

**BOSTON
UNIVERSITY**

**Boston University College of Arts & Sciences
Center for Space Physics**

2018 - 2019 SPACE PHYSICS SEMINAR SERIES

Lightning Related Transient Luminous Events in the Middle Atmosphere

Transient luminous events are large-scale optical events occurring at high altitude in the Earth's atmosphere, which are directly related to the electrical activity in underlying thunderstorms. Several different types of transient luminous events have been documented and classified. These include relatively slow-moving fountains of blue light, known as 'blue jets', that emanate from the top of thunderclouds up to an altitude of 40 km; 'sprites' that develop at the base of the ionosphere and move rapidly downwards at speeds up to 10,000 km/s; 'elves', which are lightning induced flashes that can spread over 300 km laterally, and upward moving 'gigantic jets', which establish a direct path of electrical contact between thundercloud tops and the lower ionosphere. The goal of this talk is to provide an overview of the history of discovery of different types transient luminous events, and some of the recent modeling efforts at Penn State directed on interpretation of observed features of these events. We will discuss a physical mechanism proposed for explanation of sprites, which is build on original ideas advanced many decades ago by the Nobel Prize winner C. T. R. Wilson. We will also discuss similarity properties of electrical discharges as a function of gas pressure in the context of a selected set of results from the recent laboratory studies of streamers, which are directly applicable for understanding of high spatial resolution imagery of sprites revealing many internal filamentary features with transverse spatial scales ranging from tens to a few hundreds of meters.



Thursday, September 27th

4:00 - 5:00 p.m.

725 Commonwealth Avenue | Room 502



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