



Western

Western University
Department of Physics and Astronomy

PHYSICS & ASTRONOMY COLLOQUIUM

Date: Thursday, 20th September 2018

Time: 1:30 p.m.

Location: Physics & Astronomy Seminar Room 100

Dr. Gunter Stober

Leibniz-Institute for Atmospheric Physics
Rostock University

“Meteor observations from ground based sensors: What can we learn about the Earth’s atmosphere and the meteors?”

ABSTRACT

The Leibniz-Institute of Atmospheric Physics (IAP) is dedicated to investigate the middle atmosphere from the troposphere up to the mesosphere. This talk presents an overview of the meteor research at IAP covering some observational aspects of the involved instruments like the Middle Atmosphere Alomar Radar System (MAARSY) in Northern Norway and the recently developed Multi-static Multi-frequency Agile Radar for investigation of the Atmosphere (MMARIA) to study mesospheric dynamics and meteor physics.

Meteors entering the Earth’s atmosphere are decelerated and heated by the impinging atmospheric molecules. Meteoroids with a sufficient amount of high kinetic energy are vaporized forming an ambipolar diffusing plasma trail. Radars can detect the ionized plasma around the meteoroids as either meteor head echoes or specular reflection along the trail. MAARSY is a HPLA class radar system designed for atmospheric observations having 16 receiving channels for interferometry. In 2013, we updated the system to allow for a quasi-continuous meteor head echo campaign leveraging the atmospheric experiments. In total, we collected about 1 million head echoes with 3D trajectories and orbits, velocities and decelerations to derive meteoroid masses for each meteor head echo. These observations are accompanied by meteor ablation modelling to investigate the meteor physics during its atmospheric flight.

Besides the astrophysical observations of meteor head echoes, IAP operates several specular meteor radars to investigate the atmosphere dynamics. Such observations are suitable to study atmospheric waves of various scales, ranging from planetary waves, tides to smaller scale gravity waves as well as large scale vertical coupling processes. Recently, the MMARIA concept was introduced allowing the observation of horizontally resolved wind fields by using a network of specular meteor radars.

HOST: P. G. Brown

COFFEE + light snacks will be available in the Atrium, 2nd floor, at 1:15 p.m.