

# PHYSICS AND ASTRONOMY COLLOQUIUM

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Probing the Dark Halo of the Milky Way

The Local Group, the regime in which detailed star-by-star studies can be done, is becoming a major testbed for the concordance Lambda (Dark Energy) + Cold Dark Matter model of our Universe. The dwarf galaxies of the Local Group, in particular, pose a variety of challenges to the nature of dark matter. For e.g., the “Missing Satellites Problem” refers to the fact that there are orders of magnitude too few dwarf galaxies around the Milky Way than is predicted by structure formation in a cold dark matter universe. But the big galaxies have a role to play as well: a better estimate of the total Milky Way halo mass is important for many of these questions. The most reliable means by which to constrain the properties of the Milky Way dark halo is through assessing the 6-D phase space distributions of tracers of its gravitational potential. This requires accurate proper motions (tangential velocities) in addition to generally known radial velocities for field stars and satellites widely distributed throughout the halo. I will discuss some novel approaches we have been developing to obtain proper motions for a variety of tracers in the Milky Way halo, as well as our efforts to push further out into the Local Group, and to definitively constrain the Milky Way’s dark halo mass, shape and distribution.



**THURSDAY, FEBRUARY 25, 2016 | 4:00 PM | HAWKING AUDITORIUM**



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