PHYSICS AND ASTRONOMY
COLLOQUIUM

Dr. Tim Beers

National Optical Astronomy Observatory, Tucson

"The Stellar Metallicity Distribution Function of the Galactic Halo from SDSS Photometry"

Abstract

I describe an exploration of the stellar metallicity distribution function of the Galactic halo derived from SDSS ugriz photometry. Our effort is based on estimated distances and metallicities for individual main-sequence stars in the multiply scanned SDSS Stripe 82, at heliocentric distances in the range 5 -- 8 kpc. The in-situ photometric metallicity distribution has a shape that matches that of the kinematically-selected local halo stars from Ryan and Norris (1991). We also examine independent kinematic information from proper-motion measurements for high Galactic latitude stars in our photometric sample. We find that stars with retrograde rotation in the rest frame of the Galaxy are generally more metal poor than those exhibiting prograde rotation.

These results are consistent with earlier arguments by Carollo et al. (2007) that the halo system comprises at least two overlapping components with differing metallicity, kinematics, and spatial distributions. The observed photometric metallicity distribution and that of Ryan and Norris (1991) can be described by a simple chemical evolution model by Hartwick (1976) (or by a single Gaussian distribution); however, the suggestive metallicity-kinematic correlation contradicts the basic assumption in this model that the Milky Way halo consists primarily of a single stellar population. When the observed metallicity distribution is deconvolved using two Gaussian components with peaks at [Fe/H] ~ -1.7 and ~ -2.3, the metal-poor component accounts for ~ 20% to 35% of the entire halo population in this distance range.

Wednesday, November 28, 2012
3:30 p.m.
Bob Wright Centre
Room A104