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Ulugh Beg Astronomical Institute, Tashkent, Uzbekistan

BOOK OF ABSTRACTSIWRAG-2021

ACADEMY OF SCIENCES OF THE REPUBLIC OF UZBEKISTAN

UBAI
Ulugh Beg Astronomical Institute

1) Id:6 **Explosions of massive stars**

Ernazar Abdikamalov
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Abstract
Core-collapse supernovae are the powerful explosions of massive stars that happen at the end of their lives. They play an important role in the evolution of the universe, enriching galaxies with heavy elements and giving birth to neutron stars and, in some cases, black holes. Despite their importance, the exact details of how they explode remain uncertain. In this talk, I will review our current understanding of the explosion mechanism with a particular emphasis on the role of multi-dimensional hydrodynamic instabilities.

2) Id:42 **Optical properties of black hole**

Ahmadjon Abdujabbarov
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Abstract
We discuss the gravitational lensing and shadow of black hole in defferent gravity models.

3) Id:106 **Effects of nonlinear electrodynamics of vacuum in the magnetic field of a magnetar**

Medeu Abishev
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Abstract
The nonlinear effect of the magnetar's magnetic field to the propagating gamma ray is calculated. Equations of motion for electromagnetic pulses transmitted in a strong magnetic field of magnetar by two normal modes with mutually orthogonal polarization are constructed. The difference Δt in propagation times of normal waves from the common source of electromagnetic radiation to the receiver is calculated. It is shown that the forward part and the "tail" by length cΔt of any hard radiation pulse due to the nonlinear electromagnetic influence of the magnetic dipole and quadrupole fields turn out to be linearly polarized in mutually perpendicular planes, and the remaining part of the pulse must have elliptical polarization.

4) Id:8 **Development and Perspectives of Relativistic Astrophysics in Uzbekistan**

Bobomurat Ahmedov
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Abstract
I will discuss successful development and establishment of scientific group specialized in general relativity and relativistic astrophysics in Uzbekistan. Summary of scientific results performed on the study in Uzbekistan in relativistic astrophysics of compact gravitational objects will be provided.

5) Id:118 **Magnetic field in Monoceros OB1 East cloud**

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Abstract

Magnetic fields are one of the key factors that regulate star formation process from the largest scales of molecular clouds down to prestellar cores. I will present the analysis of the large scale magnetic field properties of the Monoceros OB1 Eastt molecular cloud. This work joins observational and theoretical approaches and combines different types of data. We show that the magnetic field in the Monoceros OB1 East cloud is dynamically important, but its exact role is different in the two distinct parts of the cloud.

6) Id:127 **Multi-messenger observations with GRANDMA**

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Abstract
The multi-messenger astronomy aims at study astrophysiacal events through differents messenger : GW, photons, neutrinos. The 170817 joint detection of GW and photons (at all wavelengths) has proven the relevance of multi-messengers studies. Yet it also showed the necessity of coordination and preparation of electromagnetic observations (from gamma to radio) to have relevant constraints on physical parameters. In this talk, I will present the Global Rapid Advanced Network Devoted to the Multi-messenger Addicts (GRANDMA), a network of telescopes aiming to detect, identify and characterize electro-magnetic counterparts to gravitational-wave sources. I will detail the consortium, its capabilities, scientific programm and public tools I for the time domain astronomy. I will conclude by presenting a summary of our scientific results after O3 LIGO/Virgo run and the prospect we will be conducting to prepare the next GW observation runs.

7) Id:60 **Gravitational waves from binary neutron stars**

Luca Baiotti
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Abstract
I will review the current global status of research on gravitational waves emitted from mergers of binary neutron star systems, focussing on general-relativistic simulations and their use to interpret data from the gravitational-wave detectors, especially in relation to the equation of state of compact stars.

8) Id:49 **Testing General Relativity with black hole X-ray data: recent progress and future developments**

Cosimo Bambi
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Abstract
The theory of General Relativity has successfully passed a large number of observational tests. The theory has been extensively tested in the weak-field regime with experiments in the Solar System and observations of binary pulsars. The past five years have seen significant advancements in the study of the strong-field regime, which can now be tested with gravitational waves, X-ray data, and mm Very Long Baseline Interferometry observations. In my talk, I will summarize the state-of-the-art of the tests of General Relativity with black hole X-ray data, discussing its recent progress and future developments.

9) Id:2 **Dynamical Analysis of Self-gravitating Objects in Modified Gravity**

Muhammad Zaeem Ul Haq Bhatti
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Abstract
This talk aims to analyze the generalization of Lemaitre-Tolman-Bondi (LTB) spacetime for dissipative dust under the influence of particular modified gravity. We explore the modified field equations, kinematical variables, and mass function in this scenario. We calculated the scalar functions coming from the orthogonal decomposition of the Riemann tensor in this framework. These scalar functions known as structure scalars have been explored for LTB spacetime using modified field equations. We found that generalized LTB spacetime has properties comparable with LTB and obtained structure scalars in both cases which have a similar dependence on a material profile even in modified gravity.

10) Id:79 **Particle motion around charged black hole in 4D Einstein-Maxwell-Gauss-Bonnet gravity**

Madina Boboqambarova
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Abstract
The charged particles motion around electrically and magnetically charged black holes in 4D Einstein-Maxwell-Gauss-Bonnet gravity is explored. The parameters of the innermost stable circular orbit such as energy, angular momentum, and position of particle have been explicitly investigated. The dependences of the energy efficiency and the velocity of charged particle by RN black hole from the charge coupling parameter are shown.

11) Id:107 **Quasinormal modes in the field of a dyon-like dilatonic black hole**

Kuantay Boshkayev
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Abstract
Quasinormal modes of massless test scalar field in the background of gravitational field for a non-extremal dilatonic dyonic black hole are explored. The dyon-like black hole solution is considered in the gravitational $4d$ model involving two scalar fields and two 2-forms. It is governed by two 2-dimensional dilatonic coupling vectors $\vec{\lambda}_i$ obeying $\vec{\lambda}_i (\vec{\lambda}_1 + \vec{\lambda}_2) > 0$, $i =1,2$. Quasinormal modes for a massless scalar (test) field in the eikonal approximation are obtained and analysed. These modes depend upon a dimensionless parameter a ($0 < a \leq 2$) which is a function of $\vec{\lambda}_i$. For limiting strong ($a = +0$) and weak ($a = 2$) coupling cases, they coincide with the well-known results for the Schwarzschild and Reissner-Nordstr\"om solutions. It is shown that the Hod conjecture, connecting the damping rate and the Hawking temperature, is satisfied for $0 < a \leq 1$ and all allowed values of parameters.

12) Id:51 **Higher dimensional rotating black holes cannot be formed by an accretion process**

Naresh Dadhich
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Abstract
Black holes are generically formed by gravitational collapse of a dust cloud under its own gravity or accretion of matter onto a gravitating centre. For rotating black hole, matter with angular momentum should accrete, and for that to happen, particles should have angular momentum less than the threshold value defined by the innermost stable circular orbit (ISCO). Thus existence of

ISCO becomes the necessary condition for rotating black hole formation. It is known that, what to talk of ISCO, even bound orbits cannot exist in dimensions greater than the usual four. That's how arises the question posed in the title, how do rotating black holes form in higher dimensions?

13) Id:69 **DYNAMICS OF CHARGED AND MAGNETIZED PARTICLES AROUND CYLINDRICAL BLACK HOLES IMMERSED IN EXTERNAL MAGNETIC FIELD**

Aleksandra Demyanova
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Abstract
The motion and acceleration of an electrically charged and magnetized particle around a cylindrical black hole in the presence of an external asymptotically uniform mag netic field parallel to the z axis is investigated. We look at circular orbits around a central object and study the dependence of the most internal stable circular orbits (ISCO) on the so-called magnetic coupling parameters, which are responsible for the interaction between the external magnetic field and magnetized and charged particles. It is shown that the ISCO radius decreases with increasing magnetized parameter. Therefore, we also studied collisions of magnetized particles around a cylindrical black hole immersed in an external magnetic field, and showed that the magnetic field can act as a particle accelerator near non-rotating cylindrical black holes.

14) Id:111 **Nonperturbative quantization a la Heisenberg**

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Abstract
Nonperturbative quantization method in field theories, including gravity, is considered. The closure problem for an infinite system of Green's equations describing a strongly quantum-field interacting system is discussed. It is shown that modified gravitational theories can be considered as approximate phenomenological models in quantum gravity. Various special cases are discussed: F(R) gravity, Weyl gravity, nonperturbative QED on the Hopf bundle, and so on.

15) Id:59 **GW190814: Impact of a 2.6 solar mass neutron star on the nucleonic equations of state**

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Abstract
Is the secondary component of GW190814 the lightest black hole or the heaviest neutron star ever discovered in a double compact-object system [Abbott et al. Astrophys. J. 896, L44 (2020)]? In this talk, I give a nuclear physics perspective to answer this question. We employ covariant density functional theory that provides a unique framework to investigate both the properties of finite nuclei and neutron stars, while enforcing causality at all densities. By tuning existing energy density functionals we were able to: (i) account for a 2.6 solar mass neutron star, (ii) satisfy the original constraint on the tidal deformability of a 1.4 solar mass neutron star, and (iii) reproduce ground-state properties of finite nuclei. Yet, for the class of models explored in this work, we find that the stiffening of the equation of state required to support supermassive neutron stars is inconsistent with either constraints obtained from energetic heavy-ion collisions or from the low deformability of medium-mass stars. Thus, considering general relativity correct in the strong field regime, we speculate that the maximum neutron star mass can not be significantly higher than the existing observational limit and that the 2.6 solar mass compact object is likely to be the

lightest black hole ever discovered.

16) Id:88 **Shadows of hairy Kerr black holes and constraints from M87***

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Abstract
We take on an extensive study of the rotating hairy Kerr black holes, which encompasses, in particular cases, the Kerr black hole ($\alpha=0$). We investigate ergosphere and shadows of the black holes to infer that their size and shape are affected due to the l_0 and are found to harbour a richer chaotic structure. In particular, the hairy Kerr black holes possess smaller size but more distorted shadows when compared with Kerr black holes. We also estimate the parameters l_0 and a associated with hairy Kerr black holes using the shadow observables. The inferred circularity deviation $\Delta C \leq 0.1$ for the M87* black hole puts a constraint on hairy Kerr black hole parameter a, whereas shadow angular diameter $\theta_{d}=42 \pm 3 \mu as$, within 1σ region, for a given choice of α, also places bounds on the parameters a and l_0. Interestingly, the axis ratio obeying $1< D_x \lesssim 4/3$ is in agreement with the EHT results and thus eventuates in the hairy Kerr black holes being suitable candidates for astrophysical black holes.

17) Id:7 **The gravitational wave signal from core-collapse supernovae**

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Abstract
We study gravitational waves (GWs) from a set of two- and three-dimensional multi-group neutrino radiation hydrodynamic simulations of core-collapse supernovae (CCSNe). Our goal is to systematize the current knowledge about the post-bounce CCSN GW signal and recognize the templatable features that could be used by the ground-based laser interferometers. We demonstrate that starting from ~400ms after core bounce the dominant GW signal represents the fundamental quadrupole (l=2) oscillation mode (f-mode) of the proto-neutron star (PNS), which can be accurately reproduced by a linear perturbation analysis of the angle-averaged PNS profile. Before that, in the time interval between ~200 and ~400ms after bounce, the dominant mode has two radial nodes and represents a g-mode. We associate the high-frequency noise in the GW spectrograms above the main signal with p-modes, while below the dominant frequency there is an `excluded region' with very little power. Weak dependence of the dominant GW frequency on the progenitor mass motivates us to provide a simple fit for it as a function of time, which can be used as a prior when looking for CCSN candidates in the LIGO data.

18) Id:50 **Testing propagation effects of gravitational waves**

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Abstract
In general relativity, there is no dispersion in gravitational waves, while some modified gravity theories predict dispersion phenomena in the propagation of gravitational waves. In this paper, we demonstrate that this dispersion will induce an observable deviation of waveforms if the orbits have large eccentricities. The mechanism is that the waveform modes with different frequencies will be emitted at the same time due to the existence of eccentricity. During the propagation, because of the dispersion, the arrival time of different modes will be different, then produce the

deviation and dephasing of waveforms compared with general relativity. This kind of dispersion phenomena related with extreme-mass-ratio inspirals could be observed by space-borne detectors, and the constraint on the graviton mass could be improved . Moreover, we find that the dispersion effect may also be constrained by ground detectors better than the current result if a highly eccentric intermediate-mass-ratio inspirals be observed.

19) Id:55 **Broken Lie Symmetries and the Energy Content of Some Charged Black Hole Spacetimes**

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Abstract
Mass and charge of some black hole spacetimes are taken as small parameter and perturbed geodesic equations are constructed for them. Second-order approximate Lie symmetries are used to define the energy content of such spacetimes.

20) Id:56 **The fundamental equation of the field theory in De Sitter pulse space**

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Abstract
The fundamental equation of the field theory in De Sitter pulse 5-dimensional space is obtained. The wave function, subordinated to this equation in usual space-time, doubles. One of these functions, probably to consider as the candidate on “the Phantom field” responsible for expansion of the Universe with acceleration. The Lagrangian of quantum electrodynamics with the fundamental mass is chosen as an effective interaction Lagrangian. All the calculations are made in the Euclidian space, the transfer to the ordinary pseudoeuclidian space is established in the final expressions only.The approach has been based on the assumption that the momentum space possesses the geometric structure of a de Sitters pace of constant curvature. A key role has been be assigned to this constant radius of curvature.

21) Id:11 **Gravitational lensing and shadows for some spherically symmetric black holes**

Mubasher Jamil
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Abstract
I will discuss the gravitational lensing for the Kiselev black hole and shadow for the spinning black hole in conformal massive gravity.

22) Id:92 **Gravitational Collapse, Black Holes and Naked Singularities**

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Abstract
The final fate of massive collapsing stars at the end of their life cycle has been a fundamental issue in black hole physics and gravitation theory for many decades. The general theory of relativity predicts the occurrence of a space-time singularity, when the matter cloud collapses under self-gravity. This singularity, which is a super-dense region where space-time curvatures

and other physical quantities are arbitrarily large, can be hidden within a black hole or could be visible to distant observers. These collapse endstates -- a black hole or a naked singularity - are determined by the dynamical evolution of collapse within Einstein's gravitation theory. We consider the profound and exciting implications this scenario may have for Quantum Gravity and astrophysical observations of the Universe.

23) Id:83 **Test particles around Hayward black holes surrounded by quintessential medium**

Nozima Juraeva[1] and Malika Xudoyberdiyeva[2]
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Abstract
Based on extension of Kiselev's spacetime metric, we have investigated a Hayward black hole surrounded by a quintessence. We have selected the cases when the quintessence state parameter ω =-2/3, ω =-1/2 and ω =-0.6. Using the spacetime metric of the black hole surrounded by the quintessence, we have determined the effective potential for test particles motion. By analyzing the effective potential of test particles (photon), we have investigated the null geodesics and the typss of orbits of the Hayward black hole surrounded by quintessence corresponding to different energy levels.

24) Id:68 **Dark matter halo**

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Abstract
We use two suites of ultra-high resolution N-body simulations Phoenix and Aquarius Projects to study the assembly history of sub-halos and its dependence on host halo mass. We found that more massive haloes have more progenitors, which is in contrast with former works because they counted dynamical progenitors repeatedly. Less massive halos have larger fraction of dynamical progenitors than more massive ones. The typical accretion time depends strongly on host halo mass. Progenitors of galactic halos are accreted at higher redshift than that of cluster halos. Once these progenitors orbit their primary systems, they rapidly lose their original mass but not their identifiers. Most of the progenitors are able to survive to present day. At given redshift, the survival fraction of accreted sub-halos is independent of host halo mass, while sub-halos in high mass halos lost more mass. In the second part if our research we use a semi-analytical galaxy formation model compiled on a Millennium Simulation to study the size evolution of massive early-type galaxies from redshift z = 2 to present days. We find that the model we used is able to well reproduce the amplitude and slope of size-mass relation, as well as its evolution. The amplitude of this relation reflects the typical compactness of dark matter halos at the time when most stars are formed. This link between size and star formation epoch is propagated in through galaxy mergers. Minor mergers are increasingly important with increasing present day stellar mass for galaxies more massive than 1011.4M⊙. At lower masses, major mergers are more important. In situ star formation contributes more to the size growth than it does to stellar mass growth. Similar to former works, we find that minor mergers dominate the subsequent growth both in stellar mass and in size for early formed early-type galaxies.

25) Id:64 **Nucleosynthetic Evidence for Primordial & Stellar Black Holes and Binaries**

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Abstract

The success of big-bang nucleosynthesis of the light elements and CMB anisotropies supports the standard cosmology, but the expected time variation of the light elemental abundances is thought to be a piece of evidence for the Hawking radiation from primordial black holes which operates over the entire history of cosmic evolution. Likewise, the standard scenario of element genesis indicates that the nucleosynthesis in the supernovae leaving neutron stars as remnants and the mergers of neutron stars or neutron star and black hole are the major source of gold, uranium and other heavy atomic nuclides. However, it has recently been found theoretically that the catastrophic collapse of very massive stars into the black holes and associated jets are the viable site for heavy element production. In this talk, we will discuss the recent progress in the nucleosynthesis theories and the roles of the primordial black holes and stellar black holes.

26) Id:23 **Charged particle motion in black hole magnetosphere**

Martin Kolos
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Abstract
Long-range forces provided by gravitational and electromagnetic interactions are of crucial importance for understanding of astrophysical processes around black holes. In this presentation we will try to compare different approaches to the problem of electromagnetic field around black hole and then we will examine charged particle dynamics in selected black hole magnetosphere models.

27) Id:77 **To the chromodynamics of nuclei fissioning**

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Abstract
The presence of neutron flux coupled with fissioning component like helium-3 isotope creates at any point of space highly energetic particles. Their enormous energy was acquired from the transformation of strong interactions' energy of fissioning nuclei to kinetic energy of produced particles. Their further evolution can not be resulted by Maxwell distribution due to the constant rate of their formation. Moreover, each fission fragment possesses its unique energy spectra function formed by the stopping media and the initial fragments' energy. It also should be pointed out that transformation of strong interactions' energy, maintained by gluons, into kinetic energy of fission fragments products can not take place without neutrino or antineutrino participation. Any radioactive decay, as well as any nuclear fissioning processes, are resulting in fast particles, among them – electrons and their immanent satellite antineutrino. Antineutrinos and neutrinos are spreading in all directions and berry all information about what's going on within the reactor. In the present paper the typical fissioning process $32He + 10n \rightarrow 1p + 31T + 0.76MeV$ is analyzed with accent at this problem. This fission reaction is unknown due to the variety of all possible transformations of quarks from one type to another. The very high intensity of strong interactions field makes it possible to transform its energy directly to mass creating in this case massive W +, W −, Z0 bosons which start breaking equilibrium within nuclei.

28) Id:57 **Scalarized Black Holes**

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Abstract
Black holes represent outstanding astrophysical laboratories to test the strong gravity regime, since alternative theories of gravity may predict black hole solutions whose may differ distinctly

from those of General Relativity. When higher curvature terms are included in the gravitational action as, for instance, in the form of the Gauss-Bonnet term coupled to a scalar field, scalarized black holes result. Here we discuss several types of scalarized black holes.

29) Id:61 **Properties of a class of black hole mimickers**

Daniele Malafarina
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Abstract
We discuss the observational properties of a class of exact solutions of Einstein's field equations that posses naked singularities and describe exotic sources that can mimic black holes.

30) Id:74 **On exact dyon-like black hole solutions in the model with two Abelian gauge fields and two scalar fields**

Algis Malybayev
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Abstract
Dilatonic black hole dyon-like solution in the gravitational 4d model with two scalar fields and two 2-forms, governed by two 2-dimensional dilatonic coupling vectors is found. Some physical parameters of the solutions are obtained: gravitational mass, scalar charge, Hawking temperature, black hole area entropy and parametrized post-Newtonian (PPN) parameters.

31) Id:133 **Coupled dynamics of two polarons and a one-dimensional Bose-Einstein condensate in a parabolic potential**

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Abstract
We have studied the coupled motion of two polarons interacting by one-dimensional Bose-Einstein condensate in a harmonic potential. We show that the dynamics of the polarons are strongly nonlinear and critically depend on the polarons' positions and the self-interaction in the condensate and the sign of the interaction between the polaron-forming embedded particles and the condensate. Strongly mutually related evolution of the polarons coordinates and the condensate shape are studied for coupled nonlinear polaron-polaron and polaron-condensate oscillations.

32) Id:54 **Wormhole solutions in higher curvature theories**

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Abstract
We consider scalarized wormholes with a Newman-Unti-Tamburino charge in both Einstein-scalar-Gauss-Bonnet and Einstein-scalar-Chern-Simons theories. By varying the coupling parameter and the scalar charge we determine the scalarized wormhole solutions, and their dependence on the Newman-Unti-Tamburino charge. We generalize these scalarized wormhole solutions in two ways. On the one hand, we include a Newman-Unti-Tamburino charge and on the other hand we consider besides the Gauss-Bonnet invariant also the Chern-Simons invariant.

33) Id:62 **Kerr-Taub-NUT spacetime to explain the energetics of black hole candidates.**

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Abstract
In the work we explain the radiative efficiency and the jet power of the selected black hole sources in point of view of the Kerr-Taub-NUT spacetime. We consider thin accretion disk model proposed by Novikov-Thorne to explain the radiative efficiency of the selected sources and Blanford and Znajeck mechanism to explain the transient jets of the black hole candidates.

34) Id:103 **Light curves of the hot spots on the circular orbits around Generic Regular Black Hole Related to Nonlinear Electrodynamics with Maxwellian Weak-field Limit**

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Abstract
Photon motion in the vicinity of the Generic Regular Black Hole Related to Nonlinear electrodynamics (GRBHNED) described by the null geodetics of corresponding effective geometry. In this talk the semi analytical method for the construction of the light curves from the hot spots on the circular orbits in vicinity of GRBHNED with Maxwellian Weak-field Limit will be presented. Generated light curves will be compared with those generated by hots spots in Schwarzschild and Reissner-Nordström spacetimes.

35) Id:99 **Virial clouds and frequency asymmetry in galactic halos**

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Abstract
In 1995 it had been proposed that there would be molecular hydrogen clouds in galactic halos and that they could be seen by an asymmetric frequency shift of the CMB on either side of the galaxy, essentially like a Doppler shift. This was seen in 2011 and confirmed in 2012 for M31, and later in other galaxies of the local cluster. It has been used to study the rotation of galactic halos. To be able to go further, one needs to model the clouds. It has been suggested that these clouds have a viral temperature equal to the CMB temperature. In this talk this work will be reviewed.

36) Id:5 **Study of Interacting Dark Sectors using Chevallier-Polarsky-Linder Type Parametrization**

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Abstract
The main focus of this paper is to investigate an interacting phenomena between dark matter-dark energy within a non-flat FLRW spacetime geometry bounded by a horizon with specific cut-off. We assume an interaction term $Q(z)$ between two dark components of the fluid and evaluate it analytically via physical quantities like energy density and pressure. We constraint the model parameters and found specific region of validity for these parameters. Considering ``Chevallier-Polarsky-Linder type parametrization" of the coincidence parameter $r(z)$, we observed that our model possess a future singularity of Type III. After finding the singular behavior, we examine the nature of our model via cosmological parameters like $q,~r,~s$. It is noted that our model is very close to Λ cold dark matter model.

37) Id:134 **Effect of perfect fluid dark matter on particle motionaround a static black hole**

Sanjar Shaymatov
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Abstract
We investigate particle and photon motion in the vicinity of a static and spherically symmetric black hole surrounded by perfect fluid dark matter in the presence of an external asymptotically uniform magnetic field. We determine the radius of the innermost stable circular orbit (ISCO) for charged test particles and the radius for unstable circular photon orbits and show that the effect of the presence of dark matter shrinks the values of ISCO and photon sphere radii. Based on the analysis of the ISCO radius we further show that the combined effects of dark matter and magnetic field can mimic the spin of a Kerr black hole up to $ a/M \approx 0.75-0.8$. Finally, we consider the effect of the presence of dark matter on the center of mass energy of colliding particles in the black hole vicinity. We show that the center of mass energy grows as the value of the dark matter parameter increases. This result, in conjunction with the fact that, in the presence of an external magnetic field, the ISCO radius can become arbitrarily close to the horizon leads to arbitrarily high energy that can be extracted by the collision process, similarly to what is observed in the super-spinning Kerr case.

38) Id:52 **Constraints in inflationary magnetogenesis**

Yuri Shtanov
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Abstract
We discuss popular models of inflationary and early post-inflationary magnetogenesis and present model-independent upper bounds on the strength of the resulting magnetic fields imposed by the considerations of weak coupling, back-reaction and Schwinger effect.

39) Id:81 **The evolution star clusters with centrally peaked star-formation efficiency**

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Abstract
Star clusters are useful source of information about the dynamics and star-formation history of their host galaxies. Therefore is it very important to understand the formation and evolution of these bright building blocks of galaxies. We study the evolution of star clusters formed according to the local-density-driven clustered star formation theory. The constant star-formation efficiency per free-fall time leads to the centrally peaked star-formation efficiency profile in gas embedded clusters formed from centrally concentrated gas clumps. We discuss how such clusters response to the consequences of gas expulsion and the to impact of the tidal field.

40) Id:114 **Effects of STVG modifiel gravity on neutrons star radiation**

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Abstract
We performed magnetospheric studies in STVG (MOG) model to analyze how it effects the radiation of neutron stars and deathline of radiopulsars. Obtainel results may hint to an explanation of part-time pulsar phenomenon.

41) Id:4 **Effects of electromagnetic field on the structure of massive compact objects**

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Abstract
This paper encompasses a set of stellar equations that administer the formation and evolution of self-gravitating, dissipative spherically symmetric fluid distributions having anisotropic stresses in the presence of electromagnetic field. The Riemann tensor is split orthogonally to procure five scalar functions named as structure scalars which are then utilized in the stellar equations. It is shown that some basic fluid properties such as energy density inhomogeneity, pressure anisotropy and heat flux are interlinked with the obtained scalars. Further, it is shown that all the solutions to Einstein equations can be written in terms of these five scalars keeping in view the static case.

42) Id:119 **Perspectives of optical astronomy at Maidanak observatory**

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Abstract
The capabilities of the Maidanak observatory (66°56”E, 38°41”N) for optical astronomy are presented. Optical properties of the atmosphere above the observatory are reviewed. Site testing results of new 4 m telescope project are presented. A few places inside the observatory and nearby summits are considered as candidate sites. The most optimal place in terms of the ground layer turbulence must be chosen. The ESO LuSci lunar scintillometer will be used for comparison of the ground layer turbulence at candidate places.

43) Id:63 **Gauss-Bonnet boson stars**

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Abstract
In this talk we will discuss construction of flat and asymptotically Anti-de Sitter (AdS) boson stars in (4+1)–dimensional Gauss–Bonnet gravity. We describe the dependence of the mass M , charge Q and radius R of the boson stars on the model parameters such as the Gauss–Bonnet coupling, the cosmological constant and the gravitational constant. The basic properties of boson star solutions have been investigated for different negative values of Gauss-Bonnet parameter.

44) Id:94 **Capture of massless and massive particles by parameterized black holes**

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Abstract
We study capture of massless and massive particles by generic spherically symmetric, static black holes whose line element is described in parameterized form [Phys. Rev. D 90, 084009 (2014)] in terms of the bumpy parameters ϵ and a_i with $i=0,1,2,...$ that define the deviation from the general relativity. We have shown that negative (positive) values of ϵ decreases (increases) radius of characteristic circular orbits and consequently, increases (decreases) the energy and decreases (increases) the angular momentum of the particle moving along these orbits. Moreover, we have calculated and compared the capture cross section of the

massive particle in relativistic and non-relativistic limits. It has been shown that in the case of small deviation from general relativity the capture cross sectionfor the relativistic and nonrelativistic particle has additional term being linear insmall dimensionless deviation parameter ϵ.

45) Id:85 **Kerr-Newman black holes as sources of relativistic jets**

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Abstract
In this work we analysed depends of charge, rotation parameters and astrophysical jets around Kerr-Newman black holes by the Blandford-Znajek mechanism.

46) Id:53 **The Measure of Complexity in Spherical Relativistic Geometry**

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Abstract
The aim of this paper is to generalize the definition of complexity for the static self-gravitating structure in f (R, T, Q) gravitational theory, where R is the Ricci scalar, T is the trace part of energy–momentum tensor, and Q ≡ RαβTαβ. In this context, we have considered locally anisotropic spherical matter distribution and calculated field equations and conservation laws. After the orthogonal splitting of the Riemann curvature tensor, we found the corresponding complexity factor with the help of structure scalars. It is seen that the system may have zero complexity factor if the effects of energy density inhomogeneity and pressure anisotropy cancel the effects of each other.