$\nu_h = 140$ km s$^{-1}$ and the parameters $a = 6.5$ kpc; $b = 0.26$ kpc; $c = 0.7$ kpc and $d = 12$ kpc (Johnston et al. 1995). The satellite was modeled by a plummer sphere whose potential is of the form:

$$\phi = -\frac{GM_{\rm sat}}{\sqrt{r^2 + r_0^2}}, \qquad (4)$$

where the mass of the satellite $M_{\rm sat}$ was varied between $5 \times 10^8$ and $1 \times 10^9$ $M_\odot$. We took plummer radii $r_0$ of 0.3, 0.5, 0.6 and 1.2 kpc. The NFW dark halo was constructed with the method proposed by Mashchenko & Sills (2005).

When we simulated the satellites only with barionic matter, we found that in the case of the densest ones, i.e., satellites whose plummer radius is $\leq$0.5 kpc, more than 30% of its initial masses survives for 10 Gyrs. This means that this galaxies are more stables than the observed Sagittarius. Furthermore, we found galaxies whose 10% or 20% of their initial masses survives for 10 Gyrs; this type of galaxies neither reproduce the properties observed in Sagittarius. Finally, extended satellites, i.e., the ones whose plummer radius is 1.2 kpc, reproduce some properties of the dwarf; but in a very early time (at 3 Gyrs). These results point out two important things: Sagittarius, at the beginning of its evolution, might have been immersed in a dark matter halo and its plummer radius could not have been $\leq$0.5 kpc.

We simulated galaxies with plummer radius of 0.6 kpc immersed in different contents of dark matter. In the whole simulations, the half light radius of the satellites always was lesser than the one measured in Sagittarius; this fact indicates that the progenitor of this dwarf galaxy might have been an extended galaxy, i.e., its plummer radius should have been equal or higher than 1.2 kpc. This result was confirmed when we simulated a galaxy with initial radius of 1.2 kpc immersed in a dark halo. It was the only galaxy that reproduced the half light radius of Sagittarius. Figure 1 shows the evolution of a galaxy without dark matter and immersed in a dark halo. As we can see, the halo acts as a shield, because more percentage of initial mass can survive for 10 Gyrs.

## 3. CONCLUDING REMARKS

Despite of the failed effort of some people to find out direct evidence of dark matter in Sagittarius, our simulations suggest that this galaxy at the beginning of its evolution might have been immersed in dark matter. This result has an important impact in the theories of formation of structure in the universe, which suggest that only big galaxies have dark matter halos. Nevertheless, our simulations are not enough to find the exact initial content of dark matter in Sagittarius; it would be necessary to have a larger range of mass and to simulate the Milky Way as a live component since dynamical friction effects become important. With respect to the features of the progenitor of Sagittarius, we found that it should have been an extended galaxy with plummer radius higher or equal to 1.2 kpc.

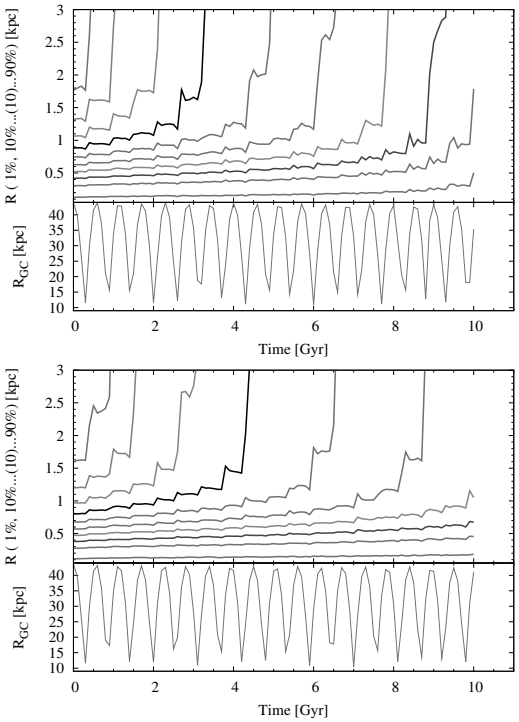


Fig. 1. Evolution of a satellite with $7 \times 10^8$ $M_\odot$ and plummer radius of 0.6 kpc, top: without dark matter and bottom: with a dark halo of $8 \times 10^8$ $M_\odot$. Note that for this case, the galaxy is more stable; 30% of its initial mass survives for 10 Gyrs. $R_{\rm GC}$ is the movement of the maximum density.

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