Astronomy & Physics - Colloquia Abstracts

SUBJECT TO CHANGE! Be sure to check back often.

Friday September 11

10:00 AM
L 296
Undergraduate Symposium
Saint Mary's University

Friday September 18
3:00 PM
SB 265
Dr. Sara Ellison
University of Victoria
Galaxies and their environments: mergers, morphologies and metallicities

Dr. Charles Horowitz
Indiana University
Neutron Rich Matter in the Cosmos and in the Laboratory
Neutron rich matter is at the heart of many fundamental questions in nuclear physics and astrophysics. Moreover it can be studied with an extraordinary variety of new tools such as the Facility for Rare Isotope Beams (FRIB)---a heavy ion accelerator to be built at Michigan State University---and the Laser Interferometer Gravitational Wave Observatory (LIGO). The historic detection of gravitational waves is anticipated within five years. Gravitational waves couple directly to large-scale motions of dense neutron-rich matter, providing an unprecedented probe of its properties. The proposed International X-ray Observatory (IXO) should enable one to accurately measure the mass and radius of several neutron stars and deduce the equation of state (pressure versus density) of dense matter. In the laboratory, radioactive beam facilities, such as TRIUMF ISAC or FRIB, can produce very neutron rich nuclei. These facilities will allow direct measurements of basic properties (such as masses, shapes, and spectra) of many exotic nuclei and enable reliable extrapolation to the extremely exotic environments that are present in neutron star crusts. The Lead Radius Experiment (PREx) at Jefferson Laboratory will use parity violation to measure the neutron radius of 208Pb, in a model-independent fashion. The PREx measurement will have implications for many neutron star properties, such as the radius, transition density between solid crust and liquid core, and the possibility of rapid neutrino cooling via the direct Urca process.

Tuesday October 6
4:00 PM
L 296
Dr. Hideyuki Saio
Tohoku University
Oscillations of Magnetized Stars
Some cool magnetic Ap stars show rapid (6-20min) photometric and velocity variations, which are caused by p-mode oscillations strongly affected by the strong magnetic field. Starting with basic properties of stellar oscillations, I will talk about how the magnetic field modifies p-modek about hT(Tc-.0

review the goals and strategy of the Large Program, and will present the results of the first two semesters of observations and data analysis.

Friday October 23
3:00 PM
SB 265
Dr. Emily Levesque
University of Hawaii
The Physical Properties of Red Supergiants
Red supergiants (RSGs) are an evolved He-burning phase in the lifetimes of moderately high mass (10-25 solar mass) stars. The physical properties of these stars mark them as an important and extreme stage of massive stellar evolution, but determining these properties has been a struggle for many years. The cool extended atmospheres of RSGs place them in an extreme position on the H-R diagram, and present a significant challenge to the conventional assumptions of stellar atmosphere models. The dusty circumstellar environments of these stars can potentially complicate the determination of their physical properties, and unusual RSGs in the Milky Way and neighboring galaxies present a suite of enigmatic properties and behaviors that strain, and sometimes even defy, the predictions of the stellar evolutionary theory. Despite these challenges, our understanding of RSGs has changed and grown dramatically in recent years. I will present some of the latest work that has progressed our understanding of RSGs, and consider the many new questions posed by our ever-evolving picture of these cool massive stars.

Friday October 30
3:00 PM
SB 265
Dr. Ralph Pudritz
McMaster University
From planet formation to thermodynamic constraints on the first genetic code
Protoplanetary disks provide the initial conditions for planet formation as well as for the prebiotic states of planets (eg. water and biomolecules). In this talk I will examine both planet formation and how planets become equipped to host life.

Standard models for planet formation in dusty, gaseous disks reveal that planets rapidly migrate from their birth positions. This process is so efficient that planets risk plunging into their central stars within a million years. I shall review observations and ideas of what controls the process of exoplanet formation and migration. I will then pr of prebiotic environments. This provides insight into the environments which produced biomolecules for early life and possible constraints on the nature of the first genetic code.

Friday November 6
3:00 PM
SB 265
Dr. Arthur McDonald
Queen's University
Neutrino and Astro-Physics Measurements with SNO and the new SNOLAB
The Sudbury Neutrino Observatory (SNO) is a 1,000 tonne heavy-water-based neutrino detector in an ultra-clean environment created 2 km underground in a mine near Sudbury, Canada. SNO has used neutrinos from 8B decay in the Sun to observe one neutrino reaction sensitive only to solar electron neutrinos and others sensitive to all active neutrino flavors and has found clear evidence for neutrino flavor change. This requires modification of the Standard Model for Elementary Particles and confirms solar model calculations with great accuracy. The implications of the SNO results to date and other recent neutrino results for particle physics and solar physics will be discussed. The SNO detector has now completed its operation and final data analysis is in progress. The subjects of that analysis and plans for future use of the SNO detector for the SNO+ experiment will be described. The expansion of the underground facility to create a long-term international laboratory (SNOLAB) with a broad future experimental capability for the detection of dark matter, double beta decay, lower energy solar neutrinos and geo-neutrinos will also be described.

Friday November 13
3:00 PM
SB 265
Dr. Con Beausang
University of Richmond
Progress towards GRETA: The future of gamma-ray spectroscopy and the use of surrogate reactions to elucidate cross sections on unstable nuclei
One of the frontiers of research in low energy nuclear physics focuses on the properties of nuclei far from stability, particularly on nuclei with a large excess of neutrons. Such neutron-rich nuclei are pathways to heavy element production in explosive nucleo-synthesis. However, many properties of such systems are unknown leading to uncertainties in the predictions for element abundances in nature. Some such systems will become available to study in next generation rare (radioactive) isotope facilities such as FRIB in the US, FAIR in Europe, RIKEN in Japan and TRIUMF in Canada. To fully exploit such facilities a new generation of gamma-ray spectrometers, so called tracking arrays, is being developed. Here I will review progress towards GRETA, the Gamma Ray Energy Tracking Array and indicate some of the potential physics themes it can address. The first phase (1[illegible]) of GRETA, GRETINA is nearing completion in the US. The second theme of my talk will focus on what progress we can make now, prior to the arrival of GRETINA and FRIB, with stable beam facilities and modest detector arrays, to elucidate the properties of unstable nuclei via the use of surrogate reactions.

Friday November 20
3:00 PM

SB 265
Dr. Sarah Gallagher
University of Western Ontario
Resolved: The SED's the Thing
Quasars' spectral energy distributions are remarkable for the amount of power emitted across decades of frequency, from the infrared through the X-ray. The continuum emission from the optical through the X-ray regime is the primary signature of the accretion disk feeding the