The chemo-dynamical structure of the Milky Way

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Observations of the structure and dynamics of different stellar populations in the Milky Way's disk provide a unique perspective on disk formation, evolution, and dynamics. I will review our current knowledge of the chemo-orbital structure of the disk and its implications for our understanding of how the Milky Way formed and evolved. In particular, I will show recent results from a dissection into mono-abundance populations (MAPs) of the Galactic disk based on SDSS/SEGUE data. These results show that the individual components are simple, but exhibit very different spatial and kinematic structure, with important implications for the vertical structure of the Milky Way's disk. I will further present a new dynamical measurement of the MW's surface density between 4 and 10 kpc, obtained by rigorous 3-integral modeling of the vertical kinematics of MAPs. Combined with the latest measurements of the MW's rotation curve, this allows us to separate the disk and halo contributions to the gravitational potential and to determine the radial profile of the dark matter halo.