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به یاری خداوند بزرگ توانستیم در هفتصد و پنجاهمین سال پس از تأسیس رصدخانه ی مراغه و در شهری که روزگاری خواجه نصیرالدین طوسی در آن می زیسته ، سمینار بین المللی نجوم و اخترفیزیک را برگزار کنیم.

در این سمینار که از دوم تا چهارم خرداد ماه 1388 در مراغه برگزار شد ، اندیشمندانی از ایران و چند کشور خارجی حضور داشته و مقالاتی ارائه شد که در اینجا چکیده ی مقالات ارائه شده خدمت شما تقدیم می گردد.

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O-1

### **New developments in the study of binary systems in milky- way and extra-galaxies**

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In this paper, some of the new and exciting developments in the study of binary systems will be discussed. Recent technological advances such as CCD's and HST make it possible to study faint objects such as exo-planets and EB's in extra-galaxies. Excellent examples are the discovery of over 10<sup>4</sup> new EB 's in LMC, M31 and M33. A small fraction of these binaries are serving as standard candles to measure accurate distances to host galaxies. Also, the increasing numbers of EB Planet-Star systems that have been found from accurate photometric observations will be discussed. These systems are important since the radii and masses of the hosted planets can be directly determined. Finally, new classes of binaries which contain Jupiter-size planets and binaries containing pulsating components will be introduced.

O-2

## **Black Hole Accretion Disks: Toward a New Paradigm**

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Accretion onto black holes is one of the most fundamental concepts for understanding a variety of active phenomena in the universe, including active galactic nuclei, stellar mass black holes, ultra-luminous X-ray sources, gamma-ray bursts, and stellar and galactic jets.

Accretion onto black holes has been studied intensely during last three decade, and several types of models have been proposed. The standard accretion disk model (Shakura & Sanyev 1973) which has been very useful for the interpretation of observations in binary systems and active galactic nuclei is based on the number of simplification assumptions. In particular the flow was assumed to be geometrically thin and with a Keplerian velocity distribution. For low accretion rate this assumption is reasonable. Since the end of 1970s, however, it has been realized that, the advection of energy with the flow can crucially modified the properties of the innermost part of accretion disks around the black holes. In this talk we will present some of development models of accretion disks such as ADAF, CDAF, RIAF. And we will present some of our experiences in the role of thermal conduction in ADAF disks.

O-3

About the role of external planets in formation of cometary's system

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Statistical aspects of a question on dynamic relation of long-periodic comets with planets - giants (Saturn, Uranus and Neptune), dwarf planets (Pluto, Makemake, Haumea and Eris) are investigated. Data on 938 comets with period  $P > 200$  years, which observed upon to 2009, are used in statistics. Comets of group Kreutz, Marsden, Kracht and Meyer are not considered. Object of the analysis basically is interorbital minimal distances of comets from the above-mentioned planetary bodies and distribution of remote nodes. By testing cometary's data relative to 67 planes there are established effects testifying the kinematical relation of a part of comets with planets. Analogical task is solved concerning four hypothetical planets. It is necessary remind that existence of such hypothetical planets on periphery of solar system earlier has been predicted by one of authors by research of the some comet's parameters. It is established, that the reason of existence of comets with a hyperbolic orbit might be unknown planets and dwarfish ones. Hypotheses about Existence of Oort's comet cloud and an interstellar origin of comets contradict data of observation.

O-4

### **Our Sun: a new look upon an old star.**

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The Sun supports life on Earth and the Earth's magnetosphere sustains that life. But we must not only understand how life can arise and how it can be sustained, but also the sources that support life: the stars. From that point of view, our closest star, the Sun, is at the heart of our societal and scientific lives. As of today, we must perceive and accept pursuing the study of our nearest star. One should not forget that Science is not only needed for mere applications but also for basic understanding of how physics is at work in our Universe. When Newton devised his theory of gravity, he had strictly no idea that it could be used for playing "space snooker".

Although the Sun is very close, this proximity does not yet provide a better understanding of that star over other stars, nor of the physics at work inside the Sun.

In this conference, we will give a very new look on the structure of the solar core (physics taking place at a few tens of million Kelvin for which helioseismology cannot provide reliable inferences), on the rotation of the surface related with deeper layers, for which it is believed that the interaction with the primal magnetic field at the base and at the top of convection zone (the so called Tachocline and Leptocline) might explain the solar cycle and it is the luminosity variations responsible for modifying the terrestrial climate. Thus, the influences that can lead to varying solar signals and how they affect long-term global climate change will be presented. We will conclude by a brief summary of strategies and requirements for future research

O-5

### حل منحنی نوری سیستم دوتایی گرفتی V508 Oph

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Lapasset.E et al.<sup>[5]</sup> (1985) می باشد. رده طیفی مؤلفه های این سیستم G2V و G0V Wenxian Lu (1986)<sup>[7]</sup> می باشند که در ضمن هر دو مؤلفه این سیستم حد روج خود را پر کرده اند<sup>[8]</sup> Hoffmeister,C. (1986) P.Rovithis et al. V508 Oph در سال 1935 توسط [2] به عنوان یک ستاره متغیر کشف شد و طبیعت گرفتی آن در سال 1936 توسط Jacchia,L.<sup>[3]</sup> آشکار گردید. Lapasset,E. et al. (1990)<sup>[6]</sup> براساس بررسی نورسنجی، تغییرات دوره تناوب سیستم را ناشی از وجود یک لک داغ بر روی سطح هر یک از مؤلفه های سیستم می داند که سرچشمه آنها را ناحیه ای با تابش انتخابی در طول موج های آبی در نظر می گیرد. نتیجه کار حاصل تأییدی بر وجود لک های مذکور می باشد.

Lapasset,E & Gomez.M(1990)<sup>[6]</sup> داده های نوری و سرعت شعاعی Khalessseh,B. (1999)<sup>[4]</sup> این سیستم را با کد 1979 ویلسون مورد بررسی قرار دادند و پارامترهای مربوطه<sup>[1]</sup> Berahitdin,A. (2005) را به صورت زیر تعیین کردند:

$$M_1 = 1.01M, \quad M_2 = 0.52M, \quad R_1 = 1.06R$$

$$R_2 = 0.80R, \quad \text{Log}L_1 = 0.087L, \quad \text{Log}L_2 = 0.286L$$

در این کار بررسی نورسنجی با استفاده از داده های نوری Wilson,R.E. (2003)<sup>[9]</sup> و با کد V,B 2003 ویلسون صورت گرفته است.

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O-6

### بررسی و حل منحنی نوری ستاره ی دوتایی گرفتی U Pegasi

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ستاره ی دوتایی U Pegasi (BD +15°4915) اولین بار توسط Chandler [1] در سال 1895 به عنوان یک ستاره ی متغیر Di-Sheng Zhai و همکارانش [2] در سال 1984 نشان دادند که دوره تناوب این سیستم با زمان کاهش می یابد و این کاهش را به حضور یک جسم سوم که ستاره ای از رشته ی اصلی و دارای جرم  $1/6 M_{\odot}$  می باشد، و نیز به سبب انتقال جرم در سیستم فرض کردند. در سال 1988 Di-Sheng Zhai و همکارانش [3] علت تغییرات منحنی نوری این سیستم را حضور لک در سیستم عنوان کرده و یک لک سرد روی مؤلفه ی دوم در نظر گرفتند.

G. Djurasevic و همکارانش [4] در سال 1998 سیستم را با حضور دو لک سرد روی مؤلفه ی دوم حل نمودند که حاصل کار ما ضمن تأیید حضور دو لک فوق الذکر، با توجه به برازش منحنی های نوری، مؤید نتایج دقیق تری می باشد.

G. Djurasevic و سایرین [5] در سال 2001 نیز به بررسی داده های نوری بین سالهای 1950 تا 1989 پرداختند و بر اساس منحنی های نوری حاصل نشان دادند که در بیشینه ها و کمینه های منحنی نوری U Pegasi عدم تقارن وجود دارد که این می تواند ناشی از وجود لکه ها باشد، نتیجه ای که حاصل کار ما هم آنرا تأیید می نماید. البته متذکر می شویم که Lafta, S. J. & Grainger, J. F. [7] این پدیده را علاوه بر وجود لک احتمالاً ناشی از حضور ابرهای گازی دانسته اند.

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O-7

M. H. Kermani

O-8

## Temperature Dependence of the Polarized Nucleonic matter Equation of State

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A hot neutron star is born within a short time after a supernova explosion. In this stage (proto-neutron star), the interior temperature of a neutron star is of the order 20–50 MeV. The structure properties of this object, especially its maximum mass, is of a great interest for astrophysicists [1]. Theoretically, in calculating the maximum mass of neutron star which should be in agreement with the precise observations, the equation of state of nucleonic matter plays a crucial role. The equation of state of the nucleonic matter determines uniquely the mass-radius relation of the neutron star sequences. These show that the study of the properties of nucleonic matter at finite temperature is very important in the investigation of the proto-neutron star structure.

The lowest order constrained variational method is a powerful tool for determination of the properties of the nucleonic matter at zero and finite temperatures [2-6]. In this paper, we compute some bulk properties of the nucleonic matter at finite temperature using this many-body technique. The equation of state of the hot nucleonic matter is also calculated, and the effect of polarization on the properties of this matter is investigated.

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O-9

### Structure of Quark Stars at Finite Temperature

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The astrophysical observation shows that there are some stars which are more dense than the neutron stars. These stars are composed of a matter with density more than the nuclear matter density. These dense stars are quark stars which are more stable than the neutron stars.

In this research, we have considered the quark stars as a pure quark matter and for calculating the equation of state, we have used the MIT bag model. In this model the energy per volume of the quark matter is assumed to be the kinetic energy of its constituents (free quarks) plus a constant B (bag constant). There are different forms for B (constant and density dependent forms), where in our calculations we have used the constant value  $90 \frac{\text{MeV}}{\text{fm}^3}$ . The bag constant is the energy difference

between the perturbed space and real space, and it dynamically acts as the pressure which keeps the quark gas with constant density and potential. In fact, it is entered in the calculations as the potential energy between the quarks. For calculating the kinetic energy of the quark matter, we obtain the quark densities in terms of the baryonic density by considering the two conditions of the beta equilibrium and the charge neutrality (we assume that the electron density of pure quark matter to be zero). Now, we compute the pressure of this system as a function of the density and therefore the equation of state of quark star is obtained. Using this equation of state, we calculate the structure properties of the quark star by numerically integrating the TOV equation. In order to see how the equation of state and the structure of quark star change with temperature, we make this procedure for four different temperatures. Our calculations show that the maximum mass of the quark star decreases by increasing the temperature. Our results are in good agreement with the results of others and the experimental data.

O-10

**بررسی تاثیر خودگرانش بر قرصهای برافزایشی با الگوی وشکسانی بتا ( $\beta$ ) در حضور میدان مغناطیسی چنبره ای**

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در این مقاله اثر خودگرانش قرص برافزایشی را ، بر دینامیک سیستمی شامل جرم مرکزی و قرص اطراف آن بررسی می کنیم .

با اعمال الگوی وشکسانی بتا ( $\beta$ ) در معادلات ، سعی نموده ایم به روش خود مشابه معادلات مغناطو هیدرودینامیک ، را حل کرده و نحوه ی تغییر سرعت شعاعی را بر حسب پارامترهای سیستم بررسی نماییم .

O-11

**Considering of the Solar Magnetic Energy with the Solar Tubes Dynamo****Elham. Bazyar, Ali. Ajabshirizadeh**[Bazyar\\_84@yahoo.com](mailto:Bazyar_84@yahoo.com), [A-adjab@tabrizu.ac.ir](mailto:A-adjab@tabrizu.ac.ir)**Tabriz University****Abstract**

Studies of the solar magnetic field is one of the important method of explaining phenomena as granules, flares and sunspots found in the Sun and their formation type was explained by the solar dynamo. There is a nonlinear interaction between the magnetic field and the solar plasma that connect to the fluid dynamo in a special location. The Babcock-Leighton model explains that the surface eruptions of the toroidal magnetic field are the source of the poloidal field, whereas, generation of the toroidal field takes place in a thin, deep seated layer, called the Tacholin Layer, at the bottom of the Solar Convection Zone (SCZ).

Consider of the solar magnetic energy variability and connecting parameters (for example, the Solar rotation and inhomogeneous mass) are key factors of understanding magnetic phenomena activity details. Because it seems that the magnetic energy can be different in several directions, in this paper, the toroidal magnetic energy is considered with the rotation factor in the thin layer and their results are compared with solar observations.

O-12

### **Sunspot number and solar radio flux Prediction by neural network method**

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Solar cycle predictions improve our knowledge about solar dynamo, a term that includes the level of solar magnetism. Solar activity predictions are used by space weather operators to plan when to reboost satellites in low-earth orbit, anticipate radiation exposure for current and upcoming missions and to plan for outage in radio-based communication and navigation systems.

Sunspot number ( $R_z$ ) is the most commonly predicted solar activity index. The rate of solar flares and amount of energy they release are well correlated with sunspot number, as is the rate of coronal mass ejection. In general, the sunspot number and solar flux at radio wavelength 10.7 cm are the basic quantities needed for space weather research.

A large range of methods is used to predict the occurrence and amplitude of solar cycle. In this paper, we predict some solar indices ( $R_z$ ,  $F_{10.7}$ ) in solar cycle 24 using the neural network method. A neural network is a computational model that is loosely based the neuron cell structure of the biological neurons system. Given a training set of data, the neural network can learn the data with a learning algorithm.

By using feed forward one hidden layer neural network, we study and predict sunspots number and solar radio flux of solar cycle 24.

O-13

Investigation of the effect of torsional Alfvén waves on the coronal line profiles

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Spectral line profiles of 5303 FeXIV of coronal loops were calculated taking into account of motions in the torsional Alfvén waves and thermal motions of radiating ions FeXIV.

We consider the case of optically thin loops with the Doppler profile radiation of unit volume. Calculations carried out for different values of temperature and maximal amplitude of velocity on the surface of the loops associated with propagating torsional wave. The result of these calculations is that calculated profiles in contrary to the transversal Alfvén waves have no central depression and therefore better can describe observed line profiles.

O-14

## اثر میدان مغناطیسی بر روی ساختار دینامیکی ADAF ها در حضور خودگرانش و هدایت گرمایی با استفاده از رهیافت خودمشابه

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### چکیده

میدان مغناطیسی تاثیر عمده ای بر قرص دارد. میدان ها علاوه بر اینکه تکانه زاویه ای قرص را تغییر می دهند و باعث برافزایش می شوند، در ضمن می توانند باعث تولید جت ها و فوران های ماده از قرص نیز شوند و به این صورت کسر عمده ای از انرژی برافزایشی را از سیستم خارج می کنند در یک قرص مغناطیده، لختی گاز می تواند خطوط میدان مغناطیسی را خم کند و در نتیجه یک مولفه میدان مغناطیسی چنبره ای در قرص ایجاد می شود که ممکن است باعث ایجاد شارش های برون سوی ماده تا فاصله های زیاد به صورت جت ها شود. قرص های برافزایشی اصولاً در اطراف ستارگان مغناطیده یافت می شوند. در این تحقیق برانیم تا تاثیر میدان مغناطیسی با مولفه چنبره ای را بر ساختار دینامیکی ADAF ها بررسی کنیم. سازوکار غالب در این طرح علاوه بر میدان اعمالی، خودگرانش و هدایت گرمایی است. در این مقاله پس از حل معادلات MHD با استفاده از رهیافت خودمشابه، اثر میدان را بر روی ADAF ها بررسی می کنیم و نشان می دهیم که سرعت های شعاعی چگونه تغییر می کنند.

**کلمات کلیدی:** میدان مغناطیسی چنبره ای، خودگرانش، قرص برافزایشی، هدایت گرمایی، رهیافت خودمشابه، ADAF، معادلات MHD.

O-15

On the Fraunhofer line profiles asymmetry and their classification in the spectrum of the Sun

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Line profiles about 100 Fraunhofers lines of weak and moderate intensity in the spectrum of the solar disc centre and total flux are constructed. Digital spectral materials obtained by rapidly scanning monochromators and Fourier spectrometers of high spectral resolution are used. The asymmetry parameters of the line profiles were determined using method proposed by Kuli-Zade. Classifications of the line profiles asymmetry were carried out. 6 classes have been proposed:

Class I. The profiles of lines for which negative part of the integral asymmetry  $\Lambda_{-}=0$ ; i.e. the profiles of the lines are fully characterized by the violet asymmetry;

Class II. The profiles of lines for which positive part of the integral asymmetry  $\Lambda_{+}=0$ ; i.e. the profiles of the lines are fully characterized by the red asymmetry;

Class III. The profiles of lines for which residual asymmetry  $\Delta\Lambda>0$ ; i.e. the violet asymmetry predominates;

Class IV. The profiles of lines for which negative residual asymmetry  $\Delta\Lambda<0$ ; i.e. red asymmetry predominates;

Class V. The profiles of lines for which integral asymmetry  $\Lambda=0$ ; i.e. the profiles of lines are symmetrical;

Class VI. The profiles of lines for which residual asymmetry  $\Delta\Lambda=0$ ; i.e both asymmetries have the same power.

O-16

Low-energy effective theory for a different Randall-Sundrum system

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We derived the low-energy effective theory for a generalized Randall-Sundrum scenario, with three 4D branes embedded in a 5D AdS bulk. Two of the branes are located at the fixed points of the orbifold, but the third brane can be located anywhere in between. By construction, the metrics on the three branes are all connected by an appropriate conformal transformation. It is therefore enough to derive the 4D effective Einstein equations on the third brane, as the effective theory on the other branes can then be obtained performing a conformal transformation.

We followed the covariant approach adopted in [1] to derive the low-energy effective theory for a two brane Randall-Sundrum system. We considered an expansion of the extrinsic curvature and of the projected Weyl tensor, where the expansion parameter is the ratio of the energy density on the brane to the vacuum energy density as in [1-3]. In each separate region of the AdS bulk, the evolution equations for the extrinsic curvature tensor and for the projected Weyl tensor are, at each order, the same as in the two brane scenario and solutions to the first-order equations can be found separately in each AdS slice. The presence of the third brane obliges the evolution of the projected Weyl tensor to be discontinuous. From the requirement of consistency of the Einstein equations and from the junction conditions for the extrinsic curvature tensor at the third brane we obtain a junction condition for the projected Weyl tensor in terms of the extrinsic curvatures on both sides of the branes and the sources on both branes. Once an expression for the Weyl tensor as a function of the sources on the branes was obtained, we have finally derived the first order 4D effective Einstein equations on the third brane. The resulting theory is a generalized Brans-Dicke theory with two independent scalar fields. The appearance of two independent scalar fields is not surprising as the three brane scenario is characterized by two natural scalar degrees of freedom: the overall size of the orbifold and the position of the third brane. A non-minimal coupling of the fields is found with respect to matter on the other two branes. We have then showed that the effective theory is conformally equivalent to Einstein gravity plus two scalar fields minimally coupled with the geometry.

We can conclude that the interpretation of the radion field in the two brane scenario can be generalized to a three-brane scenario in which there exists an additional scalar degree of freedom. In the two brane case the realization at first order of the non-local Einstein gravity, with the generalized dark radiation term, as a local effective theory is described by the radion field which appears in the equations through its derivatives. In the three brane case, as in the case where a scalar bulk field is living in the bulk [4-6], two scalar fields both contribute to the realization of the (local) effective theory on the brane.

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### **Stairway to Heaven or Sullam-al Sama from Jamshid Kashani**

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The meaning of treatise of Sullam al-Sama is the stairway or ladder of heaven, which is the name of the precious book of kashani, an eldest Iranian mathematician & Astronomer.  
A survey of Sullam al-Sama can be very important since this book has not been translated to Persian or any other foreign languages. .

O-18

## Design and Construction of the Projection Radium Planes of Astrolabes

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### Abstract

Projection Radium is an angle in the celestial coordinates. In this system of coordinates the axis of rotation is between the northern and southern pole and its main circle, (corresponding to earth's equator) is a great circle, crossing the zenith, the nadir and the east and west of the observe. Peripheral circles are orthogonal to this great circle and cross the poles of the observer. The origin for measuring the Projection Radium is the celestial meridian of the observer. The angle between the celestial object and the meridian is the projection radium of that object.

In the astrolabes such a plate was designed, called the Projection Radium plate, which was also called the projection plate by Abureihan Biruni. This plate includes the stereographic planar projection of the celestial coordinates. The viewpoint is in the Nadir and the horizon plane is the projection plane. In this article we present the designing method of this plate for latitudes  $32^\circ$  and  $34^\circ$ , separately. Then we discuss the superposition method of these two plates and its give examples of applications in the calculation of quartile aspect, sextile aspect and trine aspect of a celestial object with respect to an observer and with respect to other celestial objects.

O-19

### Scientific-philosophical Thoughts of Khaje Nasir al-Din Toosii

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In the wake of Mongol attack and their devastations in early 8<sup>th</sup> century AH, Khaje Nasir played a major role in resuming cultural thought and exercised a unique influence on reestablishing and invoking scientific, ideological tradition in Iran at the time that Mongols insurgencies had brought about regression and deep intermission in Iran. During the same periods, Khaje contributed to renaissance of rational sciences (philosophy and theology) and natural sciences (mathematics and astronomy) by establishing scientific-research centers in Marageh.

As regards philosophy, Khaje is considered as a follower of Avicenna; however this should not imply that he has unquestioningly subscribed for the entire tenets of his philosophy since reviewing the works and investigations carried out by this scientist is suggestive of his critical temperament. Khaje is influenced by earlier philosophical and theological schools in his revisions however, the question which will be treated in the article.

Regarding his scientific thoughts both in mathematics and astrology, it is possible to see the signs of deep insight and perhaps innovation in some problems, such as the formulations he presents in the treatise concerning with doubt on the fifth principle of Euclid or what we find in his *Tazkira* with regard to undermining principles of Ptolemaic system.

*Khaje Nasir and Peripatetic Philosophy:* In this regard, we will explore two approaches of Khaje in his dealing with peripatetic school: a) problems not explicitly discussed in works of Avicenna, including the question of equivocality of objective existential reality, authenticity and finally the concomitant relationship between existence and nature (which is mentioned in third volume of *Isharat*; b) controversies between Avicenna and Khaje, including knowledge and negation of combination of form and material in body.

*Khaje Nasir and Euclidian Mathematics:* For the first time, Khaje demonstrated the well-known theorem on parallelism of parallel lines in mathematics and geometry by using *reductio ad absurdum*, and his scrutiny in the subject is regarded as marking a turning point in the history of mathematics and geometry in defining the origin of non-Euclidian geometry. Khaje substantiated the principles of Euclidian subject by adopting a twofold approach of using bi-perpendicular isosceles square and qualities of triangle.

*Khaje Nasir and Ptolemaic Astrology:* Khaje is among the earliest scholars who criticized Ptolemaic system paving the way for refuting the system. In his important astrological work *al-Tazkirat ol-Nasiria fi al-Hayat*, criticizing Ptolemaic ideas, Khaje proposes a new theory on stellar systems. In the new theory, unlike Ptolemaic system, the earth is located exactly in the center of universe. In order to explain the formal movement of stars, he supposed two spheres in a way that one sphere rotated within the other one. Called Toosii Couples in astrological literature, the theory was later embraced by Qutb al-Din of Shiraz who suggested a similar model for movement of Mercury.

Keywords: philosophical, scientific, Khaje Nasir al-Din Toosi, Mathematical, astronomy, Avicenna, Euclid, Ptolemy.

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## چالش های تغییرات روشنایی سیارات : عبوری از زمین مرکزی به خورشید مرکزی سحر رحمانی، سارا مشحون بهناز خالقی

دانشگاه صنعتی شریف  
دانشکده فیزیک

### چکیده:

تغییرات فیزیکی سیارات به ویژه تغییر قدر ظاهری آن ها، یکی از چالش برانگیزترین مسائلی بود که در دوران نجوم زمین مرکزی و نجوم پیش از گالیله وجود داشت. در این مقاله پس از بررسی نظریه های ارسطو و دیگر فلاسفه ی یونان قدیم و نظریه ی زمین مرکزی و مشکلات آن در این زمینه، به تحلیل و مقایسه ی داده های رصدی منجمان آماتور پرداخته شده است و سپس به بررسی کارهای کوپرنیک و استدلال های وی برای ارائه ی نظریه ی خورشید مرکزی و به ویژه روش های رصدی وی در این فرآیند مورد بررسی قرار گرفته است.

O-21

## Halo and galaxy properties of fossil galaxy groups

Habib Khosroshahi

### IPM

Galaxy groups are key systems in advancing our understanding of structure formation and evolution. They contain the majority of galaxies in the universe, and are precursors to the most massive structures, i.e. clusters, giving them cosmological importance. They show departures from the scaling relations obeyed by galaxy clusters indicating that groups are not simply scaled-down versions of clusters. It is argued that galaxy groups are rapidly evolving, and many are not virialised. Thus identifying and studying a sample of well-characterised galaxy groups can help us understand the origin of some of the observed diversities in groups. Galaxy groups also play a key role in understating the formation of luminous elliptical galaxies such as the brightest cluster galaxies (BCGs) arguably as a result of higher efficiency of galaxy-galaxy merger.

In the class of galaxy groups known as "fossil groups", the group is dominated optically by a single luminous elliptical galaxy at the centre of an extended luminous X-ray emission similar to that seen in bright X-ray groups. The X-ray is emitted as a result of gravitational shock heating during the collapse, and formation, of the system and is a powerful probe of the dark matter distribution in groups and clusters of galaxies. The X-ray emission in fossils is regular and symmetric, indicating the absence of recent group merging thus they are seen as simple laboratories to study formation and evolution of galaxies and haloes in the absence of recent mergers. The absence of  $L^*$  galaxies in fossils is argued to be the consequence of multiple mergers of galaxies within the group itself which could also mean that fossils are old galaxy systems as the time-scale of such mergers are usually over around 4 Gyr (Jones 00). Thus fossils are the best candidates for virialised groups.

On the observational side, we study the X-ray properties of fossil galaxy groups as the extreme relaxed objects, in contrast to the bullet cluster, and found observational evidences that these systems have a relatively early formation epoch and hence can be used as cosmological tools to understand the IGM, dark matter halo and galaxy properties of old galaxy systems. The strongest support for the early formation of fossils came from their higher halo concentration compared to non-fossils as well as having hotter IGM for a given halo mass.

Similarly using the cosmological N-body simulations we study the history of the mass assembly of fossil groups, selected using the usual observational criteria at  $z=0$ , from a redshift  $z=0.8$  to the present day, within the Millennium simulation. We found that the space density of X-ray fossil groups is in close agreement with the observed space density of fossils. Although for low luminosity fossils simulations predict roughly 1/3 of the observed fossil space density, there are several potential factors that could lead to this difference. As well as significant uncertainties in the observational studies, the X-ray properties of halos in the real Universe show far greater scatter than those seen in the preheating simulation used here.

The probability of finding optical fossils is a decreasing function of: (a) group dark matter halo mass and, (b) the fraction of the virial radius within which the first and second brightest galaxies are being found.

O-22

**Multiband optical monitoring of blazars****Aghaee, Alireza**<sup>1,2</sup><sup>1</sup>*Department of Physics, University of Sistan and Baluchestan, Zahedan, Iran*<sup>2</sup>*School of Astronomy and Astrophysics, Institute for Research in Fundamental Sciences, Tehran, Iran***Abstract**

Blazars form a sub-group of radio loud AGN and they include BL Lac objects as well as quasars with flat radio spectrum. Blazars vary at all wavelengths over a variety of timescales. Various models have been proposed to explain blazar variability, however, the mechanism responsible for variability is not conclusively understood. One factor which can discriminate among the various variability models is that of colour (spectral index) variations of blazars. By this one may be able to better understand the mechanism of blazar variability. The author of this paper has therefore proposed to the OHP observatory to carry out quasi-simultaneous multiband monitoring of one of the brightest blazars, Mrk 180. Fortunately, it was accepted by the scientific team of the observatory and Mrk 180 was simultaneously monitored, from 23 to 28 April 2009. In this paper, the different models will be investigated and will try to represent the primary results of this blazar.

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### مطالعه تحولات مربوط به خورشید با استفاده از کد شبیه سازی CESAM

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گروه فیزیک دانشگاه بیرجند

کد CESAM (Code d'Evolution Stellaire Adaptatif et Modulaire) شامل برنامه ها و زیر برنامه هایی است که تحولات یک بعدی شبه استاتیکی ستاره ای را با استفاده از محاسبات مداوم و طولانی مورد بررسی قرار می دهد. این کد تحول مربوط به ستارگان قبل از رشته اصلی تا شروع چرخه سوخت هلیوم ( $3\alpha$ ) را محاسبه می کند.

هدف کلی این کد فراهم آوردن یک مدل استاندارد برای تحول خورشید از ZAMS تا زمان فعلی آن است. دقت محاسبات از مرتبه  $10^{-4}$ ، حداکثر تعداد لایه های به کار رفته برابر 500 و همچنین تعداد گام ها برابر 50، و بیشترین بازه زمانی برابر 100 میلیون سال است. ساختار کلی کد به دو قسمت تقسیم می شود:

1. فضای فیزیکی: در این فضا ثابت های معادلات دیفرانسیل با توجه به فرمالیزم های فیزیکی نوشته می شوند و شامل معادلات حالت، کدری، سرعت های واکنش های شیمیایی، شرایط مرزی خارجی، محاسبه همرفتی و ... است.

2. فضای عددی: در این فضا به نحوه حل معادلات دیفرانسیل پرداخته می شود.

در این مقاله تحول ستاره ای با جرم خورشید توسط این کد مورد بررسی قرار می گیرد.

شعاع و جرم خورشید به ترتیب  $R_{\text{sun}}=6.9599 \times 10^{10}$  cm و  $M_{\text{sun}}=1.989 \times 10^{33}$  gr در نظر گرفته شده است. همچنین سن خورشید برابر  $4.75 \times 10^9$  yr و فروغمندی آن نیز با محاسبه میانگین حاصل از نتایج درخشندگی برابر  $3.846 \times 10^{33}$  فرض شده است.

کالیبره کردن با فرض  $Z=0.0194$  و برای نسبت  $Z/X=0.0275$  در مدل خورشیدی انجام می گیرد.

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## تاریخ نجوم

زیبا دانش - طغرل طهماسبی

روزگاری بود که مردمان، آسمان بالای سرشان را می‌نگریستند و از چستی ستارگان درخشان پرسش‌ها می‌نمودند. آنان از آسمان به عنوان قطب‌نما، ساعت و تقویم استفاده می‌نمودند. طلوع و غروب خورشید به ترتیب نمایانگر شرق و غرب بود. صورت‌های کره‌ی ماه، یک ماه را معین می‌نمود و ماه به همراه حرکت سالانه‌ی خورشید در آسمان تقویم را پدید می‌آورد. با شروع تبادلات تجاری میان فرهنگ‌ها، موقعیت ستارگان برای راهنمایی دریانوردان به کار گرفته شد.

مردمان گذشته را باور بر این بود که سه دانش بایسته بر انسان است: فقه برای دین، طب برای تن و نجوم برای زمان.

نجوم معرفت و مطالعه‌ی مواد و مقدمه‌ی است درباره‌ی فرآیند به‌وجود آمدن هر آنچه در ورای جو زمین است، که این جهان، آسمان و گوی آسمان را از اتم‌های کوچک تا گیتی وسیع شامل است.

در سال 150 میلادی منجم و ریاضی‌دان یونانی به نام «کلودیوس بطلمیوس» رساله‌ی درباره‌ی علم نجوم به رشته‌ی تحریر درآورد. وی در آن رساله، 48 گروه ستاره‌ی را که صورت‌فلکی نامیده می‌شدند، فهرست کرد که بیشتر برگرفته از اعلام اساطیر بود.

از دوران پیش از اسلام به جز کتاب «زیچ شهریار» سند مکتوبی برجای نمانده است، لکن ابوریحان بیرونی در کتاب خود، اطلاعات نغزی درباره‌ی باورهای اقوام گذشته درباره‌ی اخترشناسی ارایه نموده است.

نخستین علمی که ساکنان بلاد اسلامی به آن اهتمام ورزیدند، طب، کیمیا و نجوم بود، که احکام این علوم را بر دیگر علوم ترجیح می‌دادند و از مباحث مهم دانش‌های اسلامی نیز، دانش نجوم اسلامی بود که به دلیل مسایل عبادتی و تعیین اوقات شرعی بسیار مهم می‌نمود. دانش ستاره‌شناسی در ایران هم مانند دیگر نقاط جهان پیشینه‌ی طولانی دارد و از نخستین علمی است که به‌دست آریاییان مورد توجه قرار گرفته است.

این حقیقت امروز فاش شده است که در 24 مه 1032 م. ابن سینا با چشم غیرمسلح پدیده‌ی نجومی نادر عبور ستاره‌ی زهره از میان قرص خورشید را کشف کرد، و این واقعه بدان معناست که بایستی تاریخ علم را تصحیح کرد، چرا که دیربازی عقیده بر این بوده است که این پدیده برای نخستین بار در سال 1639 توسط یک ستاره‌شناس انگلیسی به نام «جرامیا هوراکس» رصد شده است.

از دیگر ابداعات منجمین این دوره، ساخت اولین رصدخانه‌ها بود. رصدخانه‌های سمرقند و مراغه از دقیق‌ترین رصدخانه‌های این دوره بودند. نجوم در دوران معاصر نیز با برگردان مقالات بیگانه در نشریات و آشنایی ایرانیان با اخترشناسی نوین از سال‌های ۱۳۲۰ تا ۱۳۴۰ آغاز شد...

در این مقاله سعی داریم ضمن تعریفی از علم تاریخ و علم نجوم، به چگونگی به‌وجود آمدن علم نجوم به عنوان قدیمی‌ترین علم جهان بپردازیم. تاریخ ستاره‌شناسی را در 4 دوره‌ی: ما قبل تاریخ، پیش از اسلام، پس از اسلام و معاصر از نظر خواهیم گذرانند و با سیری در نجوم اروپا و آمریکا، با مشاهیر این علم عظیم آشنا و آرایه‌ی را که در طول قرن‌ها برای توجیه و پیش‌بینی حرکات آسمانی ارایه شده است، مرور خواهیم کرد. تکمله‌ی مباحث نیز ستاره‌شناسی در قرآن و نجوم در ادبیات خواهد بود. باشد که به لذتی برسیم که از مشاهده‌ی جهان هستی در پرتو این اندیشه‌های نو به انسانی اندیش‌مند دست یازیم...

O-26

Introducing of Astronomical Texts of Safineye Tabriz Book

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Abstract:

Safineye Tabriz is a book that written by Abolmajd Mohamad ibn Masoud Tabrizi in 712-723 hijri in Tabriz city during Ilkhanat period , the author In this book collect a lot of texts about astronomy, Mathematics , Erfan , Poet , medicine and ... , This book has 209 text and 7<sup>th</sup> of them are astronomical while 5 of them are from Nasiraddin tusi and they are very old and may be some of them are oldest one of these texts because have been written in very near time to Nasiraddin period and only 50 years after him and of the other astronomical texts is “ Bist Bab Dar Ostorlab” by Nasiraddin Abidollah Abidi.

O-27

## طراحی الگویی برای بقای آماتورها در کشف دنباله دارها

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مقدمه:

از دوران مسیه در قرن 18 تا کنون کشف دنباله دارها یکی از مهیج ترین بخش های نجوم برای منجمان آماتور بوده است. این اکتشافات عموماً به شیوه ی بصری انجام میگرفته است. هر چند نمونه های بسیار زیادی از این گونه اکتشافات در تاریخ تا کنون (تقریباً تا انتهای قرن گذشته) دیده می شود اما اکنون، به خصوص در نیمکره ی شمالی زمین اوضاع برای ستاره شناسان آماتور (در این موضوع) چندان مناسب به نظر نمی آید.

مهمترین دلیل برای این مورد اکتشافات بسیار زیادی است که در زمینه ی دنباله دارها و نیز سیارک ها از طرفی غیر از روش های بصری، رایج شده است. در آخرین دهه از قرن گذشته (درست در سال 1990) برنامه تصاویر فراوانی از آسمان فرای زمین تهیه کرد که (NEO) پایش خودکار آسمان برای اجرام نزدیک زمین نتیجه ی آن کشف نمونه های زیادی از دنباله دارها به روشی غیر از دیداری بود. این مورد شاهدهی بود برای از دور خارج شدن منجمان آماتور از دایره ی کشف دنباله دارها. هرچند کشف دنباله دار C/2002 E2 در سال 2002 نشان داد هنوز کاشفانی که از تلسکوپ های بزرگ استفاده می کنند شانس خوبی دارند. کشف حدود 5 دنباله دار دیگر در سالهای بعدی اوضاع را باز هم برای آماتورها امیدوارانه کرد اما شوک اصلی کشف (SWAN solar wind) بود که این بار یک آماتور ژاپنی از روی عکس های C/2006 O6 SWAN این دنباله دار را کشف کرد و قضیه ی اصلی این بود که این تصاویر آزاد بوده و در (anisotropies)

دسترس همگان قرار دارد. به عبارتی آماتور ها حدس می زنند که دنباله دارهای کم نور به راحتی و پیش از این که آماتور ها بتوانند آنها را کشف کنند در این تصاویر یافت می شوند و دیگر فعالیت رصدی چندان جدی ای برای این اکتشافات لازم نیست. در ایران متأسفانه فعالیت چندان برای کشف دنباله دارها چه به صورت بصری و چه با استناد به تصاویر هیچگاه امری جدی محسوب نشده است. در این مقاله به SWAN

رصد های بصری برای کشف دنباله دارها SWAN بررسی این پرسش مهم که آیا با ظهور پدیده هایی چون به سر آمده یا خیر مورد نظر قرار گرفته است.

O-28

**DIFFERENCE OF MAGNETIC RECONNECTION IN 3D AND 3D AND CORONAL HEATING****farman,hosein;bagheri,samara***Department of Physics, science and technology University, Tehran***Abstract**

Magnetic reconnection, is the best proposal for justifying coronal heating. In this paper, we first summarized the developments of the theory of 2D and 3D reconnection and then we compared them with each other and then, we mentioned the different methods that have been proposed for coronal heating. At 3D null points reconnection may occur by either **spine**, **fan** or **separator** reconnection. In the absence of null points, reconnection of two flux tubes is completely different from 2D reconnection since in 3D a flux-conserving velocity  $\mathbf{w}$  does not exist. Heating in the corona has been proposed to occur by reconnection at X-ray bright point and binary reconnection.

O-29

### Third Order Effect of Rotation on Stellar Oscillations of Upper Main Sequence Stars

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#### Abstract

Here the effect of rotation up to third order in the angular velocity of a star on the p, f and g modes is investigated. To do this, the third-order perturbation formalism presented by Soufi et al. (1998) and revised by Karami (2008), was used. I quantify by numerical calculations the effect of rotation on the oscillation frequencies of a uniformly rotating upper main sequence star, and particularly  $\beta$ -Cephei star with  $12M_{\odot}$ . For an equatorial velocity of  $90 \text{ km s}^{-1}$ , it is found that the second- and third-order corrections for  $(l,m)=(5,-4)$ , for instance, are of order of 0.07% of the frequency for radial order  $n=-3$  and reaches up to 0.6% for  $n=-20$ .

#### References

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Soufi F., Goupil M.J., Dziembowski W.A., 1998, Astron. Astrophys., 334, 911

O-30

***Comparative study of the solar wind interaction with Venus and Mars:******Z. Altaha MOtahar*****Islamic Azad University, Research & Science Branch**

Venus and Mars are the two most notable planets of the solar system whose plasma and magnetic field conditions produce an obstacle to the solar wind that is entirely different from that measured around the rest of the solar system planets that have been explored.

In the absence of a significant intrinsic global magnetic field in Venus and Mars there is no magnetospheric obstacle around them and the solar wind can directly reach the exosphere and the ionosphere of both planets. The interaction of solar wind with these planets produces energetic neutral atoms (ENAs) and X-rays. In addition, at both planets, proton cyclotron waves and ion beam events have been observed and the production mechanisms of them will be discussed.

Despite the fact that Mars, like-Venus, currently does not have an appreciable global intrinsic magnetic field its region of interaction with the solar wind has properties that as a whole are different from those found in the solar wind–Venus interaction region. Most notable are the boundaries found in the Mars plasma environment as well as the region that is present between them. (Mars has strong localized magnetic crustal anomalies suggesting that the planet may have had a significant intrinsic magnetic field in the past and these crustal magnetic fields contribute to the Martian obstacle locally. Nevertheless, such crustal magnetic fields are unrelated to differences of solar wind interaction with Venus and Mars.)

Venus has larger radius and volume than Mars that implicates in larger interaction region; also, it has larger gravity that results in its different exosphere. These differences may cause the peculiar response of the ionosphere of each planet to the oncoming solar wind dynamic pressure. While at Venus the peak ionospheric thermal pressure is in general sufficient to withhold the incident solar wind kinetic pressure there is a different response in Mars where the peak ionospheric thermal pressure is in general not large enough to deviate the solar wind. In Mars, the ionosphere is unable to force the solar wind to move around the ionosphere and as a result, the oncoming electron population can reach low altitudes where it is influenced by neutral atmospheric particles.

O-31

**The effect of ISM on pulsar death**

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Translational velocity of pulsars in the surrounding ISM and the resulting ram pressure of the medium could, in principle, be expected to interfere with the pulsar (radio) emission mechanism. In particular penetration of (ionized) matter into the pulsar's magnetosphere would "turn off" the pulsar. The effect depends, for a given pulsar velocity and matter density, on the pulsar period and magnetic field strength. Hence a separate "death line" on the B-P plot of pulsars is realized, in contrast to the standard one. We compare the relative positions of the two lines, for various sets of parameters, and investigate the possible role of such a death line on the statistics of pulsar distribution, in the B-P diagram.

O-32

Study of the variations of quasi-biennial oscillations seen in the indexes describing the large-scale solar magnetic fields

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Quasi-biennial oscillations (QBO) in various active events in the Sun are the second most powerful variation after the 11-year cycle. They are stable harmonic oscillations with a period changing noticeably from ~1.5 to ~3.0 years. QBO are mainly revealed in the structure of large-scale solar magnetic fields (LSMF). In the medium-scale fields, they are weak. QBO have been also detected in the dynamics of sunspot indices, active longitudes, activity indices in the polar zone, magnetic field of the Sun as a star, solar irradiance, neutrino flux, coronal mass ejections, solar wind and heliospheric parameters and geomagnetic activity. QBO are well pronounced in the time-latitude diagrams and correlograms, as well as in the spectra of the source surface magnetic field sector structure. Thus, QBO are actually variations of the equatorial dipole and quadrupole.

QBO are also clearly seen in the indices characterizing the asymmetry of the LSMF parameters. In this paper variations of the QBO seen in the indexes of LSMF are investigated for the period of 85 years (1915-2000). It is revealed that in the zone-even part reflecting asymmetry of the main index of global magnetic fields, QBO are observed permanently. The QBO intensity changes with time being maximum in the middle of the 20th century. Analysis of the obtained results enables to conclude that QBO are describers of asymmetric processes in LSMF. Obtained results could be used in prognostic purposes in study of solar activity.

O-33

Atmospheric conditions of the Maidanak Observatory  
for the high angular resolution observations

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The atmospheric conditions for the high angular resolution observations and meteorology of the Maidanak Observatory in Uzbekistan are reviewed. *Night-time seeing* was measured during the period 1996–2004 with the ESO Differential Image Motion Monitor (DIMM). The median zenith seeing (FWHM) for the entire period of observations is 0.70 arcsec at 0.5  $\mu\text{m}$ . A maximum clear sky season for Maidanak is July–September, with about 90% of possible clear time and a median seeing of 0.69 arcsec. The best monthly median seeing 0.62 arcsec is observed in November. Negligible correlation between seeing and the wind velocity at ground level has been found. During an additional site testing campaign (9 nights) organized in July 1998, the median *wavefront outer scale* being 25.9 m and a median *isoplanatic angle* being 2.48 arcsec were measured with the Generalized Seeing Monitor (GSM) developed at the University of Nice. This corresponds to a remarkably large atmospheric time constant. The *night-time microthermal measurements* of surface layer optical turbulence were carried out in July–August 2002 using the micro temperature sensors developed at the University of Nice. Temperature sensors were installed on 8 levels between 3.0 and 25.5 m on the preinstalled meteorological mast. Simultaneous measurements of total seeing by DIMM allow us estimate the surface layer contribution to the total seeing was found to be about 8%.

O-34

On Comet's hazard problem

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Distribution of ascending and descending nodes of orbits about 1200 comets concerning of the Earth orbit is studied in the work. The theoretical opportunity of collision of comets and the Earth is considered taking into account of following parameters: size of the Earth, eccentricity of Earth orbit, size of actions sphere of Earth quantity cometary's nodes. It is established that such collision can occur on the average once for 950 years. Thus the question about asteroid hazard is not considered. At the same time authors prove that the idea about existence cometary's family of the Earth has no sufficient arguments.

O-35

Sky names, music in Universe and meteorites related to Azerbaijan

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Relevant information is given on 12 names of asteroids as well as craters on Moon and planets Mars and Mercury, related to Azerbaijan. Details and illustrations are also provided.

Information about meteorites found in the territory of Azerbaijan and registered in international catalogues and collections as well as relevant physical details about these meteorites (1 iron and 2 stone) are also provided.

In this paper we tell about interstellar mission Voyager 1 and 2 in 1977. Both Voyager spacecrafts carry a greeting to any form of life, should that be encountered. The message is carried by a phonograph record - a 12-inch gold-plated copper disk containing sounds and images selected to portray the diversity of life and culture on Earth. There were assembled 115 images and a variety of natural sounds. To this they added musical selections from different cultures and eras, and spoken greetings from Earth-people in fifty-five languages.

Azerbaijani balaban (Azerbaijani double reed woodwind instrument or bagpipes) music recorded by radio Moscow (2.30 minutes) was also among these musical records - an eclectic 90-minute selection of music from many cultures, including Eastern and Western classics. In the past, the balaban was an essential musical element in the performance of mugham.

O-36

### حل منحنی نوری سیستم دوتایی گرفتی IM Aur

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چکیده:

داده های نوری سیستم دوتایی IM Aurigae که از نوع آنگول می باشد، در دو صافی B و V توسط برنامه ویلسون 2003 مورد تجزیه و تحلیل قرار گرفته است. نتایج حاکی از آن است که سیستم نیمه جدا بوده و مؤلفه دوم حد روچ خود را پر نموده است. از طرفی تحلیل نتایج مؤید وجود جسم سوم در سیستم می باشد که پارامتر نوری آن مشخص می گردد. همچنین رده طیفی مؤلفه اول B6V و مؤلفه دوم A2IV تعیین می گردد.

نتایج بدست آمده تطابق بسیار رضایت بخش با نتایج حاصل از کار برکویتس و همکاران (2002) دارد

O-37

Analysis of the solar green corona N-S asymmetry over the last 5.5 activity cycles

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We examine three available long-term databases of monthly means of the green coronal brightness which cover the period of five and the half last solar cycles to compare obtained north-south asymmetry of the corona and to determine the behaviour of asymmetry. We use the data from (1) Norikura Observatory, (2) Kislovodsk Observatory, (3) intensities registered by several coronagraphs and converted to the common photometric scale of Pic du Midi. We analyze them by means of nonlinear tools to find the periodicity characteristics of asymmetry and phase relationship between two hemispheres and between green brightness and the set of sunspot numbers. In general features the green corona asymmetry agrees with the asymmetry of sunspot activity.

O-38

**Modeling Black-Holes Super Gravity effects in N-Dimensions Space-time, to solve Homogeneous World Modeling**

**Hossein.Masalehdan<sup>1</sup> , Thomas.G.Rizzo<sup>2-1</sup> , Milad.Bastam<sup>3</sup>**

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*In this paper you will found out how we can explain the dimensions breaking to mode : new type of Homogeneous space around Super massive black holes, first we input  $N=2$  to improve in higher levels of Strings Super symmetry, then in 4D-metric with the general form of the metrics we use Quantum geometry systems to N-Cases and N-Brane, at last in advance manifolds we discuss about BH's Structure.*

O-39

### **Spherical Collapse with MOND: The effect of Background Cosmological Models**

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In this work I consider the spherical collapse model in the framework of Modified Newtonian Dynamics (MOND). Here, the effects of background cosmological model on the formation of cosmic structures are investigated. In this regard, first I assume that the background cosmology is a low density Friedmann model without cold dark matter and dark energy, then I carry the background cosmological model to a variable dark energy dominated universe without cold dark matter. It is shown that the evolution of structures depends very strongly on the value of MONDian acceleration threshold  $a_0$ . For a lower values of  $a_0$  structures virialize at a lower redshift. Also I show that a variable dark energy background model would lead to much slower collapse of structures in comparison with the low density background model.

O-40

### **A review on Pulsars' Velocities and NS Birth Kick**

*Masoumeh Delband*

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Observations show that most of the pulsars have large velocities (several hundred km/s) which are so greater than their progenitors' velocities. Since the supernova explosion of pre-NS is not spherically symmetric, it is assumed that pulsar receives a kick-velocity at its birth time. There are some mechanisms that are used to explain it, but the physical origin of this asymmetry is not clear yet.

Pulsars are found in isolated form or in binary systems. Most of isolated pulsars are born in binary systems and due to the amount and direction of their kick velocities (after SN), they escaped from binary. So this can be useful to study binaries in order to predict the future of that system after supernova explosion and the situation that new born pulsar can release from this system.

In this paper we want to review what we know about the pulsar velocities and what are the constrains on binary systems that lead to disruption of binary after the SN-explosion and birth of isolated pulsar.

Using Pulsar Catalogues to study the most recent pulsar parameters that are available, is so helpful to achieve more information on pulsar characteristics and to connect the theoretical conclusions into the observational facts.

O-41

### Light curve analysis and study of surface magnetic field effects on the orbital period variations of UV Leo

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#### Abstract

The solutions of photometric BV light curves for the Algol like system UV Leo were obtained using Wilson-Devinney code. The physical and orbital parameters along with absolute dimensions of the system were determined. It has been found that to best fit the V light curve of the system, assumptions of three dark spots were necessary; two on the secondary and one on the primary, the details of which are given in Table 3. The absolute visual magnitudes ( $M_v$ ) of the individual components i.e., primary and secondary were estimated to 4.41 and 4.43, respectively, through the color curve analysis. The period analysis of the system presented elsewhere, indicated a cyclic period change of 12 yr duration, which was attributed to magnetic activity cycle, as a main cause of period variation in the system, through the Applegate [20] mechanism. To verify the Applegate' model I preformed calculations of some related parameters using the equation 2-10, barrowed from Applegate[20] and Kalimeris [22]. Values of all the calculated parameters were in accordance to those obtained for similar systems by Applegate. The differential magnitudes  $\Delta B$  and  $\Delta V$ , along with corresponding values of  $\Delta(B-V)$  color index, were plotted in the Fig. 8. The cyclic variations in brightness are quite clear from the Fig.8. There are three predictions of Applegate's theory concerning effects of cyclic magnetic changes on the period variations, which can be checked through the observations, these are as follows:

I) The long term variations in mean brightness (at outside of eclipses) and cyclic changes of orbital period, vary with the same period. II) The active star gets bluer as it gets brightened and/or the brightness and color variations are to be in phase. III) Changes in luminosity due to changes in quadrupole moment should be of the order 0.1 mag.

All the above mentioned predictions of Applegate's theory are verified through Fig. 8. These results combined with cyclic character of P(E) presented elsewhere and also consistency of parameters obtained from the relations 2-10, led me to conclude that one the main causes of period variability in UV Leo system is magnetic activity cycle (newly presented here).

Since both components (G0&G2) of this system magnetically can be active, and separation of the components is relatively low (3.9Rs), the magnetic braking could also cause the period change.

The magnetized star winds move outward from the star, but are twisted due to rapid rotation of star. Charged particles in the stars wind become trapped in the star's magnetic field and are dragged along the field lines. The result is angular momentum (AM) transfer from the star by magnetic field to the charged particles. As the winds leave the star surface they are dragged by the magnetic field which in turn slows down the star's rotation.

O-42

**The change on the electronic energy levels of a neutron star due to its fast rotation and estimating the possibly share of these effect on the neutron star magnetic field.**

This paper aims at investigating the changes in the particle distributions of a rotating neutron star. We have shown that some part of magnetic field of a rotating neutron star can be attributed to its ununiformed distribution electric charges. With comparison of potential energy and Fermi energy we concluded that despite we can treat electrons as ideal gas, but we have to treat nucleon as localized particles with uniform distribution. ununiformed electron distribution leads to ununiforme charge density as this (for understanding order of magnitude of these effects, in first treatment, we solved the problem for a cylinder of radius  $a$ , with angular speed  $\omega$ ):

$$\delta n \sim n_0^{1/2} \left( \frac{\omega a m_e}{h} \right)^2$$

where  $n_0$ ,  $m_e$  and  $h$  are the center electron number density, electron mass and Planck costant respectively.

Then, the magnetic filed generated by this uniformed charge distribution is studied.

O-43

**ارائه مدلی جهت ساختار دینامیکی سحابی سیاره نمای NGC6369 با استفاده از شدت خطوط طیفی**

دکتر جمشید قنبری  
سکینه رضایی کهخایی

**چکیده:**

سحابی های سیاره نما، سحابی های منفردی هستند که غالباً دارای تقارن دوطرفه آشکاری هستند. مهمترین خصوصیت سحابی های سیاره نما، طیف آنها می باشد. ما در این مقاله با مطالعه ساختارهای دینامیکی و یونیدگی سحابی سیاره نمای NGC6369 شدت خطوط طیفی  $H\beta$  و  $H\gamma$  را محاسبه نموده ایم. با مقایسه شدت خطوط محاسبه شده با نتایج مشاهدات، دینامیک سحابی را توصیف نموده و کمیات مربوط به آن را به دست آورده ایم.

O-44

Space weather, Earth's environmental physical activity and human health state at different locations on Earth

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Conditions on the Sun and in the solar wind, interplanetary space, the magnetosphere, ionosphere and thermosphere constitute the so called “Space Weather”; they can influence not only the performance and reliability of space-borne and ground-based technological systems, but can also endanger many kinds of human activities, particularly in connection to human life itself and human health. The need to understand space weather and to mitigate its effects becomes more and more urgent. Furthermore, the effect of meteorological weather on humans is a potential source of impact; sharp changes of meteorological parameters lead, for example, to increased morbidity level over the world. In fact, meteorological weather and space weather are considered as two major interrelated factors permanently influencing human being.

In this paper we provide part of results of collaborative experimental and statistical researches conducted for revealing potential influence of environmental physical activity variations - space weather and meteorological weather changes on human homeostasis and particularly cardio-vascular health state.

This study describes results concerning the potential effects of space weather changes on morbidity and mortality from acute myocardial infarctions (AMI) in two geographical regions (Sofia, Bulgaria and Baku, Azerbaijan) situated at middle latitudes (between 40-43°N) but at different longitudes (between 23-50°E) and sudden cardiac deaths (SCD) in Baku. Possible effects of geomagnetic disturbances of various strengths, estimated by different geomagnetic indices and geomagnetic storm type (those caused by magnetic clouds (MC) of solar origin or those by high-speed solar wind stream (HSSWS)) were investigated. This study performed on data from two middle-latitude locations enabled us to obtain more suggestive evidence about the influence of space weather variations on cardio-vascular diseases in general at middle latitudes. The degree of this influence depends on the individual physiological status. Similar trends were found in the Sofia and Baku data, and differences in the effects during the solar activity cycle were revealed. It was obtained that both low and highest GMA levels are related to an increase in the number of the considered cardiac incidences

and fatal outcomes. The obtained results possibly indicate that different types of geomagnetic storms, through their different parameters, can affect in different ways living organisms, including the human health state and the cardio-vascular system.

O-45

### **The Study on Prominence Fine Structures in the Multi-component Atmospheres**

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#### **Abstract:**

The emerging intensities from solar prominences exhibit some fluctuations which related to the existence of fine structures in the line of sight. Moreover, these fluctuations have the minimum values in the centers of some EUV lines and growing to the wings. The explanation of such a phenomenon motivated us to use theoretical models for fine structures in solar quiescent prominences. In addition, the astrophysical objects are from Local Thermodynamic Equilibrium (LTE) which can be achieved in the stellar interiors. The analytical solution of Non-LTE equations is very difficult and in some cases is impossible. In this concern, in order to calculate emerging intensities and their fluctuations we solve the radiative transfer equations and find Ambartsumian  $\phi$  and  $\Psi$  functions in some cases.

O-46

**Z. Fazel, Tabriz U.****ABSTRACT**

The effective temperature of the Sun during the solar cycle has been already studied together with the solar luminosity and radius variations, but the effective temperature between the pole and the equator,  $\Delta T_{\text{eff}}$ , has not yet fully investigated. This last subject has been studied for some stars like Altair, Achernar or Regulus by different methods. In this paper, we will extend such methods to our star, the Sun, bearing in mind its small oblate shape due to its rotation. To first order, we used the Von Zeipel gravity-darkening effect which is an “atmospheric” phenomenon and request a conservative rotation law for a radiative atmosphere at the surface, i.e. the emergent flux is proportional to the effective gravity. To go further, we took into account the differential rotation: as the angular velocity depends on the latitude,  $\theta$ , a distorted shape is obtained,  $R(\theta)$ . Resuming the works of Claret (2000) who analyzed the influence of the differential rotation on the gravity-darkening parameter, the key role of the rotation is emphasized and especially the logarithmic derivative of the angular velocity,  $\alpha$ , which yields if  $\alpha < 0$ , a rotation of the interior of stars faster than the outer layers, while  $\alpha > 0$ , implies the external layers rotate faster than the interior ones due to the increase of the angular momentum. With such new competitions we obtained the solar  $\Delta T_{\text{eff}}$  between the poles and the equator of about 0.125 K. Such a small estimate is expected, but an equatorial effective temperature smaller than the polar one suggests that the meridional equatorward

flows may accelerate the equator rotation. This also demonstrates a small equatorial bulge leading to decrease the gravity and the emergent flux.

O-47

### تشکیل ساختارها در مدل غیر کروی

مجتبی امیرمجاهدی  
دانشکده فیزیک دانشگاه تبریز

یکی از جالب‌ترین زمینه‌های کیهانشناسی مدرن، مطالعه منشأ ساختارهایی از قبیل کهکشانها و خوشه‌های کهکشانی است و اینکه این ساختارها چگونه تحول پیدا کرده و به صورت امروزی در آمده‌اند. هر گاه تباین چگالی ساختارها کمتر از یک باشد، تحول تباین چگالی با معادله دیفرانسیل داده می‌شود. در حالی که اگر تباین چگالی ساختار بزرگتر یا مساوی یک باشد، وارد رژیم غیر خطی شده‌ایم. حل دقیق تحول ساختار در رژیم غیرخطی، مستلزم شبیه‌سازی‌های  $N$  ذره‌ای است. ولی با یک سری تقریب‌ها از جمله مدل رمبش کروی می‌توان نتایج خوبی به دست آورد.

مدل رمبش کروی که توسط Gunn&Gott بسط داده شد، ساده‌ترین مدل برای تحول ساختار غیرخطی بوده و اگر درست تفسیر شود، هنوز می‌تواند به درستی موفقیت‌آمیز باشد. از جمله نقاط ضعف این مدل این است که پیشینی می‌کند که هر فراچگال از ماده در یک زمان محدود، به یک نقطه رمبش می‌کند. برای برطرف کردن این ضعف، می‌توان مدل غیر کروی را به کار برد.

یکی از رویکردها به مدل غیر کروی این است که شکل غیر کروی مانند کروی گون (کره پخیده) را به عنوان ناحیه پیش کهکشانی در نظر بگیریم. پتانسیل روی چنین سطحی را می‌توان بر حسب چندقطبی‌ها بسط داد. با داشتن پتانسیل، معادله انرژی برای ذره‌ای به جرم واحد که بر روی چنین سطحی قرار گرفته است، را به دست می‌آوریم. با داشتن این معادله، می‌توان تحول ساختار را در مدل top-hat غیر کروی بررسی کنیم. ماده تشکیل دهنده ماده پیش کهکشانی را می‌توان ماده تاریک و ماده باریونی در نظر گرفت. و برای محاسبه مقدار اولیه تباین چگالی ماده تاریک از طیف توان Harrison-zoldovich استفاده کرد. نتایج مدل کروی و کروی گون نشان می‌دهد که در حالت کروی گون تشکیل ساختار دیرتر و در انتقال به سرخ‌های کوچکتر رخ می‌دهد.

یکی از نتایجی که با مطالعه مدل غیر کروی پیش می‌آید، این است که ساختار دارای اندازه حرکت زاویه‌ای است و این امر می‌تواند چرخش مواد ساختار در حالت‌های مختلف از جمله حالت ویریالی توضیح دهد.

در این مقاله تشکیل ساختار در مدل غیر کروی هم به صورت تک مؤلفه‌ای و هم دو مؤلفه‌ای توضیح داده شده است.

P-1

### **Application of an Artificial Neural Network for Velocity Curve Analysis of the Spectroscopic Binary Stars V373 Cas, V2388 Oph, V401 Cyg, V523 Cas, and HD 141929**

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#### **Abstract**

We use the Artificial Neural Network (ANN) introduced by Karami et al. (2009 a,b) to derive the orbital parameters of spectroscopic binary stars. Using measured radial velocity data of five double-lined spectroscopic binary systems V373 Cas, V2388 Oph, V401 Cyg, V523 Cas, and HD 141929, we find corresponding orbital and spectroscopic elements. Our numerical results are in good agreement with those obtained by others using more traditional methods.

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P-2

On the differential asymmetry variation inside of line profile in the spectrum of the Procyon and solar flux

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The profile of the  $\lambda$  5324.185 Å FeI line in the spectrum of the Procyon in basis of digital spectral materials of high spectral resolution is constructed. The general spectrophotometric characteristics of the line profile by high precision are determined. The fine structure of the profile is investigated. The asymmetry parameters of the profile by Kuli-Zade method are determined. The variation of the differential asymmetry inside of the line profile is investigated. The results are compared with results obtained by authors for unresolved spectrum (flux spectrum of the Sun).

The variation of the differential asymmetry inside of the line profiles for Procyon and Solar flux spectrums is identical. In the following table  $\delta(R)$  is differential asymmetry and R is depth of the profile.

R	$\delta(R)$ , mÅ		R	$\delta(R)$ , mÅ	
	Procyon	Flux		Procyon	Flux
0.000	50	-5	425	5	0
025	75	20	450	5	-5
050	40	115	475	0	-10
075	20	110	500	0	-10
100	10	85	525	0	-10

125	5	55	550	-5	-15
150	0	30	575	-5	-10
175	0	20	600	0	-15
200	0	20	625		-15
225	0	10	650		-15
250	0	5	675		-20
275	0	0	700		-20
300	0	0	725		-20
325	0	0	750		-15
350	5	0	775		-15
375	5	0	800		-15
400	5	0	825		-20

P-3

**The influence of winds on the time-dependent behavior of self-gravitating magnetized accretion discs**

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We study effects of winds on the time evolution of isothermal, self-gravitating magnetized accretion discs by adopting a radius dependent mass loss rate because of the existence of the wind. Our similarity and semi-analytical solution describes time evolution of the system in the slow accretion limit. We use the cylindrical coordinates and assume that the magnetic field is in Z- direction.

P-4

### مطالعه اثر قرص برافزایشی و مواد پیراستاره ای بر منحنی نوری سیستمهای دوتایی گرفتی

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#### چکیده

منحنی نوری سیستمهای دوتایی گرفتی توسط افراد زیادی بررسی شده است، اما در هیچ کدام از این بررسی ها اثر قرص برافزایشی و مواد پیرا ستاره ای در نظر گرفته نشده است. اما آن چه که مسلم است یکی از مکانهایی که قرص های برافزایشی در آن شکل می گیرند همین سیستمهای دوتایی هستند. بنابراین مطمئناً نادیده گرفتن این عضو از سیستم در مطالعات، از میزان درستی نتایج ما می کاهد و در نظر گرفتن پارامترهای آزاد مربوط به قرص برافزایشی قطعاً اطلاعات دقیقتری از سیستم مورد مطالعه به ما می دهد. در این مقاله ما با استفاده از نرم افزار جدید SHELLSPEC به بررسی اثر پارامترهای مختلف قرص برافزایشی و محیط پیرا ستاره ای بر روی منحنی نوری سیستمهای دوتایی گرفتی ای پرداختیم که دارای قرص برافزایشی هستند و همچنین اثر وجود یا عدم وجود قرص در سیستم را روی منحنی نوری آن بررسی کردیم. ماحصل مطالعه ما در نمودارهایی ارائه و بررسی شده است. نتایج بیانگر آن است که نادیده گرفتن اثرات قرص تا حد زیادی از دقت نتایج ما می کاهد.

P-5

### **Investigation of the magnetic field in Solar**

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Formation and eruption of solar prominences, coronal mass ejections ( CMES) and solar flares are the most magnificent phenomena among solar activities. Formation of solar prominences and solar eruptive processes, which encompass prominence eruption ,coronal mass ejections and flares, as responses of the solar conona to photospheric motions, one of the major photospheric conditions for prominence eruption ,CMES and flares ,is the increase of magnetic shear. And also there is a important relation between all aspects of the solar activity and the presence of solar magnetic fields, then in the article we try to investigate the role of magnetic fields in solar activities

P-6

Heliogeophysical activity and human cardio-health state

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The heliobiological investigations within last years affirmed once again that solar and geomagnetic activity can affect not only the technical systems and human health state also. In this paper we provide results of investigations on revealing possible influence of solar and geophysical activity on human cardio-health state. Investigation based on analysis of experimental and statistical medical data.

Daily experimental investigations of parameters of cardio-vascular health state were performed in Azerbaijan with a permanent group of examined persons. Heart rate and electrocardiograms were digitally registered (in total 1532 records) for seven functionally healthy persons on working days and Saturdays, in the Laboratory of Heliobiology at the Medical Center INAM in Baku, from 15.07.2006 to 13.11.2007. Medical statistical data were taken from all of Emergency and First Medical Aid Stations of Grand Baku Area with millions of inhabitants for the time period 2003-2005. In total 788 sudden cardiac death (SCD) cases, 440 acute myocardial infarction (AMI) mortality cases and 4479 AMI morbidity cases were analyzed.

Obtained digital recordings were subjected to medical, statistical and spectral analyses. The statistical method of the analysis of variance (ANOVA) and post hoc analysis were applied to check the significance of the influence of geomagnetic activity (GMA) on the cardio-vascular parameters under consideration. The Student's t test, Pearson's correlation coefficient  $r$ , and their probabilities  $p$  were calculated and chi-squared analysis was used to compare groups of statistical data.

Results revealed that heart rate reaction was ambiguous and not significant for healthy persons examined under conditions with geomagnetic activity changes. Obtained results show on strong

negative correlation between monthly averaged geomagnetic activity GMA and SCD in Baku for the considered period. AMI morbidity followed a daily distribution according to GMA, mostly on geomagnetically quiet days. A monthly comparison showed inverse relationships with solar activity and GMA and correlation with cosmic ray activity (CRA). Despite the daily rise in AMI mortality on days with the highest GMA, the days with the lowest GMA and higher CRA were predominant for AMI occurrence and pre-admission mortality.

P-7

Very Low Frequency (VLF) remote sensing studies of the lower ionosphere in middle latitude site of the Azerbaijan using AWESOME receiver

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Ground based observations of Extremely Low Frequency (ELF) / Very Low Frequency (VLF) (300 Hz - 30 kHz) waves are considered as an important remote sensing tool for the investigation of the ionosphere and the magnetosphere. VLF waves find their origin in various natural and artificial phenomena; the natural sources include thunderstorms, lightning and associated phenomena. Sub-ionospheric VLF transmissions propagating inside the Earth-ionosphere wave-guide is also being widely used for investigating sudden ionospheric perturbations (SIDs) in lower part of the ionosphere.

We monitor VLF signals continuously at Pirculu location in Azerbaijani sector with the help of AWESOME (Atmospheric Weather Educational System for Observation and Modeling of Electromagnetics) VLF receiver from Stanford University. It was installed in Azerbaijan by Prof. U. Inan and his colleagues in the context of the IHY/UNBSS program for 2007 as part of the United Nations initiative to place scientific instruments in developing countries.

VLF receiver enables handling of data that is used by researchers conducting ionospheric and space weather research. With the use of simple square air-core magnetic loop antennas of a couple of

meters in size, the sensitivity of these instruments allows the measurement of magnetic fields in the frequency range of  $\sim 300$  Hz to 50 kHz.

AWESOME VLF receivers are capable of collecting both broadband (used for the study of natural signals) and narrowband (sub-ionospheric VLF signals corresponding to VLF transmitters) data.

Sub-ionospheric VLF observations allow the measurement of the lower ionosphere, normally not accessible with other instruments.

The obtained data will enable us to understand the generation and propagation mechanism of naturally occurring VLF waves in middle latitude region such as radio atmospherics from lightning flashes, magnetospheric whistlers, VLF emissions, to conduct remote sensing of the lower ionosphere, lightning and thunderstorms, to investigate long-term trends of magnetospheric parameters such as electron density, total electron content in a flux tube and electric fields during quiet and active solar periods, to find correlation between VLF wave activity and geomagnetic activity, and other phenomena. Narrowband sub-ionospheric VLF signals (remote sensing) and planned ground-based geomagnetic data in Azerbaijani middle latitude region will help us to study sudden ionospheric disturbances associated with transient phenomena like solar flares, geomagnetic storms, giant cosmic gamma-ray flares, lightning induced electron precipitation (LEP), effects of lightning discharge, sprites, elves, blue jets, gravity waves etc. Sub-ionospheric VLF signals are also helpful in the study of VLF waves as a precursor to earthquakes.

AWESOME VLF receiver provides an open-ended potential for exploration and also can be used for educational outreach.

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## بررسی ارتباط وقوع زلزله با وقایع نجومی

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در این مقاله به بررسی این موضوع می پردازیم که آیا بین وقوع زلزله و در راستای هم قرار گرفتن ماه و خورشید و زمین ارتباط مستقیمی وجود دارد یا خیر؟

برای بررسی این موضوع ابتدا کل آماز زلزله های بزرگ با بزرگی بیشتر از 5 درجه را کاتالوگها جمع آوری کرده سپس روز وقوع آنها را از نظر در راستای هم قرار گرفتن ماه و خورشید و زمین بررسی کرده و در نهایت به صورت آماری مساله را بررسی می کنیم.

تجربه نشان می دهد به صورت آماری ارتباط مستقیمی بین وقوع زلزله و وقایع نجومی وجود دارد.

در پایان مقاله ضمن تاکید بر اینکه علت اصلی وقوع زلزله عوامل درون زمین است به تشریح علت ارتباط بین زلزله و وقایع نجومی پرداخته شده است.

P-9

**Long -period variations of solar irradiance**

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The Sun has always been the most important celestial object in our sky and plays a vital role in the Earth's climate system. There are many factor for long period climitic variations but we study at this paper effects of movement of the earth and long period variations of solar irradiance for it.we know there is a cohrence between variation of climate and variations of solar irradiance . Earth receives a total amount of radiation determined by its cross section ( $\pi \cdot R_E^2$ ), but as it rotates this energy is distributed across the entire surface area ( $4 \cdot \pi \cdot R_E^2$ ). Hence the average incoming solar radiation sometimes called the solar irradiance.The solar constant is the amount of incoming solar electromagnetic radiation per unit area, measured on the outer surface of Earth's atmosphere in a plane perpendicular to the rays The solar constant includes all types of solar radiation, not just the visible light. It is measured by satellite to be roughly 1,366 watts per square meter ( $W/m^2$ ). Solar insolation is the amount of energy received by the sun at the earths' surface. On a clear day  $\sim 1000 W/m^2$  reaches a surface perpendicular to the incoming radiation. This energy varies due to the angle of the incoming radiation and cloud variations solar irradiance atmospheare produced by changes of the earth's orientation and its orbit in space, i. e. by the precession of the earth's axis of angular momentum and by variations of the obliquity and eccentricity of its orbit. Milutin Milankovitch, a Yugoslavian astronomer(1879 – 1958), studied the variations of climiate based on astronomical,s variations. Milankovich cycles are cycles in the Earth's orbit that influence the amount of solar

radiation striking different parts of the Earth at different times of year. Milankovich explained how these orbital cycles cause the advance and retreat of the polar ice caps. The Earth travels through space around the sun, cyclical variations in three elements of Earth-sun geometry combine to produce variations in the amount of solar energy that reaches Earth::

1. Changes in the tilt of the Earth's axis(wobbling)
2. Variations in the shape of the Earth's orbit around the Sun; and
3. Precession: changes in how the tilt of the axis is oriented in relation to the orbit.

Friederich (1984) investigated at three years data set of the visible radiation and the results about amplitude and phase of extraterrestrial solar radiation showed the insolation measured on the ground because of scattering, absorption and reflection in the atmosphere differs without atmosphere the small variation in the undisturbed influx depend on long- period variation of eccentricity

$e^2$ , precession index

Keys words: Solar irradiance-solar constant - precession -wobbling- insolation- eccentricity - ~~obliquity~~ Solar insolation

P-10

### **Iranian Observatories from Ancient Time to Maragheh Observatory**

Saravi, M.J. & Hushyar, I.

#### ***Abstract***

Following the gradual emergence of mythology in antiquity, the ancient man tries to explain rising and setting of the sun, lunar evolutions, creation of universe, etc through exploring the earth and observing the sky. It can be said that prior to Zoroaster in Iran (7<sup>th</sup> century H) astrology was developed in the form of symbols, images, seals and cornerstones, clear examples of which are found on a huge stele in Azerbaijan, on Sabalan slopes, and in Deylaman.

Given that Iranians traditionally based their astronomical principles on centrality of Earth up to Khaje Nasir al-Din Toosi, the entire observations and observatories had been made in accordance with this idea.

The present paper sets to study Iranian observatories and astronomical tables since ancient times, i.e. from Zoroaster's appearance up to Sasanids, and from 3<sup>rd</sup> century AH, i.e. from the advent of the earliest Islamic observatory (Shamasia observatory) under al-Mamun, the Abbasid Caliph, until Khaje Nasir al-Din Toosi, and finally the development of Maragheh observatory by Khaje Nasir and

its scientific position as well as the ways in which the observatory evolved into the scientific center of Iran in the field of astronomy.

Keywords: Marageh, Iran, Observatory.

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Measurements of the near surface potential gradient of atmospheric electric field during three solar eclipses: 30 Jun 1954, 29 Mar 2006 and 1 Aug 2008

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The paper shows the results of measurements of the near surface potential gradient of atmospheric electric field during three solar eclipses: partial occurred on 30 Jun 1954 over part of Poland and total occurred on 29 Mar 2006 over part of Turkey and on 1 Aug 2008 over Siberia. The measurements site were Swider, Poland, Manavgat, Turkey and in Bijsk near Novosibirsk, Russia. During various stages of these eclipses the fair weather conditions were observed. In the first mentioned experiment the radioactive gauge was used, in the next two expeditions were equipped with Electric Field Meter type EFM-R1. As in such similar experiments the potential gradient registered was reduced during eclipses. In general decreases in our registrations were about 20 – 40 %. Possible mechanisms of reductions are discussed.

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**اندازه گیری آلودگی نوری و روشنایی آسمان در محل احداث رصدخانه ملی ایران با استفاده از فیلترهای استاندارد  
افشاری، داود<sup>1</sup> نصیری، سعداله<sup>2,1</sup>**

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کیفیت تصاویر نجومی علاوه بر خصوصیات تلسکوپ و ابزارهای تصویر برداری، به مناسب بودن محل استقرار تلسکوپ نیز بستگی دارد. برای مکانیابی رصدخانه های مجهز به تلسکوپهای بزرگ (با قطر بیش از دو متر) باید پارامترهای مختلفی از قبیل محلی (توپوگرافی محل، لرزه شناسی، نزدیکی به امکانات شهری نظیر برق و جاده و ...)، هواشناسی (سرعت و جهت باد، ابرناکی، رطوبت نسبی، تغییرات دما، تغییرات فشار، تعداد و ارتفاع لایه های وارونی و ...)، نجومی (دید، روشنایی آسمان، آلودگی نوری، کدورت جو، چشمک زنی ستارگان و ...) بررسی شوند.

منظور از مکانیابی، انتخاب مناسبترین مکان از لحاظ پارامترهای محلی، هواشناسی و نجومی است.

محل مناسب برای یک رصدخانه اپتیکی، مکانی است که بیشترین شبهای صاف و بدون ابر را در طول سال داشته و واضحترین تصاویر را از اجرام آسمانی بدهد. تردیدی نیست که برای استفاده و بهره برداری هر چه بیشتر از این رصدخانه و مراقبت از سرمایه ی کلانی که صرف آن شده، بایستی بهترین مکان انتخاب شود تا از نظر بهره وری دچار مشکلی نشود.

از مهمترین پارامترهای نجومی برای تعیین محل دقیق رصدخانه اپتیکی اندازه گیری روشنایی آسمان است؛ دانستن حد قدر آسمان یکی از مهمترین نکات رصدی در رصد اجرام آسمانی است.

هدف مقاله اندازه گیری دقیق آلودگی نوری و روشنایی آسمان با استفاده از فیلترهای استاندارد UBVR I در محل احداث رصدخانه ملی ایران است. در این راستا پس از بررسی مدل‌های ارائه شده برای این اندازه گیری، ابزارها و نرم افزارهای مربوطه فراهم شده و اندازه گیری انجام شد.

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### The heritage of ancient Iranian astronomy

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#### Abstract

In this article we discuss briefly the influence of Iran's ancient astronomy on rest of the world from four aspects. One aspect is the mythology, where a number of symbols and rich cultural heritage can be found in the astronomy in the world. The second aspect are the measurements and the calculations, where Iranian astronomers not only invented many of the most important ancient instruments, but also made remarkable observations of their time, which remained unsurpassed until

optical instruments were available. In this section we briefly present some of these ancient instruments. Third aspect is the daily life applications of astronomy, where in examples like calendar, the utmost possible precision was used. The fourth aspect is astrology or the interpretation of stars, which although has lost the scientific basis, but its deeper and hidden concepts can be revealed in a closer look. At last we take a look on the impact of the invention of modern optical instruments of the man's current approach to astronomy, and the current stance of Iranian astronomy in the world.

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### **نیمروز اولین خاستگاه گاهشماری خورشیدی**

کاظم‌نقیسی، بهمن حسین زاده، علی وظیفه دان، محدثه عظیم زاده  
گروه فیزیک، دانشکده علوم، دانشگاه بیرجند

سرزمین سیستان در وسط منطقه آبادان جهان باستان و در عرض جغرافیایی 30 درجه و 33 دقیقه شمالی واقع شده که خط نیمروز یا نصف النهار مبدا باستانی از آن می گذرد. وجه تسمیه نیمروز قرار گرفتن در میانه خشکی شناخته شده است که جهان قدیم را به دو نیمه تقسیم می کرده و هنگام ظهر در تمام جهان باستانی روز بوده است. نیمروز در میانه جغرافیای مسکونی شناخته شده باستانی (ربع مسکون) قرار داشت یعنی از 90 درجه شرقی به جزایر کورل در اقیانوس آرام و 90 درجه غربی به جزایر آزور در اقیانوس اطلس می رسد. تاریخ رصد ایرانی که مبدا آن، اولین رصد در رصدخانه نیمروز بود، مقارن است با 1725 قبل از میلاد که در محاسبات کنونی ما نقش شایانی دارد. در آثار ایرانی آمده که زرتشت در رصدخانه نیمروز حلول خورشید به برج بره (حمل) را رصد کرد و تقویم یزدگردی باستانی را اصلاح نمود. شواهد حاکیست رصدخانه نیمروز ساختمانی با دایره های هم مرکز واقع در قبه الارض بوده که امروزه مجهول المکان می باشد. لازم به ذکر است در آثار تاریخی و غیرنجومی از کوه خواجه (ناحیه ای مرتفع در سیستان) به عنوان قبه الارض یا گنگ دز یاد شده است. از بناهای موجود، آفتاب سنج موسوم به دهانه غلامان می باشد که بنایی خشتی و چهار گوش با اضلاعی به طول 54 متر است که در هر ضلع 2 ردیف و در هر ردیف 6 ستون قرار دارد و توانایی محاسبه ساعت و گاهشماری فصول را داشته است. این بنا در طول جغرافیایی 23 دقیقه کوه خواجه واقع است و احتمالاً به عنوان آفتاب سنج رصدخانه نیمروز مورد استفاده بوده است زیرا بررسی ها نشانگر قاعده مند بودن مکان سایه ستون ها در هنگام طلوع خورشید در فصول مختلف سال است. با توجه به اینکه تاریخ رصد ایرانی مبدا و بنیان بسیاری از تقویم ها و گاهشماریهای خورشیدی بعد از خود بوده و دقیق ترین گاهشماری خورشیدی جهان بوده و هست، وجود منطقه نجومی در این ناحیه انکارناپذیر به نظر می رسد که متأسفانه از دیدگاه نجومی مورد توجه چندانی قرار نگرفته است.

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### چکیده

در این مقاله به بررسی تاریخچه پیدایش نجوم در دوران باستان پرداخته شده است. از دوران باستان و گذشته، آسمان، آزمایشگاه نجوم بشر بوده است که گاهی پیشینیان تصویر قهرمانان و جانوران و غیره را در صور فلکی آسمان تصور می کردند و آنها را قابل احترام می دانستند. نجوم در سیر تحول خود به عنوان یک علم، بسیاری از قوانین بنیادی حاکم بر اجرام را کشف کرده است. اما در ماهیت پژوهش، علمی است که کار آن هرگز پایان نپذیرد و در اینجا نیز چون علوم دیگر، تلاش های بسیاری به جامانده است که باید انجام شود.

**کلمات کلیدی:** نجوم، دوران باستان، صور فلکی، قوانین بنیادی.

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### The lost chain in the history of Astronomy

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Books and references on the science of Astronomy which are taught in the universities of the country have often been written by western scholars who mostly lack the traces of Islamic astronomers, if any, have been pointed to a few Islamic scientists. Since most of our resources are translated books, therefore most of our thinkers do not have enough information about the works done by the moslems. More important, there is no reference to the words of chaste imams, especially Imam sadeg(pbuh) who have left many wonderful words about the matter. We daresay that this "lost chain in the history of Astronomy" is a reference whose items are absolutely correct and definite, because their knowledge *originates* from Revelation and has been transferred, through the generations, to him. There are also interesting things about the matter in the Holy Quran: all of which have been, to some extent, studied by moslem and non-moslem scientists, but in this case Imam sadeg's words more than that of the Holy Qur'an have been obsoleted.

We'll deal, in this article, with some of the Imam's words about astronomy, and by taking advantage of the recent discoveries and data, will discuss about their correctness. He wonderfully answered the intensive questions posed about the fixed stars and planets. He elaborated, "of the brightest stars is the Sirius, and of the brightest planets are Venus and Jupiter. Venus is a very brightness it is called the second moon. Its component is such that it reflects much of the sun's light like a mirror and if its structure were like the moon, it wouldn't be so bright."

As we've known, in the recent decades, and understood by using telescopes and satellites that the Venus, because of its compressed atmosphere, reflects about 76% of the sun's light, whereas the surface of the moon reflects 7% to 13% of the sun's light. The importance of his words have recently been revealed to us and it is expected, with the advancement of the knowledge, more and more of the implications of His words will appear to us. And also of the origination of the universe (big bang), and the structure of the stars, He has told very wonderful statements which will be dealt with later.

We'll conclude that by using these valuable words, man can divulge the secrets of universe and attain great progress in the field of astronomy and varies sciences.

Keywords

Astronomy-universe-big bang-planets-Venus-Jupiter

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## بررسی برداشت و تحلیل روشمند فارابی در استفاده از داده های نجومی

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### چکیده:

در طول تاریخ دانشمندان زیادی با روش ها و دیدگاههای متنوع در زمینه ی دانش نجوم قدم برداشته اند و هر کدام در استفاده از داده های نجومی راهی را در پیش گرفته اند. گاه در برهه های از زمان، برخی افراد از این اطلاعات در قالب های غیر علمی بهره جسته اند و به عوام فریبی پرداخته اند. فارابی به عنوان یکی از بزرگترین دانشمندان مسلمان که در علوم مختلف تبحر داشته است نظریات خاصی در زمینه ی بهره گیری از داده های نجومی ارائه می کند؛ در این پژوهش که به روش کتابخانه ای و به صورت توصیفی - تحلیلی انجام گرفته است به بیان جایگاه علم نجوم در اندیشه ی فارابی، نحوه ی دسته بندی داده های نجومی و چگونگی بهره برداری بهینه از آن پرداخته می شود. نتیجه ای که از این پژوهش عاید گردید شامل موارد زیر می باشد: فارابی نیز مانند هر صاحب نظر دیگری روش خاصی در این عرصه دارد. وی برای علم نجوم، اعتباری ویژه قایل می شود؛ هر نوع داده ای را بی قید و شرط قبول ندارد. نجوم علمی را با معیارهایی چند معرفی و تبیین می کند، علم نجوم را از احکام نجوم تفکیک و به فرق های میان آندو می پردازد.

**کلید واژه ها:** فارابی، روش شناسی، داده های نجومی

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### ضرورت آگاهی از تاریخ علم در پویایی علم نجوم

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#### چکیده:

استفاده از تجربیات گذشتگان در راستای پیشرفت و درس گیری از اقدامات آنها یکی از کارهای هست که همواره بزرگان و اندیشمندان از بهره می گیرند؛ بهره گیری از دستاورد های علمی در دانش نجوم به خاطر ویژگی های خاص آن میتواند به تقویت علمی و خودباوری بیانجامد در این میان آشنایی و بررسی تجربیات پیشینیان در قالب آگاهی از تاریخ علم صورت می گیرد، و برای استفاده ی بهینه از این یافته ها در جهت پویایی دانش نجوم شایسته است ضمن آگاهی از سیر پیشرفت و ترقی علمی و زمینه های پیدایش آن به عوامل رشد و یا افول آن در تاریخ علم توجه شود و با اسبب شناسی درست بستری برای بروز رسانی و باز کاوی آنها آماده گردد. در این پژوهش که به صورت تحلیلی - توصیفی و به روش کتابخانه ای صورت گرفته است به ضرورت آگاهی از تاریخ علم در پویایی علم نجوم پرداخته شده است و زوایای آن مورد نقد و بررسی قرار گرفته است؛ و نتایجی که از این پژوهش نشان میدهد آشنایی و اطلاع از گذشته ی هر چیزی محققان آن مورد را راهنمایی بی بدیل است؛ و میتواند ضمن پدید آورد ایده های نو باعث جلو گیری از موازی کاری ها و دوباره کاری ها گردد.

**واژگان کلیدی:** تاریخ علم، علم نجوم، پویایی دانش نجوم

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#### ضرورت تدوین دایره المعارف تاریخ علم نجوم دوره اسلامی

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هر علمی در طول تاریخ، مراحل مختلفی را طی کرده است و دانشمندان بزرگ در دوره هایی ظهور کرده اند و خدمات ارزشمندی را به علم عرضه کرده اند که در رشد و تعالی علوم، بس مفید بودند. از سوی دیگر تهاجم فرهنگی به کم ارزش جلوه دادن فرهنگ بومی ایرانی - اسلامی پرداخته و از آنجاییکه جوامع غافل از ارزش سرمایه های علمی و گهرهای خویش، داشته های گرانبهای خود را به دیگران به بهای ناچیز می فروشند و دستاورد ناچیز دیگران را به قیمت گزاف می خرند. این پژوهش سعی کرده است به ضرورت تدوین دائرة المعارف تاریخ علم نجوم دوره اسلامی پردازد و با آگاه کردن پژوهشگران معاصرین به بهره گیری از دستاورد های علمی در دانش نجوم به خاطر ویژگی های خاص آن میتواند به تقویت علمی و خودباوری بیانجامد. در این میان شنایی و بررسی تجربیات پیشینیان در قالب آگاهی از تاریخ علم صورت می گیرد، و برای استفاده ی بهینه از این یافته ها در جهت پویایی دانش نجوم شایسته است ضمن آگاهی از سیر پیشرفت و ترقی علمی و زمینه های پیدایش آن به عوامل رشد و یا افول آن در تاریخ علم توجه شود و با اسب شناسی درست بستری برای بروز رسانی و باز کاوی آنها آماده گردد. در این پژوهش که به صورت تحلیلی - توصیفی و به روش کتابخانه ای صورت گرفته است به ضرورت تدوین دائرة المعارف تاریخ علم نجوم دوره اسلامی پرداخته شده است و زوایای آن مورد نقد و بررسی قرار گرفته است؛ و نتایجی که از این پژوهش نشان میدهد شنایی و اطلاع از گذشته ی هر چیزی محققان آن مورد را راهنمایی بی بدیل است؛ و میتواند ضمن پدید آوردن ایده های نو باعث جلوگیری از موازی کاری ها و دوباره کاری ها گردد. و در قویت روحیه خود باوری و هویت ملی موثر واقع شود.

**واژگان کلیدی:** تاریخ علم، علم نجوم، تدوین، دائرة المعارف نجوم، دوره اسلامی

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### **Modeling Galaxies mass structure by studying of BH's Gravity Forces in N-Body Realization Method.**

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We present a method for simulating numerically the effects of the adiabatic growth of black holes on the structure of elliptical galaxies. Using a parallel self-consistent Fields, we add black holes to N-body realizations of model distribution functions for spherical galaxies and any two-body galaxies that are crashing to each other, using a continuous mass-spectrum. The variable particle mass, combined with a simple multiple timestep integration scheme, makes it possible to evolve the models for many dynamical times with  $N \sim 10^6 - 10^9$ , allowing Gravity lines forces and high spatial and mass resolution. This paper discusses verify and analyze the data that we received from AAS using analytic models for spherical galaxies, comparing our numerical results of the e effects of central black holes on the structure of the galaxies massive center.

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**Oscillations of longitudinally variations of density and magnetic field coronal loops**

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**Abstract**

This work studies effects due to the longitudinal variation of equilibrium density and magnetic field on the kink mode of coronal loops. The ideal MHD equations are reduced to solve the simple partial differential equations for the square of frequencies. Analytical dispersion relations and spatial eigenfunction are derived for unstratified and constant magnetic field loops. Perturbation techniques are used to obtain the conventions on the frequencies and the eigenfunctions. The frequency ratios, mode profiles, and the antinode shifts from those of sine profiles of the homogenous unstratified loops, are calculated. To this end, we have expanded the relevant factors up to the second order in the stratification parameter,  $\epsilon$ , and first order of inhomogeneity magnetic field parameter,  $\eta$ . Result of our previous studies are reviewed. The frequencies of the fundamental mode and first overtone are decrease by respectively 6% and 27% and their ratio 10% increase for the case of slightly stratified and inhomogeneous loop.

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### **بررسی تحولی تهی جاها بر حسب انتقال به سرخ**

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امروزه تکنیک های نوین رصدی این امکان را برای پژوهشگران فراهم کرده است تا بتوانند ساختارهای کیهانی را در کیهان دوردست مورد مطالعه و بررسی قرار دهند. COSMOS پروژه ایست که در آن به بررسی توزیع فضایی کهکشان ها در ناحیه ای به وسعت دو درجه مربع از آسمان می پردازد.

در این پژوهش با استفاده از داده های این پروژه در گستره بین انتقال به سرخ های  $0/01$  تا  $3/00$  توزیع فضایی کهکشان ها مورد بررسی قرار گرفته است. برای این منظور با استفاده از رایانه چگالی عددی کهکشان ها را در انتقال به سرخ های مختلف در یک میدانی چگالی نرم (Smoothed Density Field) محاسبه کرده و با مقایسه نتایج بدست آمده با چگالی کهکشانی کیهان در هر انتقال به سرخ و بر اساس مدل های ارائه شده به جست و جوی نواحی کم چگال (تهی جاها) در آنها می پردازیم. پس از تعیین مشخصات تهی جاها به بررسی تغییرات ویژگی تهی جاها در انتقال به سرخ های مختلف پرداخته و تلاش می کنیم تا الگویی برای تغییرات آنها برحسب انتقال به سرخ بیابیم.

## Wave motions in an anisotropic magnetized space plasma

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The instability of MHD waves in anisotropic, collisionless, rarefied hot plasma is studied. Anisotropy properties of such plasma are caused by a strong magnetic field, when the thermal gas pressures across and along the field become unequal. The study of the anisotropy features of the plasma are motivated by observed solar coronal data. The 16-moments equations derived from the Boltzmann-Vlasov kinetic equation are used. These equations strongly differ from the usual isotropic MHD case. The general dispersion relation for the possible wave modes is derived, solved and analysed. It is shown that a wide wave spectrum with stable and unstable behaviour is possible, in contrast to the usual isotropic MHD case. The dependence of the instability on magnetic field, pressure anisotropy, and heat fluxes is investigated. The results can be applied to the theory of solar and stellar corona and wind models.

## **The effect of twisted magnetic field on the resonant absorption of MHD waves in coronal loops**

**K. Karami and K. Bahari**

### **ABSTRACT**

The standing magnetohydrodynamic (MHD) quasi-modes in a cylindrical magnetic flux tube modelled as a straight dense tube surrounded by a thin inhomogeneous layer with a uniformly twisted magnetic field, are considered. Using the relevant connection formulae of the resonant absorption, the dispersion relation for the MHD waves is derived and solved numerically to obtain both frequencies and damping rates of the fundamental and first-overtone modes of both the kink and fluting waves.

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