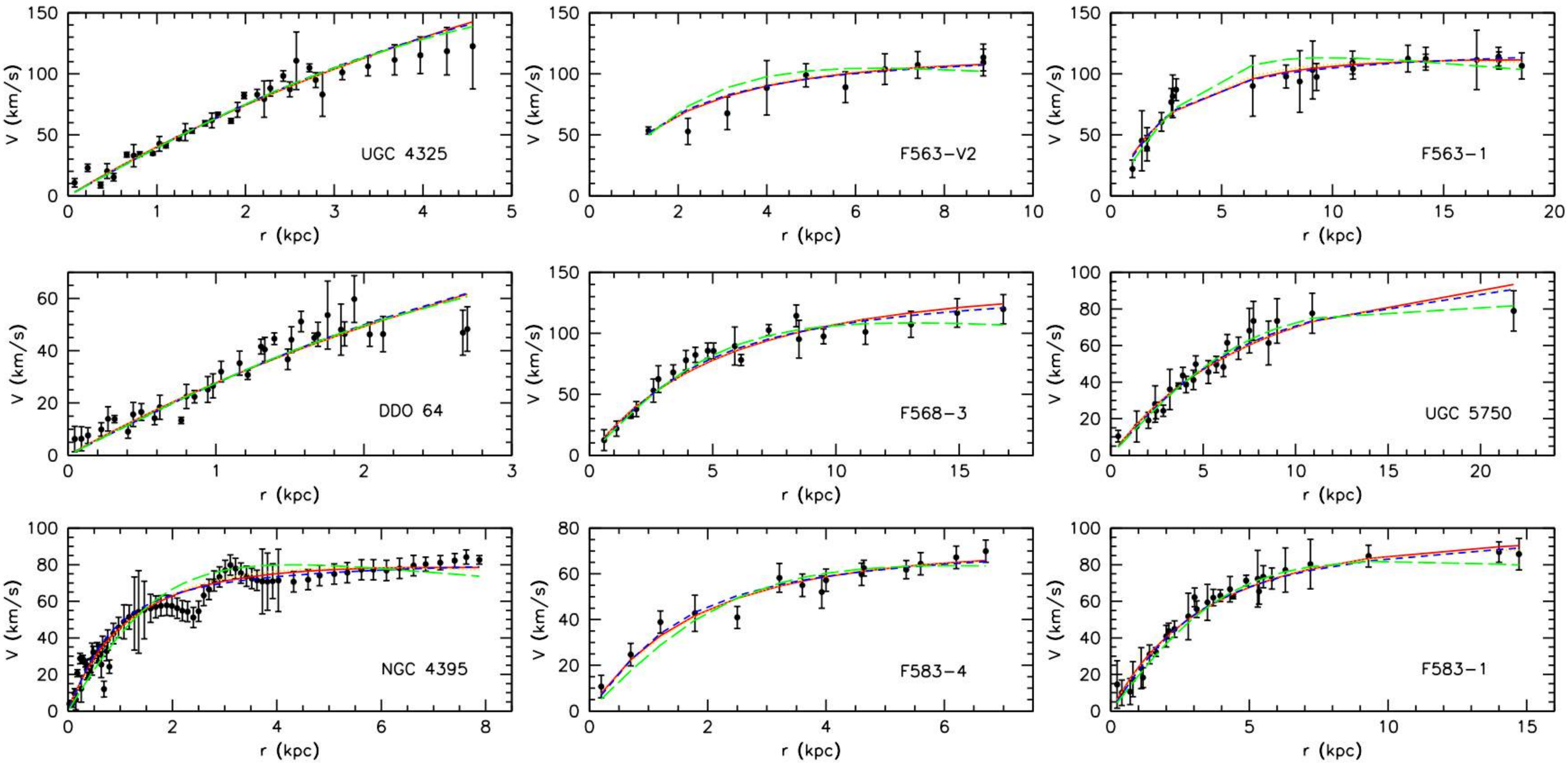
Dark matter cusps vs. cores

Observationally-inferred cores in low-surface brightness (LSB) galaxies



$$v_{\rm c} \propto r \Rightarrow \rho = {\rm const}$$

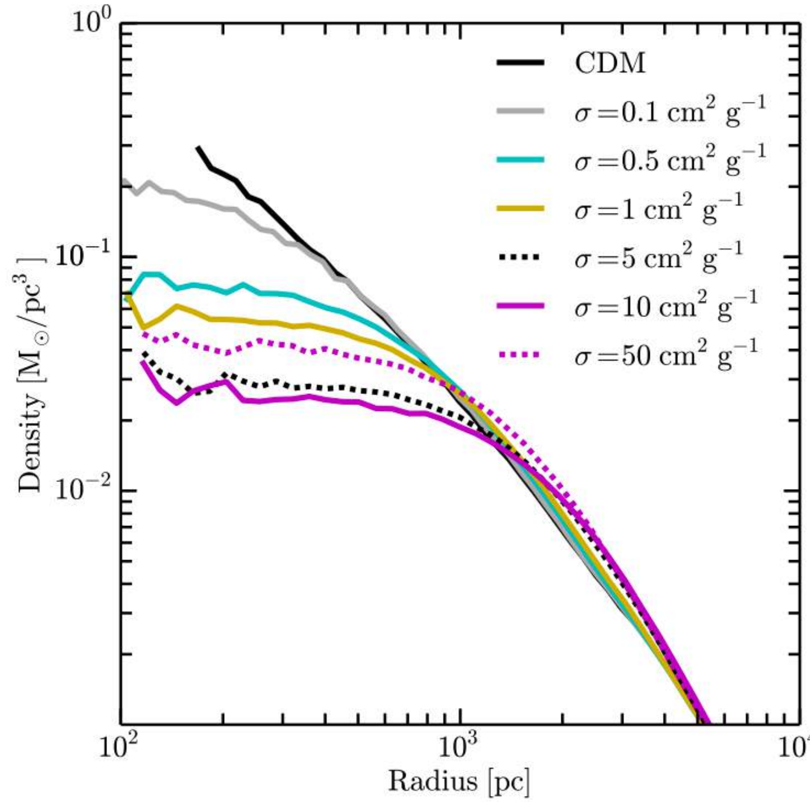
Compare with pure CDM: $\rho_{\rm NFW} \propto r^{-1}$ for small r

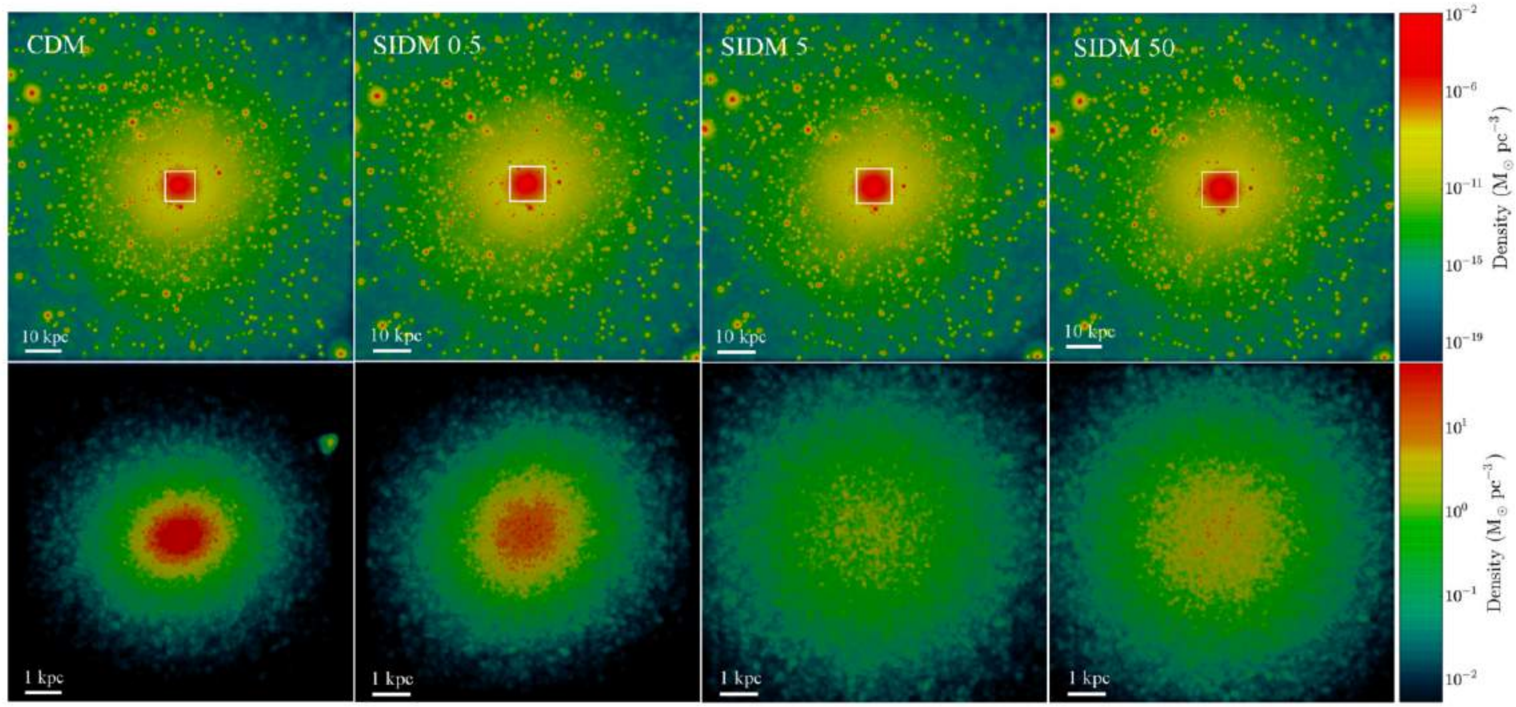
Kuzio de Naray+10

Self-interacting dark matter

One way to produce dark matter cores is to postulate that dark matter scatters with itself with a cross section σ (no annihilation nor dissipation needed)

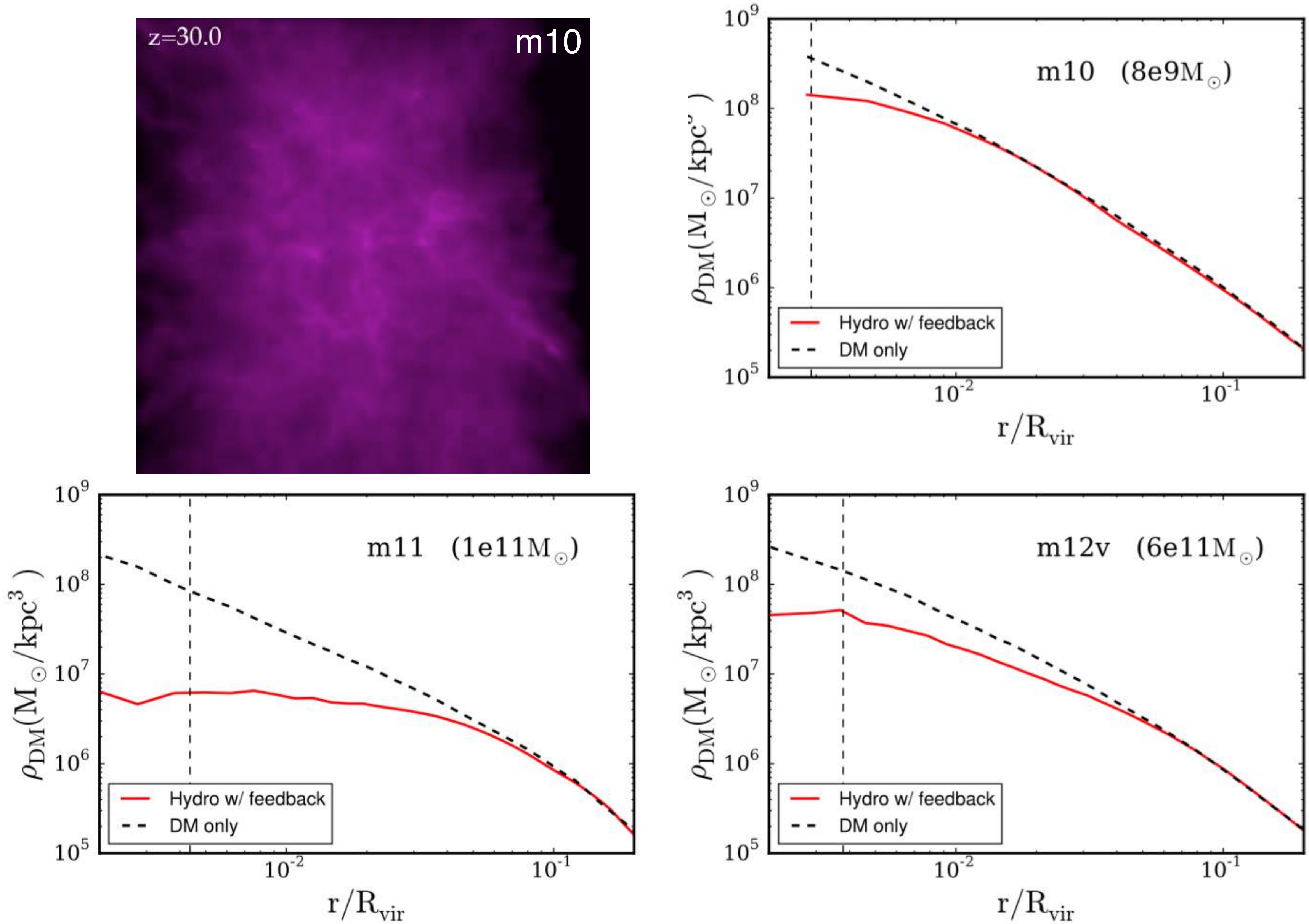
Cons: correct σ unknown, values required to explain rotation curves not particularly well motivated





Elbert+10

Stellar feedback can also produce cores by



Pros: appears to be an inevitable consequence of successful galaxy formation models, does not require “new physics"

Chan+15