

Radiation MHD simulations of super-/near-Eddington accretion flows and outflows

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By performing the radiation-MHD simulations, we reveal the global inflow and outflow structures around black holes. The optically and geometrically thick disks supported by the radiation pressure form, and the powerful outflows are driven by the radiation force for electron scattering in the super-Eddington phase. A part of the outflows fragments into numerous gas clouds, and the outflow generated near the trapping radius falls to the disk surface. It is also found that, for the case of the rotating black holes, the energy conversion efficiency increases, and the precession motion of the disk occurs. In the near-Eddington case, the radiation force for spectral lines is responsible for the disk winds, which is thought to be the origin of the ultrafast outflows.

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