

Dominik Gronkiewicz - Thermal instability of warm and optically thick corona

Thursday, 13 June 2019 15:20 (20 minutes)

Warm, optically thick corona in slab geometry is a plausible explanation for Soft X-ray Excess observed commonly in AGNs and in some Black Hole Binaries. We have shown that this coronal layer can be formed by dissipation of energy carried by magnetic field from the disk midplane.

However, the energy supply does not guarantee the existence of the corona, as in some situations it appears to be severely impacted by local thermal instability when even basic radiative transfer is included. The instability is caused by steep dependence of free-free opacity with temperature. The extent and magnitude of deviation from stability is dependent mostly on temperature of the disk-corona boundary, however slight dependence on magnetic field strength is also observed. For this reason, it impacts mostly outer parts of the disk, where the gas is cooler and free-free opacity contribution is significant.

We discuss the strength and limitations of used approach and effects of different opacity models. We also consider the possible interesting consequences and outcome scenarios of this result for coronal models as well possibility for disk winds or outflows.

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