in its circumstellar environment: a polar wind and an equatorial disk. Traditionally, these components are modeled independently. For example, the equatorial disk is typically assumed to be in hydrostatic equilibrium in the vertical direction, resulting in a flared disk structure. However, given the presence of a wind above the disk surface, questions arise about whether hydrostatic balance holds and if the flared disk structure is sustained.

In this talk, I will present hydrodynamic simulations of the wind-disk interaction, showing that the Be disk tends to maintain a constant opening angle rather than achieving hydrostatic equilibrium in the vertical direction. This is due to the entrainment of disk gas by the stellar wind, which removes a significant amount of gas (nearly 50% in the case of an isotropic wind) from the disk.

In binaries consisting of a Be star and a compact object, another type of wind-disk interaction occurs: the collision of the Be wind with an accretion flow. This is especially likely if the spin axis of the Be star is misaligned with the binary orbital axis, a common scenario in Be/X-ray binaries, a major subgroup of high-mass X-ray binaries. In such systems, the Be wind can have a strong dynamical effect on the accretion flow, dispersing a large fraction of the accreting gas and significantly reducing the accretion rate onto the compact object. I will also discuss this effect, based on results from numerical simulations.