

ABSTRACT

(In Alphabetical Order of Author Names)

CANONICAL FORMULATION OF THE FOKKER-PLANCK EQUATIONS ADMITTING SCALE-INVARIANT SOLUTIONS

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Abstract: Recent investigations show that the Fokker-Planck equations of certain types admit scale-invariant stationary solutions. One physical example is the problem of transport of cold atoms in optical lattice, in which the exact momentum distribution is given by a Tsallis scale-invariant distribution with the entropic index q (that can experimentally be tuned freely). An analogous situation is expected astrophysical problems, where a number of scale-invariant distributions are observed. Here the canonical formulation of the Fokker-Planck equation is developed by making use of an auxiliary field and Dirac's method of singular Lagrangians. Then, the scale invariance is realized by imposing the dilatation symmetry on the system Hamiltonian. The above-mentioned optical lattice is shown, in fact, to be a simple case of the present theory.

THE ACTIVITIES OF SAAA

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**VERY LOW FREQUENCY (VLF) REMOTE SENSING MEASUREMENTS
OF THE LOWER IONOSPHERE AT SITE
OF THE UNITED ARAB EMIRATES**

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Abstract: The project is one of the chains of the international active research projects in the field of Space Weather and comes under the umbrella of the global project entitled “International Heliophysical Year (IHY)” and is supervised jointly by both the United Nation (UN) and national aeronautics and space administration (NASA). The proposed research project is aiming for providing a basis data for quantitative comparison of lightning-induced disturbances of the ionosphere and the radiation belts in the American, European and Asia sectors. Most of the current data on such phenomena has so far been obtained in the western hemisphere, and the weight of scientific information indicates that lightning-induced effects at high altitudes and in the radiation belts may dominate other processes on a global scale. The proposed research project will facilitate the establishment and conduct of Very Low Frequency (VLF) observations in the United Arab Emirate (UAE) as a part of Asia sector, thus providing a basis for comparison to facilitate global extrapolations and conclusions. Under the proposed project, Stanford University partners with Sharjah University, deploying one of their VLF receivers at Sharjah University campus. Sharjah University provides the data digitization and recording equipment to facilitate continuous acquisition of the data. All data from the proposed project will be available for analysis over the Internet, and a series of annual visits are planned to maximize interactions and information exchange between the two universities.

DAILY MID-LATITUDE E-SPORADIC CRITICAL FREQUENCY FoEs VARIATION WITH DAILY SUNSPOT NUMBER R

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Abstract: In some respects, many advances have been made over the last 30 years in the study of sporadic-E. Ionosonde data recorded at Kokubunji, Japan (Latitude 35.7 N; Longitude 139.5 E) during a year of low solar activity (2004) and high solar activity (2000) were used in our research work to study the correlation between daily sunspot numbers (R) and the daily mid-latitude E sporadic region critical frequency (f_oE_s) for four seasons (Spring, March; Summer, June; Autumn, October; Winter, December). There is a diurnal variation of (f_oE_s) with (R). Trends found over years of solar maximum (2000) are more negative at night for all seasons and positive at midday. The year of solar minimum (2004) there are positive trends in all seasons at night and day except in March (Spring) it is negative at midday and midnight.

H-ALPHA OBSERVATION OF SOLAR ACTIVE PHENOMENA ON THE ULAANBAATAR ASTRONOMICAL OBSERVATORY

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Abstract: Our Astronomical Observatory was founded during the first International Geophysical Year in close cooperation with scientists from Russia and Germany. In 1964, our Observatory is equipped with the Coronagraph telescope (from Carl Zeiss, Germany) for observations of solar active phenomena and solar corona. In this presentation, as an example of our results are presented the last images of the solar active phenomena observed by the Coronagraph. Last year we bought Apogee CCD camera U4 for Coronagraph. The H-alpha filter with half band 0.5\AA is used. We obtained excellent images of solar prominences, sunspots and active regions. These materials are quite suitable for study of physical conditions of the Sun and for the solution of a concrete problem.

**PUBLISHING IN THE NEXT 5 YEARS:
A COMMERCIAL PUBLISHER'S PERSPECTIVE**

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Abstract: Over the past decade, Internet technology changed the ways of publishing tremendously. It is truly revolutionary that both fresh and historic science publications are so much easier to search and find. This revolution has not been completed and all parties involved in science publishing are continuously adjusting their activities to the new rules and opportunities. From a commercial publisher's perspective, I will extrapolate what happens today to predict what happens in the next 5 years with journal articles, subscriptions, online access and several other aspects of journal publishing. The journals "Earth, Moon, and Planets" and "Astrophysics and Space Science" will be presented as examples to illustrate the developments.

GENERATING MORE REALISTIC COMPLEX NETWORKS FROM POWER-LAW DISTRIBUTION OF FITNESS AND TSALLIS STATISTICS

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Abstract: In this work we analyze the implications of using a power law distribution of vertice's quality in the growth dynamics of a network studied by Bianconi and Barabási. Including quality considerations in the usual preferential attachment model provides much more realistic complex networks. Moreover, the usual networks properties, such as the degree distribution, average path length, etc, are investigated using the Tsallis nonextensive statistical mechanics, what provides a much more accurate description and understanding of our results, since normally the standard analysis of networks does not take into account the Euclidean distances, but instead only those related with topological properties.

**INDONESIA PARTICIPATION IN IHY 2007 :
RESEARCH ACTIVITIES AND PROPOSAL TO COORDINATED
INVESTIGATION PROGRAMME**

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Abstract: Related to International Heliophysical Year (IHY) 2007, we do observational and research activities on solar activities, geomagnetics, ionosphere, space environment, and Sun-Earth relationship. Some are parts on international collaboration, such as MAGDAS. Lack of experience and some problem in data acquisition prevent us to propose more Coordinated Investigation Program (CIP), although we have interest in joining to the proposed CIPs. Only one CIP have been proposed, i.e. Influence of Space Weather on Micrometeoroid Flux (CIP 60). Some preliminary results related to IHY activities will be discussed.

FURTHER OBSERVATION OF KZ HYA

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Abstract: In this study, we carried out CCD photometry of KZ Hya from June 2004 to July 2006 using a 45-cm telescope with an SBIG ST-8 at the Astronomical Observatory of the National University of Asuncion in Paraguay. We obtained 19 light maxima and collected additional maximum data from literatures and databases. The derived new ephemeris has a period change of 8.02 years, which supports the binary nature of KZ Hya suggested in some previous studies. We also detected clearly the secondary maximum of 0.03 Mag in the light curve at the phase of 0.66. The secondary maximum seems to have been present at the constant phase substantially since 1975 when KZ Hya was discovered as a pulsating variable.

SOLAR WIND SPEED THEORY IN NONEXTENSIVE STATISTICAL MECHANICS

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Abstract: Most astrophysical plasmas are observed to have velocity distributions with non-Maxwellian suprathermal tails. This characteristic may be described by the power-law distribution in nonextensive statistical mechanics. We introduce the nonextensive effect into the fundamental dynamical equations for the solar wind plasma, the equation of state for the plasma gas and the entropy are considered in the framework of nonextensive statistical mechanics. By solving the dynamical equations under different models, we show that the variation of the solar wind speed with the radial distance are significantly dependent on the nonextensive parameter q , thus providing one potentially theoretical base for explaining the disagreement of the old theory with the observation of the solar wind speed.

HOW THE LITERATURE IS USED: A VIEW THROUGH ACCESS STATISTICS OF THE ADS

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Abstract: Most of the access to the astronomical literature now goes through the ADS. Because of that fact, the access statistics of the ADS can provide detailed information on how scientists use the literature in different parts of the world. The access statistics can provide information on whether usage of the literature has changed since the availability of on-line searching and the arXiv e-print for posting articles without lengthy refereeing.

CONNECTIVITY BETWEEN THE LITERATURE AND ON-LINE DATA

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Abstract: The ADS Abstract Service is the search system of choice for astronomers, solar physicists and planetary scientists. It provides a free search system for the scientific literature. An extensive system of links to related on-line resources helps with finding and accessing information relevant for scientists. All the links to on-line data point to information that is freely available for anybody. Only links to on-line journals require subscriptions in most cases.

RESEARCH AND EDUCATIONAL COMPONENTS OF THE INTERNATIONAL HELIOPHYSICAL YEAR IN NIGERIA

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Abstract: Nigeria has continued to play active role in the ongoing International Heliophysical Year, IHY since joining in 2004. Research and public outreach components of IHY have greatly changed the face of Sun-Earth Scientific research and education in the country. The coordinated and celebrated viewing of the solar eclipse of 29 March 2006 was a tremendous success in Nigeria. Current status of the IHY projects in Nigeria -astronomical telescopes, AWESOME, MAGDAS and SCINDA facilities — will be discussed. Research students are involved in the IHY research networks. National Education and Public Outreach, EPO office is collaborating with relevant arms of the government to address, develop, and encourage Scientific but People-Oriented Education, SPOE. This implies the ultimate inclusion of Space and Earth education, in an assimilable and customized language, well rooted in the Nigerian culture, into the schools curriculum. Proposals are sent to the relevant bodies to the National Board on Education for ratification and necessary actions. 2007 Yuri's night was observed with public outreach to high school students.

VIRTUAL OBSERVATORIES IN GEOSCIENCES - A LEGACY OF THE ELECTRONICAL GEOPHYSICAL YEAR (2007-2008)

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Abstract: The virtual observatory paradigm has been gaining visibility in communities beyond Astronomy and distributed data systems have been around for at least 15 years. These efforts are producing numerous successes, lessons learned, new concepts, new designs, and copious experience with changing technologies. Science communities (especially Geosciences) and agencies stand ready to utilize these concepts to their fullest extent in meeting the challenging explosion of data from instruments and models in the present and the next decade.

Motivated by the Electronical Geophysical Year (eGY) which promotes the use of virtual observatory concepts/paradigms for data-intensive activities in the 2007-2008 timeframe, this presentation will discuss the current state of the art, and future developments in geosciences that are changing the way scientist work.

The presentation will also address questions such as: What have we learned in developing and deploying distributed data systems and virtual observatories? How can proper branding and attribution of sources of data be made and tracked in a data-world that is increasingly 'virtual'? What role will informatics and semantics play in developing smart data search and access? How can educators make use of virtual observatories to bring authentic data into classrooms?

SOLAR WIND OBSERVATIONS WITH INTERPLANETARY SCINTILLATION AT 327 MHZ

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Abstract: Radio wave from a compact radio source such as a quasar are scattered by irregularities of electron density. The scattered waves interfere with each other as they propagate to the Earth producing diffraction patterns on the ground. This phenomenon is called interplanetary scintillation (IPS). The IPS pattern contains the information of solar wind velocities and density fluctuations passing across a line of sight from an observer to a radio source. The IPS is a useful tool which allows us to measure the solar wind in three dimensional space inaccessible to in situ observations. We have been operating multi-station IPS observations at a frequency of 327 MHz over two solar cycles at the Solar-Terrestrial Environment Laboratory, Nagoya University, Japan.

Although the IPS measurement is an integral of solar wind velocities and density fluctuations along the line-of-sight, which causes degradation of accuracy, we have succeeded to develop computer assisted tomography (CAT) method to remove the effect of line-of-sight integration. The CAT analysis can retrieve quasi-steady two dimensional solar wind velocity structures (V-map) every solar rotation (~27 days).

Different approaches have been carrying out to reproduce structures of interplanetary disturbances caused by coronal mass ejections. Since the CAT analysis is not applicable to highly variable phenomena, we use model fitting analysis to derive the three dimensional structures of IP shocks.

These IPS techniques are applied to space weather forecast, which can obtain the solar wind velocities and density fluctuations at 0.2 to 0.9 AU a few days before encountering the Earth. This challenging attempt has been started in these years.

**A SCIENCE MISSION FOR QSAT PROJECT:
STUDY OF FACS IN POLAR AND EQUATORIAL REGIONS**

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Abstract: Kyushu University, Kyushu Institute of Technology and Fukuoka Institute of Technology are now designing, developing and building a micro-satellite (called “QSAT”). The primary objectives for QSAT project are (1) understanding mechanism of spacecraft charging (particularly, we have an interest in polar and equatorial regions where field-aligned currents (FACs) are always flowing) and (2) comparing the field-aligned current observed in orbit with ground-based MAGDAS observations. QSAT simultaneously observes the (1) magnetic field disturbances caused by the FACs in geospace, (2) plasma densities in geospace and (3) charge (electric potential) of the satellite, using respectively a fluxgate magnetometer, high-frequency probe (HP) and Langmuir probe (LP).

**REMOTE INTERFACE FOR SCIENTIFIC ANALYSIS (RISA):
USING VAST PROCESSING RESOURCES THROUGH WEB SERVICES**

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Abstract: The Scientific Analysis System (SAS) is the package for interactive and pipeline data reduction of all the XMM-Newton data. RISA will make possible to run SAS through web services, enabling observers to access and analyse data making use of all the existing SAS functionalities, without any installation/download of software/data. The possibility of having access to vast processing resources within a GRID architecture is especially appealing for scientists in developing countries.

THE IHY TRIPOD: AN UPDATE

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Abstract: Joining hands with the United Nations Basic Space Sciences (UNBSS) initiative, the International Heliophysics Program (IHY) has been encouraging scientists from the developed countries to donate instruments to developing countries. These instruments will be used for scientific research and for university level education for young people from developing countries. Currently, about a dozen instrument concepts have been approved. Deployment of radio telescopes has started at three locations in the world to continuously monitor radio bursts from the Sun related to CMEs. H-alpha flare monitor telescopes will also monitor mass motions, waves, and visible emissions related to CMEs. Chains of magnetometers will be deployed in Africa to augment the existing chains in the developed world to study the dynamics of geospace plasma changes during magnetic storms and auroral substorms as a response various solar wind changes. Instrument networks are being established in Africa that will monitor ionospheric disturbances; other plans include mapping of the ionosphere above Africa using inexpensive GPS receivers. In addition to these Sun-Earth connection experiments, an international space weather network is being planned, which will utilize the connection between the solar system and our galaxy via cosmic rays. Ground-based instruments to detect secondary particles (neutrons, muons) from galactic cosmic rays reaching Earth's atmosphere and can identify the passage of CMEs at Earth by monitoring the intensity of these secondary particles. In addition, large data bases will be open to all scientists of the world for training and extracting science not originally planned. This presentation will summarize the current status of the program including initial results.

THE SOHO LASCO CME DATA BASE

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The Solar and Heliospheric Observatory (SOHO) mission's Large Angle and Spectrometric Coronagraph (LASCO) has been observing the solar corona since 1996 and has detected more than 11,000 coronal mass ejections (CMEs) to date. CMEs constitute the most energetic phenomenon in the heliosphere and play an important role in deciding the space weather because of their ability to produce geomagnetic storms and particle radiation. All CMEs detected by SOHO have been manually identified and cataloged at the CDAW Data Center at NASA's Goddard Space Flight Center (<http://cdaw.gsfc.nasa.gov>). The catalog contains all the basic attributes of the CMEs such as speed, width, acceleration, central position angle, mass, kinetic energy, onset time at the Sun and various types of movies. The catalog is also searchable from the Virtual Solar Observatory (VSO) site

<http://vso.nascom.nasa.gov/cgi-bin/vso/catalog.pl>

and from the Solarsoft site

http://www.lmsal.com/solarsoft/www_getcme_list.html.

This paper provides a summary of the catalog contents and CME attributes and illustrates how it can be used for new projects on CMEs as an IHY data base.

INTERNATIONAL HELIOPHYSICS YEAR 2007: PERUVIAN PARTICIPATION

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Abstract: In meetings passed of the Latin American Geofísica Association Espacial (ALAGE) the conformation of projects of regional investigation worked; it is as well as it is born our participation in the IHY 2007. Here we showed the projects in which we are participating, one of them is the Determination of indices of solar activity using the ionosphere like a great radio antenna, this project is called SAVNET (South America VLF Network). We also showed the works to motivate the greater amount of people (students of all level and college students), to participate in this event. For it will elaborated several experiences related to the Sun-Earth Connection like: book to color in reference to the space climate; and design of activities and folders of work for the measurement of solar irradiance and pursuit of sunspots.

NEAR INFRARED EXCESS ENERGY IN BINARY SYSTEM V367 CYGNI

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Abstract: Spectral energy distribution of the Serpentid type binary V367 Cyg was obtained using several previous photometric measurements made on this system in different spectral bands. We found Near IR excess starting from $3\mu\text{m}$ and this excess flux is attributed to the free-free emission from the mass accretion disk of the binary system. We adopted the temperature of primary component as 8000 K. We added the free-free emission flux of the circumstellar disk to the black body energy of the primary component to find a best fit for the observed near IR excess flux. In this fitting we left the electron density of the circumstellar disk n_e of the free-free emission as a free parameter. We found the electron density of the disk is $\sim 9 \times 10^{59} \text{ cm}^{-3}$.

QSAT : THE SATELLITE FOR POLAR PLASMA OBSERVATION

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Abstract: This paper introduces the QSAT satellite for polar plasma observation. The QSAT project began in 2006 as an initiative by graduate students of Kyushu University, and has the potential to contribute greatly to IHY (International Heliophysical Year) by showing to the world the beauty, importance, and relevance of space science. The primary objectives of the QSAT mission are 1) to investigate plasma physics in the Earth's aurora zone in order to better understand spacecraft charging; and 2) to conduct a comparison of the field-aligned current observed in orbit with ground-based observations. The secondary objectives of the QSAT mission are 1) education and research opportunities for students in an activity combining space sciences and satellite engineering; 2) validation of a spacecraft charging analysis software MUSCAT that is being developed at Kyushu Institute of Technology; 3) in-flight verification of satellite bus system built by COTS products, and 4) cooperation between Kyushu University, Kyushu Institute of Technology, Fukuoka Institute of Technology and local industries in developing valuable satellite design expertise. The QSAT satellite is designed to be launched in a piggyback fashion with the Japanese launch vehicle H-IIA. The spacecraft bus is being developed at Department of Aeronautics and Astronautics of Kyushu University with collaboration of Fukuoka Institute of Technology. Regarding the payload instruments, Space Environment Research Center of Kyushu University is developing the magnetometers, whereas Laboratory of Spacecraft Environment Interaction Engineering of Kyushu Institute of Technology is developing the plasma probes. The status of the QSAT project is now on Phase C, "Design," and the critical design review is scheduled for May 31. We are aiming to launch the QSAT satellite in the summer of 2008 together with GOSAT the greenhouse gases observing satellite.

**ARSIP: MIRROR SERVERS FOR SCIENTIFIC DATA –
A CASE STUDY OF ADS – NASA INDONESIA**

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Abstract: We report a national scale programme to provide content management and mirror services for scientific data based on the web in Indonesia. The programme was initiated by a grass-root movement to fill in the scientific information gap between the Indonesian scientists and their counterparts in the developed countries, and further is followed up by the government and the local private companies. Focusing on the one of main mirror services, the ADS-NASA Indonesia, we show the progress and its real impact in the local theoretical physics community during the last two years of its implementation. The largest impact is the mirror triggers new research topics in Indonesia Utilizing the parallel and grid computing, which further motivate a nation-wide plan to connect the networks among the local research institutions.

INTERNATIONAL HELIOPHYSICAL YEAR 2007

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Abstract: IHY Secretariat The United Nations General Assembly, in its resolution 60/99 of 2005, noted with satisfaction the contribution being made by the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and the efforts of Member States and the United Nations Office for Outer Space Affairs (UNOOSA) to promote and support the activities being organized within the framework of the International Heliophysical Year 2007 (IHY 2007). In 2007, a number of major anniversaries occur, among them the 50th anniversary of the International Geophysical Year, the launch of Sputnik 1, and UNCOUOS will also hold its 50th meeting. IHY 2007 is an opportunity to (i) advance the understanding of the fundamental heliophysical processes that govern the Sun, Earth, and heliosphere, (ii) continue the tradition of international research and advancing the legacy of IHY 1957, and (iii) demonstrate the beauty, relevance and significance of space and Earth science to the world (<http://ihy2007.org>). In preparation of IHY 2007, the UNOOSA, in cooperation with NASA, ESA, and the IHY Secretariat, hold international workshops in the United Arab Emirates in 2005 (<http://www.ihy.uae.ac.ae/>) and in India in 2006 (<http://www.iiap.res.in/ihy/>), and is preparing such a workshop to be held at the National Astronomical Observatory of Japan in Tokyo, 18-22 June 2007 (http://solarwww.mtk.nao.ac.jp/UNBSS_Tokyo07/).

The starting date of IHY 2007 was February 19, 2007. On that date, during the session of the Scientific and Technical Subcommittee of UNCOUOS, the IHY kick-off included an IHY exhibit, press briefing, and an opening ceremony in the United Nations Office Vienna (http://ihy2007.org/newsroom/opening_ceremony.shtml). Representatives of UN Member States, IHY regional coordinators, Steering Committee members, and Advisory Committee members participated in the IHY kick-off event. The Austrian Academy of Sciences will hosted a one-day symposium on IHY 2007 in Vienna on 20 February 2007 (<http://ihy-austria.oeaw.ac.at/index.php>).

THE VIRTUAL SOLAR OBSERVATORY - A RESOURCE FOR INTERNATIONAL HELIOPHYSICS RESEARCH

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Abstract: The Virtual Solar Observatory (VSO) is a software system designed to provide seamless and unified access to heliophysics data sets. The VSO concentrates on the solar end of the sun-earth system, and includes data from all of the major space- and ground-based solar observatories. The user can search 13 archives with access to data from 62 instruments, and on the basis of time, data source, observable, spectral range or any combination of these. In addition, several catalogs of events are provided and searches can be constructed using the catalog information. The interface is freely available on the web, and access to the data is completely open.

**CREATION OF AN INTERNATIONAL RADIO OBSERVATORY ON THE
PLATEAU SUFFA WITH UNIQUE 70 – METER
RADIOTELESCOPE IN MILLIMETRES RANGE**

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Abstract: I'd like to inform you that Centre of Space Research, Uzbekistan, has initiated a number of large applied and scientific space projects. One of the important one among them is the project (joint project with Russia) mentioned above. It planned be to put into operation in the year 2010. I have prepared a presentation paper on the project and will send it immediately after translating. We realize that such large project could be interested for the wide international scientific community and it should be to begin international co-operation on the early stage of the project by its integrating with such international programs as GEODYNAMIC, VLBI, ES-VLBI, VSOP and others. Besides, it is very important to study correlation between solar activity, magnetosphere-ionosphere disturbances and radio transparency on the site plateau Suffa in a frame of the International Heliophysical Year 2007. Therefore there is an acute necessity in studying of a world experience both as at a level of management as at a level of technical details. It is also necessary to seek and engage the partners to fulfill our project. On the other hand, our experience can be useful to the potential partners and we hope for development of mutual benefit co-operation.

SCIENCE OF THE TRANSIENT OBJECTS FROM SMALL TELESCOPES

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Abstract: Using small telescope is a powerful tool to observe transient objects, including novae, dwarf novae, GRB afterglows. I report recent results from the VSNET, which is one of the largest networks all over the world using small telescopes.

DEVELOPMENT OF ASTRONOMY, SOLAR PHYSICS AND RADIO ASTRONOMY AND GEOMAGNETIC DATA ACQUISITION IN PERU

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Abstract: In March of 2004 Instituto Geofísico del Perú (IGP) and the National Astronomical Observatory of Japan (NAOJ) agreed in make collaborations in Educational astronomy, Solar Physics and Radio Astronomy. On the other hand Government of Japan donated as a Cultural Grant a new Planetarium to be installed in Lima. Dome for projections is ready and planetarium is almost ready.

A 32 m parabolic antenna that belongs to a private telephone company will be transferred to IGP and converted into a powerful radio telescope, initially will receive methanol maser line spectrum signals from Young Stellar Objects. Equipments and training in radio astronomy of Peruvian staff is supported by NAOJ. The Radio Observatorio Astronómico de Sicaya would become the first National Facility in Perú and will participate different universities, actually Japanese universities and research institutions are collaborating and implementing the new radio observatory.

Solar flare monitor telescope (FMT) of Hida Observatory of Kyoto University will be sent to Peru to be installed at Ica National University, where IGP will construct a Solar Station and planned to install a solar spectrograph refurbished thanks to NAOJ collaboration. Also an old Monochromatic Heliograph of Huancayo Observatory of IGP will be refurbished to observe protuberances of the Sun as a part of FMT program.

IGP hosts MAGDAS and CPMN magnetometers at Ancón Observatory, Cañete and Guadalupe stations. A digital magnetometer of Tokyo University at Ancón Observatory will be moved to Universidad Nacional de San Agustín in Arequipa (UNSA) and replace an old photographic paper magnetometer, then thanks to Kyoto University collaboration UNSA's photographic magnetograms will be digitized using a digital camera and will be available on the web.

IGP is actively participating in celebration of IHY and also did for IGY in 1957. Huancayo Observatory of IGP contributes with geomagnetic data since 1922. International collaborations and participations of universities is the key world to make science in developing countries.

CURRENT AND FUTURE CAPABILITIES OF THE KOTTAMIA 74-INCH TELESCOPE IN EGYPT

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Abstract: In this paper, the Kottamia observatory is introduced and the 74- inch telescope current situation is described. The telescope control system and its attached equipments are presented. The equipments include a CCD direct imaging system and a spectrograph. This spectrograph (OKS) has been recently gifted to Kottamia observatory from Okayama observatory in Japan. A new LN cooled CCD imaging camera as well as a new TV guiding camera have been installed on this spectrograph. A description of the spectrograph and its attached cameras are presented in detail. A retrofit and refurbishment of the telescope control system are being implemented recently. It is supposed to finish within 3-4 months. A general description of this control system is discussed. Finally, a description of a recently purchased 2K×2K LN cooled CCD for direct imaging is given.

MALAYSIA IHY NATIONAL PROGRAMME

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Abstract: This paper will describe the main role of National Space Agency of Malaysia in coordinating, monitoring, organizing and implementing the Malaysia IHY programme through the local and international partners.

STUDENT PARTICIPATORY PROGRAMS AT SUGINAMI PLANETARIUM

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Abstract: The Suginami Planetarium has long experience to provide effective planetarium shows for school education. In our show, students are not passive audience but active participants such as students in laboratory at the school. I will introduce such Suginami programmes for planetarium shows.

DATA TRANSFER SYSTEM OF MAGDAS IN INDONESIA

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Abstract: We are constructing and developing the Data Transfer System of MAGDAS in Indonesia. The Data Transfer System is developed by using GPS/GPRS modern and the data of MAGDAS is storage at our FTP at National Institute of Aeronautics and Space, in Bandung. The data transfer every five minutes. By this system is possible to developing the real-time observation of geomagnetic anomaly in Indonesia and developing the study of space weather.

**CONTRIBUTION OF THE JAPANESE ODA TO THE BASIC SPACE
SCIENCE IN DEVELOPING NATIONS FOR THESE TWENTY YEARS**

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**INTERNATIONAL COOPERATION PROGRAM OF
GUNMA ASTRONOMICAL OBSERVATORY**

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Abstract: This paper describes the activities of Gunma Observatory on International Co-operation. In fact we have trained astronomers of Vietnam, the Philippines, Thailand and so on and provided small telescopes to Vietnam and others. We also sent our staff to Vietnam to repair telescopes there.

PHOTOMETRIC AND SPECTROSCOPIC STUDIES OF BW ERI

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Abstract: Eclipsing binary stars are frequently used to determine several absolute astrophysical parameters which cannot be deduced from single stars observations. Since its founding (Hoffmeister, 1936), BW Eridani (BW Eri), a 10th-magnitude short period eclipsing binary (0.6384777 days), has received little attention over the past two decades. The last observation and study has been published by Baade et al (1982). BW Eri is located at the southern hemisphere, which makes southern observatories easy to observe it; Bosscha Observatory is the one of them.

We will discuss photometric and low-resolution spectroscopic observations of BW Eri, followed with the data analysis to determine its physical parameters. *BVRI* photometric observations were carried out in five nights (January – February 2006) using Bosscha's 20-cm (f/10) GAO-ITB Remote Telescope System and two nights (January 2007) using 28-cm (f/10) Schmidt-Cassegrain telescope. The secondary minimum was well-sampled, but only half of the primary minimum has been observed. Five nights' low-resolution spectroscopic observations were carried out with Bosscha's 45-cm (f/12) GOTO Telescope and Bosscha Compact Spectrograph in optical window.

Photometric analysis yields some physical parameters of BW Eri, i.e. inclination, mass ratio, fractional luminosities, and radius relative to separation. We confirm the evidence of mass transfer between the components. Qualitative spectroscopic investigation yields the spectral class of the components.

We acknowledge the helpful supports and fruitful discussions with Dr. H.L. Malasan and H. Kuncarayakti. We also would like to thank Professor M. Kitamura for constant encouragement.

PROGRESS REPORT ON THE DEPLOYMENT OF MAGDAS

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Abstract: MAGDAS is a network of 50 real-time magnetometers that each send data in real-time to a central location (SERC). This state-of-the-art magnetometer was developed by SERC of Kyushu University. Because of the global nature of the network, we believe it to be Japan's most scientifically significant contribution to IHY. Today I briefly mention the status of MAGDAS deployment. Deployment is concentrated along the 210 Magnetic Meridian and along the dip equator, making MAGDAS a formidable tool for space weather research.

ACTIVITIES IN STELLAR ASTROPHYSICS WITH GOTO-45 CM AT BOSSCHA OBSERVATORY

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Abstract: This talk aims at reporting progress of research and education activities using the GOTO 45-cm reflecting telescope at Bosscha Observatory. In view of sky condition, and with the existence of newly developed compact spectrograph (the Bosscha Compact Spectrograph) and CCD cameras, most of recent research activities are in the area of stellar spectroscopy. Photometric and spectroscopic studies with the telescope and its new instruments, include asteroid, nova, pulsating variable stars, Be stars, planetary nebulae and, in particular, the eclipsing binary, BW Eri, recommended by Prof. M. Kitamura during the previous UN/ESA Workshop in Beijing 2002. We also successfully replaced the old control system of the telescope with the self-made one, developed by us with the help of colleagues from Department of Applied Physics in the Institut Teknologi Bandung. Several aspects concerning the technological enhancement and outcomes of researches will be described and discussed.

IHY ACTIVITIES IN INDIA

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**RESULTS FROM CALLISTO IHY SOLAR RADIO SPECTROGRAPH
HOSTED AT RAC**

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A PATHWAY THROUGH MATHAI'S ENTROPY TO MULTIVARIATE GAUSSIAN MODELS

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Abstract: Among all multivariate densities which one will optimize Mathai's entropy measure? It is shown that among all densities $f(X)$, where X is a $q \times 1$ real random vector such that $\int_{\mathbb{R}^q} f(X) dX = 1$, $f(X) \geq 0$ for all X , satisfying a principle called "ellipsoid of concentration is proportional to the strength of Information in $f(X)$ ", gives rise to a density which gives a pathway to eventually a multivariate Gaussian model. The principle of conservation of ellipsoid of concentration can be stated as follows. $(1 - \alpha) (X - \mu)' V^{-1} (X - \mu) = 1$ where $1 - \alpha$ is the strengths of information, $\mu = E(X)$, $V =$ covariance matrix of X , where E denotes the expected value.

PATHWAY MODEL, SUPERSTATISTICS, TSALLIS STATISTICS, AND A GENERALIZED MEASURE OF ENTROPY

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Abstract: The pathway model of Mathai (2005) is shown to be inferable from the maximization of a certain generalized entropy measure. This entropy is a variant of the generalized entropy of order α , considered in Mathai and Rathie (1975), and it is also associated with Shannon, Boltzmann-Gibbs, Rényi, Tsallis, and Havrda-Charvát entropies. The generalized entropy measure introduced here is also shown to have interesting statistical properties and it can be given probabilistic interpretations in terms inaccuracy measure, expected value, and information content in a scheme. Particular cases of the pathway model are shown to be Tsallis statistics (Tsallis, 1988) and superstatistics introduced by Beck and Cohen (2003). The pathway model's connection to fractional calculus is illustrated by considering a fractional reaction equation.

IONOSPHERE AND GEOMAGNETIC STUDIES OF THE MANILA OBSERVATORY

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Abstract: The IGS programme is primarily engaged in the scientific observation and analysis of the ionized layer of the earth's atmosphere, which is vital to long range radio communications. Research is based on vertical and oblique (i.e. trans-equatorial) soundings that are routinely conducted together with continuous monitoring of geomagnetic activity. The IGS programme also includes the Observatory as a node in the Low-Latitude Ionospheric Tomography Network (LITN) that consists of an array of receivers spanning Manila to Shanghai which obtain beacon signals from the US Naval Navigation Satellite System. The LITN is designed to carry out large scale experiments on ionospheric imaging by computerized tomography to study structures and disturbances of the ionosphere at low latitudes.

Research activities include:

- Ionospheric F Layer properties in relation to solar activity, sunspot cycle and magnetic activity, including temporal (i.e. diurnal, seasonal, annual) and spatial (i.e. latitudinal) variations.
- Ionospheric E Layer properties in relations to atmospheric electricity.
- Electron content/scintillation studies.
- Equatorial ionospheric anomalies, spread phenomena, and radio signals, and
- Trans-equatorial propagation studies (in coordination with DSTO Australia).

SPACE WEATHER DIAGNOSIS USING COSMIC RAYS: OBSERVATION WITH A GLOBAL NETWORK OF COSMIC RAY MUON DETECTORS

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Abstract: The galactic cosmic ray (GCR) intensity often shows a dramatic variation responding to the arrival of the interplanetary disturbances at the Earth. For instance, the Interplanetary Coronal Mass Ejections (ICME) accompanied by strong shock often forms a GCR depleted region behind the shock. The abrupt decrease of GCR density (i.e. the isotropic intensity), known as Forbush Decrease (FD), is recorded by ground-based detectors when the Earth enters the depleted region. In addition to the variation of GCR density, the ICME arrival also causes a systematic variation in the GCR streaming (i.e. the directional anisotropy of intensity). The magnitude of the streaming is small (of the order of 1 % or less in most cases), but the variation is significant. Since the variation reflects the spatial gradient of the GCR density in the interplanetary magnetic field (IMF), the systematic variation of the streaming gives us important information on both the structures of the depleted region and the IMF. Muon detectors measure high-energy GCRs by detecting secondary muons produced from the hadronic interactions of primary GCRs (mostly protons) with the atmospheric nuclei. Since muons have relatively long life-time (about 2.2 microsecond) and can reach the detector at the ground level preserving the incident direction of primary particles, we can measure the GCR intensity in various directions with a multidirectional detector at a single location. In March 2001, we constructed a prototype network of multidirectional detectors by installing a small detector in Brazil in addition to other two in Japan and Australia. By March 2006, the prototype network was upgraded by expanding the Brazilian detector in its size and also by putting an additional detector in operation at Kuwait City in Kuwait. This new global network, currently consisting of four detectors at Nagoya (Japan), Hobart (Australia), Sao Martinho (Brazil) and Kuwait City (Kuwait), can continuously monitor the GCR intensity in total 60 directional channels covering almost entire sky and can precisely measure the variation of the GCR streaming separately from the variation of the GCR density. In this paper, we summarize results derived from the observation using a prototype network and also report the initial performances of the new global network.

VLF-LIGHTNING INDUCED ELECTRON PRECIPITATION DISTURBANCE AS MEASURED BY ALGIERS RECEIVER

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Abstract: Very Low Frequencies (VLF) are used to probe the lower layer of the ionosphere (D layer). It is well known that Lightning are the most powerful perturbations which causes direct heating of the ionosphere known as Early/Fast events and/or electron precipitation coming from higher altitude (LEP). In our contribution we will present a result of two months of observation (February and March 2007) using three different frequencies (45.9KHz, 23.4KHz and 22.1KHz) of the LEP ionosphere perturbations in the south of Mediterranean sea and West of Europe. The results show a large number of perturbations at 45.9 KHz with decrease of signal amplitude up to 2.1dB followed by perturbations at 23.4 KHz with decreasing signal amplitude up to 3dB, a little number of events registered at 22.1KHz.

CONSTRUCTION OF VIRTUAL OBSERVATORIES THROUGH GLOBAL COLLABORATION AND STANDARDIZATION

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Abstract: In astronomy more than 15 Virtual Observatory (VO) projects are underway aiming at connecting various astronomical databases and computing resources in the world, toward challenging many mysteries that would be solved by using huge amount of data in wide range of wavelengths. Japanese Virtual Observatory (JVO) project, that is conducted at the National Astronomical Observatory of Japan, aims at including various catalogs, images and spectra taken by the SUBARU telescope, ALMA and other telescopes based on international cooperation. The JVO has close collaboration with the International Virtual Observatory Alliance (IVOA; <http://www.ivoa.net/>) that was formed in June 2002 with a mission to facilitate the international coordination and collaboration necessary for the development and deployment of the tools, systems and organizational structures necessary to enable the international utilization of astronomical data archives as an integrated and interoperating virtual observatory.

By May 2007, the IVOA has grown to include 16 funded VO projects from Armenia, Australia, Canada, China, Europe, France, Germany, Hungary, India, Italy, Japan, Korea, Russia, Spain, the United Kingdom, and the United States. This membership is now being expanded to include representation from projects constructing and planning new observatories and astronomical facilities, as well as emerging astronomical communities that seek to benefit from the global availability of VO facilities and technologies.

IVOA has been acting as a standardization body among above mentioned VO projects for their interoperation, and succeeded to adopt several recommendations, such as meta data format and access protocol, data access protocols (e.g., Simple Image Access Protocol), and is now working to standardize other important protocols. Some VO projects implemented such recommended protocols, and consequently succeeded to interoperate to each other. VO projects in Canada, Europe, France, Japan, Spain, the UK and the USA have been connected successfully.

Japanese Virtual Observatory implemented data access (catalogs, images and spectra) by using the standard protocols and is now available to access more than 600 astronomical data resources in the world, and examined a work flow system that enables users to analyze collected data through Vo interfaces to produce new astronomical insights.

My talk will include conceptual structure of the Virtual Observatories, practical approach adopted in the IVOA, recent achievement by the Japanese Virtual Observatory, and future prospects of VOs in the world. VOs are regarded as good examples of Data Grid Applications.

CURRENT AND FUTURE RESEARCH ACTIVITIES IN THE CENTRE FOR BASIC SPACE SCIENCE (CBSS) NSUKKA

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Abstract: We review current research activities in CBSS Nsukka in the areas of Astronomy and Atmospheric Sciences. We discuss project carried out by CBSS in collaboration with Nigerian Universities and other research institutes. We also briefly discuss projects carried out with our three major international partners: National Astronomical Observatory Japan, South African Astronomical Observatory, South African and Universities of Delaware, USA. We in addition discuss new projects, we intend to carryout for the International Heliophysical Year (IHY) as well as International Astronomical Year (IAY). Various problems encountered in the execution of our projects will be highlighted and possible assistance required from the international research community will be mentioned.

FEASIBILITY STUDY FOR SETTING UP A RADIO TELESCOPE IN NIGERIA FOR SPACE AND VLBI RESEARCH

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Abstract: To determine a suitable radio telescope for space and VLBI research at an affordable cost, we considered; a parabolic radio telescope, a cylindrical radio telescope and arrays of both parabolic and cylindrical radio telescopes. This we did by comparing the advantages and disadvantages of these radio telescopes, calculating their parameters using established mathematical methods and their cost estimates.

Though a radio telescope suitable for space and VLBI research must be as large as possible, to achieve a balance between performance and economics a 25m parabolic antenna radio telescope at a cost of ₦1.76 billion (US\$13.968 million) was considered suitable to be set up.

A consideration of the parameters of the proposed site at Ebilimmiri showed that the site is radio quiet, though not quite in a valley.

A careful analysis show that this telescope can be used to carry out sky survey at a given frequency, observe interplanetary scintillations (IPS) of distant radio sources, provide information on solar wind velocity and with a resolution, ranging from 0.01° at $\lambda = 1\text{cm}$ (30Ghz) to 0.3° at $\lambda = 30\text{cm}$ (1Ghz), the telescope will be very effectively used for studying a variety of solar and planetary radio bursts. The telescope can equally be used as a VLBI technique with the radio telescope in Hartebeesthoek in South Africa. The maintenance of the Radio telescope will not pose so much problems considering the MoU signed with National Astronomical Observatory, Japan which includes capacity building and manpower development programme which the Centre for Basic Space Science has embarked upon.

SCINDA IN NIGERIA: PROBLEMS AND PROSPECTS

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Abstract: The first SCINDA measurement in Nigeria was obtained in November 2006. The local internet system in the host university became unstable just before the installation was perfected. Erratic power supply has resulted in non-continuous measurements. Typical results were presented. Means of overcoming the problems associated with the measurement process are discussed.

AKARI –INFRARED SATELLITE MISSION – PRESENT STATUS AND EARLY RESULTS

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Abstract: AKARI is the first Japanese infrared satellite mission dedicated for infrared astronomy, a JAXA project with the participation of ESA. It was launched 22 February 2006. AKARI was designed to make an all-sky survey at 6 photometric bands in the mid to far infrared (9-160 micron), which will surpass 24 year old IRAS survey, together with staring observations for deep imaging and spectroscopy. AKARI has two scientific instruments on board, the Far-Infrared Surveyor, FIS, and the Infrared Camera, IRC. Both instruments have been working fine and providing significant data for the various fields of astronomy. In this presentation, an overview of the AKARI mission is given together with the early scientific results of the AKARI mission.

USING THE MAGDAS-CPMN TO STUDY EQUATORIAL ELECTROJET

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Abstract: I propose to use the Circum pan-Pacific Magnetometer Network (CPMN) installed by the Space Environment Research Centre (SERC), Kyushu University along the 210° magnetic meridian and the magnetic equator, to study the equatorial electrojet (EEJ). With its newly developed MaGnetic Data Acquisition System (MAGDAS), it is possible to observe geomagnetic field variations in real time. Utilizing this network of ground-based instruments, I hope to elucidate EEJ's regular day-to-day and seasonal variabilities, its irregular variations during magnetic storms and substorms, and the occurrence of counter electrojet (CEJ).

SPACE WEATHER MONITORING LABORATORY IN KOREA

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Abstract: Last February we opened Space Weather Monitoring Laboratory and we would like to introduce SWM Laboratory and suggest organizing IHY 2007 or 2009 in Republic of Korea.

PRELIMINARY RESULTS FROM THE MAGNETIC FIELD MEASUREMENTS USING MAGDAS AT ILORIN, NIGERIA

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Abstract: MAGDAS, Magnetic Data Acquisition System, was successfully installed at the University of Ilorin, Nigeria – an equatorial station - in August 2006. MAGDAS is a strong component of International Heliophysical Year, IHY. We examined the preliminary results obtained from the analysis of the geomagnetic data obtained from the MAGDAS measurement. Diurnal variations of the solar quiet and disturbed daily variations in the three elements H, D, Z were studied. The obtained signatures of the magnetic field variations were discussed in light of literatures. The day-to-day variability of the horizontal magnetic field was examined. The paper justified the need for a partner magnetic field observatory along same meridian as Ilorin, north or south of it, to facilitate synthesis of the equatorial electrojet effect.

STRIDES OF INTERNATIONAL HELIOPHYSICAL YEAR (IHY) IN AFRICA: AN APPRAISAL

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Abstract: We appraised the impact of the ongoing International Heliophysical Year (IHY) in Africa. Astronomical Telescopes, AWESOME, MAGDAS and SCINDA research facilities are the IHY intervention facilities already installed in African countries. The facilities are being well coordinated except for some peculiar problems in some places highlighted in the paper. Two continental IHY workshops were held in Cape Verde and South Africa within a year, one is planned for Ethiopia in November 2007. National Organising committees are being formed in individual member nations and the African Regional Committee is being strengthening towards the sensitization of the member countries and ultimate actualization of the goals of the International Cooperation program. IHY is fostering strong intra-continental partnerships amongst African scientists as well as effective collaboration between the IHY equipments donors and their respective hosts.

RESEARCH AND EDUCATIONAL COMPONENTS OF THE INTERNATIONAL HELIOPHYSICAL YEAR IN NIGERIA

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Abstract: Nigeria has continued to play active role in the ongoing International Heliophysical Year IHY since joining in 2004. Research and public outreach components of IHY have greatly changed the face of Sun-Earth Scientific research and education in the country. The coordinated and celebrated viewing of the solar eclipse of 29 March 2006 was a tremendous success in Nigeria. Current status of the IHY projects in Nigeria - astronomical telescopes, AWESOME, MAGDAS and SCINDA facilities – were discussed. Research students are involved in the IHY research networks. National EPO office is collaborating with relevant arm of government to address, develop, and encourage Scientific but People-Oriented Education (SPOE). This imply the ultimate inclusion of Space and Earth education, in an assimilable and customized language, well rooted in the Nigerian culture, into the school curriculum through a proposal to the National Board on Education for ratification and necessary actions. 2007 Yuri's night was observed with public outreach to high school students.

SOUTH AMERICA VLF NETWORK (SAVNET) : DEVELOPMENT AND INSTALLATION STATUS, FIRST RESULTS

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²ROI Radio Observatorio de Itapetinga – Atibaia, Brazil

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Abstract: The South America VLF NETwork is a network of Very Low Frequency tracking receivers installed at seven different sites over the South American territory. SAVNET is fully financed by Brazilian Funding Agencies and is part of the UNBSSI/IHY activity programme. The main scientific objectives of this network is to provide a long-term monitoring of parameters related to quiescent and active solar features, which include the formation of the daytime low ionosphere D-region and transient perturbations within it, and nighttime propagation anomalies. These features are e.g., the long-term variations of soft X-ray and Lyman- α solar radiations, solar flares and geomagnetic perturbations of solar origin. Another scientific goal is the study of the spatial structure of the South Atlantic Magnetic Anomaly where the effects of geomagnetic perturbations are generally enhanced. In this work we will present the status of the SAVNET tracking receivers' construction, and performances as well as their installation, which is planned to be completed by July 2007. We will describe in details the installations done in Piura (Peru), Punta Lobes (Peru), São Martinho cia Serra (RS, Brazil), Palmas (TO, Brazil), and Atibaia (SP, Brazil). We will also present and discuss the lust observations and results obtained by the SAVNET network comparing the records of VLF stations located at various sites over the continent, during daytime and during transient phenomena like solar flares. Outreach results obtained also at different academic institutions in Peru and Brazil will be discussed. Finally, we will propose future plans to extend the spatial coverage of the SAVNET.

CREATING AN ADS MIRROR SITE AND VIRTUAL OBSERVATORY IN ALGERIA

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Abstract: Brief description of solar projects in Algiers Observatory.

COLLABORATION STUDY BETWEEN IKIR AND SERC BY USING MAGDAS

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Abstract: The development of MAGDAS on Far East and the coordination with other international projects in Russia are considered. The geomagnetic, radar, lidar and communication systems are presented. The role of Kamchatka, Magadan and Cape Schmidt stations in the study during the International Heliophysical Year (IHY) is discussed. The proposals of the optical and Super DARN systems installation for the investigation of the ionosphere are announced. The possibilities of the geosphere coupling study during the solar activity are shown.

Hinode SATELLITE

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Abstract: Hinode Satellite is the orbital solar observatory, and carries three excellent telescopes. The observation data from the telescopes is marvelous and huge. Hence, it is hard to search the data and the large computer resource is needed for the analysis of Hinode data. Since prelaunch of Hinode, We (NAOJ and ISAS/JAXA) developed the data search/provide system and prepared the providing of the data analysis environment to public use. In the talk, we introduce the data searching/providing system “DARTS/Hinode” and the data analysis environment at Hinode Science Center at NAOJ.

SUBARU DATA ANALYSIS ON JAPANESE VIRTUAL OBSERVATORY

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Abstract: The amount of astronomical observation data is rapidly growing, so the way of traditional analysis appears to be insufficient for using the large amount of data effectively and efficiently. The SuprimeCam, which is one of the instruments equipped with the Subaru telescope, has been generating 6 TB of public data since its start of operation. It is almost impossible to transfer all the data to the local machine to analyze it. It is, therefore, desirable to have an environment where the data is analyzed where it is stored.

Fortunately, CPU performance is rapidly increasing, and cost for purchasing such a high performance CPU is decreasing. Not only for the economic reason, a computing technology and software system that enable to make good use of a lot of computing resources, i.e. GRID computing, are emerging. So, it is now reasonable to concentrate a huge amount of computing resource at the location where the data is stored in relatively low cost.

We have applied the grid technology to construct the Subaru Grid Data Analysis system, that is aimed to be used by hundreds of users through a Web interface. The system is composed of four parts: Data Analysis Service, Storage Service, Data Search Service and Monitoring and Discovering Service. Each component communicates with each other by exchanging a SOAP message. The detail of the role of each component is described in this paper. We integrated this system to the Japanese Virtual Observatory, so a user can easily utilize the grid system through the web browser interface. Currently 30 CPU are installed on the GRID system. Using this system, all the SuprimeCam data (6TB) is reduced just in 10 days. It takes more than one year, if data were retrieved from a remote data archive through 100 Mbps network and analyzed with one CPU. Another advantage of using this system is that a user can have data analysis environment without installing any software package, and he can get a reduced Subaru data without special knowledge about the instrument. Thus the users can concentrate their mind on the scientific analysis. The system is not only used for Subaru data analysis but also applicable to any arbitrary analysis tools, so it can provide general astronomical research environment based on the Web.

In this paper, we will introduce the Subaru Grid Data Analysis system, how it will be used from the JVO.

**THE ESTABLISHMENT OF THE NATIONAL ASTRONOMICAL
RESEARCH INSTITUTE OF THAILAND**

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ASTROPHYSICAL APPLICATIONS OF FRACTIONAL CALCULUS VIA STOCHASTIC DESCRIPTION OF SUBDIFFUSION

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Abstract: The paradigm of fractional calculus occupies an important place for the macroscopic description of subdiffusion. Its advance in theoretical astrophysics is also very attractive. In this report we discuss a recent development of the idea to some astrophysical problems. One of them is connected with a random migration of bright points associated with magnetic fields at the solar photosphere. The transport of the bright points has subdiffusive features that require the fractional generalization of the Leighton's model. Another problem is related to the angular distribution of radio beams, being propagated through a medium with random inhomogeneities. The peculiarity of this medium is that radio beams are trapped because of random wave localization. This view can be useful for the diagnostics of interplanetary and interstellar turbulent media.

OUT-OF-EQUILIBRIUM DYNAMICS IN A SELF-GRAVITATING N-BODY SYSTEM: STATISTICAL AND DYNAMICAL CHARACTERIZATION

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Abstract: The long-term dynamical evolution of self-gravitating N-body system is an old problem with rich history that involves the non-equilibrium nature of long-range system. In this talk, we present our attempts to characterize the out-of-equilibrium dynamics in a N-body system. In somewhat idealistic situation, we found that the transient state of out-of-equilibrium system can be approximately described by the stellar polytropic distribution with time-varying polytrope index, which corresponds to the extremum states of non-extensive Tsallis entropy. The time-scale of quasi-equilibrium states can be analytically estimated by means of the generalized variational method, which reproduces the N-body result quite well.

**THE GENERALIZED CENTRAL LIMIT THEOREM CONSISTENT WITH
NONEXTENSIVE STATISTICAL MECHANICS AND THE VOYAGER 1
DATA ON SOLAR WIND: A POSSIBLE CONNECTION**

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CURRENT SITUATION AND FUTURE DIRECTION OF ASTRONOMY AND SPACE SCIENCE IN MONGOLIA

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Abstract: The history, current situation, education and future directions of modern Mongolian Space Science and Astronomy are reviewed. This paper discusses recent efforts to develop astronomy education and research capacity in Mongolia with cooperation of the International Astronomical Union. Various capacity-building initiatives in space science including remote sensing in Mongolia are discussed.

NEW VIEW OF THE SUN WITH HINODE SATELLITE

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Abstract: Initial Scientific results from Hinode will be presented.

INVESTIGATIONS FOR INSTALLING THE FLARE MONITORING TELESCOPE IN PERU UNDER THE CHAIN-PROJECT

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Abstract: The Flare Monitoring Telescope (FMT) was constructed in 1992 at Hida observatory in Japan to investigate the long-term variation of solar activity and explosive events. We want to monitor solar flares and erupting filaments continuously as much as possible by using several of such characteristic telescopes. We are then planning to execute "Continuous H-alpha Imaging Network (CHAIN)-project" as part of the CAWSES project. As part of CHAIN-project, we are examining the possibility of installing of the telescopes in developing countries with being supported from the United Nations. Then, we selected Peru as the country where the 1st oversea FMT will be installed. At the second UN/NASA workshop on the International Heliophysical Year and Basic Space Science in 2007 in India, we introduced the characteristics of the FMT, some scientific results by using the data obtained with it and our plans of installation of the FMT in Peru. In January 2007, we actually visited to candidate sites to install the FMT in Peru. As the result, we are considering the campus of the Ica University as the 1st candidate location in Peru where it hardly rains all the year round and where the educational and studying environment is comparatively excellent. Currently, we are investigating various items, aiming to start the operation of the FMT in Peru by the end of 2009, such as the seeing condition and the size of the turbulence due to the heat haze, the best structure of the housing of the telescope, the efficient method of remodeling the telescope with corresponding to the latitude of Peru, the best combination of the observing wavelengths, the appropriate software for data processing under the computer environment at Ica University, the human environment and the way of training of the local staffs, etc. In this meeting, we introduce such investigations.

INTRODUCTION TO MERIDIAN SPACE WEATHER MONITORING PROJECT

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Abstract: The Meridian Project is a ground-based network program to monitor Solar-Terrestrial space environment, which consists of a chain of ground-based observatories with multiple instruments including magnetometers, ionosondes, HF and VHF radar, Lidar, IPS monitors, sounding rockets etc. The chain is mainly located in the neighborhood of 120°E meridian, and is thus named the Meridian Project. It has officially been approved by the Chinese government and will be finished by 2010. This talk will give an overview and update of the Meridian Project and the proposed International Space Weather Meridian Circle Program.

DELIVERY OF SPACE WEATHER INFORMATION IN COLLABORATION WITH THE INTERNATIONAL SPACE ENVIRONMENT SERVICE (ISES)

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Abstract: There is an international organization concerned with space weather, called International Space Environment Service (ISES). Eleven countries (Australia, Belgium, Canada, China, the Czech Republic, India, Japan, Poland, Russia, Sweden, and the U.S.) in the world operate regional warning centers (RWCs) of the ISES.

Space Weather is defined as the conditions on the Sun and in the solar wind, magnetosphere, ionosphere, and thermosphere that can endanger human life and health by influencing the performance and reliability of space-borne and ground-based technological systems (Wright et al., 1995). The space weather information is also useful for coordinated observations of scientific purpose. One of the two origins of the ISES supported the coordinated observations of International Geophysical Year (IGY) by delivering coded data and reports of Special World Intervals (SWIs). We want to promote delivery of space weather information beyond International Heliophysical Year (IHY) in collaboration with the RWCs.

In Japan, National Institute of Information and Communications Technology (NICT) operates the RWC. We monitor real-time data from satellites and ground-based observatories, issue forecast everyday at 6:00 UT, and deliver it via our web page (http://swc.nict.go.jp/contents/index_e.php), e-mail, RSS, and other means.

OUT-OF-EQUILIBRIUM STATISTICAL MECHANICS IN A HAMILTONIAN SYSTEM WITH LONG-RANGE INTERACTIONS

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Abstract: Hamiltonian systems with long-range interactions are frequently trapped in long-lasting quasi-stationary states before relaxing to thermal equilibrium. In the Hamiltonian mean field model, a family of the quasi-stationary states is well described by maximizing an entropy based on Lynden-Bell's pioneering work. We show that the maximum entropy principle predicts out-of-equilibrium phase transitions, and that the theoretical predictions are in good agreements with numerical results.

HAYABUSA'S ADVENTURE AROUND A TINY ASTEROID ITOKAWA

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Abstract: The Japanese spacecraft Hayabusa, which was launched in May 2003, arrived at its destination, Asteroid Itokawa, in September 2005. The view of this tiny (about 500 m sized) asteroid was quite different from what we had in mind. We can say that we saw the building block of planets for the first time. In this presentation, we introduce what Hayabusa has done and what we have understood about Asteroid Itokawa.

THE VIRTUAL SOLAR OBSERVATORY

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Abstract: The recent explosion of data quantity and complexity has lead to the need for a new way to make data available, the virtual observatory. The Virtual Solar Observatory (YSO) provides a versatile means for solar physicists to discover and share the growing sources of data. We present the development of the VSO, show the system in action and discuss how data users and data providers can benefit from it.

IHY ASIA/PACIFIC REGIONAL PLANNING

K. Yumoto^{1&2} and STPP Sub-Committee²

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²The International Subgroup of the Earth and Planetary Science Committee, SCJ

Abstract: The IHY is an extensive international programme to study the universal physical processes in the heliospace for a better understanding of the Sun-heliosphere system. Three global observations (MAGDAS, Muon Detector, IPS) contribute to IHY Science and Instrument development. Public Outreach is carried out through the Network of International Space Environment Services of NICT. IGY Gold Club members are nominated from Japan. This summer (June of 2007) Japan is hosting an UN/ESA/NASA Workshop on Basic Space Science and IHY 2007 in Tokyo. IHY Asia/Pacific parties expressed their strong interest in multilateral cooperation within the framework of IHY.

PRELIMINARY RESULTS OBTAINED FROM MAGDAS PROJECT

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Abstract: The Space Environment Research Center (SERC), Kyushu University will install the MAGnetic Data Acquisition System (MAGDAS) at 50 stations in the Circum-pacific Magnetometer Network (CPMN) region, and several FM-CW radars along the 210° magnetic meridian. The MAGDAS project has the potential to contribute greatly to IHY (International Heliophysical Year) by supporting ground-based magnetometer array for worldwide studies, and by demonstrating the beauty, importance, and relevance of space science to the world. Nearly 20 and to MAGDAS units were installed in collaborations with 30 organizations in the world, respectively, along the 210° magnetic meridian in 2005 and along the magnetic dip equator in 2006. In the year 2007, 20 MAGDAS units will be deployed in places such as South Africa, India, Italy, Mexico, Alaska, Siberia, and Antarctica. The goal of MAGDAS is to become the most comprehensive ground-based monitoring system of the earth's magnetic field. It does not compete with space-based observation. Rather, this ground-based network complements observation from space. To properly study solar-terrestrial events, data from both are required.

MAGDAS/CPMN are roughly divided into two portions. MAGDAS-A system is a new magnetometer system installed at the CPMN stations, while MAGDAS-B is data acquisition and monitoring system installed at SERC. The new magnetometer system consists of 3-axial ring-core sensors, tilt-meters and thermometer in sensor unit, fluxgate-type magnetometer, data logging/transferring units, and power unit. The total weight of the MAGDAS-A is less than 15 kg. The data transferring unit transfers the 1-sec averaged data ($H+\delta H$, $D+\delta D$, $Z+\delta Z$, $F+\delta F$) in real time from the overseas stations to the SERC, Japan, by using three possible ways: Internet, Telephone line or Satellite phone line.

By analyzing these new MAGDAS data, we can perform a real-time monitoring and modeling of the global 3-dimensional current system and the ambient plasma mass density for understanding the electromagnetic and plasma environment changes in geospace during helio-magnetospheric storms. In this paper, we will present preliminary results obtained from the MAGDAS project as follows;

(1) In order to understand couplings of the solar wind-magnetosphere-ionosphere-atmosphere system, we compared long-term spectrum peaks of solar wind parameters, geomagnetic indices, and MAGDAS data. Subtracted H component data ($H(\text{DAV})-D_{st}$) near the equatorial Davao station showed 7.5, and 14.5 day period, which are not involved with any long-term spectrum components of the geomagnetic indices and solar wind parameters. The spectrum peaks mean that there is a strong neutral wind-plasma interaction in the atmosphere-ionosphere.

(2) By using the equatorial Pi 2 pulsations observed at the world-widely separated stations near the dip equator at ILR (Dip Lat = -2.95, M. LONG = 76.80), AAB (0.56, 110.47), CEB (2.73, 195.06), ANC (0.72, 354.33), EUS(-7.00, 34.21), we found the following wave characteristics; Pi 2 pulsations observed near the dip equator show an amplitude enhancement around each 10:00-13:00 local time. The closer the observation site is to the dip equator, the Pi 2 amplitudes tend to become larger. The Pi 2 amplitudes tend to become larger as the ambient total field intensity at the stations gets lower.

(3) From analysis of SC associated electric fields observed by FM-CW radar at Sasaguri, we found that the intensity of ionospheric electric field is stronger in nighttime than in daytime. This result can be explained by the superimposed effect of the polarelectric field and the westward electric field of compressional hydromagnetic (HM) wave, which were caused simultaneously by the interplanetary shock.