

Canadian Association of Physicists (CAP) Lecture Tour 2020 Pizza will be served afterwards (5-6pm)

Winds of Change around Black Holes

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DATE: Monday, February 3, 2020

TIME: 4:00 PM

PLACE: C2045

ABSTRACT: Accretion disks, where matter with angular momentum spirals down through a disk, occur around objects ranging from the youngest stars to supermassive black holes. But not all of this material reaches the center of the disk. Instead, some material is accelerated away from the disk. These outflows can be ejected in a narrow opening angle (what astronomers call "jets") or can be relatively unfocused (what astronomers call "winds"). While we do not know the precise processes that accelerate and collimate winds and jets, magnetic fields almost certainly play a key role. My team and I study black hole X-ray binaries, stellar-mass black holes accreting from a nearby star. We combine observations across the electromagnetic spectrum to learn about the physics of accretion and jets. In this talk, I will discuss how we have revealed two new windows onto the physics of inflows and outflows in X-ray binaries: fast variability measured across the electromagnetic spectrum (which provides the potential to accurately identify the accretion physics that launch relativistic jets) and the modelling of changes in the X-ray brightness of black hole X-ray binaries (which implies that strong winds from the accretion disk are universal). With the advent of new and upcoming facilities, we have a huge potential to take advantage of these winds of change in the next decade.

Short bio: Dr. Gregory Sivakoff is currently an Associate Professor in the University of Alberta Department of Physics, where he has been a faculty member since 2011. He and his group's primary research focuses on multi-wavelength observations of compact objects (white dwarfs, neutron stars, and black holes), tying together a wide range of data to better probe important physics around compact objects. These multi-wavelength observations stretch across nearly the entire electromagnetic spectrum, and are made by facilities across the world and above it. Two classes of objects stand out among the wide range of compact objects he studies: X-ray binaries, neutron stars or black holes that accrete material from a nearby donor star; and the relativistic outflows (jets) from supermassive black holes that are responsible for (at least some) astrophysical neutrinos that have recently been detected. Dr. Sivakoff also has strong interests in Education & Public Outreach; in addition to his multiple pop-culture inspired public talks like, "Black Holes and Revelations" and "Fantastic Black Holes and How to Find Them", he is a strong advocate of citizen science. This support includes sitting on the board of the American Association of Variable Star Observers, an international non-profit organization of variable star observers whose mission is to enable anyone, anywhere, to participate in scientific discovery through variable star astronomy. In 2018 he was selected as the inaugural Telus World of Science Edmonton Science Fellow, which recognizes an outstanding researcher or innovator based in Northern Alberta, and was the recipient of the University of Alberta Faculty of Science Research Award.

ALL ARE WELCOME!