



**ASTROPHYSICS
SEMINAR SERIES**

Saurav Dhital

Embry-Riddle Aeronautical University

**“Wide Stellar Binaries: Coeval Laboratories to Probe
"Everything" from Formation to General Relativity”**

Thursday, April 24, 2014

Refreshments at 3:15pm in CAS 500

Talk begins at 3:30pm in CAS 502

Abstract:

Components of wide binaries are effectively two single stars that share their formation and evolutionary history. In essence they can be looked upon as coeval laboratories that can be used to test and calibrate relations that govern stellar astrophysics. While a large number of wide binaries have been identified, formation scenarios generally cannot account for systems as wide as most prestellar clouds. We have found evidence of multiple populations wide binaries, suggesting different formation processes are responsible for binaries of different separations. I will discuss some of the theoretical scenarios in light of existing binary samples.

I will discuss our effort to calibrate the mass–radius relation (MRR) of white dwarfs using binaries comprised of a white dwarf and a main-sequence star. The MRR is a fundamental to understanding the internal structure of white dwarfs. Indeed, the theoretical calculation earned Chandrasekhar the Nobel Prize in 1983; but empirical verification remains imprecise, mostly due to limitations in the data and their non-uniform analysis. We are using 4-m class telescopes to obtain spectra and measure precise radial velocities and gravitational redshifts for 50 wide binaries. In addition to empirical verification of the MRR, we are looking to constraining the thickness of Hydrogen envelope in white dwarf photospheres and the composition (C/O vs. Fe) in WD cores.