

Mapping the Asymmetric Thick Disk: I. Field Star Distributions of the Hercules Thick Disk Cloud

Jeffrey Larsen
US Naval Academy

November 19, 2009

Abstract: The Hercules Thick Disk Cloud (Larsen et al. 2009) was first initially discovered as an excess in the number of faint blue stars between quadrants I and IV of the Galaxy. The field stars responsible for the excess, are between 2 and 4 kiloparsecs from the Sun, 1.2 kpc above the Galactic plane, and the asymmetry feature or Cloud is kiloparsecs in length – a major substructure in the Galaxy. The origin of the Cloud could be an interaction with the disk bar, a triaxial thick disk or a merger remnant or stream. To better map the spatial extent of the Cloud along the line of sight, we have obtained multi-color UBV_R photometry for 1.2 million stars in 67 fields of approximately 1 square degree each. Our analysis of fields beyond the apparent boundaries of the excess rule out a triaxial thick disk as a possible explanation for the Cloud (Larsen et al., accepted). In this talk we present our results for the counts over all of our fields and characterize the size of the excess. Over the entire 500 square degrees of sky containing the Cloud, we estimate about a quarter of a million F/G type stars, bringing the estimated mass of the Cloud to over a million solar masses. Additionally, one of our quadrant IV fields contains a blue horizontal branch feature that implies that a large number of stars are clumped in a small range of distances. We have tentatively identified this clump with the Cetus Tidal Stream of Newberg et al. (2009).