

Unified model of the AGN



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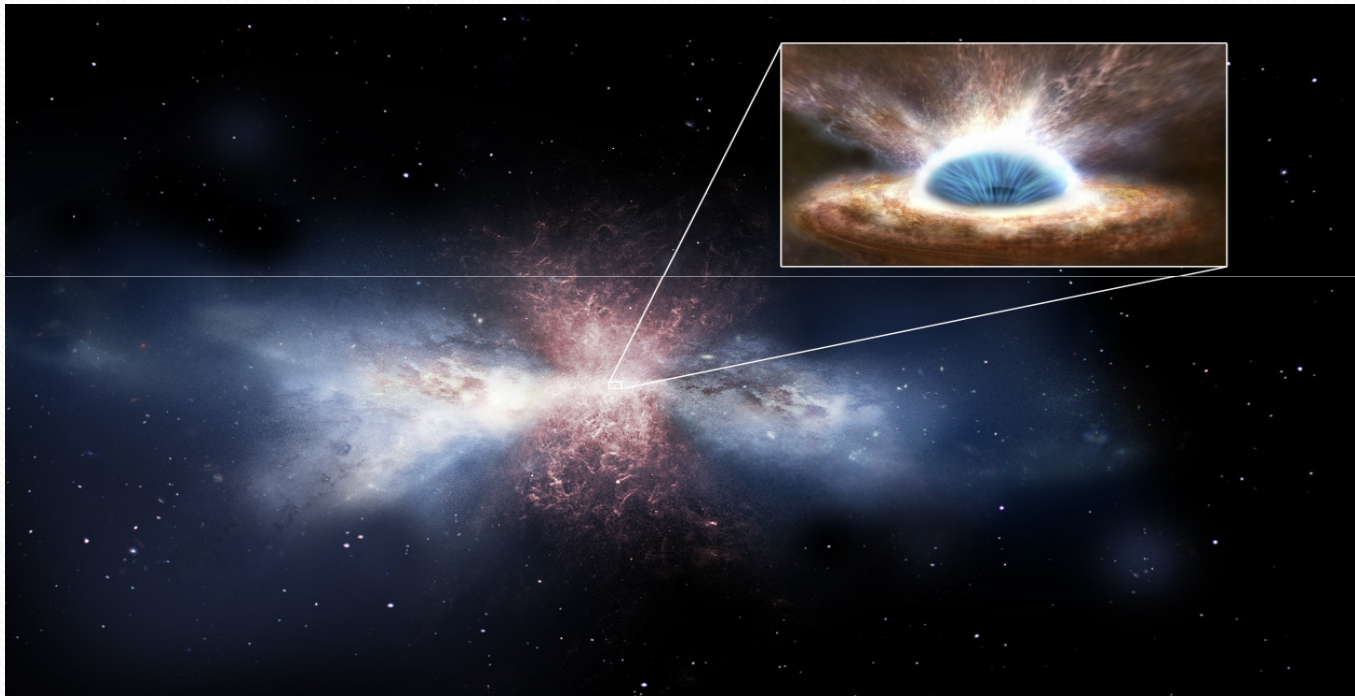
Abstract

In this paper will considering the an appropriate model for a unified description of active and sleeper cores and micro-quasars for completeness. To this aim will investigate the expansion of advective hypothesis in GR. Will analyze the behaviour on the emerging connections on the disk to the other components of quasars. We discuss development of the advective mechanism outside the disk.

Unified model of the AGN

A. A. Abdo *et al.* 2009

B. M. Machida *et al.* 1999.



Advective mechanism

$$T \left(\dot{M} \frac{D}{Dt} S \right)$$

$$\frac{\partial(\rho v_i)}{\partial t} + \frac{\partial}{\partial x_j} (\rho v_i v_j) = \rho \left(\frac{\partial v_i}{\partial t} + v_j \frac{\partial v_i}{\partial x_j} \right) = \rho \frac{Dv_i}{Dt}$$

In the presented new interpretation

Yankova Kr.D.: 2013, http://wfpdb.org/ftp/8_SBAC_D1/pdfs/34.pdf

Yankova Kr.: 2015, <http://adsabs.harvard.edu/abs/2015BlgAJ..22...83Y>

of physics at the left side of the equation for the motion: complete advective term is a complete differential: This means that arises a shifting of the average flow with velocity v_i in any direction.

When the advection is non-dominant mechanism, there is not a condition of flow deformations - doesn't indicate the individual modification of one or other of the velocity components; and full advective term transfers the solution as a whole into smaller radii, retaining his nature without ignored the action of $\partial v_i / \partial t$.

Contribution of the magnetic field

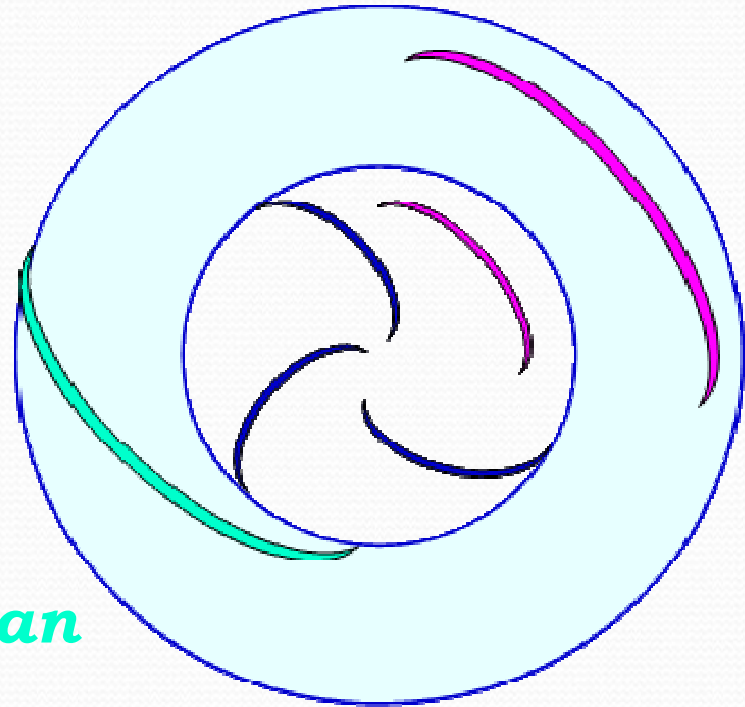
- *Determine the direction of the disc's middle flow displacement.*
- *It gives additional dissipative mechanism which directly affects the development of the gradient of entropy in the disc.*
- *Prevents transition to the dominant regime*

Sign of the entropy

Negative gradient of entropy $\partial_t S$ determined the basic criterion for development and the self-induction on the advection.

Spirals

- ④ *Tidal spiral – logarithmic*
- ④ *MHD spirals*
- ④ *Advective spirals – Keplerian*



Advective mechanism in GR

- *With the transition to GR and the dropping out of Newtonian restrictions is most important to be checked whether the most important advantages of the concept are preserved:*
 - *Equations to remain nonlinear; and*
 - ✓
 - ✓ *Moreover in new conditions, components the derivatives of velocity are equal in rights in regard to self-consistent changes in speed.*
 - ✓ *The interesting thing in the case of disk accretion is that advection manages to force photons to move in orbits for massive particles because they can not leave the mainstream due to high flow density:*
- *Then the stress tensor for massive and non-massive particles is commonly total, and this also applies to self-gravity flow*

$$T_{\mu\nu} = \begin{pmatrix} T_{00} & T_{0i} \\ T_{i0} & T_{ij} \end{pmatrix} = \begin{pmatrix} ed & md \\ efd & mfd \end{pmatrix}$$

- *so are expecting in that non-stationary nonlinear relativistic environment all the more applicable and stronger expression of advective mechanism, bacouse of there a causality of the mechanism whit the metrics of space-time, regardless of the thermal excitation.*

Advective mechanism in GR

Central object - Kerr black hole

$$ds^2 = g_{tt} dt^2 + 2g_{t\varphi} dt d\varphi + g_{\varphi\varphi} d\varphi^2 + g_{rr} dr^2 + g_{\theta\theta} d\theta^2$$

Model accretion flow

$$ds^2 = g_{tt} dt^2 + 2g_{t\varphi} dt d\varphi + g_{\varphi\varphi} d\varphi^2 + g_{rr} dr^2 + dz^2$$

Advective Spirals in GR

Advective ring and

$$ds^2 = g_{tt} dt^2 + 2g_{t\varphi} dt d\varphi + g_{\varphi\varphi} d\varphi^2 + dr^2 + dz^2$$

Advective screw

$$ds^2 = g_{tt} dt^2 + 2g_{t\varphi} dt d\varphi + g_{\varphi\varphi} d\varphi^2 + dr^2 + dz^2$$



Future

The aim is a summary of the developed analytical model for the structuring of disk components of AGNs in GR.

In our future research will be seeking answers to the following problems:

1. To identify in what way the development of non-deformable/ deformationless advection in general relativity, validation it as a fundamental mechanism;
2. To determine and displayed the nature of causal connection which provides a non-thermal control on the advection mechanism;
3. To obtain estimates of the degree of unification of the model due to the operation of the mechanism.

References

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