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KHWARIZMI
SCIENCE SOCIETY



THE UNIVERSE
YOURS TO DISCOVER

INTERNATIONAL YEAR OF
ASTRONOMY
2009

KSS Celebrates the International Year of Astronomy

(1) Motivation

Our planet – the earth - is a minuscule part of the known cosmos. In terms of space and time, we don't hold any special place. The earth is just one of many planets in a galaxy called the Milky Way, an un-assuming presence in the hundreds of billions of galaxies that stretch far beyond our every-day imagination. On the scale of time, we are also a peck of dust. With only a short span of human presence on this planet, we carry the burden of about 14 billions years of cosmic legacy on our, but feeble shoulders. But we carry it well.

Despite a realization of our physical nothingness, modern science and the astounding gamut of remarkable technological tools have both provided us the means to probe into the hearts of this wondrous and intriguing universe.

The year 2009 is being marked as the **International Year of Astronomy**. With the support of international and national agencies, many countries are preparing for this mega celebration of a human understanding of the heavens! This year will commemorate the impact of astronomy and science on human life. It will help us understand the planet we tread and the forces of nature that shape our collective culture, civilization, thoughts and history.

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In Pakistan, the *Khwarizmi Science Society* (KSS) is also gearing up to be a part of this cosmic saga. We hope that through its public outreach, the KSS can excite young minds, children and teenagers into undertaking careers in science, technology, engineering and medicine (**STEM**). It will help our citizens understand the role of STEM related subjects in their daily lives. The year-long activities will, hopefully, place the national consciousness into a global context, that we all share a common heritage. This over-arching canvas that holds within its folds, the clouds, the stars, the myriad constellations, the wandering planets, the suns and the vast expanse of nothingness, connects us across many ages and many different cultures, races and geographies. We realize that we are part of one whole. And we can transcend the artificial distinctions of race and color.

Join us in 2009 to celebrate the international year of Astronomy!

(2) Planned activities

2.1 Astronomical observation

The **KSS** is in the process of acquiring funds for the purchasing of a **Celestron CPC1100 GPS** telescope with an **Astrovid Stellacam2** Video Camera. This telescope is a real masterpiece and from one of the best company (Celestron) known for its high standards. This will be an advanced system with a very easy to align facility (uses built-in GPS receiver) and can be ready for observation in 5 minutes by a regular user. Even in a light polluted sky, an eyepiece can offer great views; but the most impressive thing would be our **live video views** of galaxies, star clusters, nebulae and solar system objects straight from the Astrovid Cam. We can project it on a big screen for public gatherings. The lunar and planetary views promise to be absolutely magnificent.

Equipped with this basic facility, we will arrange “**Meet the Stars**” and “**Meet the Sun**” sessions in public locations such as parks and open, scenic spaces in suburban localities. We will offer:

Spectacular views of our moon (craters of all sizes, lunar mountains and their shadows, frozen seas of lava); Saturn with its awe-inspiring rings; Storms in the atmosphere of Jupiter with its Galilean Moons; Surface features of the red planet (Mars) with its Polar Ice Cap; Ever changing phases of Venus and Mercury; Dozens of Clusters of a million stars; Cloudy nebulae where new stars and solar systems are being born; Galaxies, and Island Universes having billions of stars.



(Image taken by the KSS's resident astronomer – Umair Asim in his personal observatory in Lahore)

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2.2 Out-door activities

Collaborating with local amateur astronomy groups for organizing Star Parties in schools, colleges and universities; excursion to Trip to Baghaan Wali, Pind Dadan Khan, Jhelum District at the site of the ruins of Al-Beruni's observatory



(Al-Beruni's observatory in Baghaan Wali – photograph by KSS)

2.3 Telescope sharing and rental

Plans are underway to purchase two telescopes for rental. Interested users will be asked to acquire Membership of the KSS and will be able to rent out these scopes at nominal costs. Preference will be given to group rentals such as school or college classes. Basic training will be given to those who would want to learn the operation of these scopes. One of these telescopes is a 4 inch refractor **Celestron C102 mm** and the other is a computerized **SkyQuest XT6 Intelliscope, 6" Dobsonian** with GOTO capability.

2.3 Workshops and Public Lectures

Throughout the year, the KSS will arrange workshops and public lectures in different parts of the country. The titles of the Public Lectures will be provided later, whereas the workshops will focus on: Identifying constellations and planets in the sky without any equipment; binocular astronomy; Observational Astronomy with small telescopes; astronomy on the Internet; workshop on how to use the virtual observatory (<http://www.us-vo.org/>)



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The distinguished guest speakers and instructors who have confirmed their participation include:

1. Dr. **Salman Hameed** (Hampshire College, United States)
2. Dr. **Pervez Hoodbhoy** (Quaid-e-Azam University, United States)
3. Dr. **Shaukat Goderya** (Tarleton State University, United States)
4. Dr. **Asghar Qadir** (CAMP, NUST, Rawalpindi)
5. Dr. **Amer Iqbal** (University of Washington, United States)
6. **Umair Asim** (Farooqi Girls High School, Lahore).

2.4 The KSS Challenge on radio-Astronomy

As part of its activities for the international year of astronomy 2009, KSS is planning to organize a competition on building radio telescopes. This will not only grasp the attention of electronics hobbyists and students of science and engineering in Pakistan, but also create a wider awareness about the core concepts of electrical engineering and astronomy.

2.4.1 What is Radio Astronomy?

Traditional astronomy is based on the observation of celestial objects by optical methods. In the middle of the 20th century it was discovered that in addition to light, most astronomical objects also emit radio waves, revealing significantly more detail about these objects. Radio telescopes are basically sensitive radio receivers coupled with large directional antennas pointed towards the sky. Elementary results in radio astronomy are achievable using very little or no expertise in radio technology or astronomy.

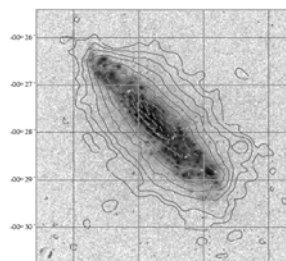


2.4.2. Problem Statement

KSS poses the following challenge: ***Build a radio telescope and then demonstrate its effectiveness by detecting and correctly identifying various astronomical objects.*** A team or person that demonstrates the highest capability in conceiving the required equipment and in reliably detecting the faintest astronomical objects will be declared as the winner.

2.4.3. Announcement and Literature

The format and rules of the competition will be announced in Fall 2008. At the same time, KSS will publish some literature on how to setup a very basic radio telescope and get elementary results. As part of our commitment to reach out to the widest audience in the country, KSS will also



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write a companion guideline in Urdu. This will catch the attention of the large electronics hobbyist communities in Lahore, Karachi and other places.

2.4.4. Format

The competition will take place in 2 or 3 rounds, the first round (of early elimination) in summer and the final in late fall 2009. This will give the participants ample opportunity to work on their projects in summer. Every one in the country will be eligible to participate. We expect the main participation from students in

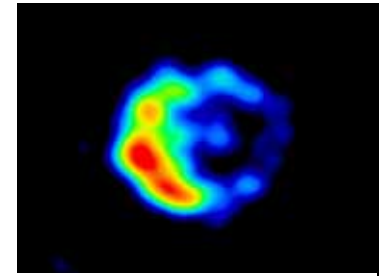
schools, polytechnic institutes and universities; electronics-hobbyists and amateur astronomers.

2.4.5. Organization

KSS will seek the assistance from various experts and institutes to host this event. In addition to KSS volunteers, the society seeks the assistance of experts in engineering and astronomy, both from academia and industry in planning the details of the competition, to act as mentors to teams and to aid in judging the submissions for the competition.

2.4.6. Wider Objectives

By organizing this truly multi-disciplinary competition, KSS wishes to highlight the symbiotic relationship between fundamental science and cutting-edge technology. The participants will soon realize that their discovery of galaxies, meteors and plants will only be enabled by a sound engineering of low-noise amplifiers, directional antennas, motion control and signal processing. It will also highlight the talent in our country and create the spirit of scientific discovery. Finally, it will enable collaboration and cross-fertilization of ideas among students and experts of various disciplines.



RS Ophiuchi observations with the Very Long Baseline Array of radio telescopes. (Credit: NRAO/AUI/NSF)

(3) Sponsorship Opportunities for the IYA 2009

The year-long activities require financial and administrative commitment. We invite sponsorship, donations and collaborations from universities, colleges, schools, national research organizations, and renowned companies that share with us in our educational and social mission.

The total, approximate costs for the year-wide activities are Rs. 1,000,000 (Pak. Rupees 1 million). A detailed break-up of projected costs can be provided on request.

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