Understanding the Solar Neighborhood through a Triptych of Low-Mass Star Populations

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As the most populous constituents of our galaxy, low-mass stars are vital to understanding our galaxy's structure and kinematics. In this talk, I will present a look at the solar neighborhood through the lens of three low-mass star populations. I will briefly outline previous work to understand the space density of cataclysmic variables and ongoing work using the Discovery Channel Telescope to measure parallaxes and proper motions of some of the nearest L dwarfs. Finally, I will present the discovery and characterization of 178 new white dwarf-M dwarf binaries in the SUPERBLINK proper motion survey. Combined with previous catalogs of WD+dMs, we find 470 spectroscopically confirmed WD+dMs in the SUPERBLINK survey. Using H-alpha chromospheric emission, we examine how M dwarf magnetic activity is affected by the presence of a close white dwarf companion and investigate in general, the effects of binary separation on M dwarf activity. We confirm that M dwarfs with close binary companions are more likely to be active and find evidence that this enhancement depends on the physical separation and introduce three binary separation regimes that should be considered when using binaries as benchmark systems. In addition, using results from our spectroscopic fits and the proper motions from SUPERBLINK, we calculate 3D space velocities for the WD+dMs in SUPERBLINK. We find that despite their enhanced magnetic activity, they have a large vertical velocity dispersion, indicating a dynamically hotter, older population compared to complementary samples of single M dwarfs.

3:30pm in CAS 502. *Refreshments served at 3:15pm in CAS 500.*

Next Week
Reshmi Mukherjee
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