



**HBNI**

## **Alumni Webinar**

**Thursday,  
25 June 2026  
at 17:00 hrs**

### **Venue:**

**Conference Hall ,  
First Floor, Training  
School Hostel,  
Anushaktinagar,  
Mumbai**

### **Link of : -**

#### **YouTube:**

[https://youtube.com/  
live/u8l1bWkTcB8](https://youtube.com/live/u8l1bWkTcB8)

#### **Webex :**

[https://hbni.webex.co  
m/hbni/j.php?MTID=  
mfca68ad999a375d8a  
845d2efe251cb85](https://hbni.webex.com/hbni/j.php?MTID=mfca68ad999a375d8a845d2efe251cb85)

## **Swaroop Chandra**

**Postdoctoral Scholar Research Associate,  
Division of Geological and Planetary Sciences,  
California Institute of Technology,  
Pasadena, CA**



### ■ **"The Science of Look-and-Tell: Infrared spectroscopy in chemical physics and planetary science"**

Dr. Swaroop Chandra was born and raised in the DAE township at Kalpakkam. He completed his integrated M.Sc. in Chemistry from Amrita Vishwa Vidyapeetham, Coimbatore, in 2018 and joined IGCAR, Kalpakkam, as a Junior Research Fellow the same year. He pursued his Ph.D. at Homi Bhabha National Institute (HBNI) under the guidance of Dr. N. Ramanathan and Dr. K. Sundararajan, where his research combined matrix isolation infrared spectroscopy and quantum chemical calculations to investigate pnictogen bonding, a class of non-covalent interactions analogous to hydrogen bonding.

Following the completion of his Ph.D. in 2023, Dr. Chandra joined the research group of Prof. Michael E. Brown at the California Institute of Technology (Caltech), USA. His current research focuses on planetary ice chemistry, employing ultraviolet, visible, and infrared spectroscopy to study frozen volatile and inorganic salt systems under conditions simulating icy bodies in the outer Solar System.

### ■ **Abstract**

Infrared spectroscopy is a versatile analytical tool with applications ranging from molecular chemistry to planetary science. This talk illustrates how the same spectroscopic techniques can address two seemingly distinct scientific challenges.

The first part focuses on matrix isolation infrared spectroscopy, a powerful method for investigating non-covalent interactions, such as hydrogen and pnictogen bonds. By combining high-resolution infrared spectroscopy with quantum chemical calculations, subtle changes in molecular bonding can be identified and interpreted, providing fundamental insights into molecular structure and intermolecular interactions.

The second part highlights the application of infrared spectroscopy in planetary science, where laboratory experiments simulate the extreme conditions of icy bodies in the outer Solar System. These studies generate reference data that aid the interpretation of optical and infrared observations from planetary missions, improving our understanding of the chemistry and evolution of extraterrestrial surfaces.

The talk will present selected results from the Planetary Ice Chemistry Laboratory at Caltech, demonstrating how laboratory spectroscopy bridges the fields of chemical physics and planetary science.

**All are cordially invited for in person attendance**