LSU LOUISIANA STATE UNIVERSITY

PHYSICS & ASTRONOMY WEEKLY CALENDAR

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WEEKLY CALENDAR

October 12, 2009

Departmental Colloquium

"Jets in low-luminosity X-ray binary systems"

3:40 PM, October 15, 2009
109 Nicholson Hall

James Miller-Jones
National Radio Astronomy Observatories

Host: Robert Hynes

• Refreshments served at 3:15 PM in 232 (Library) Nicholson Hall •

X-ray binary systems, in which a compact object accretes matter from a less-evolved donor star, are seen to emit collimated relativistic outflows during their relatively infrequent outbursts. More compact, steady jets are also seen from such systems when they are in the more quiescent, lower-luminosity states in which they spend the majority of their time. Recent work has shown the kinetic power carried by these quiescent jets to be comparable to the radiative luminosity of the system, demonstrating the importance of the jets in the dynamics of the accretion flow and the feedback of energy to the surrounding interstellar medium, even at such low luminosities. The physics of accretion at low luminosities is still not well understood, and ascertaining the nature of the jets in quiescent states will place important observational constraints on theoretical models. I will present recent spectral evidence for jets in an accreting neutron star system, and high-resolution radio observations constraining the size and power of the jets in accreting black hole systems. The radio emission from these quiescent jets can also be used to perform precision astrometry using very long baseline interferometry techniques. I will present the results of an astrometric campaign on the most luminous of the quiescent accreting black hole X-ray binaries, V404 Cyg, from which we derived the proper motion and parallax of this source. Taken together with the known position and radial velocity of the source, these can be used to infer its full three-dimensional space velocity. When compared with the velocity of the local standard of rest, this constrains the supernova kick received when the compact object was created, allowing us to probe the formation mechanism of the black hole in this system.

Publications:

- "Photon counting multienergy x-ray imaging: Effect of the characteristic x-rays on detector performance", **P.M. Shikhaliev**, **S.G. Fritz, J.W. Chapman**, Medical Physics, v.36(11), pp.5107-5119, (2009).
- "R.A.Fisher, Design Theory, and the Indian Connection", **A. R. P. Rau**, J. Biosci. 34, 353-363 (2009).
- "Bloch sphere-like construction of SU(3) Hamiltonians using unitary integration," **Sai Vinjanampathy** and **A.R.P.Rau**, J. Phys. A: Math. Gen. 42, 425303 (17pp) (2009).