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Concluding Remarks

Gennady S. Bisnovatyi-Kogan[1]

[1]*Space Research Institute, Profsoyuznaya str. 84/32, Moscow 117997, Russia, and National Research Nuclear University "MEPHI", Kashirskoye Shosse, 31, Moscow 115409, Russia*

Corresponding author: gkogan@iki.rssi.ru

Abstract

Short comments to the conference talks.

Keywords: cosmology - X-ray sources - SNe - star formation - AGN - jets - GRB.

1 Cosmology

SZ effect (**S. Colafrancesco, M. Arnaud**): does it help investigation of CMB fluctuation? SZ influence on the CMB spectrum in clusters interferes with primordial CMB perturbations. So we have:

*contamination with cluster scale CMB perturbations

*clumpiness of a gas inside cluster does not permit to extract cosmological parameters from the comparison of radio and X ray observations.

B. Harms: Gravitational waves as a dark energy - Strong Gravity Branes support GW density constant (seems like vacuum EoS), but GW produce gravity, not antigravity, like DE.

N. Panagia: SN1a, WMAP, Planck - are the cosmological parameters coincide inside error bars (Hubble constant and DE density) ? [1]

2 Magnetic Field in Astrophysics

*Core-collapse SN explosions
*CR acceleration in SNR
*Accretion disk structure and coronae formation
*Jet formation and collimation
*Magnetic accretion and cyclotron lines
*Magnetars

2.1 X-ray sources

Heating of accretion disk corona by magnetic reconnection (**S. Orlando**). About 35 years ago this problem was considered in papers of
G. S. Bisnovatyi-Kogan and S. I. Blinnikov "A hot corona around a black-hole accretion disk as a model for Cygnus X-1." Sov.Astron.Lett. **2**, 191-193 (Sep.-Oct. 1976)

and

A.A. Galeev, R. Rosner, G.S. Vaiana "Structured coronae of accretion disks". ApJ, **229**, 318-326 (April 1979).

In the first paper a convective instability of the radiation dominated region in accretion disks was established, and its connection with formation of a hot corona was considered.

"Heat transfer in the region of maximum energy release of an accretion disk will take place mainly by convection, serving to enhance the turbulence and to generate a powerful acoustic flux. The hard X-rays emitted by Cyg X-1 ($E \leq 200\,keV$) might result from Comptonization of soft photons in a corona formed around the disk through this heating."

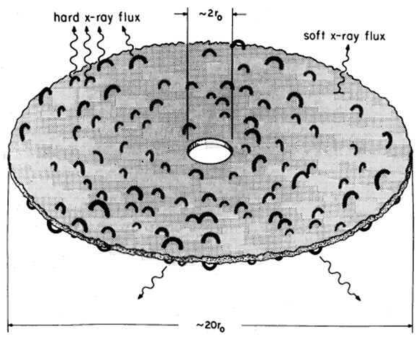
In the second paper the magnetic mechanism of the corona heating over the convective region of the accretion disk was studied.

"A model for the fluctuating hard component of intense cosmic X-ray sources (such as Cyg X-I) is developed, based upon the amplification of magnetic fields by convective motions and differential rotation within a hot ($T > 10^6$ K) accretion disk. Field reconnection within the inner portion of the disk is shown to be ineffective in limiting field amplification; magnetic fields may therefore attain strengths comparable to the equipartition value, leading to their emergence via buoyancy in the form of looplike structures and resulting in a very hot ($T > 10^8$K) magnetically confined, structured corona analogous to the observed structure of the solar corona. The energy balance of these loop structures is examined, and it is shown that the disk soft X-ray luminosity determines the predominant energy loss mechanism in loops: at low disk luminosities, thermal bremsstrahlung from these loops domi-

[1]Resent discovery (arXiv:1312.3313) of an error in the Planck detector at 217 GHz make the differences even less convincing.

nates and contributes a steady, shot-noise-like hard X-ray component. At high disk luminosities the emerging loops are Compton-cooled; the soft X-ray flux from the disk is Comptonized by the emerged loops, forming a transient, flarelike hard X-ray component."

Schematic drawing of the inner accretion disc corona, heated by magnetic reconnection in the emergent magnetic loops, (from the second paper) is given in Fig.1.



V. Simon: Analogy between LMXB KS1731-260 (ms pulsar), and Her X-1 ($P \approx 1.24$ sec) does not seems to be realistic. In particular, these objects have very different magnetic fields, with 2-4 orders of magnitude difference in strength

2.2 Jets, GRBs and SGRs

A long time before the **magnetar** concept for SGRs came out, a related object called **magnetoid** was considered by

L.M. Ozernoi in the paper "A theory for the formation and structure of quasistellar radio sources quasar model as supermassive star." Astron. Zh. **43**, 300-312 (1966).

"A "magnetoid" is a quasistationary configuration whose equilibrium is governed by a magnetic field, provides an idealized representation of many effects occurring in galactic nuclei and especially in the central parts of quasars. The gravitational energy released through secular contraction of the nucleus is the ultimate source of the intense quasar radiation. The magnetic field is an important intermediary. ... Local jets and streams of matter connected with active regions may occur when quasar nuclei reach global quasiequilibrium. Although the magnetoid approach furnishes a unified explanation for the basic property of quasistellar radio sources - an intense and variable flux emitted over a fairly long period - many aspects necessarily remain speculative."

Now there is a general opinion that quasars and AGN are connected with an accretion into supemassive black holes, may be, besides a minority, represented by

W. Kundt, who gave a talk "Astrophysics without black holes and extragalactic GRBs".

There are some observational evidences which do not support a magnetar model for SGRs, so later it could join its magnetoid predecessor.

J. Beall: Numerical simulations, jets of different scale. Heating of the surrounding matter by jet propagation.

M. Della Valle: GRB and SNe connection - questions remain.

2.3 SN 1987A

B Ashenbach: X ray development of SN 1987A

3 Fundamental Problems of Physics

Chemistry in Astrophysics.

Susana Iglesias Groth

the talk "The impact of fullerenos, PAHs and amino acides in high energy astrophysics".

Thermodynamics and Gravity.

Marco Merafina & Daniele Vitantoni

the talk "Data analysis of globular cluster Harris catalog in view of the King's models and evolution"

Gravitational Theory.

Mariafelicia de Laurentis

the talk "Testing f(R) - theories using the first time derivative of the orbital period of the binary pulsars"

Leopoldo Milano

the talk "Eccentric eclipsing detached binaries: a toll for testing gravitational theories"

4 Conclusion

Many topics, covering almost all sides of the modern astrophysics were presented. Number of participants and number of reports is increasing. Duration of talks is decreasing proportionally from 35 min maximal duration talk (1999), to 25 min (2013)

In the conference of Japan Astronomical Society (1978) the duration of each talk was 5 minutes, and some participants managed to show more than 50 transparances during this time (competition). Let us hope, that **Franco Giovannelli** will find a better solution!

Thank you Franco, and Collaborators!