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Effects of Baryon Mass Loss on Profiles of Large Galactic Dark Matter Halos

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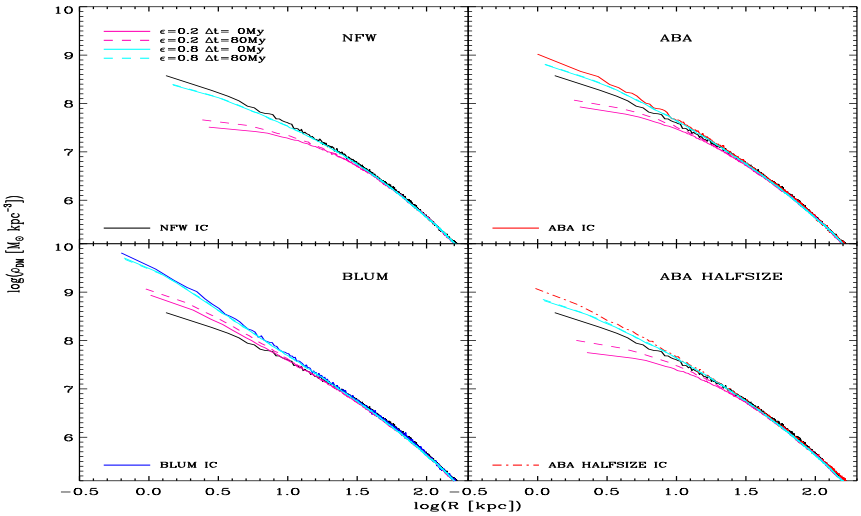
We study the effect of baryon mass loss on the inner structure of large galactic dark matter haloes by means of numerical experiments, meant in particular for AGN feedback in precursors of massive Early Type Galaxies. This has been proposed to remove over a few dynamical times a substantial fraction of their baryons. Here we focus on the distribution of dark matter in the galactic region. It is shown that the inner region of the DM halo expands and its density profile flattens by a sizeable amount, with little dependence on the expulsion timescale.



The figure shows that the inner region of the DM halo expands and its density profile flattens by a sizeable amount, with little dependence on the expulsion timescale. The ratio between the final and initial baryon mass is dubbed ϵ, while Δt is the expulsion timescale. Besides the standard NFW profile found in gravity only simulations, we used profiles contracted according to the findings from cosmological hydro simulations (ABA), as well as profiles in which the contraction is estimated using the analytical treatment (BLUM). In all panels we plot for reference also the standard NFW profile (black solid line).

Cuspy density profiles in DM halos of ETGs could be difficult to reconcile with an effective AGN (or stellar) feedback during the evolution of these systems.