



Western University
DEPARTMENT OF PHYSICS AND ASTRONOMY

PHYSICS & ASTRONOMY COLLOQUIUM

Date: THURSDAY, 25th August 2016
Time: 1:30 p.m.
Location: Physics & Astronomy Seminar Room 100

Dr. Louis Allamandola

Astrophysics & Astrochemistry Lab
NASA Ames Research Center

"From Astrochemistry to Astrobiology"

ABSTRACT

Great strides have been made in our understanding of interstellar material thanks to advances in infrared astronomy and laboratory astrophysics. Ionized polycyclic aromatic hydrocarbons (PAHs), shockingly large molecules by earlier astrochemical standards, are widespread and very abundant throughout much of the cosmos. In cold molecular clouds, the birthplace of planets and stars, interstellar atoms and molecules freeze onto extremely cold dust and ice particles forming mixed molecular ices dominated by simple species such as water, methanol, ammonia, and carbon monoxide. Within these clouds, and especially in the vicinity of star and planet forming regions, these ices and PAHs are processed by ultraviolet light and cosmic rays forming hundreds of far more complex species, some of biogenic interest. Eventually, these are delivered to primordial planets by comets and meteorites. As these materials are the building blocks of comets and related to carbonaceous micrometeorites, they are likely to be important sources of complex organic materials delivered to habitable planets (including the primordial Earth) and their composition may be related to the origin of life. This talk will focus on the chemical evolution of these cosmic materials and their relevance to astrobiology.

The first part of the talk will describe how infrared spectroscopic studies of interstellar space, combined with laboratory simulations of interstellar ice chemistry, have revealed the widespread presence of interstellar PAHs and the composition of interstellar ices, the building blocks of comets.

The remainder of the presentation will focus on the photochemical evolution of these materials and astrobiology. Within a molecular cloud, and especially the presolar nebula, materials frozen into the ices are photoprocessed by ultraviolet light and produce more complex molecules. As these materials are the building blocks of comets and related to carbonaceous micrometeorites, they are likely to have been important sources of complex materials delivered to the early Earth and their composition may be related to the origin of life.

Coffee will be available in the Atrium, 2nd floor, at 1:15 p.m.

We look forward to seeing you at the Colloquium! As a courtesy to the speaker and audience, please set your cellphones to "silent" mode. Thanks!