Chemical Abundances and Ages of the Bulge Stars in APOGEE High-velocity Peaks

Zhou Y.

Shen J.

Liu C.

Li Z.-Y.

Mao S.

Kunder A.

Rich R.M.

Zasowski G.

Fernandez-Trincado J.G.

Majewski S.R.

Lin C.-C.

Geisler D.

Tang B.

Villanova S.

Roman-Lopes A.

Schultheis M.

Nidever D.L.

Meza A.

Pan K.

Bizyaev D.V.

A cold, high-velocity (HV, ?200 km s-1) peak was first reported in several Galactic bulge fields based on the Apache Point Observatory Galaxy Evolution Experiment (APOGEE) commissioning observations. Both the existence and the nature of the HV peak are still under debate. Here we revisit this feature with the latest APOGEE DR13 data. We find that most of the low-latitude bulge

fields display a skewed Gaussian distribution with an HV shoulder. However, only 3 out of 53 fields show distinct HV peaks around 200 km s-1. The velocity distribution can be well described by Gauss-Hermite polynomials, except for the three fields showing clear HV peaks. We find that the correlation between the skewness parameter (h 3) and the mean velocity (), instead of a distinctive HV peak, is a strong indicator of the bar. It was recently suggested that the HV peak is composed of preferentially young stars. We choose three fields showing clear HV peaks to test this hypothesis using the metallicity, [?/M], and [C/N] as age proxies. We find that both young and old stars show HV features. The similarity between the chemical abundances of stars in the HV peaks and the main component indicates that they are not systematically different in terms of chemical abundance or age. In contrast, there are clear differences in chemical space between stars in the Sagittarius dwarf and the bulge stars. The strong HV peaks off-plane are still to be explained properly and could be different in nature.

Galaxy: abundances

Galaxy: bulge

Galaxy: kinematics and dynamics

Galaxy: structure