S16b Long Term Simulations For Poynting Jets And Accretion Disks

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We present results of self-consistent 2.5-dimensional nonsteady MHD numerical simulations of long term evolution of jet formation activity in a magnetized accretion disk for many orbital periods, including the dynamics of accretion disks. Although the previous nonsteady MHD simulations for astrophysical jets revealed that the characteristics of nonsteady jets are very similar to those of steady jets, the calculation time of these simulations is very short compared with the time scale of observed jets. Thus we have investigated long term evolutions of the mass accretion rate, mass outflow rate and energy of toroidal magnetic field .We found that the jet is ejected intermittently with the period of around one orbital period which is similar to the growth time of the magneto rotational instability (MRI). We, also have investigated the evolution of poynting flux, kinetic flux and enthalpy flux. We found that the poynting flux is dominated over both the kinetic energy flux and enthalpy flux in case of initial strong magnetic field. In case of weak initial magnetic field the enthalpy flux is dominated over both pointing flux and kinetic energy flux. Poynting jets are of interest for understanding of the jets from active galactic nuclei, microquasars, and possibly gamma-ray burst sources.