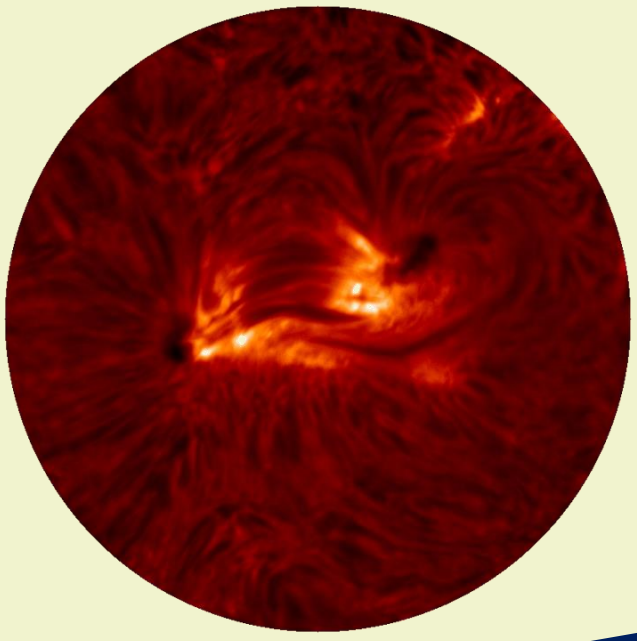
Announcement of
Short Course on Space Weather
November 14-27, 2019



Organised by

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

Conducted by

Physical Research Laboratory, Ahmedabad, India

Introduction

Space weather is a branch of Physics and Aeronomy. It includes time-varying conditions on the Sun (e.g., solar flares, filament eruptions and coronal mass ejections) due to which massive energy and mass flow through the interplanetary medium and affect the entire Solar System. This effect is more profound on the inner planets and can cause large-scale changes in the space surrounding the planet. In the case of Earth, spatio-temporal variations take place in the magnetosphere, ionosphere and thermosphere due to the adverse effects of space weather. Today there are space vehicles and space missions stationed and/or passing through both low-earth orbits and interplanetary space. Some of these may be manned. The solar wind and radiation not only affect human health in space but also can cause disruption of electronics on space-based and ground-based communications systems. Global Positioning System signals are affected by the plasma irregularities in the ionosphere generated due to space weather thereby degrading service during such events. Thus, space weather plays a very important role in life on Earth and affects almost all aspects of modern society. A clear understanding of space weather has become a necessity for modern civilization. With this view in mind, the Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP) announces to organize a short course on “Space Weather” to be held at Physical Research Laboratory, Ahmedabad for the participants from the Asia-Pacific region.

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 particles), and their effect on Near-Earth environment with possible disruptions to satellites, communication systems, and human life, etc.

This short course is intended to benefit professionals who have been working in areas of atmospheric science, space physics, satellite systems, satellite communication and navigation, high-flying airliners, pipeline 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 on Earth.

Eligibility for admission

The prospective participants should possess a Master’s degree in Physics/Astronomy/Astro-Physics/Solar Physics or other equivalent qualification relevant to Space and Atmospheric Sciences, 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.

Course Duration: November 14-27, 2019

Language

The medium of instruction 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 a high score in TOEFL examination. **Nominating agencies are requested to ensure this.**

Course Structure

The proposed short-course will consist of academic sessions mentored by experts in respective research fields. The following topics will be covered in 25 one-hour lectures:

1. **Overview of Space Weather *(2 hours)***

2. **Solar sources of space weather:** Structure of the Sun, processes on the Sun and its atmosphere, sunspots, solar activity, the origin of energetic events, solar flares, coronal mass ejections, short and long timescale change in solar outputs. ***(9 hours)***

3. **Propagation of the electromagnetic and charged particles through the heliosphere *(2 hours)***

4. **The response of Earth's magnetosphere, ionosphere and thermosphere to Space Weather:** Interaction with solar radiation and particles, and consequences on civilization. ***(9 hours)***

5. **Solar influence on middle atmospheric processes (*1 hour)***

6. **Effect of Space Weather on electronic and communications systems *(2 hours)***

Projects

In addition to the above theory sessions, the course would be having projects in the form of practical sessions on the following topics:

1. **Measurement of the speed of coronal mass ejection**
2. **Measurements of sunspots; number, area and rotation**
3. **Measurement of the geomagnetic field**
4. **Radio sounding of the ionosphere**
5. **Measurements of TEC and scintillation using GPS**
6. **Study of optical signatures of space weather events**

Course implementation

There would be a session on the modelling of space weather events. This will also cover various data archives of space weather and related topics. During the course, the participants

will visit Udaipur Solar Observatory (USO)[1], Optical Aeronomy Laboratory at Mt Abu, 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 the interactive mode in which the participants will play an active role in seminars, group discussions and assignments. The course is intended to be useful for teachers, science administrators, and policymakers.

Expected Benefits after Completion of the Course

After attending the course, the participants will gain a broad overview of the effect of solar radiation on the interplanetary medium and Near-Earth environment. They will get an awareness of how adverse space weather conditions affect radio communication and satellite systems and possible methods of prediction of such space weather conditions. The participants will also be involved with hands-on experiments to get an appreciation for the ways and means of studying space weather. The knowledge gained from this course will help the participants to address space weather issues in their home country.

Fellowships to Participants

Preference in selection will be given to those candidates whose expenses are borne by the candidate or his/her organization/nominating agency. All other selected candidates will be given return airfare (for International candidates) or return 2nd AC train fare (for Indian candidates) and a Government of India (GOI) fellowship of Rs 8000 to cover living expenses. CSSTEAP reserves the right to decide on the financial assistance matters.

Health Insurance

Medical, life and disability insurance should be undertaken before reaching India, by the participants themselves or on their behalf, by their sponsoring institute/organisation. No medical expenses will be borne by CSSTEAP. However, participants who receive the Fellowship of the GOI will be paid medical expenses for minor ailments on an actual basis (as outpatients only) as and when such expenses are incurred after recommendation by an authorised medical doctor of Physical Research Laboratory. CSSTEAP will have only limited liabilities as far as medical expenses are concerned. Candidates must clearly specify if they are suffering from any health disorders which may affect their study programmes. Candidates in sound physical and mental health only need to apply.

Application Procedure

The application form is attached at the end of this document. It can also be downloaded from www.cssteap.org or www.prl.res.in. The duly filled and signed application form should be endorsed by the applicant's organization/recommending agency and sent to us at the contact details given below. For applicants from outside India, the duly filled, signed and endorsed application form should be forwarded to us through the Governing Board member of the applicant's country (contact details are given in the link www.cssteap.org/governing-board), or through the Indian Embassy/High Commission in the applicant's country, or through the Embassy/High Commission of the applicant's country in India. For faster processing, an advance copy can be sent to us directly either by email (preferable) or by post.

[1] The high-resolution image of sunspots, shown on the front page, has been captured by the Multi-Application Solar Telescope (MAST) at Udaipur Solar Observatory (USO) of Physical Research Laboratory.

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

APPLICATION FORM FOR SHORT COURSE ON SPACE WEATHER

Duration: November 14-27, 2019
Venue: Physical Research Laboratory, Ahmedabad, India
Last date for receipt of application: August 30, 2019

AFFIX PASSPORT SIZE PHOTOGRAPH HERE

(For office use only)
Application No.....
Date Received.....

Important:
All the correspondence from CSSTEAP (issue of admission letter, e-tickets for travel, enquiries, etc) with the applicants will be by E-mail and sometimes by phone (Home/ Office). Therefore, kindly ensure that email-id, phone, fax, etc, are correctly and clearly mentioned.

(PLEASE TYPE OR USE BLOCK CAPITALS)
(Name: (As mentioned in the passport)

Dr./Mr./Ms./ ----------

First Middle Last

2. Father's Name---------- **3. Name of mother/husband/wife----------**

4. Date of Birth (DD/MM/YYYY)---------- **5. Place of Birth----------**

6. Gender (Male/Female) ---------- **7. Nationality----------**

8. Contact Information: Present official Address (Valid until date----------)

Contact number (Please give complete Phone no. with country and city codes)

Office (Tel) ---------- **Office (Fax) ----------**

Mobile: ---------- **E-mail----------**

Important

1. **Interested persons may detach last 4 pages from this brochure and use them as Application Form.**
2. **It is essential that full passport details are mentioned in the Application Form. Application Forms without passport details may not be considered.**
3. **Providing alternate email-id, and the phone number would ensure timely communication with applicants, especially during urgency/emergency.**
4. **For faster communication with the applicants, CSSTEAP Secretariat will be using your email-id for all purposes (e.g. Admission letter, air tickets and logistic arrangements).**

9. Your permanent home address in your country/ contact details ----------

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➢Contact number (Please give complete phone no. with country, city codes)
Home (Tel):): ----------Home (Fax):): ----------

Email (alternate preferably Gmail or Yahoo):): ----------

10. Nearest International airport (Specify the place/city): ----------

11. Academic Qualifications (mandatory)*

Degrees(Bachelor /Master) /Diploma	Duration of Course(mention from which year to year)	University/ Institution	Year of passing	Grade/ percentage	Major Subjects/ specialization

***(Enclose copies of Degree/Diploma/Certificates/marks/grades obtained etc. and their certified transcription in English)**

➢Major Subjects in the Last Examination:----------.➢Area of Specialization:----------

➢Medium of instruction/language: ---------- ➢TOEFL Score (Proficiency in English): ----------

Proficiency in English (please tick the option)
Reading: Fair/Good/Very Good
Writing: Fair/Good/Very Good
Spoken: Fair/Good/Very Good

Enclose certified copies of marks/grades of degree, diploma, TOEFL (validity period), etc certificates and their certified translations in English).

12. DETAILS OF EXPERIENCE AND EMPLOYMENT
➢Present Position/ Designation: : ---------- ➢Present Responsibilities: : ----------

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➢Organization and complete Address: ----------

➢Date of Joining this Organization (dd/mm/yyyy): ----------
*** If necessary, attach additional sheets giving details of your technical activity during last one year.**
➢Research or working Experience:

Name of Organization (s)	Position(s)/ Post (s) held	Nature of work done	Duration

13. (a) Activities & Projects in which your present organization is engaged (mandatory) and nature of work done or will be done

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13. (b) Main technical/scientific facilities available in your organization *(including approximate number and type of computers, type of software available etc.)

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14. Have you done any other course from CSSTEAP (If yes, please give details including theme and year):

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15. How this Course will help you in your work/organization? Please describe below.

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16. DETAILS OF PASSPORT: Please provide valid passport details below and if not holding a valid passport, please forward a copy of the passport whenever available.

Passport Number	Place of Issue (City and Country)	Date of issue	Passport valid up to	Issuing Authority	Whether previously visited India if so place and date of the last visit

17. Physical Fitness:

(a) Are you suffering from any recurring/chronic/serious communicable disease which may affect your study program in India?

(b) If yes, please specify nature of the illness (Candidates are advised to attach medical fitness certificate from a government hospital or government recognized hospital on hospital letterhead for HIV, yellow fever, complete blood test, urine test, blood group, migraine, dental infection, for T.B. chest X-ray, etc.)

(c) If necessary, the candidate may be asked to undergo necessary medical tests on arrival, and if found medically unfit then he/she will be asked to return to his/her country and the cost of travel will have to be paid either by the recommending/nominating organization or by the candidate.

18. How do you propose to meet international travel & stay expenses in India? (Preference will be given to those who will make their own travel arrangement)

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19. Declaration by the candidate

I have read the Announcement brochure and will abide by the rules and regulations of the Centre. I have made/am making/have not made travel arrangements for attending the Course, and for local expenses for the period of stay in India.

Date:

Place: **Signature of the candidate**

20. RECOMMENDING/ NOMINATING AGENCY CERTIFICATE

Mr;/Ms---------- working in this organization is recommended/nominated by----------(Ministry/ Department) to attend the Short Course on Space Weather, to be held at Physical Research Laboratory, Ahmedabad, India during November 14-27, 2019. We envisage utilizing his/her experience in specific tasks of our organization/agency.

(a) He/She will be / will not be provided international travel support.	☐ **Mandatory: Please tick the appropriate**
(b) He/She will be/will not be provided financial assistance for the period of stay in India.	☐
(c) He/She possesses adequate knowledge of English Language required by the course	☐

Date:---------- **Signature:**

Place:---------- **Name in Capital Letters:**
Designation:
Phone /Fax No:
E-mail:

(Official seal of the recommending/nominating authority including CSSTEAP GB member)
Note: Application without the official seal of sponsoring or nominating authority and their details will not be considered

(21) (*Not applicable to Indian citizens*) FORWARDING NOTE EITHER BY THE RESPECTIVE INDIAN EMBASSY/HIGH COMMISSION IN YOUR COUNTRY OR YOUR EMBASSY/HIGH COMMISSION IN INDIA

This is to forward the application of Mr./Ms----------of ---------- (specify the country name here) for the Short Course on Space Weather, to be held at Physical Research Laboratory, Ahmedabad, India during November 14-27, 2019.

Date---------- **Signature:**

Place---------- **Name:**
Designation:
Phone/Fax No:
E-mail:

(Official Seal of the Embassy/High Commission of India)

N.B. Please send an advance copy of the application form duly signed by the nominating or sponsoring agency to *Prof. J. Banerji, Course Director, Space and Atmospheric Science, Room # 762, Physical Research Laboratory, Navrangpura, Ahmedabad 380 009, India by post, or fax* (+91-79-2631-4900) or via email (uncsc@prl.res.in or jay@prl.res.in) for quick processing. Original copy to be sent through Indian Embassy/High Commission of your country after being duly signed by the recommending or nominating authority.

IMPORTANT

- **The Application which is not complete in all respects is likely to be rejected.**
- **Candidates must attach copies of certificates of:**
  - ✓ **Medical fitness to attend the course including Chest X-ray (PA), Blood Test (including Random Blood Sugar, HIV, HBs, Ag), Urine complete (in case any medical information requiring attention is hidden and if found during the course, the centre will be compelled to send the candidate back home.**
  - ✓ **Highest degree obtained (Degree certificate and marks sheet/grade card)**
  - ✓ **Proof of Proficiency in English or certificate by the nominating agency needs to be provided.**
  - ✓ **All Degree Certificates, if not in English, may please be translated in English and attested by the Head of the organization or transcript in English can also be submitted.**

- **Expectant mothers are advised not to apply for the course.**
- **Smoking and consuming alcoholic drinks in classroom and office campus is prohibited.**

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.

The Centre has been imparting education and training, helping participants in developing research skills through its Master's degree and Post Graduate courses. This is achieved through rigorous classroom (theory and hands-on exercises) sessions, group discussions, field campaigns and pilot projects in the field of space science and technology. These programs aim at capacity building for participating countries in designing and implementing space-based research and application programs. The Centre organizes Post Graduate (P. G.) diploma course of 9-month duration in the following disciplines:

- Remote Sensing and Geographic Information System (RS and GIS) at Indian Institute of Remote Sensing (IIRS), Dehradun;
- Satellite Communications (SATCOM), Global Navigation Satellite System (GNSS), and Satellite Meteorology and Global Climate (SATMET) at Space Applications Centre (SAC), Ahmedabad;
- Space and Atmospheric Science (SAS) at Physical Research Laboratory (PRL), Ahmedabad.

Successful participants also get an opportunity to pursue a Master's programme for a Master of Technology (M. Tech.) degree from Andhra University, Visakhapatnam, India.

Besides P.G. level courses, CSSTEAP also conducts short term courses of two to four weeks duration in specific themes of above subjects regularly. For further details, please visit www.cssteap.org.

About host institution (Physical Research Laboratory)

Physical Research Laboratory (PRL), founded in 1947 by Dr. Vikram A. 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, Geosciences, Atomic, Molecular and Optical Physics, 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 Internship Programme for M.Sc. students and college teachers and Project Training for 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, please visit PRL website www.prl.res.in.

Important dates

Course Duration: November 14-27, 2019

Last Date for Receipt of Applications: August 30, 2019

Information of Selection: September 15, 2019

An advance copy should be forwarded to the following address by post, fax or email for advance action and follow-up at this end:

Prof. J. Banerji
Course Director, Space and Atmospheric Science
Room # 762, Physical Research Laboratory, Navrangpura, Ahmedabad 380 009, INDIA
Telephone # +91-79-2631-4762, Mobile # +91-8141026595, Fax # +91-79-2631-4900

Email: uncsc@prl.res.in, jay@prl.res.in

For any further query, please contact us at the above address.