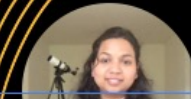


SUNRISE

GROUND RADIO LAB

Partnership Between



Dr. Shirsh Lata Soni
Researcher,
Dept of Climate and Space Science
University of Michigan, USA



SunRISE
Sun Radio Interferometer
Space Experiment

RADIO JOVE 20

sunrise.umich.edu

radiojove.gsfc.nasa.gov

Contributors: Soni, S.L.; Higgins, C.; Akhavan-Tafti, M.; Fung, S.

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Please share Radio jove funding

Solar Radio Burst Analysis: Exploring the Mysteries of the Sun

Training Module 3.3

Future Directions and Collaborative Efforts



Chuck: How to get two hour CSV file?

PREREQUISITES FOR TRAINING MODULES...

- **Basic High school science**
- **High School reading Comprehension**
- **Electromagnetic wave Spectrum**
- **Graphical interpretation of data**
- **Training Module 0**
- **Training Module 1**
- **Training Module 2**



OUTLINE...

- **Advanced Research Methods and Data Analysis Techniques**
- **Future and Existing missions and instruments for comprehensive space weather monitoring**
- **Encouraging data sharing and collaborative analysis**
- **Challenges and open questions in understanding the correlation**



Future and existing missions, NOAA, Aditya L1, SOHO, WIND-WAVES/ STEREO radio

Advance Research Approaches and Data Analysis Techniques

To obtain a comprehensive view of the emission processes and their connections with other solar phenomena.

To analyze the properties of radio bursts, such as their

- Frequency,
- Polarization,
- Temporal evolution,
- Spatial distribution,
- Signal intensity calibration
- Radiowave propagation through Ionosphere
- Combining observations from multiple instruments and wavelengths

Comparing the observed properties with theoretical models and simulations allows researchers to constrain and refine their understanding of the emission mechanisms involved.



Observational data plays a crucial role in investigating the emission mechanisms of solar radio bursts. Scientists analyze the properties of radio bursts, such as their frequency, polarization, temporal evolution, and spatial distribution, to identify patterns and characteristics that provide insights into the underlying emission mechanisms. Comparing the observed properties with theoretical models and simulations allows researchers to constrain and refine their understanding of the emission mechanisms involved.

Advanced observational techniques and instruments, including radio spectrometers, imaging systems, and multi-wavelength observations, provide valuable data for detailed analysis. By combining observations from multiple instruments and wavelengths, researchers can obtain a comprehensive view of the emission processes and their connections with other solar phenomena.

Future & Existing missions and instruments for comprehensive space weather monitoring

Radio bursts -----> Solar events

Advanced instruments: radio spectrometers, imagers, and high-energy particle detectors etc.

High-resolution and multi-wavelength observations: studies of the initiation, evolution, and properties of solar eruptions.

Space-based missions and observatories focused on solar physics and space weather provide opportunities for long-term monitoring and continuous data acquisition.



SOHO



WIND



STEREO



SDO



Solar Orbiter



PSP



ADITYA-L1
Aditya L1

<https://cdaweb.gsfc.nasa.gov/>



Future space missions and advanced instruments play a crucial role in advancing our understanding of the correlation between radio bursts and solar events. These missions can provide high-resolution and multi-wavelength observations, allowing for detailed studies of the initiation, evolution, and properties of solar eruptions. Advanced instruments, such as radio spectrometers, imagers, and high-energy particle detectors, enhance our capabilities for detecting and characterizing radio bursts associated with solar events. Additionally, dedicated space-based missions and observatories focused on solar physics and space weather provide opportunities for long-term monitoring and continuous data acquisition.

Encouraging data sharing and collaborative analysis

1...

By sharing observational data, models, and analysis techniques, researchers can validate and compare their findings, fostering a more robust and comprehensive understanding of the phenomena.

2...

International collaborations, data repositories, and open-access initiatives contribute to the accessibility and availability of data, facilitating collaborative efforts and accelerating scientific advancements in the field.

3...

Encouraging data sharing and collaborative analysis also enables the development of consistent and standardized methodologies, ensuring the reliability and reproducibility of research outcomes.



Communicate your observations and results to seminars/ workshops/ science clubs etc. presentations, publications

Challenges and Open Questions:

1. **Understanding the detailed physical processes responsible for the generation of radio bursts.**
2. **Deciphering the mechanisms behind the timing and spatial relationship between radio bursts and solar events.**
3. **Unraveling the complex interplay between magnetic fields, plasma dynamics, and particle acceleration in solar eruptions.**
4. **Understanding the Radio-wave propagation impact on Earth Ionosphere and Atmosphere.**
5. **Future research should address these challenges through advanced observations, data analysis techniques, and theoretical modeling.**
6. **Improving Space -weather forecasting using Radio observation.**



Despite significant progress in studying the correlation between radio bursts and solar events, several challenges and open questions remain. These include understanding the detailed physical processes responsible for the generation of radio bursts, deciphering the mechanisms behind the timing and spatial relationship between radio bursts and solar events, and unraveling the complex interplay between magnetic fields, plasma dynamics, and particle acceleration in solar eruptions. Future research should address these challenges through advanced observations, data analysis techniques, and theoretical modeling.

Let's embark on an illuminating journey together!

Thanks for attention!



Logos for : Youtube, facebook, Instagram, LinkedIn, PDF, Twitter*, SunRISE website, Radiojove website