

**Speaker: Ipsita Katual**

**Title: Storm Time Penetration Electric Fields and associated current systems**

**Abstract**

The effect of a geomagnetic storm and its response to the ionosphere-thermosphere system is one of the important topics in the space weather community, not only from a scientific perspective but also for practical purposes and various societal impacts (its ability to disrupt communication and navigation systems). The storm-time Penetration Electric field (direct penetration of PPEF (Prompt Penetration Electric Field) and DDEF (Disturbance Dynamo Electric Field)) significantly modifies the low and equatorial ionosphere. However, it's difficult to identify the contribution from each source in a particular observation. So, it is important to understand the physical phenomena during the storm. The field-aligned currents (Region-1 and Region-2 current systems) represent a "key" parameter for the coupling of plasma processes in the magnetosphere and ionosphere. During southward IMF Bz periods, the Region 1 (R1) field aligned currents (FAC) are often stronger than the Region 2 (R2) currents (under-shielding), and the enhanced convection electric field causes eastward (westward) PPEFs in dayside (night side) ionosphere. On the other hand, the sudden northward turning of IMF Bz makes the R2 currents to be momentarily stronger than R1-FAC (over shielding) and causes electric field perturbations that are opposite polarity to the quiet time zonal electric field. In this context, how the Region 1 and Region 2 currents play a vital role in the prompt penetration of electric fields, how the FAC closes through the ionospheric Pedersen current, also mechanism of DDEF will be discussed.