

Announcement of short course on **SPACE WEATHER**

Course Duration
9th May to 8th June
2016

To be held at



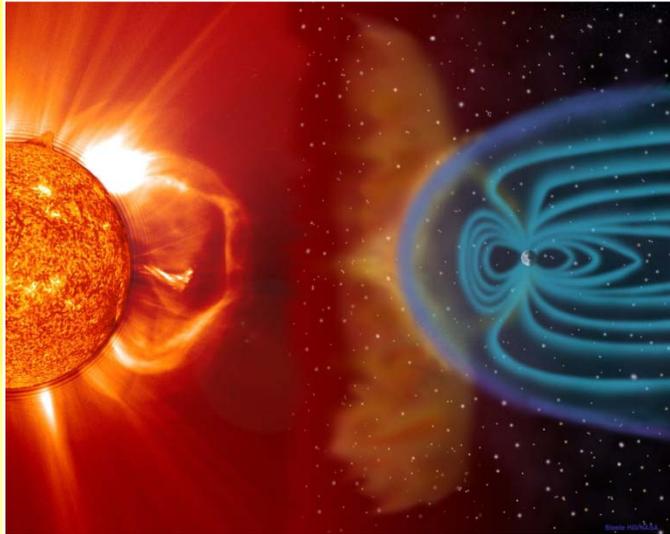
Physical Research Laboratory
Ahmedabad, INDIA



Organized by
Centre for Space Science and
Technology Education in Asia and
Pacific (CSSTEAP)
(Affiliated to the United Nations)

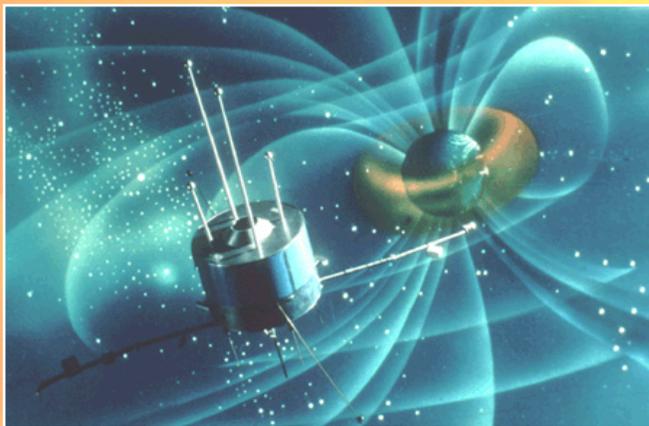
Introduction

Space weather is a branch of Physics and Aeronomy. It plays a very important role in life on the earth including humans. It affects almost all aspects of modern society. With this view in mind, the Centre for Space Science and Technology Education in Asia and Pacific region (CSSTEAP) announces to organize a short course on "Space Weather" to be held at Physical Research Laboratory, Ahmedabad for the participants from Asia-Pacific region. This includes time varying conditions on the Sun e.g., solar flares, filament eruptions, coronal mass ejections, massive energy and mass flow through interplanetary medium and their effects on the entire Solar System etc. The effects of solar radiation particles are more profound on inner planets. The space surrounding the Earth undergoes drastic changes: magnetosphere, ionosphere and thermosphere suffer large-scale changes. Today there are space vehicles and space missions stationed and/or passing through the interplanetary space. Some of these may be manned. The solar wind and radiation affect human health in space. These solar energetic events can cause disruption of electronics and communications systems onboard and also those on Earth. Global Positioning System receivers and cell phones react to some solar emissions, degrading service during such events. A clear understanding of the Space weather has become a necessity for modern civilization.



Objectives

The proposed short course on "Space Weather" will describe the solar sources of space weather disturbances, i.e., solar flares, coronal mass ejections, solar energetic particle, and their effect on near-Earth's environment and thus possible disruptions to satellites, communication systems and human life etc.



Satellite orbiting Earth inside the Magnetosphere

This short-course is intended to benefit professionals who have been working in areas of atmospheric science, satellite systems for communication, navigation and entertainment, high-flying airliners, pipe line transportation of petroleum products and national power grids. These are a few of the high-tech systems affected by space weather phenomena. Local and national

planners, as well as system designers must account for the possible disruptions and interference caused by electromagnetic waves and charged particles spewing from our Sun and arriving from deep space daily.

Eligibility for admission

The prospective participants should possess a Masters Degree in Physics or other equivalent qualification relevant to Space and Atmospheric Science, OR Bachelor's Degree in Engineering, (B.E./ B. Tech.) in Electronics and allied fields / Environmental Science/Engineering. Candidates having teaching or research experience would be preferred. Candidates possessing higher qualifications viz. a Ph. D., would also be eligible for admission.

LANGUAGE

The Medium of instructions is English. Proficiency in written and spoken English is most essential. Candidates who are not proficient in English are advised not to apply. Applicants who have done their higher studies in a medium (language) other than English, are required to submit TOEFL score or a diploma/certificate of English Language issued by an accredited language institution or by the local UNDP for satisfactory proof of the applicant's competence in spoken and written English language. Preference will be given to those who secure high score in TOEFL examination. **Nominating agencies are requested to ensure this.**

Course Structure

The proposed short-course will consist of five academic sessions mentored by experts in respective research fields. Following five topics will be covered in this course:

1. **Primary Solar sources of space weather:** structure of Sun, processes on Sun and its atmosphere, sunspots, solar activity, origin of energetic events, solar flares, coronal mass ejections, short and long time scale change in solar outputs.
2. **Propagation of the electromagnetic and charged particles:** EMR interaction in the interplanetary space.
3. **Dynamics of Earth's magnetosphere, ionosphere and thermosphere:** interaction with solar radiation and particles, and consequences on civilization.
4. **Short and long term consequences** of Sun's activity on other planetary systems.
5. **Now-cast and forecast** of space weather events.

Hands-on activity

In addition to the above theory sessions, the course would be having hands-on experiments in the form of 8 practical sessions as follows:

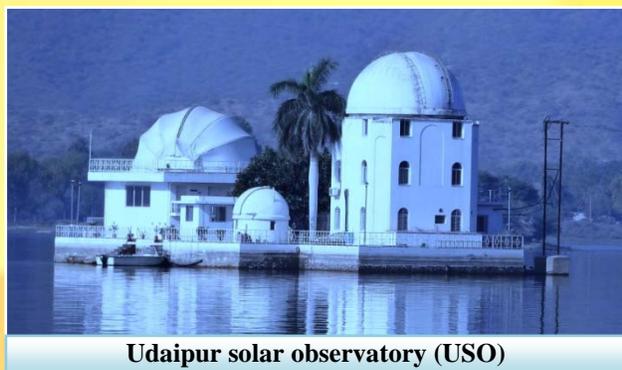
1. Study of solar eruptive events
2. Measurements of sunspots; number, area and rotation
3. Propagation of solar wind in interplanetary space and its variation
4. Measurement of interplanetary magnetic field
5. Measurement of geomagnetic field
6. Radio sounding of ionosphere
7. Measurements of TEC and scintillation using GPS
8. Study of optical signatures of space weather events

Duration

A period of one month from **9th May to 8th June, 2016.**

Course implementation

There would be a session on the modeling of space weather events. This will also cover



Udaipur solar observatory (USO)

various data archives of space weather and related topics. During the course, the participants will visit Udaipur Solar Observatory (USO), Optical Aeronomy Laboratory at Guru Shikhar, Communication Labs at SAC, TOKOMAK at IPR and various labs of PRL. The students will use some of the high-end instruments and their data for practical

work. The course will be conducted in interactive mode in which participants

will play an active role in seminars, group discussions and assignments. The course is intended to be useful for teachers, science administrators and policy makers.

FELLOWSHIPS TO PARTICIPANTS FROM COUNTRIES OTHER THAN INDIA

The candidates are required to send their personal details/bio-data to the Course Director, PRL, Ahmedabad on the prescribed Application Form which can be downloaded from the website (www.cssteap.org). Candidates are expected to make their own arrangements for all expenses. Preference will be given to the candidates who are financially supported by their organizations. A limited number of fellowships covering to and fro international air travel, domestic air travel in India and living expenses (Rs 16,000 per four weeks) in India are available from the Government of India (GOI). However, preferences will be given to the fully self-sponsored candidates or sponsoring organization candidates bearing international to and fro travel.

HEALTH AND INSURANCE

Medical, Life and disability insurance should be undertaken before leaving their country for India by the participants themselves or on their behalf by their sponsoring institute/organization for covering entire health and disability risks. No medical expenses will be borne by the Centre. However, participants who receive the Fellowship of the GOI will be paid medical expenses for minor ailments on actual basis (as out patients only) as and when such expenses are incurred. The Centre will have limited

liabilities as far as medical expenses are concerned in such cases. Candidates in sound physical and mental health only need to apply.

APPLICATION PROCEDURE

Dully filled application form (downloaded from www.cssteap.org) need to be sent on the contact details given below. The application form along with education certificates need to be nominated and forwarded through CSSTEAP Governing Board member in your country (please see details on the website) or through Indian Embassy/High Commission in your country or Your Embassy/High Commission in India. For faster processing, the advance copy can be sent to us directly either by email (preferable) or by post.

About host institution (Physical Research Laboratory)

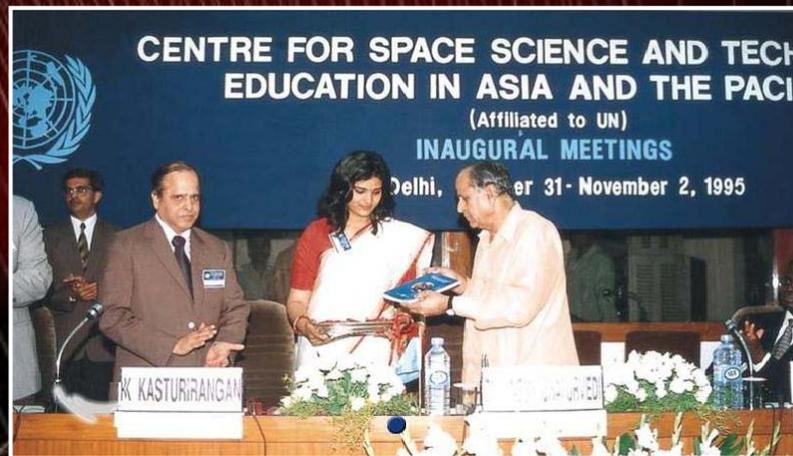
Physical Research Laboratory (PRL), founded in 1947 by Dr. Vikram Sarabhai, is a premier scientific institution under the Department of Space, Government of India. As is very well depicted in its logo, PRL research encompasses the earth, the Sun immersed in the fields and radiations reaching from and to infinity, all that man's curiosity and intellect can reveal. The research activities are multi-dimensional and cover Astronomy and Astrophysics, Solar Physics, Planetary Sciences and Exploration, Geosciences, Space and Atmospheric Sciences and Theoretical Physics. PRL has four campuses –the main campus is at Navarangpura, Ahmedabad and the others are at Thaltej, Ahmedabad, the Infra – Red Observatory at Gurushikhar, Mount Abu, and the Udaipur Solar Observatory at Udaipur.



PRL is contributing significantly to the scientific manpower development through Doctoral (Ph.D.) and Post-Doctoral programmes, Associateship Programme for university teachers, Summer Programme for M.Sc. students and college teachers and Project Training of Engineering, MCA and Diploma students. PRL alumni have played a key role in building and contributing to the development of other institutions in the country. The Indian Space Research Organization (ISRO) was nucleated in PRL in the early seventies. Two of the past Chairmen of ISRO - Professor U.R. Rao and Dr.K. Kasturirangan - are alumni of PRL. For further details you may visit PRL website: <http://www.prl.res.in>

About CSSTEAP (Affiliated to the United Nations) and its Activities

The Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP) was established in India in November 1995 with its headquarters in Dehradun and is considered as the Centre of Excellence by UN-OOSA. The 1st campus of the centre was established in Dehradun, India at Indian Institute of Remote Sensing (IIRS) which is a unit of Indian Space Research Organization (ISRO), Government of India. For conducting its Remote Sensing & GIS programmes the Centre has arrangements with IIRS as a host institution. The Centre has also arrangements with Space Applications Centre (SAC) Ahmedabad, playing as host-institution for programmes related to Satellite Communications, Satellite Meteorology and Global Climate, Global Navigation Satellite Systems, and Physical Research Laboratory (PRL) Ahmedabad for Space and Atmospheric Science.



The Centre has been imparting training and education, helping participants in developing research skills through its Master Degree, Post Graduate and Certificate programmes. This is achieved through rigorous class-room (theory and hands-on exercises), group discussions, field campaigns and pilot projects in the field of space science and technology. These programmes aim at capacity building for participating countries, in designing and implementing space-based research information and application programmes. The Centre also fosters continuing education to its alumni. About 1524 professionals from 34 countries within and outside the Asia-Pacific region have graduated so far from the Centre (<http://www.cssteap.org>).

IMPORTANT DATES

Last date of submission of application: **March 15, 2016**

Notification of admissions (website): By **March 20, 2016**

Contact details

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