



The Ghosts of Galaxy Formation

Part Two: Stripe Mining

KITP, 2nd December, 2008

Martin C. Smith
Institute of Astronomy, Cambridge

with

Wyn Evans, Paul Hewett, Gerry Gilmore, Mike Irwin, Vasily Belokurov, Dan Zucker, Matt Walker, Dan Faria, Mike Fellhauer, Martin Niederste-Ostholt, Laura Watkins, Hannah Whiteoak

Talk Outline

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- Stripe 82 catalogue
- Disc Heating
- Probing Halo Kinematics
- Constraining Halo Profile
- Accretion Remnants

Stripe-82

Bramich et al. (2007)

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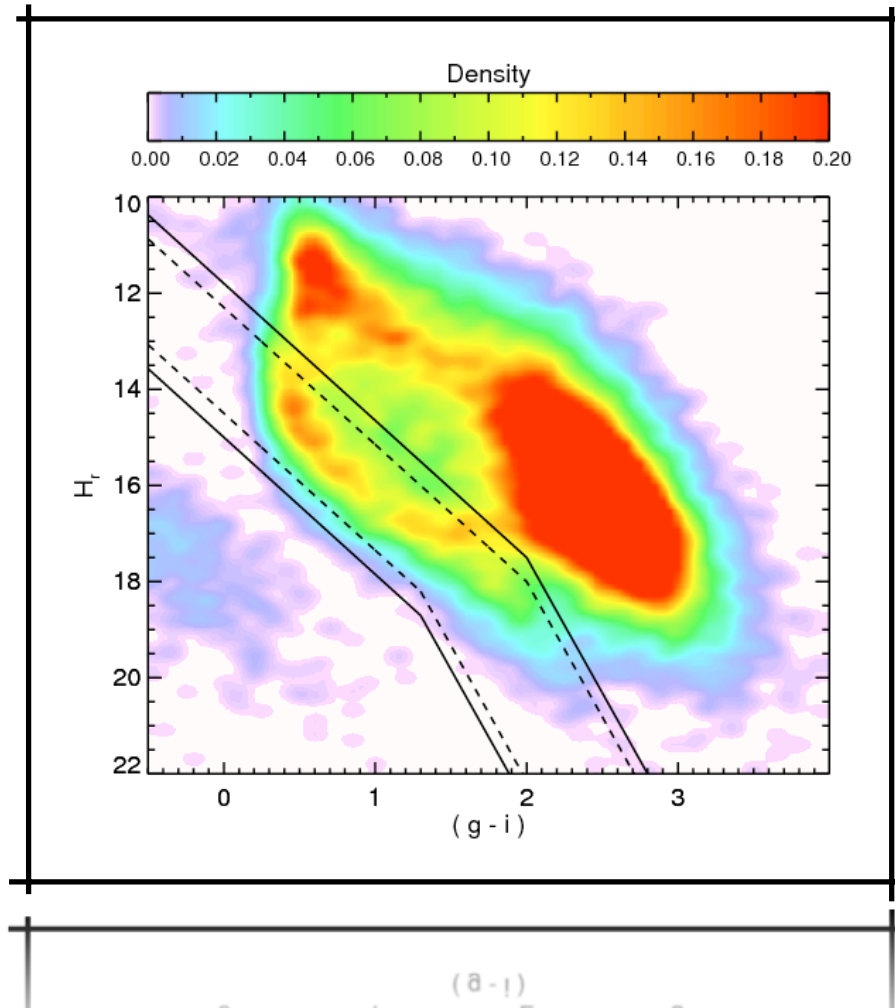
- ~250 square degrees in SDSS equatorial stripe
- up to ~80 epochs over 8 years



Stripe-82

Bramich et al. (2007)

- ~250 square degrees in SDSS equatorial stripe
- up to ~80 epochs over 8 years
- ~1 million stars with photometric and astrometric information
- We have $\sim 7 \times 10^5$ objects with $\delta\mu < 5$ mas/yr
- Ultra-cool white-dwarfs analysed by Vidrih et al. (2006)



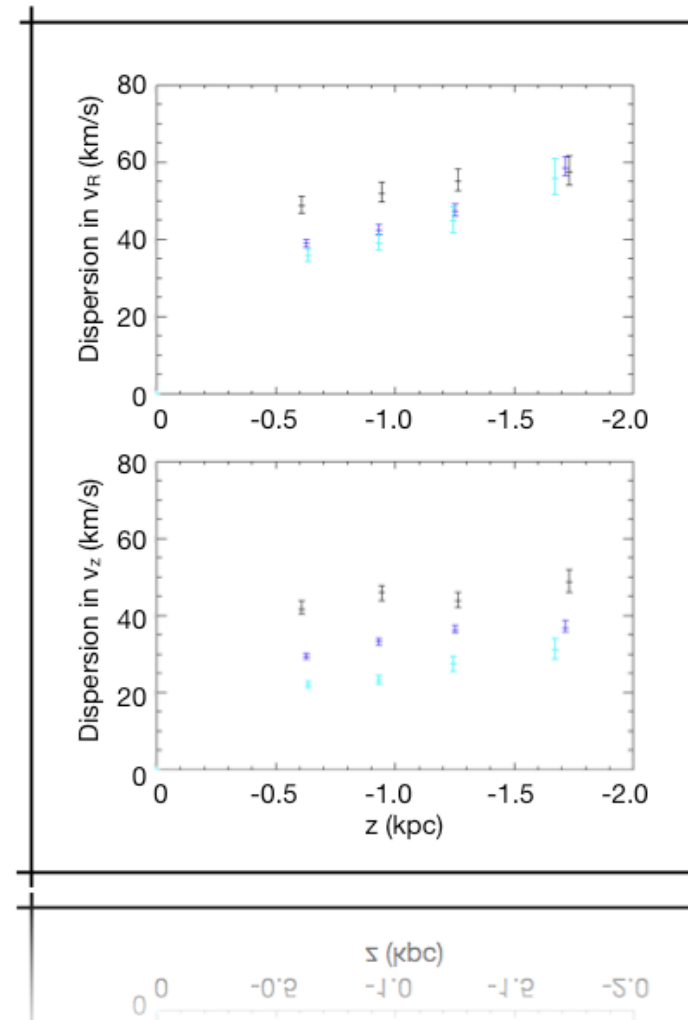
Disk Heating

Stellar Kinematics: The Disk

Whiteoak & Smith (in prep)

- Cross-match with SEGUE spectra to get ~12,000 disk & halo dwarfs out to 5 kpc
- Photometric parallax gives distances to ~10% and velocities to ~25 km/s
- Correct for halo contamination
- Use this sample to investigate disk heating and obtain trends with $[\text{Fe}/\text{H}]$ & height from the plane
- Interpretation underway

$-0.5 < [\text{Fe}/\text{H}] < 0.2$
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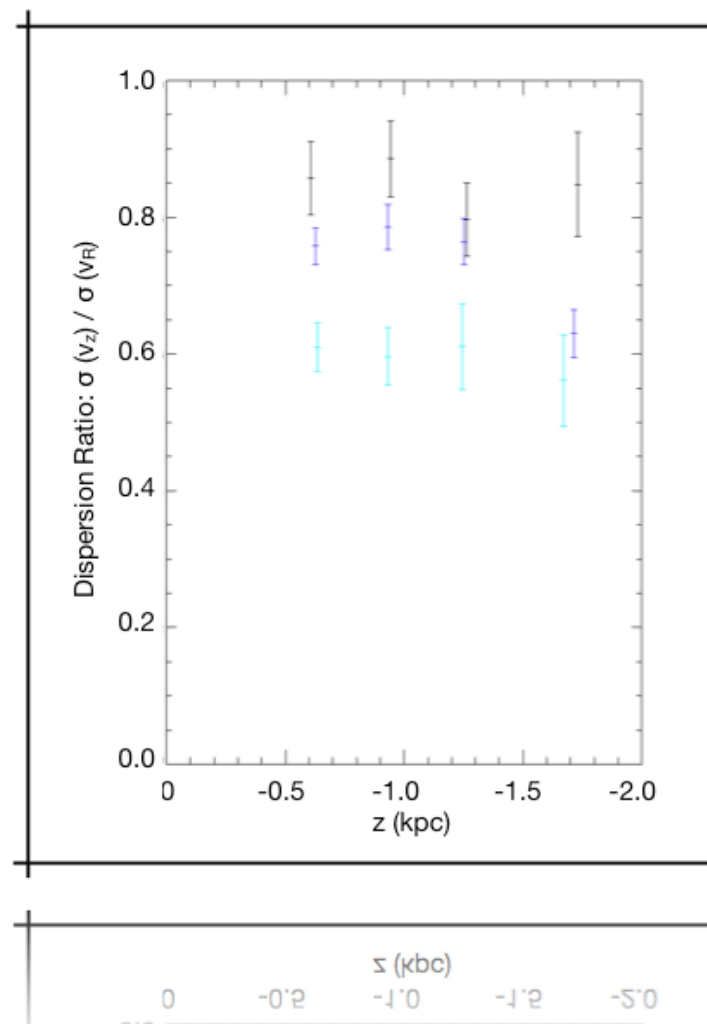


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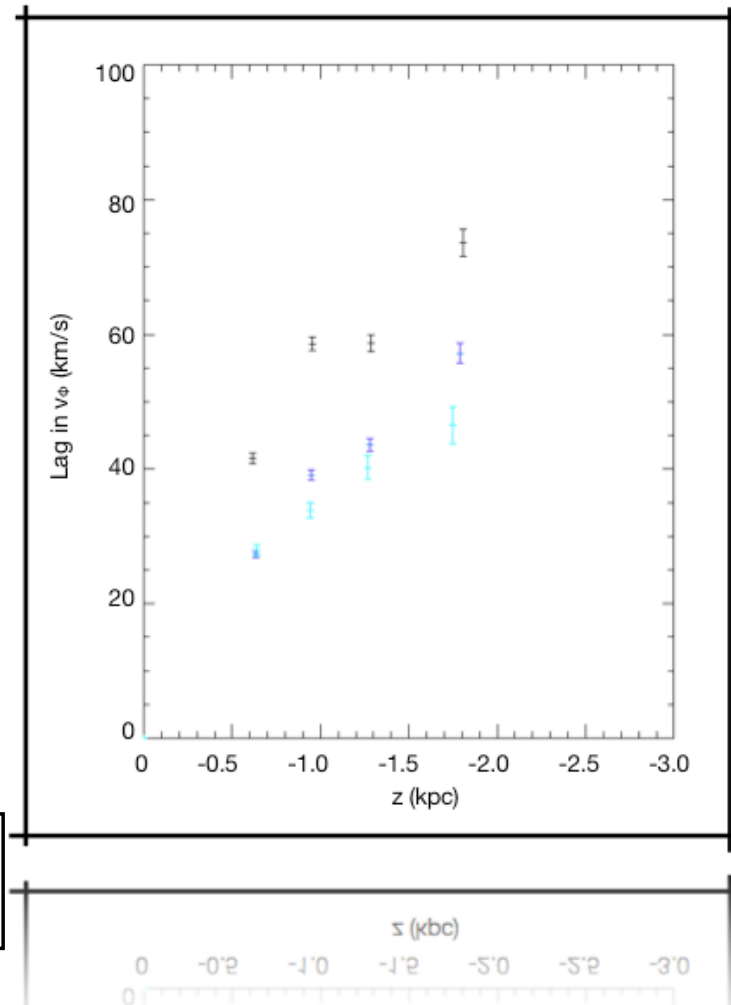


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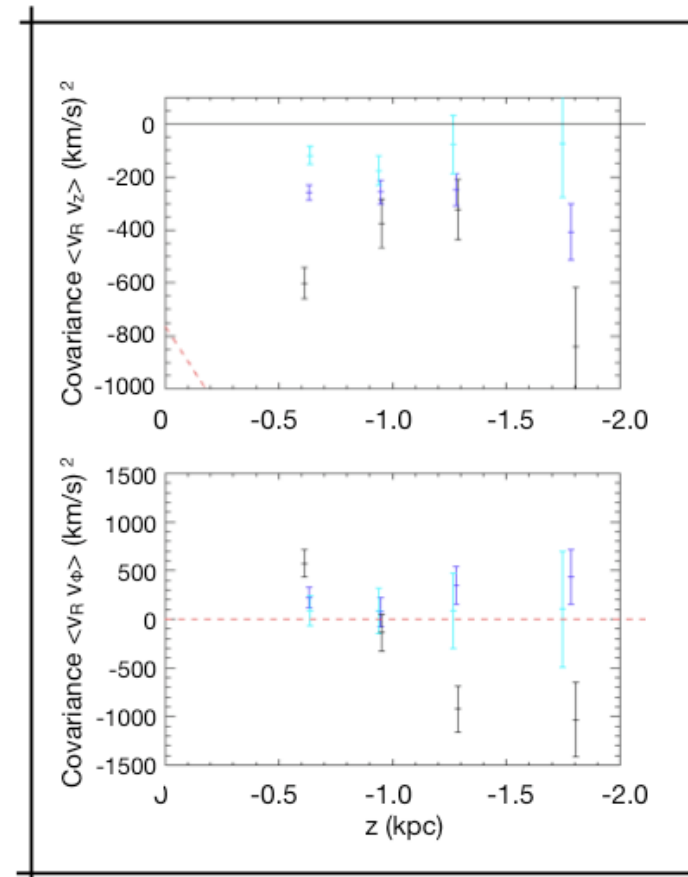


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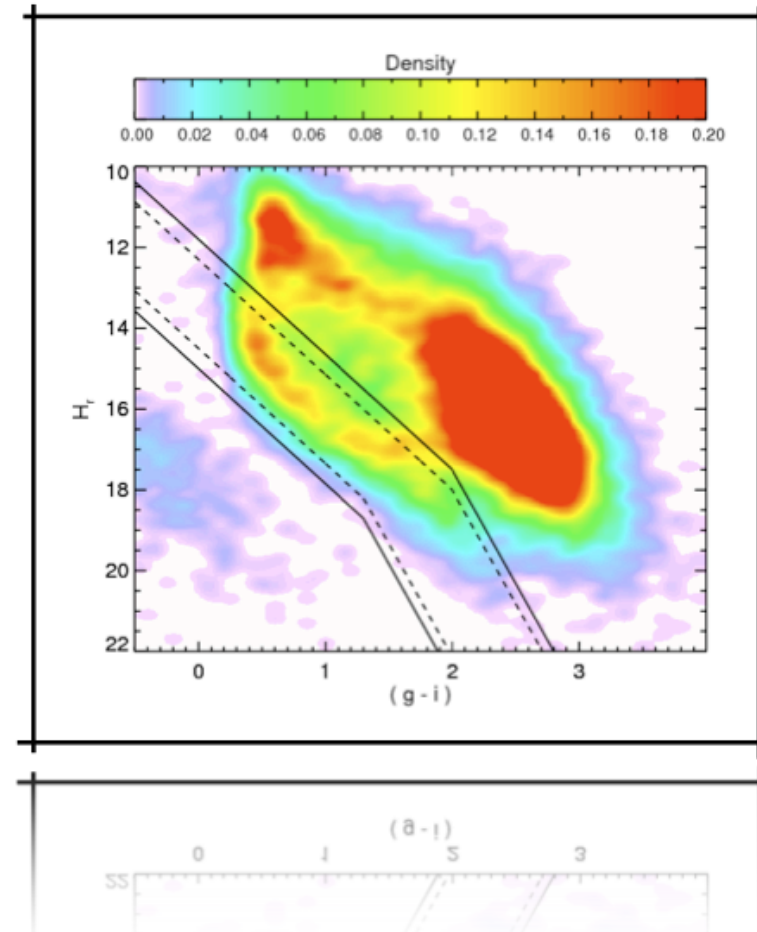




Halo Kinematics

Stellar Kinematics: The Halo

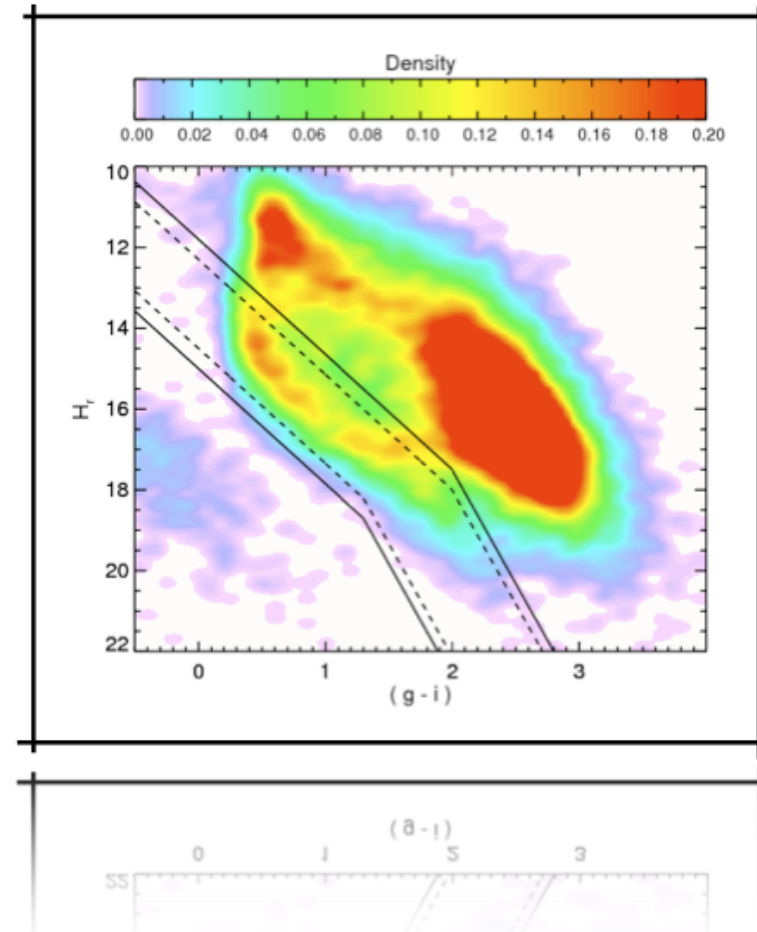
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Stellar Kinematics: The Halo

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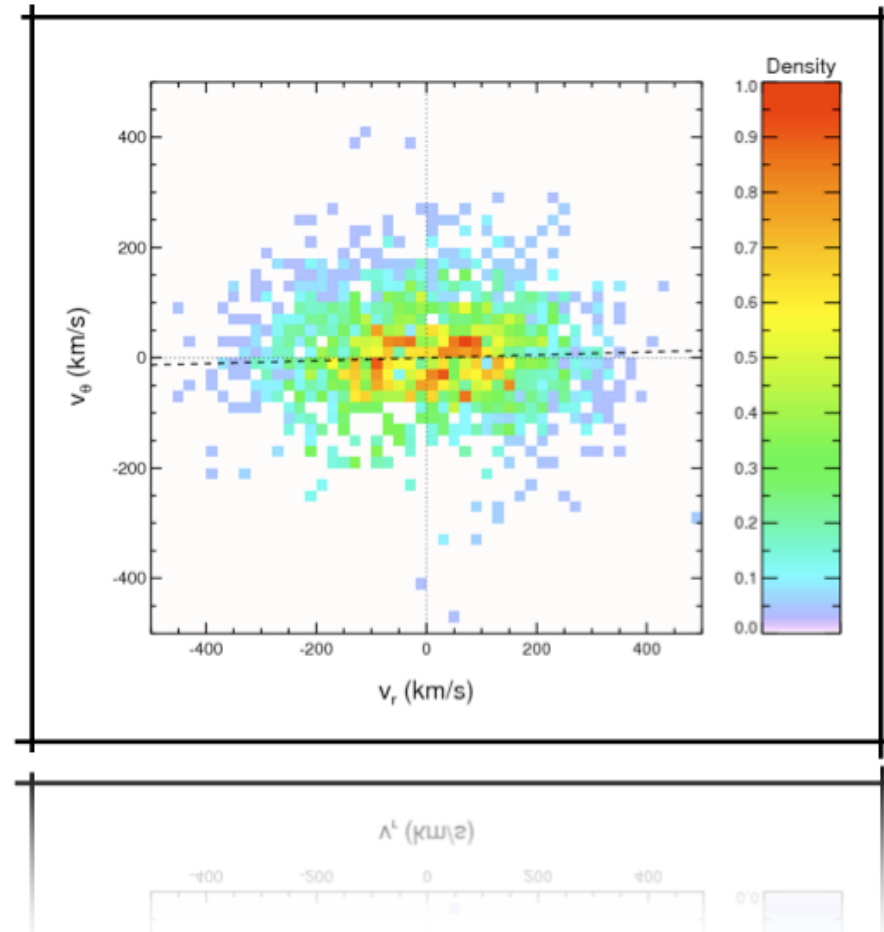
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- Small dispersions:
 $(\sigma_r, \sigma_\phi, \sigma_\theta) = (142, 81, 77)$ km/s
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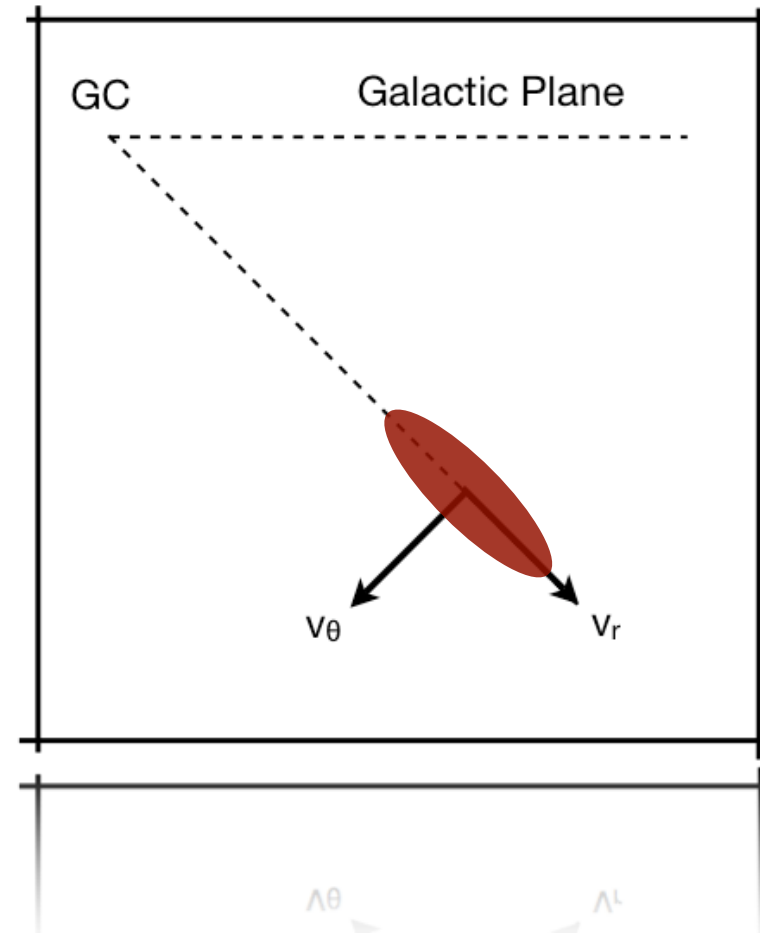
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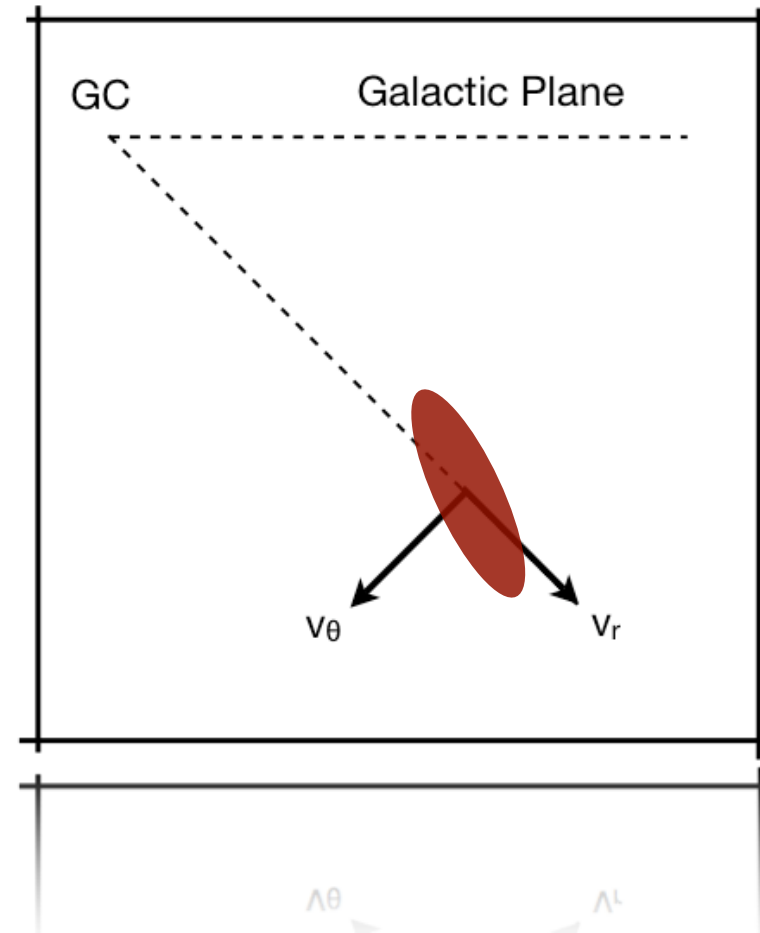
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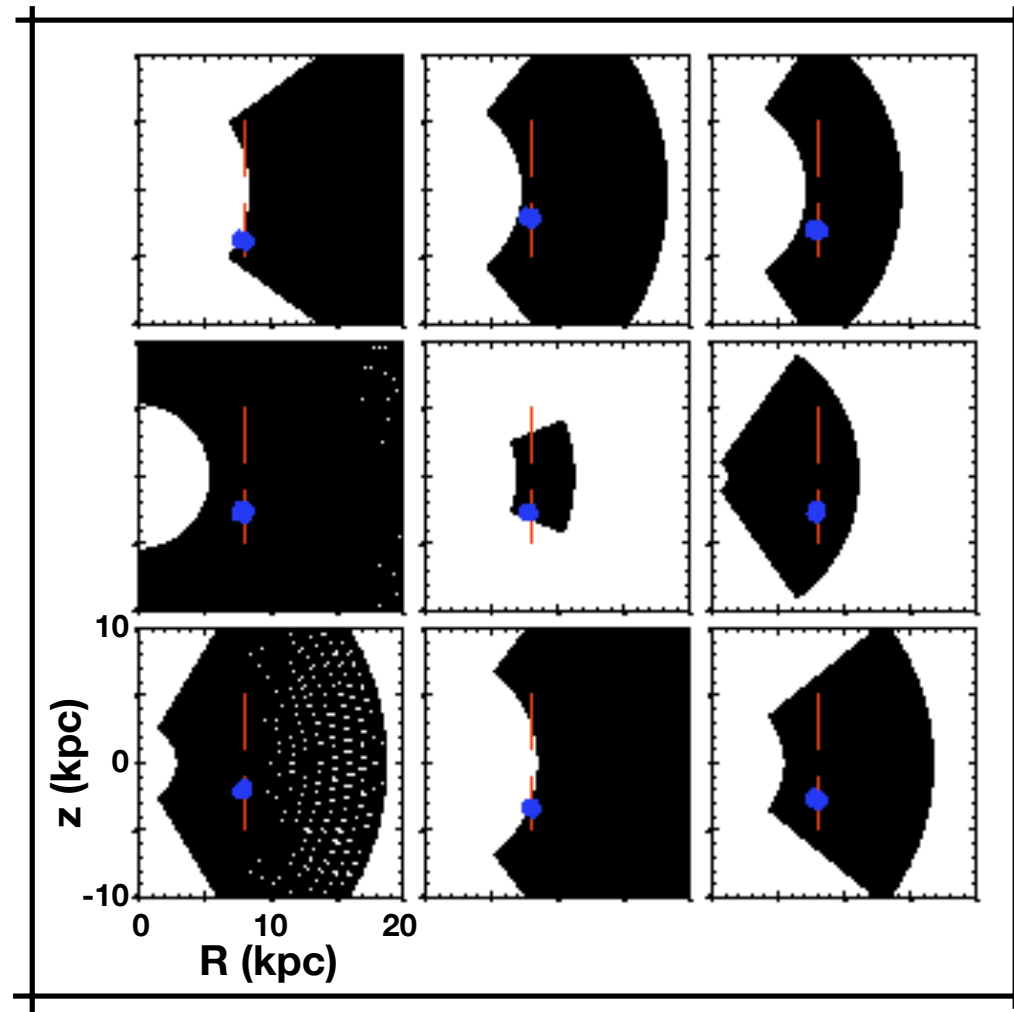
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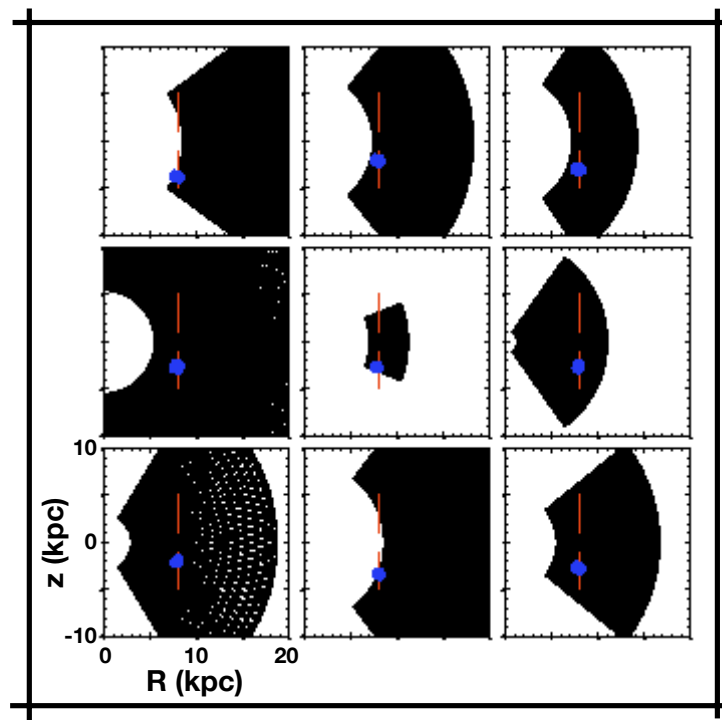


Stellar Kinematics: Tilt in Halo Ellipsoid

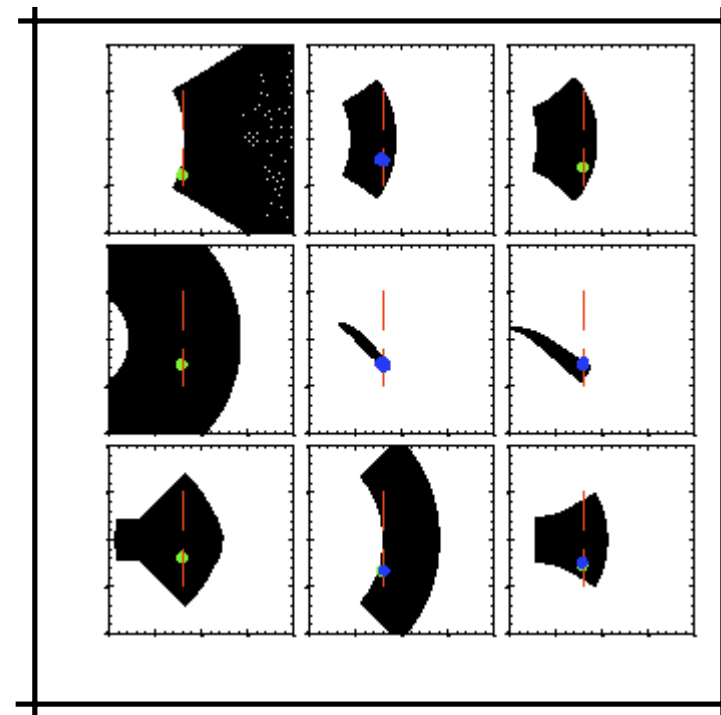


Spherical
Potential

Stellar Kinematics: Tilt in Halo Ellipsoid



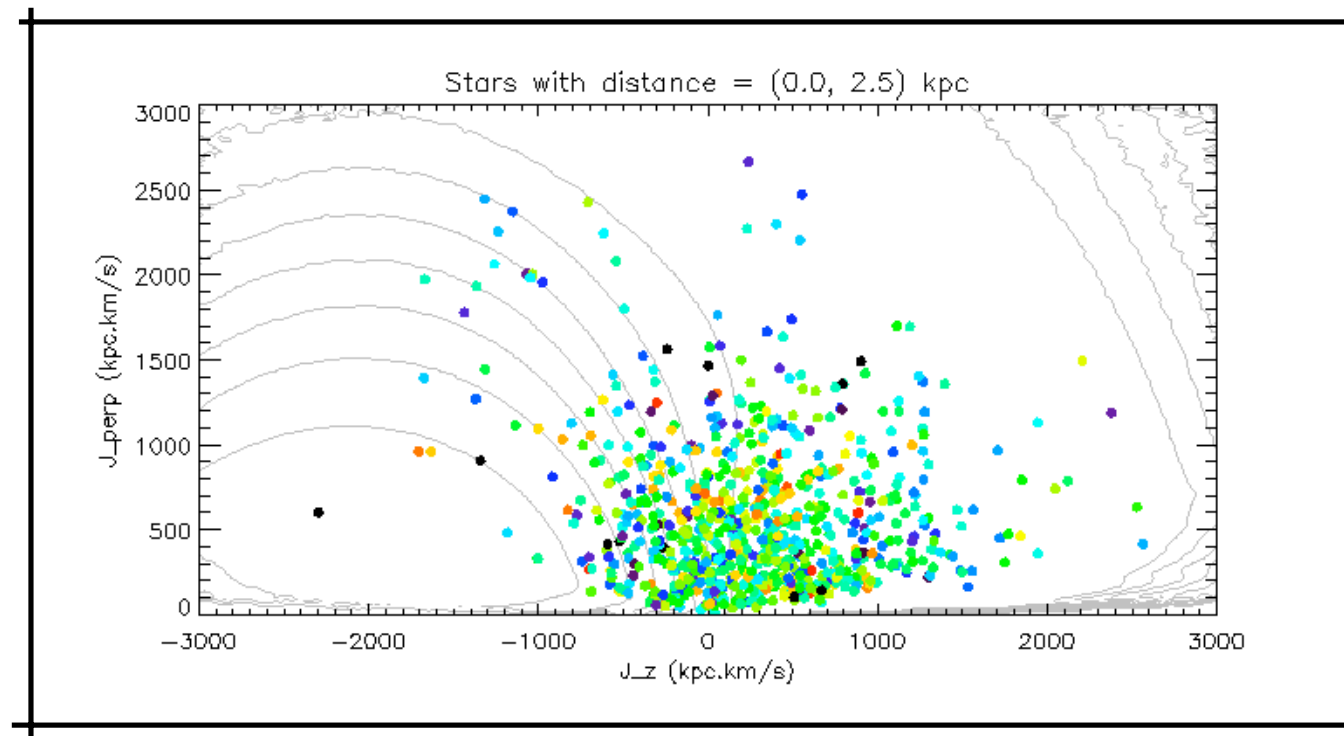
Without Disk



With Disk

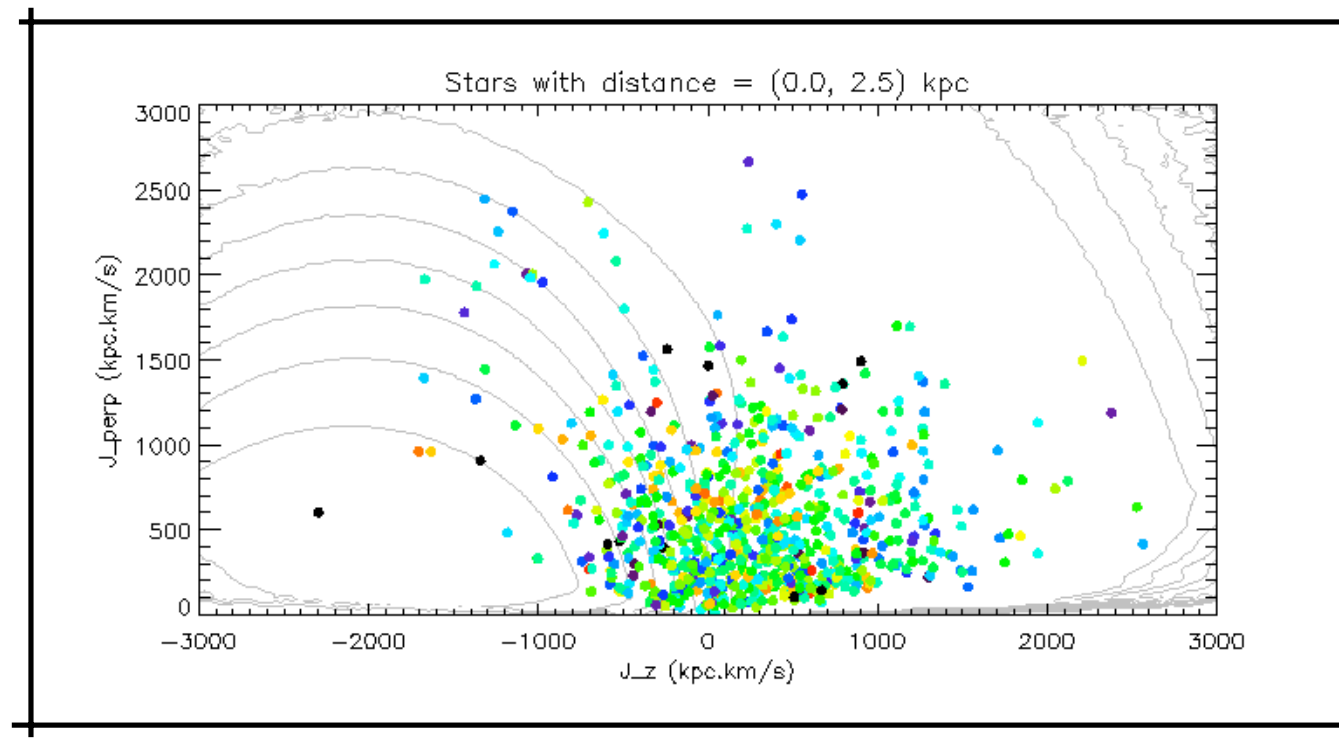
Accretion Remnants

Stellar Kinematics: Overdensities in the Halo



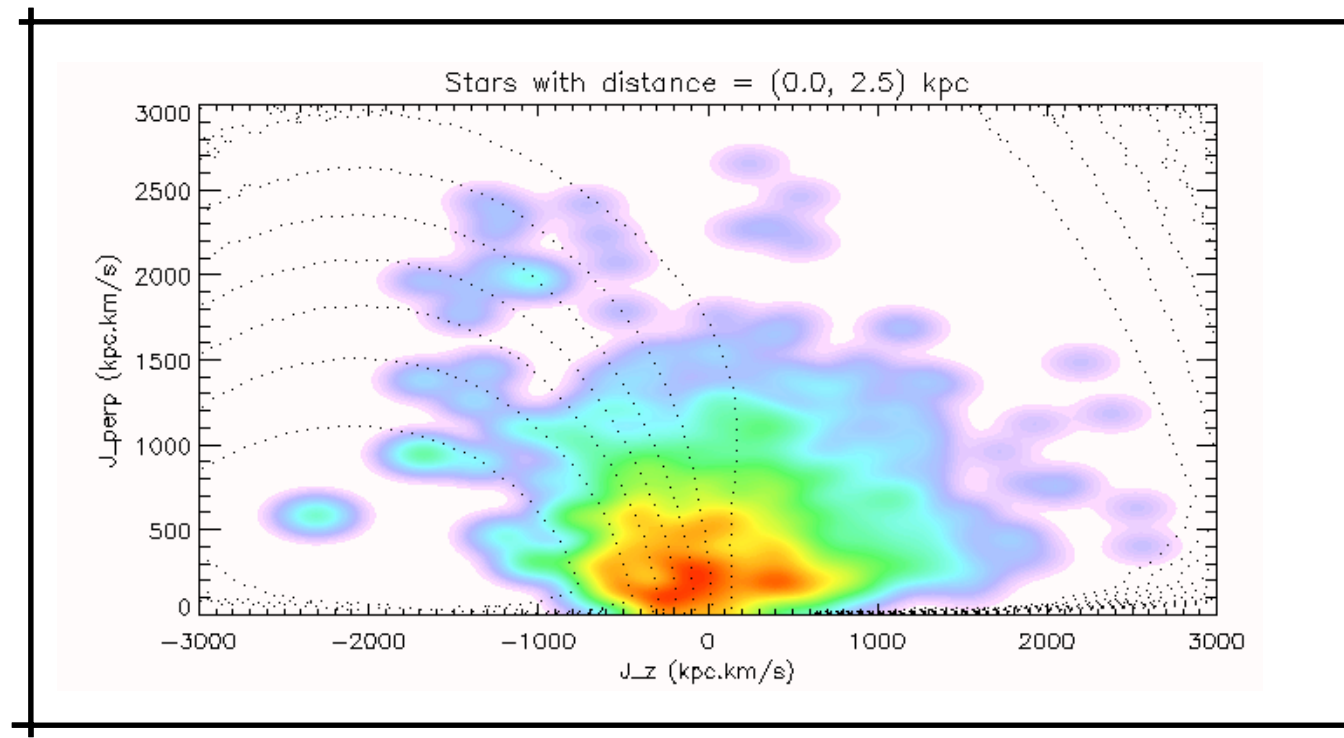
Stellar Kinematics: Overdensities in the Halo

- Use angular momentum to hunt for accretion remnants



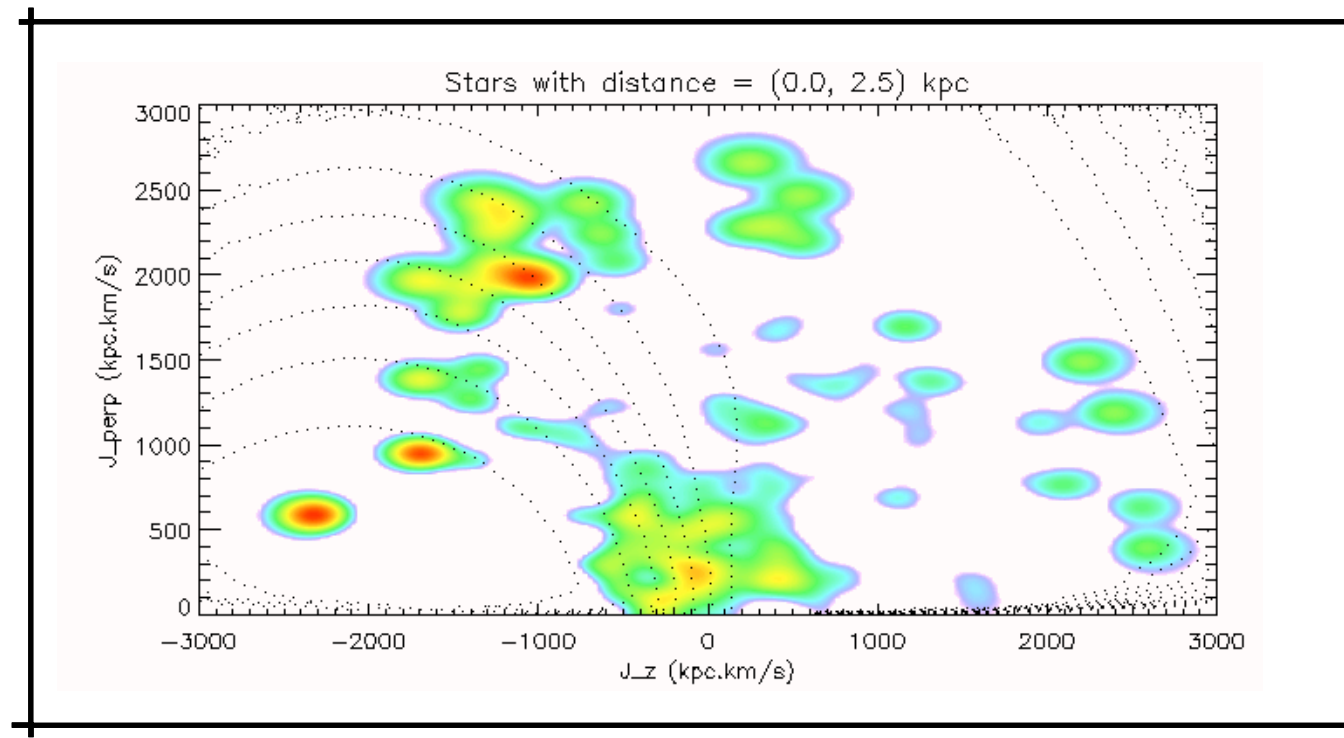
Stellar Kinematics: Overdensities in the Halo

- Use angular momentum to hunt for accretion remnants
- Smooth & correct for bias



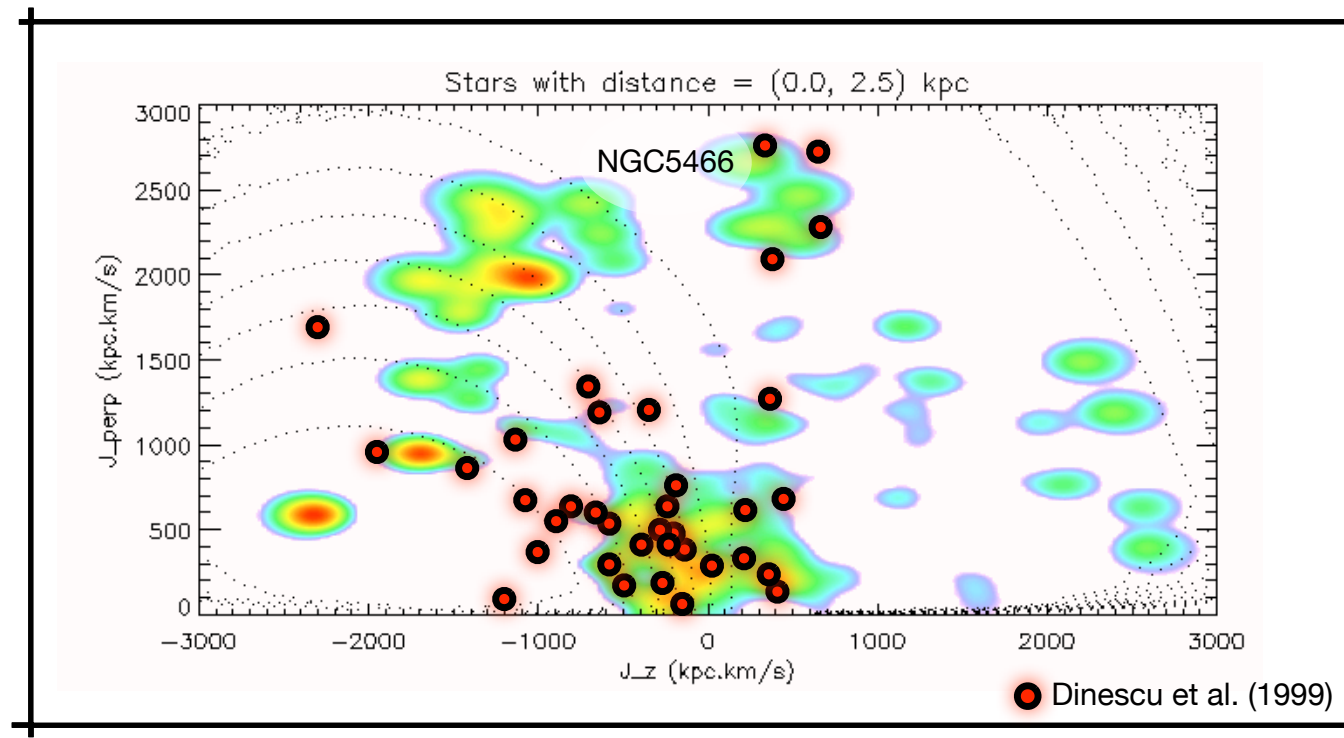
Stellar Kinematics: Overdensities in the Halo

- Use angular momentum to hunt for accretion remnants
- Smooth & correct for bias
- Clear overdensities, such as Helmi et al. (1999) stream



Stellar Kinematics: Overdensities in the Halo

- Use angular momentum to hunt for accretion remnants
- Smooth & correct for bias
- Clear overdensities, such as Helmi et al. (1999) stream
- Associated to Globular Clusters?





Conclusions

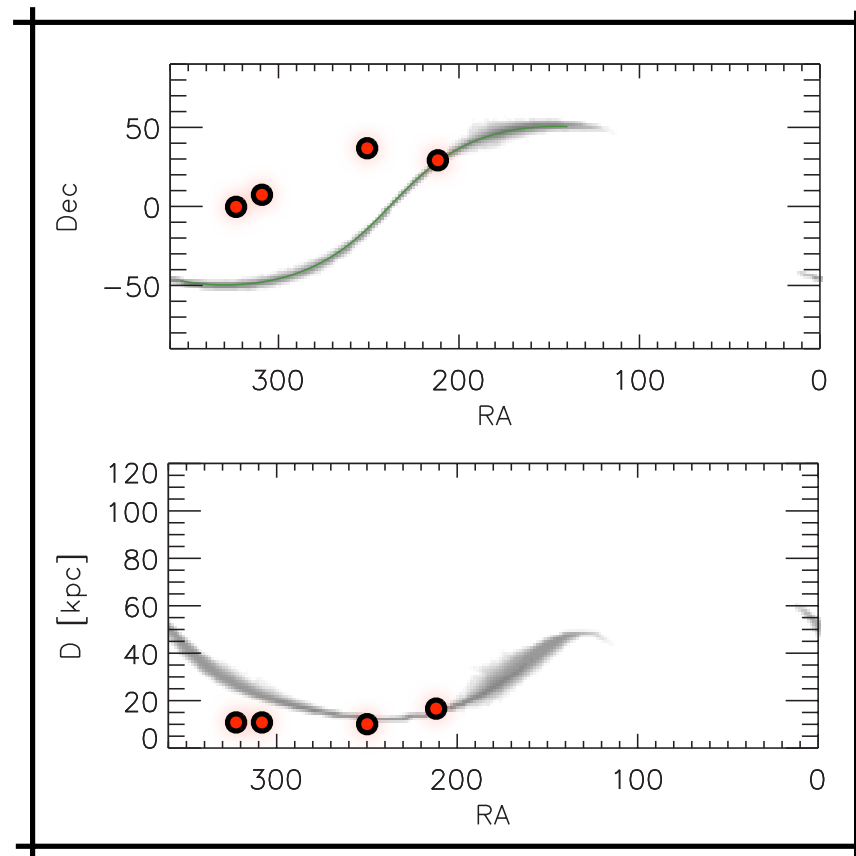
Conclusions

- Shown the potential to understand formation of Milky Way using large spectroscopic surveys
- Utilise large numbers of SEGUE spectra to investigate kinematics of disc and halo populations
 - Probe disc kinematics out beyond RAVE, producing complimentary analysis
 - Probe halo to find and classify accretion remnants
- Future prospects from short-baseline high-cadence proper motion work, e.g. Skymapper, Pan-Starrs, etc

Fin

Additional Slides

Cluster of four clusters



Orbit of
NGC5466