Boundary effect of ADAF

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ABSTRACT

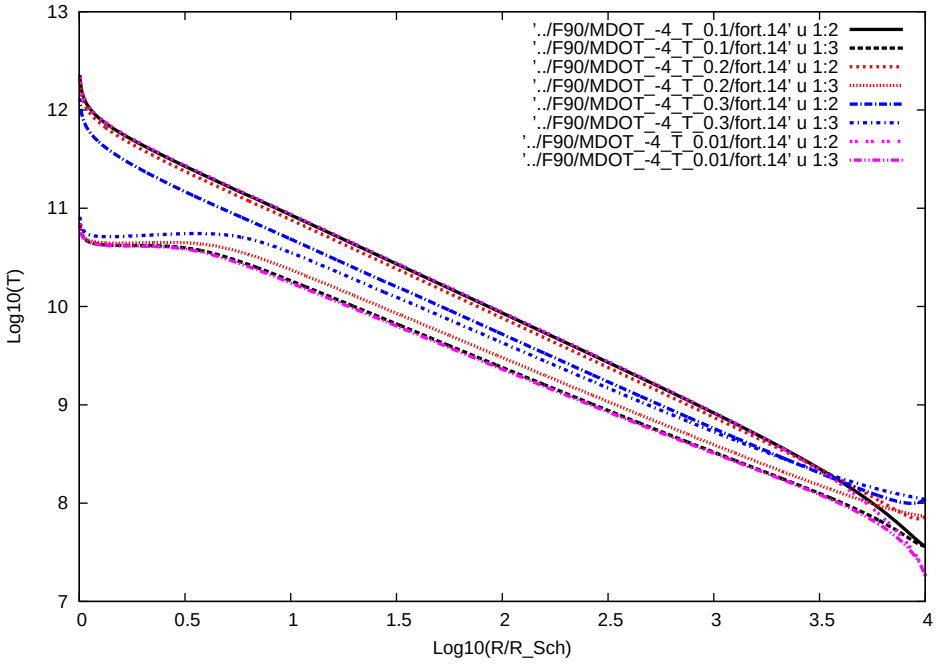
We investigate the solution of ADAF in various of boundary.

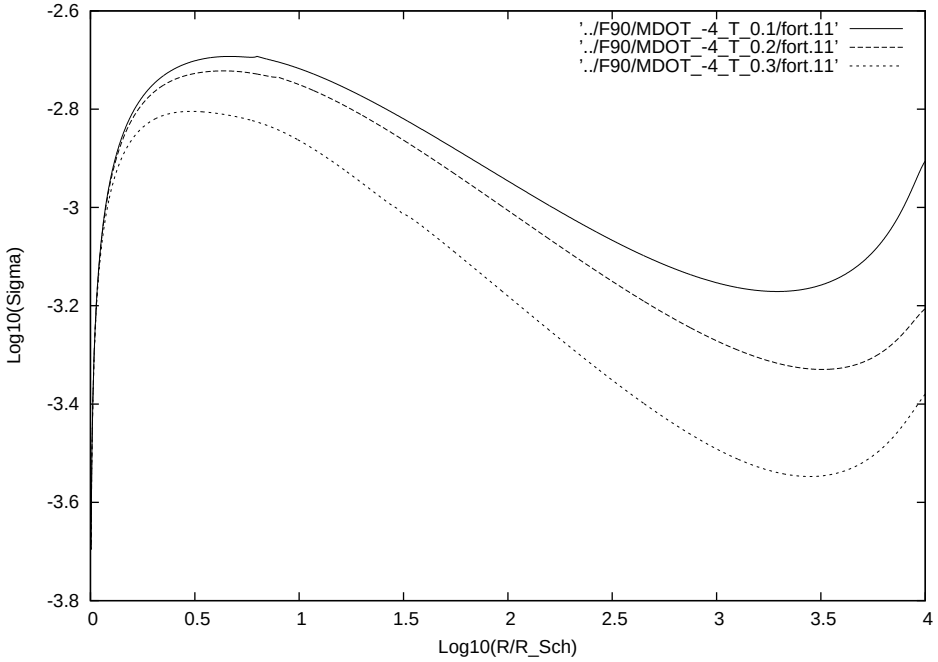
1. Boundary condition

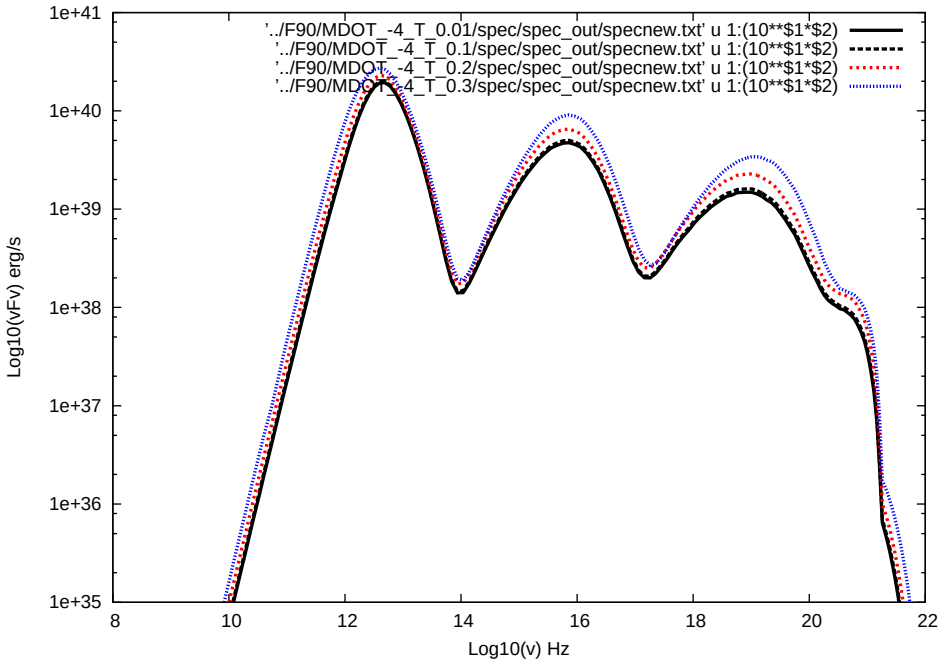
Boundary condition of ADAF contains temperature and angular velocity for a fixed accretion rate.

1.1. Temperature

We set a sequence of boundary temperature $T_{\rm out} = 0.01, 0.1, 0.2, 0.3 T_{\rm vir}$ while the angular velocity is set as $\Omega = 0.8\Omega_{\rm K}$.

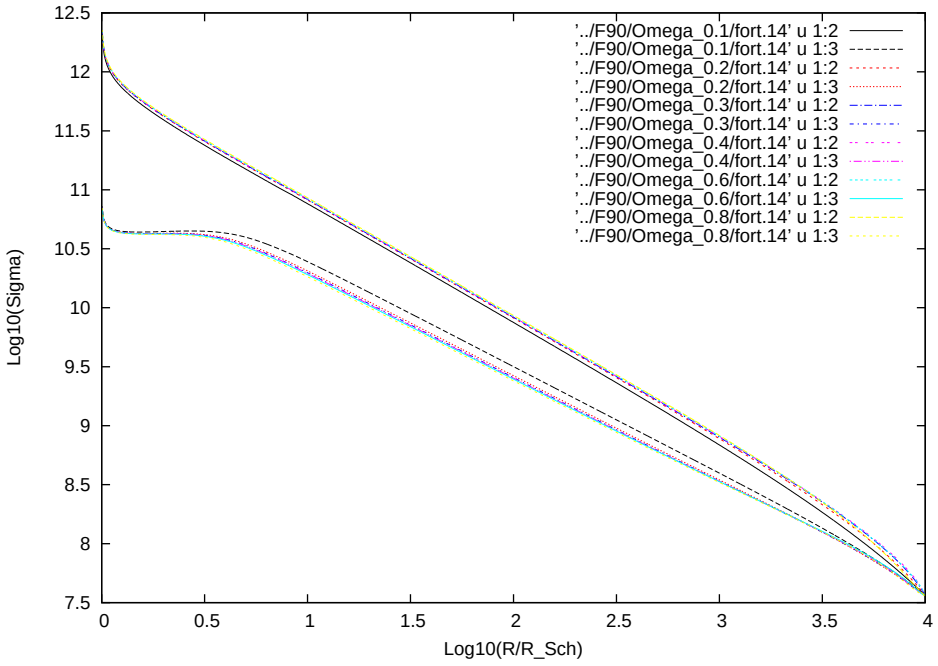


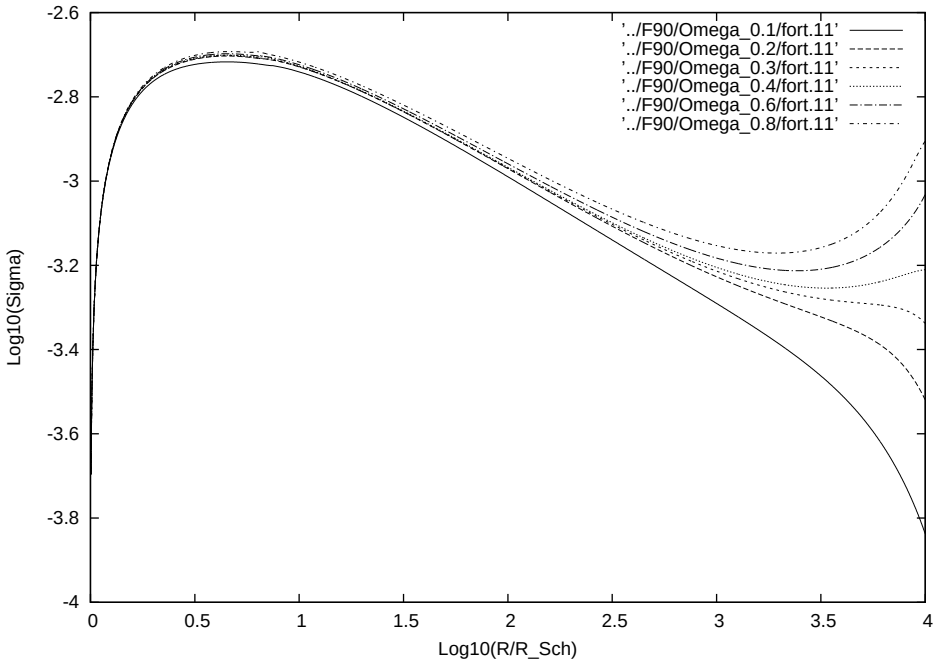




1.2. $\Omega_{\rm out}$

result for various $\Omega_{\rm out} = 0.1, 0.2, 0.3, 0.4, 0.6, 0.8\Omega_{\rm K}$ and the same boundary temperature $T_{\rm out} = 0.1T_{\rm vir}$.





2. Accretion environment

Although various boundary conditions lead to different structure of ADAF, there is only tiny alternation on the SED. This section aims to investigate the affection of different accretion rate to ADAF.

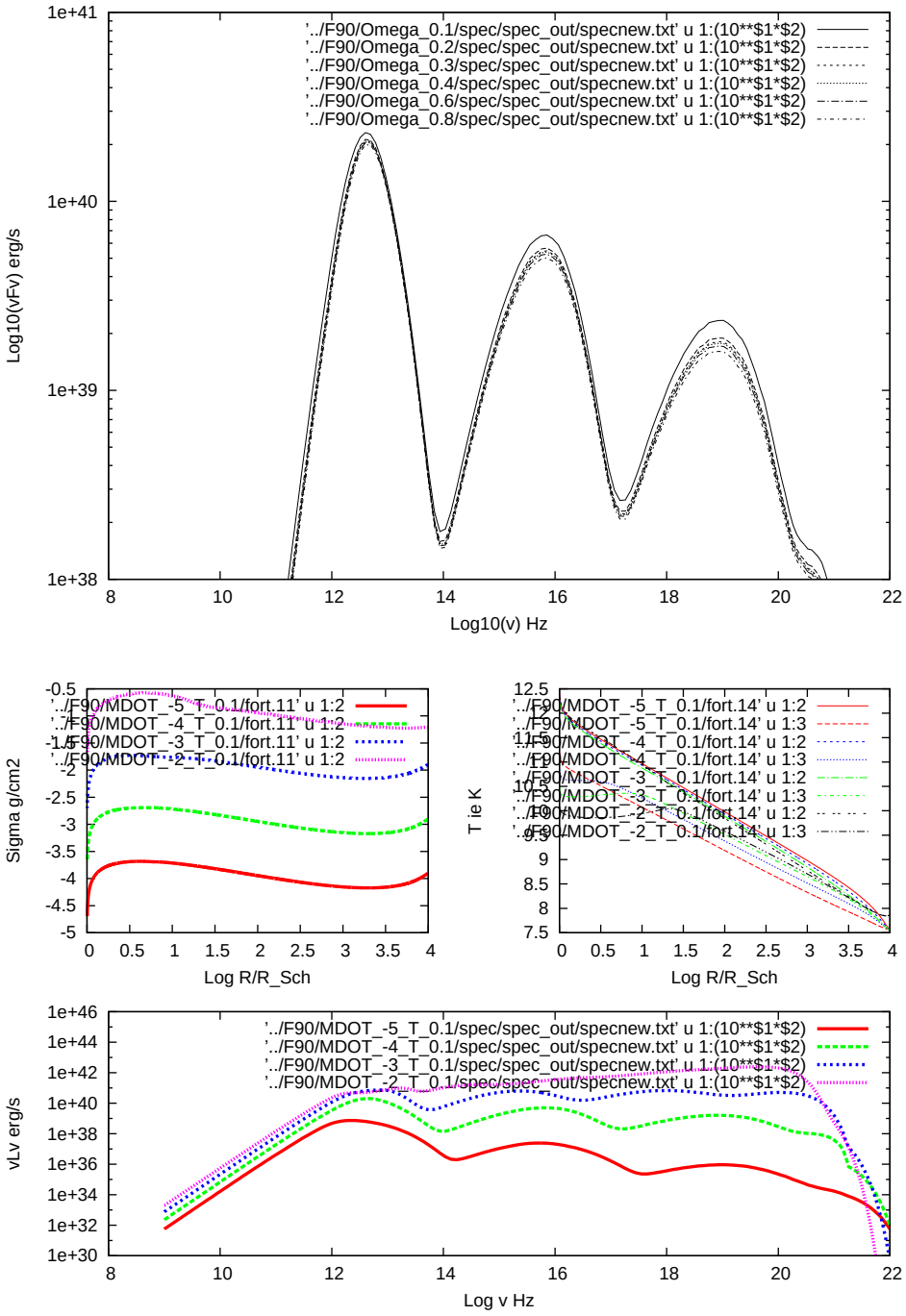


Fig. 1.— Results for different accretion rate.

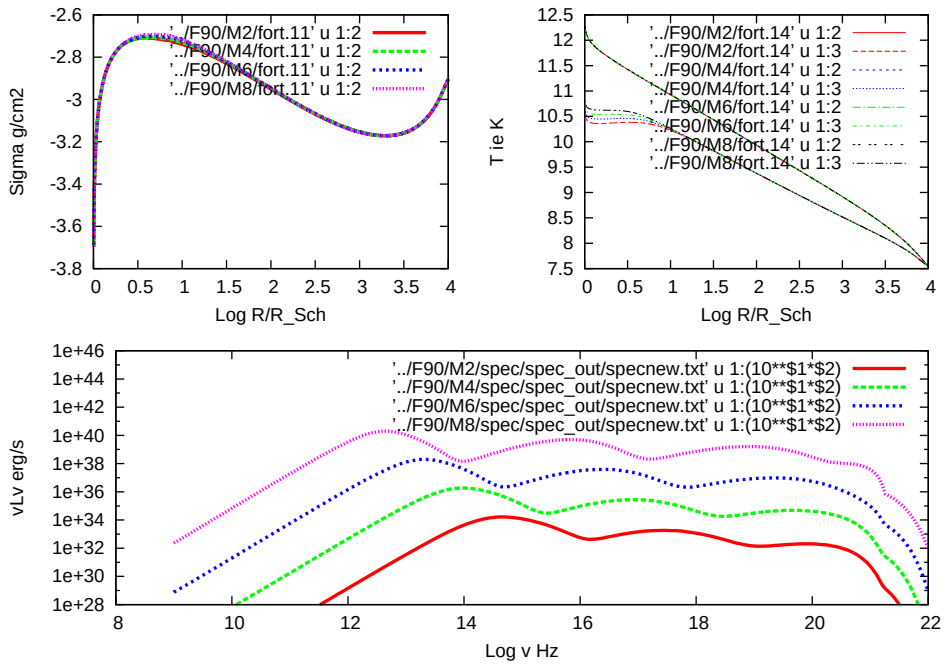


Fig. 2.— Results for different black hole mass.

3. Internal variation

$$\alpha \quad \beta \quad \gamma$$

4. discusion

4.1. result

Solution for ADAF would be more sensitive for boundary temperature.

4.2. property boundary condition?

If the outer boundary of ADAF locates from an SSD, $T_{\rm out}$ should be about the corona temperature of SSD. Although the origin of corona is still under debate, recent research show the corona is cooling by Compton and heating by magnetic reconnection.

$$P_B v_A = P_g c_s \tag{1}$$

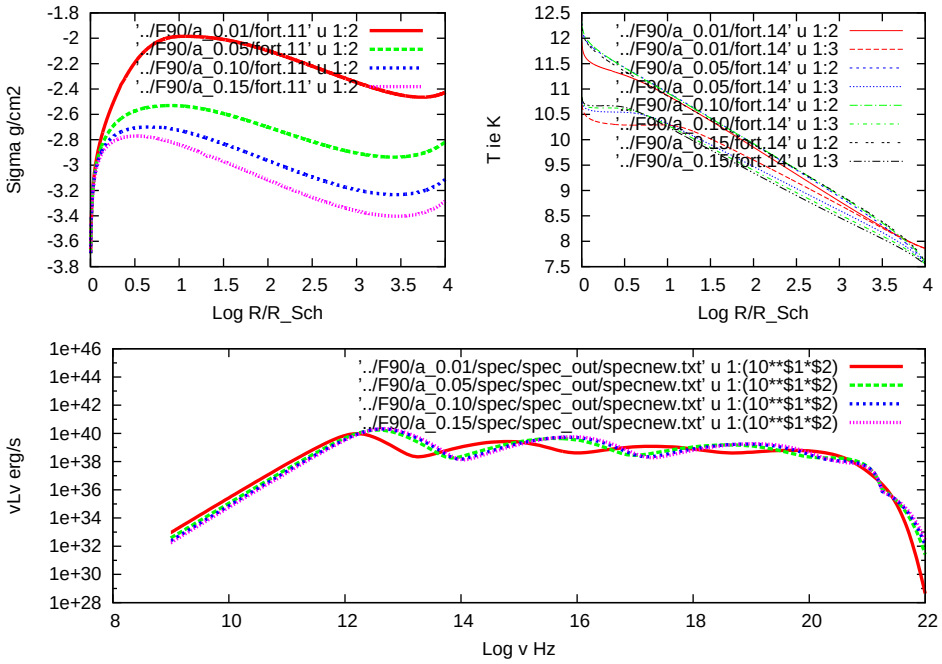


Fig. 3.— Various of α.

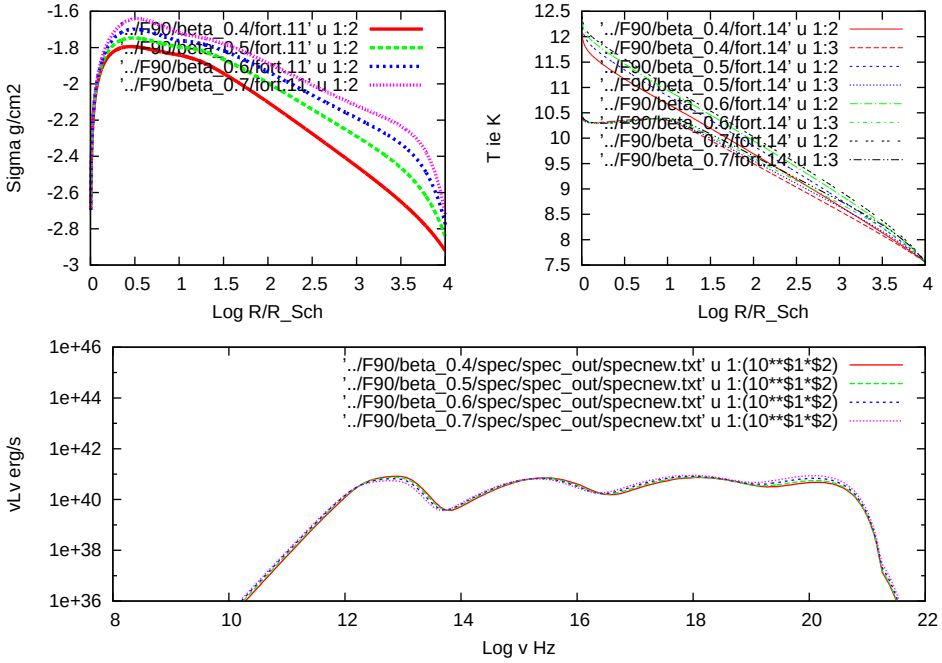


Fig. 4.— Various of β.

5. Global analyzation of ionization instability

Radiation from inner region would leads to the ionization instability.