Abstract for an Invited Paper
for the TSF10 Meeting of
The American Physical Society

Ground-based Optical Observations of Geophysical Phenomena: Aurora Borealis and Meteors

MARILIA SAMARA, Southwest Research Institute

Advances in low-light level imaging technology have enabled significant improvements in the ground based study of geophysical phenomena. In this talk we focus on two such phenomena that occur in the Earth's ionosphere: aurorae and meteors. Imaging the aurora which is created by the interplay of the Earth's magnetosphere, ionosphere and atmosphere, provides a tool for remote sensing physical processes that are otherwise very difficult to study. By quantifying the intensities, scale sizes and lifetimes of auroral structures, we can gain significant insight into the physics behind the generation of the aurora and the interaction of the magnetosphere with the solar wind. Additionally, the combination of imaging with radars provides complimentary data and therefore more information than either method on its own. Meteor observations are a perfect example of this because the radar can accurately determine only the line-of-sight component of velocity, while imaging provides the direction of motion, the perpendicular velocity and brightness (a proxy for mass), therefore enabling a much more accurate determination of the full velocity vector and mass.