Will Percival (University of Waterloo)

Date: Friday 25 March 2022
Time: 3:00 4:00 PM (ADT)
Location: Zoom or AT101

Maps of the 3D positions of galaxies in the Universe allow us to constrain the evolution of the Universe and the growth of cosmological structure within it. The present-day energy-density in the Universe is dominated by an unknown component called Dark Energy that gives rise to acceleration of the cosmological scale. Using maps of galaxies we can measure this expansion and structure growth within it. We do this using various physical features including Baryon Acoustic Oscillations, Redshift-Space Distortions and Voids. I will explain how these cosmological probes work, and present recent measurements from the Sloan Digital Sky Survey. Finally, I will look ahead to the future, reviewing the Dark q0.00>50 Tfe Dark qle2

William Welsh (San Diego State University)
Date: Friday 18 February 2022
Time: 3:00 - 4:00 PM (AST)
Location: AT 101 or Zoom

NASA's *Kepler* Mission was spectacularly successful: its discovery of nearly 3000 exoplanets has revolutionized our understanding of the architectures of planetary systems. Among the most fascinating of these systems are the "circumbinary planets": planets that orbit two stars. Like the fictional planet "Tatooine" from the Star Wars movies, these worlds have two suns in their skies. We currently know of a dozen such planets, and each system has revealed an important new facet and challenge (headache!) to solve. In this talk, I will give an overview of how we find exoplanets, present the main results of the Kepler Mission, and discuss the rich phenomenology the circumbinary planets exhibit that is both fascinating and astrophysically important.

Victoria Strait (University of Copenhagen)
Date: Friday 11 February 2022
Time: 3:00 - 4:00 pm
Venue: Atrium 101 or Zoom

Constraints on physical properties of early galaxies in the redshift range z ~ 6-10 (just a few million years after the Big Bang) are key for a full understanding of the process of reionisation and early galaxy evolution, including the onset of star formation. I will present results on the highlights from my study of ~200 z ~ 6-10 galaxy candidates from the Reionisation Lensing Cluster Survey (RELICS) survey which utilises galaxy clusters as comic lenses to magnify faint sources. This will include a variety of results about specific exciting galaxies using data from the Hubble Space Telescope, Spitzer Space Telescope, and the Keck Telescopes. Additionally, I will discuss some exciting prospects for the recently launched James Webb Space Telescope.

Raymond Simons (Space Telescope Science Institute)
Date: Friday 4 February 2022
Time: 3:00 - 4:00 PM (AST)
Location: AT 101 or Zoom

In this talk, I will discuss our emerging picture of galaxy formation in the early universe. Early galaxies evolve in a lively ecosystem, assembling through action that re

using the Texas Active Target Time Projection Chamber (TexAT TPC) using a beam of neutrons at Ohio University Edwards Accelerator Laboratory to measure the neutron inelastic scattering to populate the Hoyle state.

This talk will discuss the impact of neutron-upscattering to the triple-alpha process, how TPCs work, and present the results of this new and exciting measurement.

Institute for Computational Astrophysics (ICA)
Data Analytics Seminar Series

Joshua Speagle (University of Toronto)
Date: Thursday 18 November 2021
Time: 2:30 - 3:30 PM (AST)
Recording: https://youtu.be/pdBvz9TEW1M

I will present a brief introduction to Nested Sampling, a complementary framework to Markov

Attila Krasznahorkay (Atomki, Hungary)
Date: Friday 26 November 2021
Time: 3:00 -4:00 PM (AST)
Location: Atrium 101 or Zoom

An anomaly indicating the formation and decay of a new light particle was observed in the study of high-energy transitions in the 8Be nucleus at our institute ATOMKI in Debrecen, already in 2016. It turned out that this could be a first hint for a new mXc2=17 MeV boson, called X17 in the literature. The possible relation of the X17 to the Dark Matter problem triggered great theoretical and experimental interest in the particle, hadron, nuclear and atomic physics communities. We obtained a similar anomaly in 4He, which also supports the existence of the X17 particle. Many experiments were performed in several different cases, but the anomaly remained, which could not be reproduced by even the latest (ab initio) calculations for 4He.
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for the physics of high redshift events and helps guide discoveries in the field of galaxy and black hole evolution at the epoch when structures first formed.

Institute for Computational Astrophysics (ICA)
Data Analytics Seminar Series

Sébastien Fabbro (NRC Herzberg – Canadian Astronomy Data Centre)
Date: Thursday 18 November 2021
Time: 2:30 - 3:30 PM

(showing that galaxies form more rapidly at high redshift and that fast quenching occurs more in high mass galaxies).

Dylan Nelson (Heidelberg University)
Date: 8 October 2021
Time: 1:00-2:00 pm (ADT)
Location: Zoom

Recently it has become possible to numerically simulate large, representative volumes of the Universe. These cosmological (magneto)hydrodynamical simulations solve for the coupled evolution of gas, dark matter, stars, and supermassive black holes interacting via the coupled equations of self-gravity and fluid dynamics, all within the context of an expanding spacetime. We can use these 'virtual universes' to study, theoretically, how galaxies form and evolve within the large-scale structure.

In particular, I will discuss our investigations into galaxy evolution, galactic-scale outflows, and the circumgalactic medium in the IllustrisTNG simulations. I will show how outflows sculpt the surrounding CGM, imprinting observable signatures in the gas, as well as in nearby satellite galaxy populations. I will highlight recent results from the high-resolution TNG50 simulation, which provides a unique look at the small-scale structure of cold, circumgalactic gas.

Laurie Rousseau-Nepton (Canada-France-Hawaii Telescope)
Date: 1 October 2021
Time: 3:00-4:00 PM (ADT)
Location: Zoom

October 2018 marked the beginning of a new large program at the Canada-France-Hawaii Telescope: SIGNALS, the Star-formation, Ionized Gas, and Nebular Abundances Legacy Survey. During the next four years and with 60 nights of telescope time in hands, our collaboration is observing more than 50,000 extragalactic star-forming regions located in different galactic environments using the instrument SITELLE, an Imaging Fourier Transform Spectrograph. In order to build this sample, we cover 40 galaxies that are actively forming stars within a distance of 10 Mpc. SITELLE was built in Canada and is the perfect instrument to survey these often extended objects.

With SIGNALS, we are seeking to increase our knowledge on how stars form in galaxies, how their birthplace affects their properties, and how multiple generations of stars transform galaxies. Stars continuously affect their environment by returning new elements to the interstellar gas.

These new elements are then recycled to form new stars. Stars form in a wide variety of environments. These can be different galaxy to galaxy, location to location. The result is that each star has its own story. By studying 50,000 regions where stars actively form, we will understand what triggers their formation, how efficiently stars form, and how each generation transforms the gas around them. This will also help researchers to understand the star-formation history of the whole Universe since the Big Bang. During this presentation, I will introduce this ambitious project and the instrument SITELLE as well as show some preliminary results.

Sergio Almaraz-Calderon (Florida State University)
Date: 24 September2021
Time: 3:00-4:00 PM (ADT)
Location: Zoom

The satellite-based observation of the long-lived radioisotope aluminuf1 0 0 1 72.024 500.59 Tm0 g0 G[(Loc)5(a