2008 CfA Summer Colloquium Series

The Summer Colloquium series provides a broad introduction to the research going on at the CfA. Summer students and other junior staff are particularly encouraged to attend but all are welcome.

June 19: The Magellanic Clouds

Gurtina Besla
Harvard-Smithsonian Center for Astrophysics

The Magellanic Clouds, two dwarf irregular satellites of the Milky Way, have been observed since before the time of Magellan. Recently, new proper motion measurements by Kallivayalil et al (2007a,b) imply that the Clouds are actually moving 100 km/s faster than had been previously believed. The Clouds have long been thought to be bound satellites of Milky Way and the new velocities imply a dramatically different orbital history wherein the Clouds may have only recently entered our neighborhood. This challenges all theories regarding phenomena associated with their evolution, e.g. the nature of their episodic star formation histories and the origin of the Magellanic stream, a stream of HI gas that trails behind the Clouds 100 degrees across the sky. I'll be talking about these results and more generally about the challenges involved in changing over a century's worth of astronomy.

July 10: How to find a habitable exoplanet

Dave Charbonneau
Harvard-Smithsonian Center for Astrophysics

This tutorial will provide an introduction to the two most successful methods for detecting planets orbiting nearby Sun-like stars. I will review the radial velocity method and the transit technique, focusing on how one deduces the physical parameters of exoplanets from the time-dependent changes in the observable quantities of the star. I will then discuss current techniques for studying the chemistries and dynamics of exoplanet atmospheres. There is great excitement within the exoplanet community over the idea that refinements in the aforementioned methods will soon permit the detection of habitable planets and the spectroscopic study of their atmospheres. I will explain why that excitment is wholly justified.

July 17: The Superluminal Binary GRS 1915+105

Joey Neilsen
Harvard-Smithsonian Center for Astrophysics

X-ray binaries are often highly prized for the information they give us about their enigmatic engines, black holes and neutron stars. But accretion onto these compact objects is a fascinating and dynamic process in and of itself and can be studied with high-resolution X-ray spectroscopy. I will discuss LMC X-4, a neutron star binary in which the accretion disk is warped, tilted out of the orbital plane, and precessing around the neutron star. I will also discuss GRS 1915+105, a black hole binary which is well known for its relativistic jets and its bizarre variability.

July 24: The Lives of Galaxies

Sukanya Chakrabarti
Harvard-Smithsonian Center for Astrophysics

I will talk about the dynamical evolution of galaxies broadly - from quiescently evolving spirals to the more dramatic lives of ULIRGs. I will also talk about recent methods that have been developed to observe simulated galaxies to correlate their photometric time evolution with their dynamical evolution, to develop diagnostics of galaxy evolution. Finally, I will touch on some recent observations of high redshift galaxies that are difficult to explain.

July 31: X-ray observations of quasars

Aneta Siemiginowska
Harvard-Smithsonian Center for Astrophysics

X-ray observations of quasars constitute only a small fraction of the quasars broad-band emission, however, they carry important and unique information about physical processes responsible for the quasar phenomenon. These observations allow us to study not only the quasars and their environment, but also the distant Universe because the quasars are very luminous. I review several aspects of the quasars X-ray studies, in particular I discuss X-ray spectral components, origin of the X-ray emission in respect to the quasar "structure" and present recent Chandra X-ray Observations with X-ray morphology on arcsec scales that shows large powerful jets associated with quasars.

August 4: Robotic Exploration of the Heliosphere

Justin Kasper
Harvard-Smithsonian Center for Astrophysics

This year marks the fifty year anniversary of the prediction of the solar wind. The corona, or atmosphere, of the Sun is extremely hot, with temperatures of millions of degrees. It turns out that this high temperature makes the corona unstable, resulting in a supersonic flow of solar wind. This wind carves a bubble out of the local interstellar medium that we call the heliosphere. I will describe the use of robotic spacecraft to explore our heliosphere, from solar telescopes in space to the Voyager probes at the termination shock that marks the edge of the heliosphere.