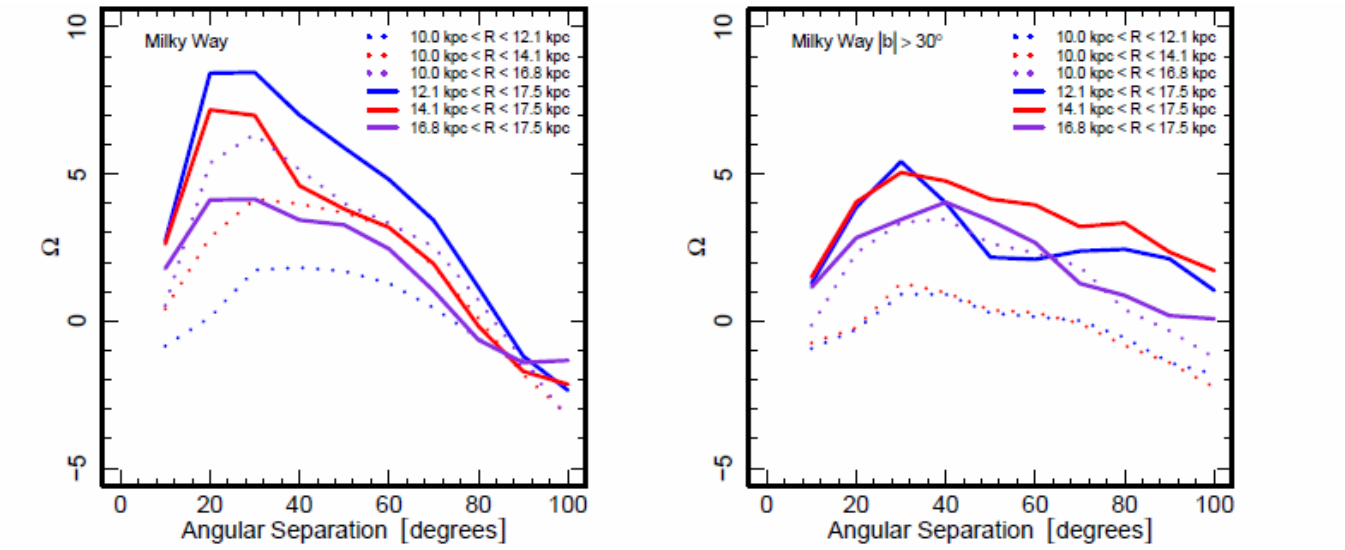
Joint Institute for Nuclear Astrophysics

Statistical Chemical Tagging in the Smooth Halo

Schlaufman et al. (2012) have shown **that the relative contribution of satellite galaxies accreted at high redshift to the stellar population of the Milky Way's smooth halo increases with distance**, becoming observable relative to the classical smooth halo about 15 kpc from the Galactic center.

Based on line-of-sight-averaged [Fe/H] and [α/Fe] in the metal-poor main-sequence turnoff (MPMSTO) population along every Sloan Extension for Galactic Understanding and Exploration (SEGUE) spectroscopic line of sight., they find significant spatial autocorrelation in [Fe/H] in the MPMSTO population in the distant half of their sample beyond about 15 kpc from the Galactic center. Inside of 15 kpc however, they find no significant spatial autocorrelation in [Fe/H]. This observation is an example of statistical chemical tagging and indicates that **spatial autocorrelation in metallicity is a generic feature of stellar halos formed from accreted satellite galaxies.**



Quantification of spatial autocorrelation in [Fe/H] in the Galaxy's pure smooth halo MPMSTO population as a function of Galactocentric distance and angular scale. Positive values of the statistic indicate spatial autocorrelation. Left: the result for all lines of sight. Right: the result for lines of sight with |b| > 30◦. Ignoring the low-latitude substructure and looking only at high Galactic latitude, there is no spatial autocorrelation in [Fe/H] interior to 14.1 kpc. Beyond 14.1 kpc however, there is significant spatial autocorrelation in [Fe/H].

Contact Information: Timothy Beers (NOAO and Michigan State University): beers@pa.msu.edu
Researchers: Kevin Schlaufman, Constance Rockosi (UC Santa Cruz), Young Sun Lee (MSU), Timothy Beers (NOAO and MSU), Carlos Allende Prieto (IAC, Spain), Valery Rashkov, Piero Madau (UC Santa Cruz), Dmitry Bizyaev (Apache Point Observatory **Publication:** Schlaufman, K.C., et al. (2012), ApJ, in press arXiv:1202.2360