ADAF (Advection Dominated Accretion Flow) Simulation around Black Holes

Seong-Jae Lee[1], Dongsu Ryu[1], Myeong-Gu Park[2], and Siek Hyung[3]

[1]*Department of Astronomy & Space Science, Chungnam National University*
[2]*Department of Astronomy and Atmospheric Science, Kyungpook National University*
[3]*School of Science Education (Earth Science), Chungbuk National University*

We investigate the advection dominated accretion flow (ADAF), non-efficient cooling flow in accretion discs around black holes. Angular momentum of this flow transfers outwards by viscosity, and as a result its internal energy increases through dissipation. We have reproduced the self-similar solution of ADAF, based on the Narayan & Yi (1994). Our simulation results agree with the analytic solutions within the error of 1%. We have studied various characteristics of ADAF for a number of free parameters. In addition we have examined the special case of zero angular momentum for $\gamma=5/3$ and convection phenomenon.