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# Rotation of Galaxy Dark Matter Halos

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**Abstract.** The degree to which outer dark matter halos of spiral galaxies rotate with the disk is sensitive to their accretion history and may be probed with associated satellite galaxies. We use the Steward Observatory Bok telescope to measure the sense of rotation of nearby isolated spirals and combine these data with those of their associated satellites (drawn from SDSS) to directly test predictions from numerical simulations. We aim to constrain models of galaxy formation by measuring the projected component of the halo angular momentum that is aligned with that of spiral galaxy disks, $J_z$. We find the mean bulk rotation of the ensemble satellite system to be co-rotating with the disk with a velocity of $22 \pm 13$ km/s, in general agreement with previous observational studies and suggesting that galaxy disks could be formed by halo baryons collapsing by a factor of $\approx 10$. We also find a prograde satellite fraction of 51%, and $J_z$ of the satellite system to be positively correlated with the disk, albeit at low significance ($2655 \pm 2232$ kpc km/s).

**Keywords.** galaxies: evolution – galaxies: halos – galaxies: structure – dark matter

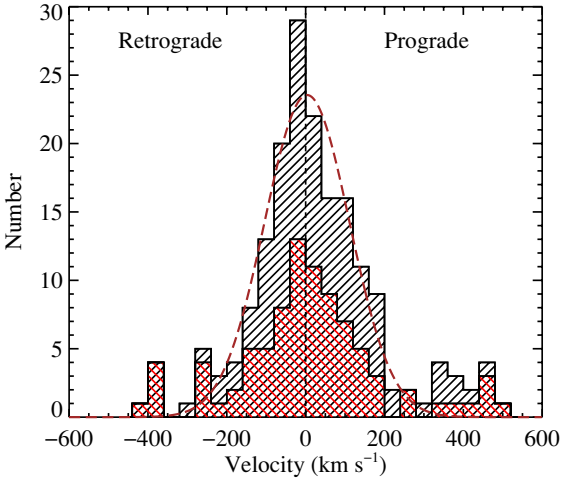


**Figure 1.** Radial rotation velocities. Positive values depict satellite rotations in the same sense as the disk, while negative values indicate counter-rotating satellites. Our new (Bok) sample is marked in hatched-fill, while the combined Bok + ZSFW sample is in diagonal-fill. The best-fit Gaussian to the full sample is overplotted. We find the **peak at small retrograde velocities**, significant here at $1\sigma$, and there is a clear **asymmetric tail towards large prograde velocities**; this feature is **inconsistent with a Gaussian distribution at the** 98% **confidence level**. The **mean net prograde velocity** of the satellite system is found to be $+22 \pm 13$ km/s. Herbert-Fort et al. (in prep.) will address these data in more detail.

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## References

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