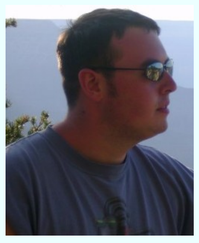
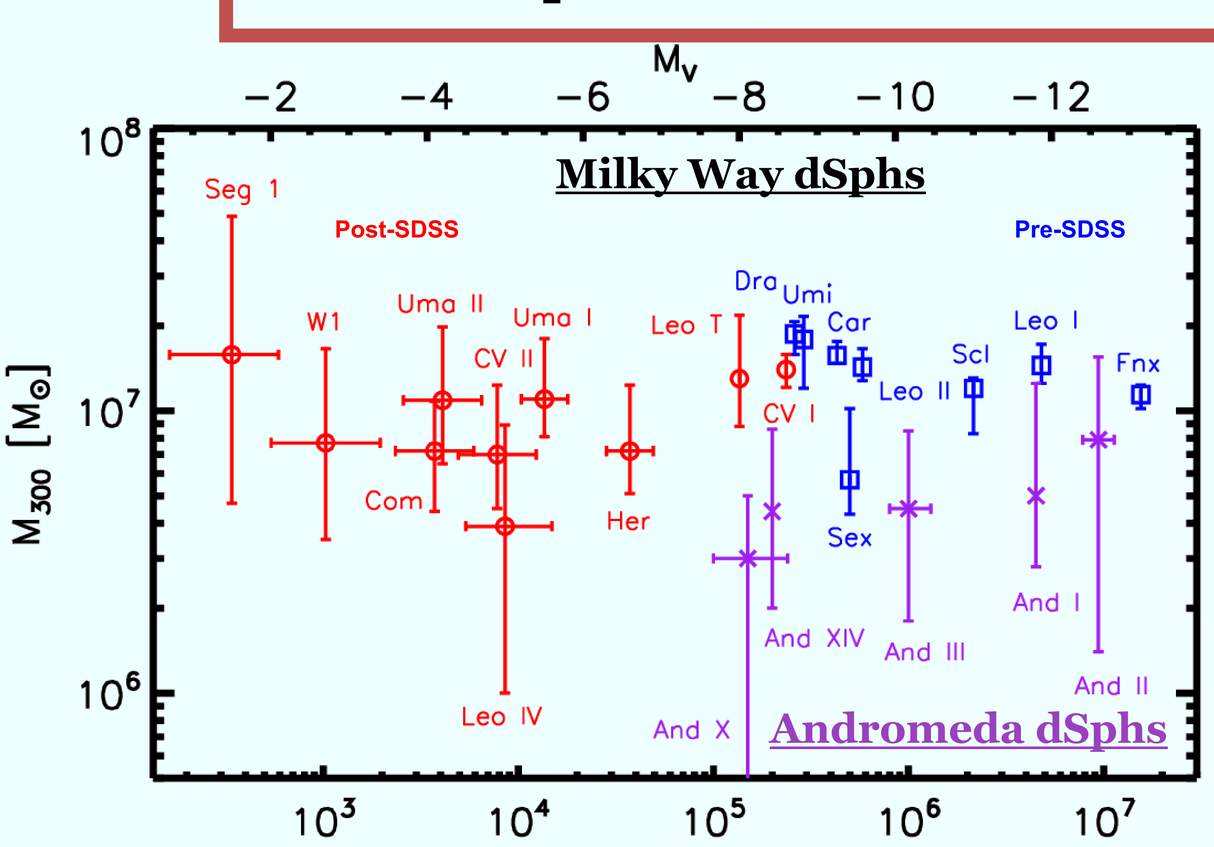
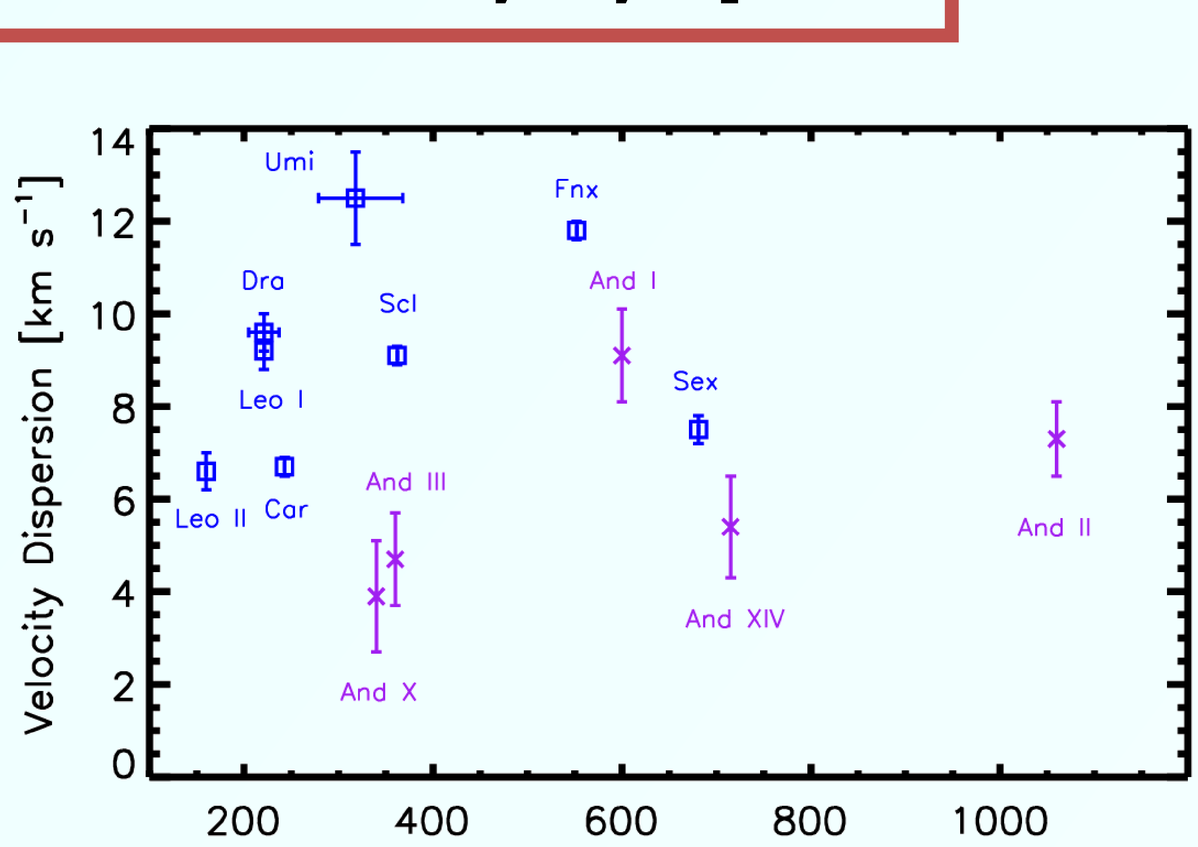
M31 DWARF GALAXY DARK MATTER HALOS



Joseph Wolf, L. Strigari, J. Bullock, M. Kaplinghat *(Center for Cosmology, UC Irvine)*
J. Kalirai, E. Kirby, K. Gilbert, P. Guhathakurta *(UCO Lick, UC Santa Cruz)*
M. Geha *(Yale)* R. Bean, S. Majewski, R. Patterson *(Virginia)* D. Zucker *(Cambridge)*

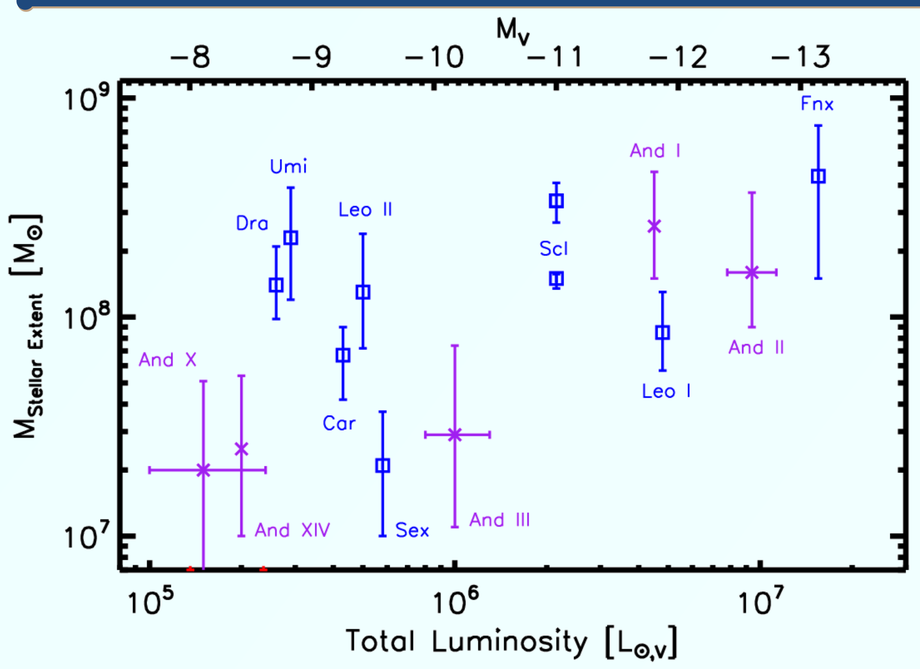
Abstract: **We marginalize over solutions to the spherical Jeans equation to obtain mass profiles for five Andromeda dwarf spheroidals (dSphs). We analyze stellar kinematics of And I, II, III, X, and XIV, obtained from Keck/DEIMOS spectroscopy, and find the integrated mass within 300 parsecs to be 2 times smaller than the Milky Way dSphs.**





Determining the mass of dSphs, the most dark-matter dominated systems known, provides a test of theories of galaxy formation and dark matter on small scales. Our results show that the M31 dSphs are a factor of 2 less massive within 300 pc than the analyzed MW dSphs.

From the observed central velocity dispersion, differing trends can be seen for the MW population and the M31 population. Both of these plots may imply that the MW dSphs and M31 dSphs lie in dark matter halos with different properties.

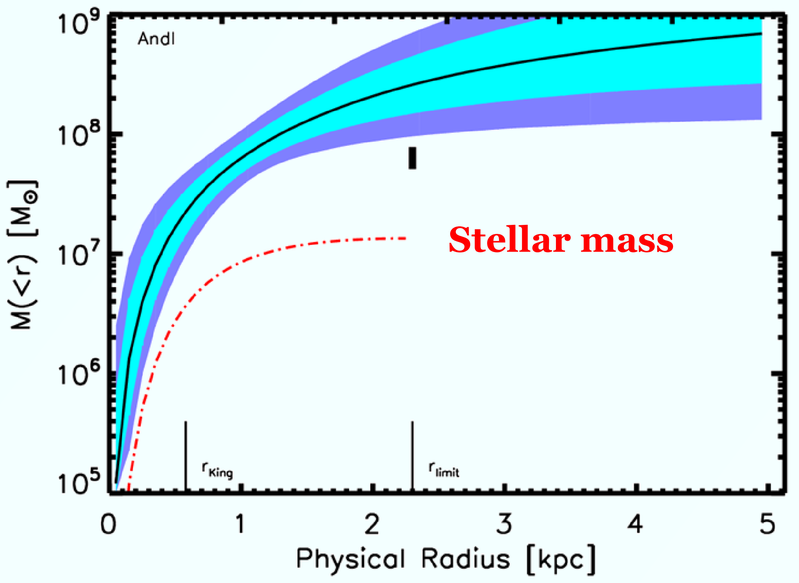


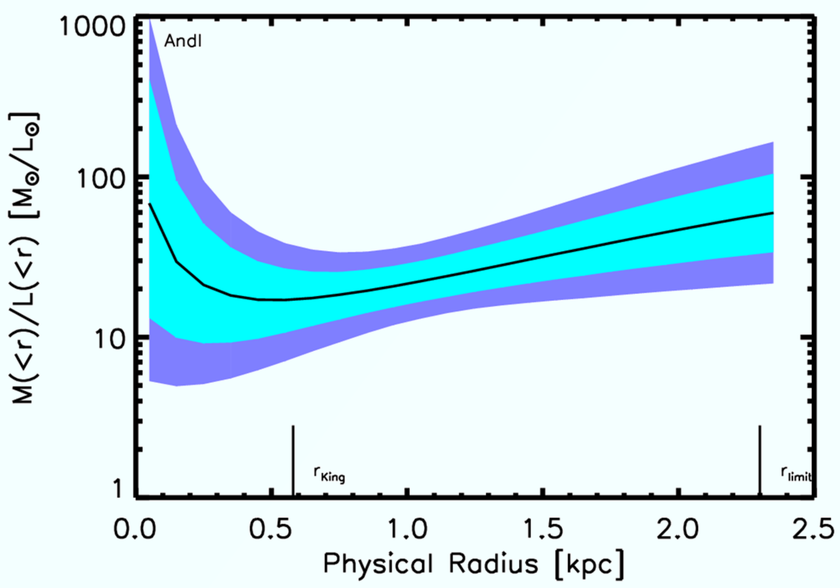
	R_{half} (pc)	σ_0 (km/s)	M_{300} ($10^7\ M_\odot$)	M_{lim}/L_V ($M_\odot/L_\odot$)
I	600	9.1±1.0	$0.50^{+0.75}_{-0.22}$	58^{+44}_{-24}
II	1060	7.3±0.8	$0.79^{+0.76}_{-0.75}$	17^{+22}_{-7}
III	360	4.7±1.0	$0.45^{+0.40}_{-0.27}$	29^{+45}_{-18}
X	340	3.9±1.2	$0.30^{+0.20}_{-0.29}$	133^{+207}_{-127}
XIV	715	5.4±1.1	$0.44^{+0.42}_{-0.24}$	125^{+145}_{-75}

Left: M_{lim} vs L shows a statistically positive trend for the M31 dSphs, but not for the MW dSphs. Sculptor's mass was derived by two different authors with two different datasets.

Right: Mass and M/L profiles for And I. The black rectangle represents the commonly-adopted Illingworth approximation, assuming mass follows light. The red dashed line shows the total mass of the stars assuming a stellar M/L of 3.

The black line is the median value of the mass likelihood at each radius, where the cyan and purple shaded regions represent the abscissae when the integrated likelihood is 68% and 95% of the total likelihood, respectively.





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