Astrophysics Seminar

Complicating the canonical picture of the Milky Way disk

Prof. Jeff Carlin
Earlham College

Tuesday

September 16

12:30 P.M.

Rm 184 NSH

In the standard picture of an axisymmetric, equilibrium Milky Way stellar disk, there should be no bulk velocities in the Galactocentric radial and vertical directions. Of course, we know that the Galactic disk contains spiral arms and a central bar, and that dynamical processes associated with these structures can produce non-axisymmetric radial velocities. However, recent evidence from large spectroscopic and photometric surveys including RAVE, SDSS, and LAMOST has revealed vertical velocity and density structure in the Galactic disk. Such vertical structures are thought to have been excited by an external perturber such as a passing satellite galaxy or dark matter subhalo, though there are also suggestions that spiral arms can induce non-zero vertical motions. My talk will focus on our study of the kinematics of ~400,000 F-type stars just outside the Sun's radius using data from LAMOST, and ongoing efforts to expand the sample of LAMOST spectra, characterize systematic effects, and map the kinematical substructure in detail. I will also discuss recent maps of vertical wave-like structures and oscillations in spatial densities of disk stars. The emerging picture of stellar kinematics and densities demonstrates that we must account for vertical structures in our picture of galactic disk formation and evolution.