Characterizing the relevance of chaotic mixing in the Solar Neighborhood

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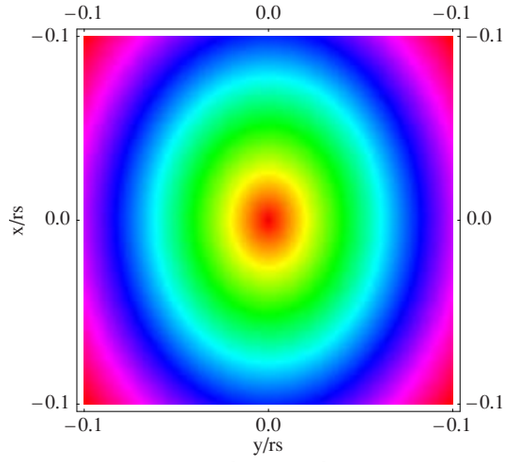
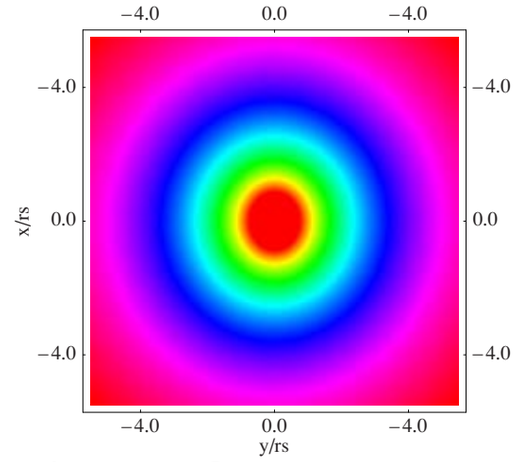
Milky Way dark matter halo potential:
Cuspy and strongly triaxial!

Name	M_{200} $[10^{12}]$	$c_{\rm NFW}$	b/a	c/a
Aq–A2	1.842	16.19	0.65	0.53
Aq–B2	0.8194	9.72	0.46	0.39
Aq–C2	1.774	15.21	0.55	0.46
Aq–D2	1.774	9.37	0.67	0.58
Aq–E2	1.185	8.26	0.67	0.46

Inner region: aspherical



Outer region ~ spherical



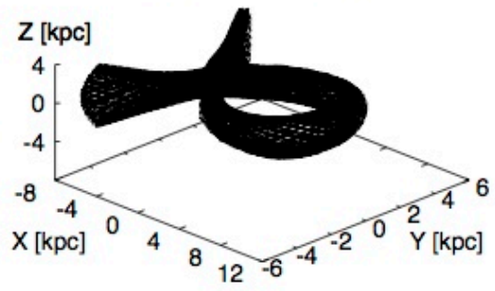
Vogelsberger et al. 2008

Triaxial extension of NFW

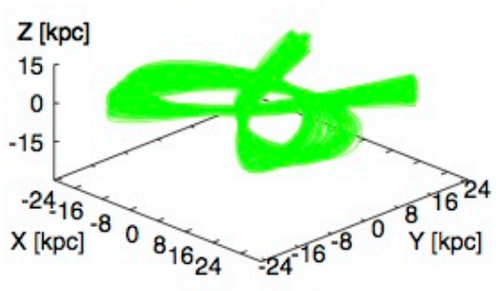
Typical orbits on a strongly triaxial NFW:

Regular
Sticky
Chaotic

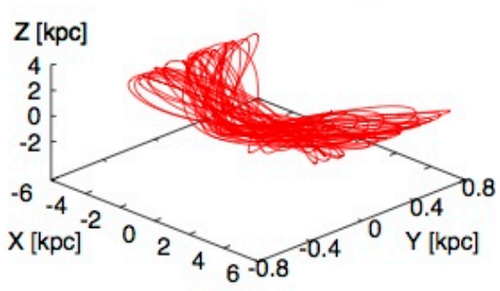
Regular orbit: 0-50 [Gyr]



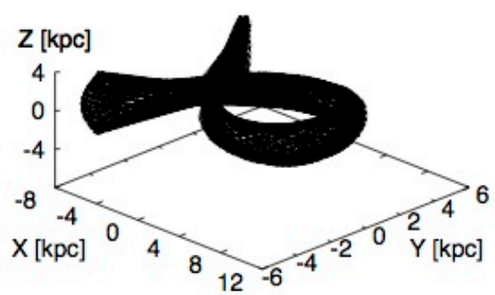
Sticky orbit: 0-110 [Gyr]



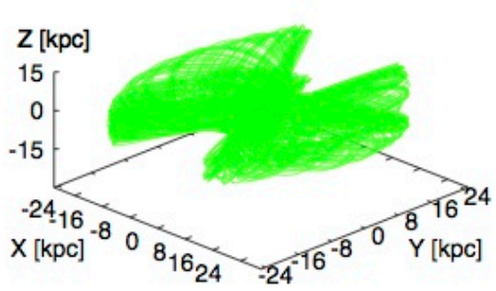
Chaotic orbit: 0-5 [Gyr]



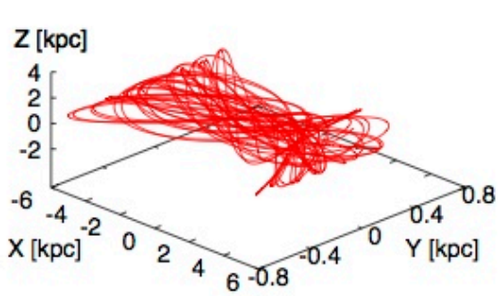
Regular orbit: 950-1000 [Gyr]



Sticky orbit: 890-1000 [Gyr]



Chaotic orbit: 5-10 [Gyr]

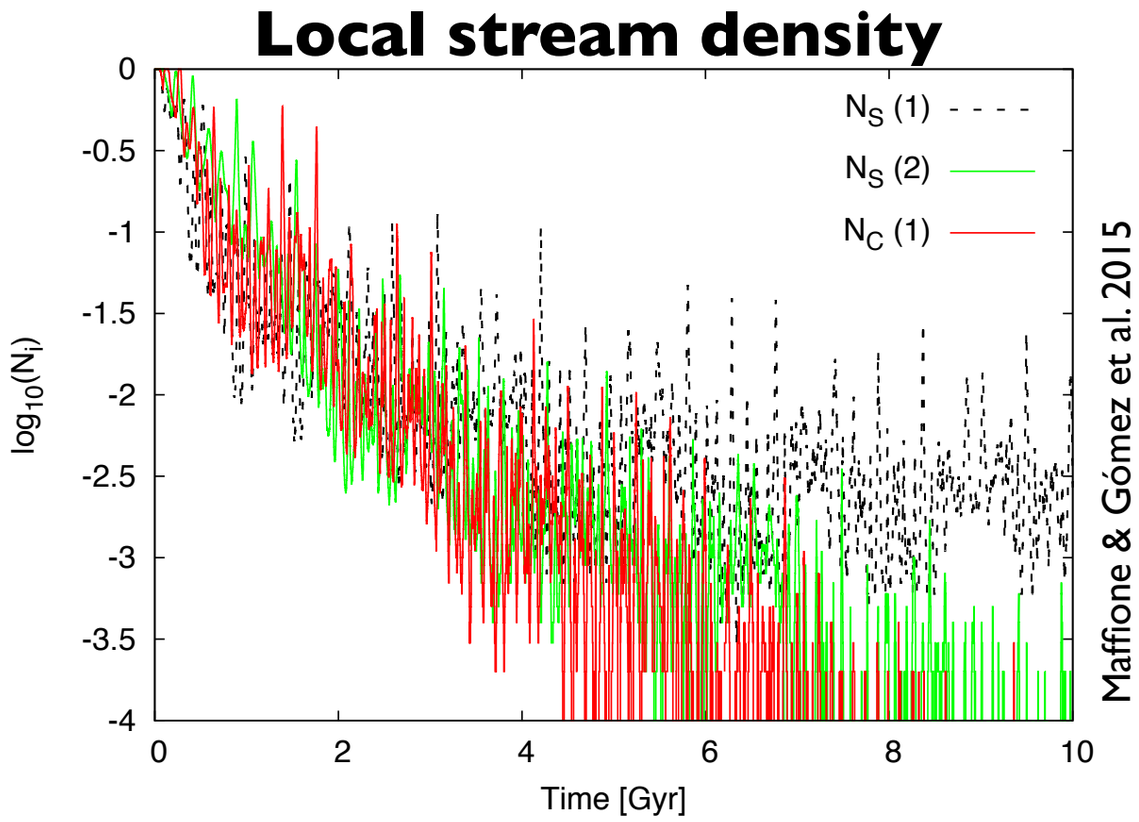


Regular:
Local stream density: **power-law**
Integral of motion: **Conserved**

Chaotic:
Local stream density: **exponential**
Integral of motion: **Diffusion**

Very hard to identify streams

Sticky?



Solar Neighborhood-like spheres (five halos):

≤ 20% orbits show **chaotic** behavior within 10 Gyr

~ 30% are perfectly **regular**

The remaining **50%** → **sticky** orbits
(Chaos onset times ≫ 10 Gyr)

For those chaotic orbits, diffusion does not have enough time to operate