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## Disk-halo interactions

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## **A Dynamical friction and halo densities**

**Jerry A. Sellwood**, University of New Jersey  
(and Victor Debattista, ETH Zurich)

**Abstract** Rotating bars in disk galaxies offer a direct probe of the dark matter halo. The dynamical friction force between the bar and the halo scales with the strength of the bar, the halo density, and the speed of the bar much in the manner predicted by Chandreskhar's formula for test particles; self-gravity in the halo has a minor impact in cases of interest. Bars slow down as they lose angular momentum, while the halo density profile is little affected by the angular momentum gained. The fact that strong bars are not slow yields an important constraint on the central density of the dark matter halo. I present new results on friction between bars and NFW halos, which require a low concentration, index if bars are to remain as fast as those observed today.