[P-127/GC-15] A study of accretion disk dynamics in presence of cooling

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We examine the behaviour of accretion flow around a rotating black hole in presence of cooling. We obtain global flow solutions for various accretion parameters that govern the accreting flow. We show that standing isothermal shock wave may develop in such an advective accretion flow in presence of cooling. This shocked solution has observational consequences as it successfully provides the possible explanations of energy spectra as well as generation of outflows/jets of various galactic and extra-galactic black hole candidates. We study the properties of isothermal shock wave and find that it strongly depends on the cooling efficiency. We identify the region in the parameter space spanned by the specific energy and specific angular momentum of the flow for standing isothermal shock as a function of cooling efficiencies and find that parameter space gradually shrinks with the increase of cooling rates. Our results imply that accretion flow ceases to contain isothermal shocks when cooling is beyond its critical value.