



## IMS - IITM - IMD NATIONAL SEMINAR

Title of the talk : **TWO TYPES OF CRITICAL TRANSITIONS TO MONSOON**

- **Venue : Meghdoot Auditorium, IITM, Pashan Road, Pune - 411008**
- **Date : 17th Jan 2023**
- **Time : 4.00 pm**



### **Prof. Dr. Sc. Elena Surovyatkina**

Potsdam Institute for Climate Impact Research (PIK), Potsdam, Germany

Space Research Institute of Russian Academy of Sciences (IKI), Moscow, Russia

#### **About the Speaker :**

Elena Surovyatkina is a Leader of Monsoon research group in Potsdam Institute for Climate Impact Research and leading researcher in Space Dynamics Department at Space Research Institute of Russian Academy of Sciences (IKI)

She holds two academic degrees in Statistical Physics: Ph.D. (1996) and Habilitation (2005) from the Russian Academy of Sciences in Moscow. Her expertise is in statistical physics in the field of theory of critical phenomena. She discovered the universal behavior around the critical transitions in various fields, from natural sciences to engineering and medicine. She contributed to understanding critical transitions in Cardiac Dynamics, Liquid Crystals Dynamics, Thermoacoustic Instability, Climate Dynamics, and Critical Phenomena at Transition to Monsoon. The most significant contribution to monsoon research is a new methodology for forecasting the onset and withdrawal of the Indian summer monsoon. Her specialties include interdisciplinary research, practical implementation of theoretical findings, and international collaboration.

#### **About the talk :**

The classical understanding of monsoon onset implies a sudden increase in precipitation and sustainable rains. However, initial rain often gets stalled after monsoon onset for a week or even longer, causing disaster for farming. Here, I show that there are two types of critical transitions to monsoon: a direct transition, with a sudden increase in precipitation, and a two/multiple-step transition, with a dry spell after the initial rain. I present evidence that 70 % of the last 47 years show two/multiple-step transition, which went overlooked. Significantly, the second type of transition prevails under climate change. I uncover that the cause of rainfall cessation is the hidden phenomenon of intermittence emerging between two successive phase transitions. The new theoretical finding opens a door for the universal definition of local monsoon onset. I show how to evaluate the effect of climate change on the transition to monsoon in every state of the Indian subcontinent.

**YouTube Link : <https://youtu.be/-9WL95DIShA>**