Abstract Outline

Facts	
Importance of Facts	Impact within Sub Field
Problem	
Goal – identify the "key component" that will solve the problem	We propose to…
Strategy – to utilize/generate the key component , (Justify HST/JWST, explain utilizing the "target")	Suitability
Importance of Solution	Impact within Sub Field
Broader Impact	Out-of-field Impact

Werk GO 14140: Using UV-bright Milky Way Halo Stars to Probe Star-Formation Driven Winds as a Function of Disk Scale Height

Galactic-scale winds driven by star formation are a common feature of galaxy formation models, and are observed ubiquitously from the local Universe to z~6. However, empirical constraints on the radial density profile and total spatial extent of these winds have been very challenging to obtain. We have devised a simple experiment using blue horizontal branch (BHB) stars in the halo of the Milky Way that will directly map the extent and density of diffuse, ionized outflows from the Galactic disk to the halo. We propose to take COS FUV spectra of 7 BHB stars that evenly sample the range of scale heights from 3 - 13 kpc, lying perpendicular to the disk of the Milky Way, extending from the position of the sun. This study will allow us to unambiguously track inflowing and outflowing material from the Milky Way via absorption component blueshifts and redshifts, respectively. This program will yield the first direct observational determination of the scale height to which star-formation-driven winds propagate in the halo. We will additionally probe the change in the gas density as it extends into the halo, and approximate a mass of metals as they leave the disk and become integrated into the halo. Our proposed experiment will yield the most detailed constraints on the physical state and energetics of gas in a large-scale galactic wind to date. Such constraints are fundamental to understanding the impact of feedback processes on galaxies and in fueling the buildup of their gaseous environments.

Facts

Importance of Facts ???

Problem

Strategy to set up Goal (when target doesn't naturally follow)

Goal – key component and target

Strategy – why HST?

Importance of Solution - products

Broader Impact

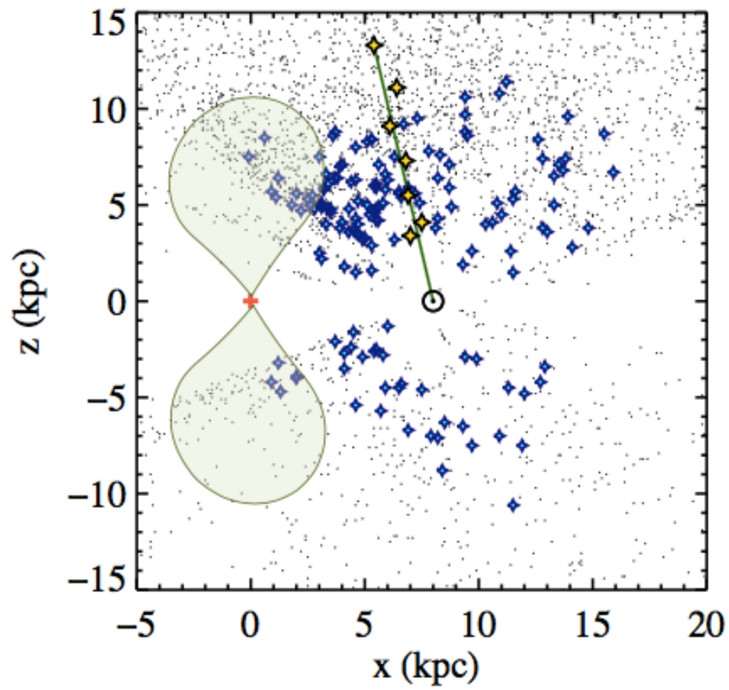

Figure 1: The spatial distribution of blue horizontal branch stars in the x-z plane from the Xue et al. (2011) catalog. The Galactic center lies at the origin of this plot (0,0) and is marked with a red plus sign, and the approximate location and size of the Fermi bubbles, presumably from a powerful wind emanating from the Galactic center, are indicated by the transparent green bubbles. The sun is assumed to lie at a distance of 8 kpc from the Galactic center at $z = 0$, and is marked by the solar symbol. Blue horizontal branch stars with GALEX FUV magnitudes brighter than 18.5 are shown by blue stars. The sample of seven stars we have selected from this subset, chosen to lie on a fairly tight line of sight (500 pc spread) extending to the most distant UV-bright halo star (at 13 kpc), is shown by the line of yellow stars.

Paper Version

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Galactic Gas Flows from Halo to Disk: Tomography and Kinematics at the Milky Way's Disk-Halo Interface

Show affiliations

Bish, Hannah V. ; Werk, Jessica K. ; Prochaska, J. Xavier ; Rubin, Kate H. R. ; Zheng, Yong ; O'Meara, John M. ; Deason, Alis J.

We present a novel absorption-line survey using 54 blue horizontal branch stars in the Milky Way halo as background sources for detecting gas flows at the disk-halo interface. Distance measurements to high-latitude ($b > 60°$) background stars at 3.1-13.4 kpc, combined with unprecedented spatial sampling and spectral resolution, allow us to examine the 3D spatial distribution and kinematics of gas flows near the disk. We detect absorption signatures of extraplanar Ca II and Na I in Keck HIRES spectra and find that their column densities exhibit no trend with distance to the background sources, indicating that these clouds lie within 3.1 kpc of the disk. We calculate covering fractions of $f_{\mathrm{Ca\,II}} = 63\%$, $f_{\mathrm{Na\,I}} = 26\%$, and $f_{\mathrm{H\,I}} = 52\%$, consistent with a picture of the circumgalactic medium (CGM) that includes multiphase clouds containing small clumps of cool gas within hotter, more diffuse gas. Our measurements constrain the scale of any substructure within these cool clouds to <0.5 kpc. Ca II and Na I absorption features exhibit an intermediate-velocity (IV) component inflowing at velocities of -75 km s^{-1} $< v <$ -25 km s^{-1} relative to the local standard of rest, consistent with previously studied H I structures in this region. We report the new detection of an inflow velocity gradient $\Delta v_z \sim$ 6-9 km s^{-1} kpc^{-1} across the Galactic plane. These findings place constraints on the physical and kinematic properties of CGM gas flows through the disk-halo interface and support a galactic fountain model in which cold gas rains back onto the disk.

Goal – key component and target
We propose → We present

Strategy/Methods

Findings/Results

Broader Impact/Importance – tjos tells the reader how the paper should be cited.

What's the difference?

Setting the stage in a paper abstract

Hunting for the Dark Matter Wake Induced by the Large Magellanic Cloud

Show affiliations

Garavito-Camargo, Nicolas iD ; Besla, Gurtina iD ; Laporte, Chervin F. P. ; Johnston, Kathryn V. iD ; Gómez, Facundo A. ; Watkins, Laura L. iD

Satellite galaxies are predicted to generate gravitational density wakes as they orbit within the dark matter (DM) halos of their hosts, causing their orbits to decay over time. The recent infall of the Milky Way's (MW) most massive satellite galaxy, the Large Magellanic Cloud (LMC), affords us the unique opportunity to study this process in action. In this work, we present high-resolution ($m_{dm} = 4 \times 10^4\ M_{\odot}$) N-body simulations of the MW-LMC interaction over the past 2 Gyr. We quantify the impact of the LMC's

Facts/Context

Which abstract calls your attention, and tries to engage you to read the paper?

Providing facts/context to understand the need for the study / worthiness of publication --> Argument for a referee!
Set the stage and start by telling the ready WHY you did the study rather than starting with what you did