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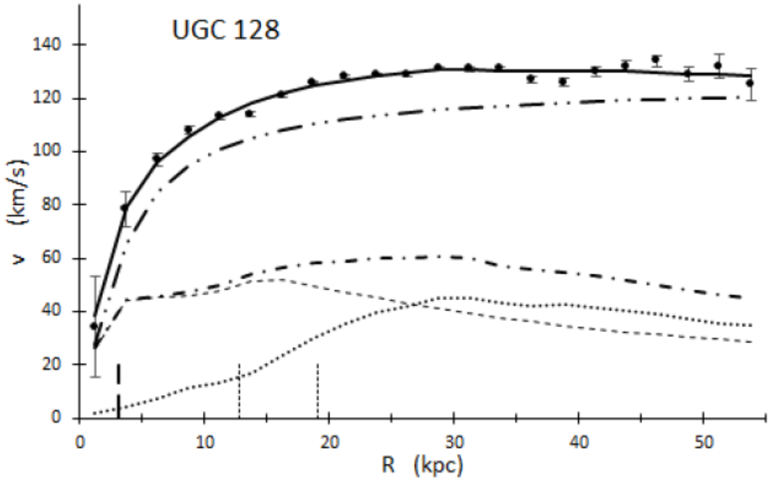
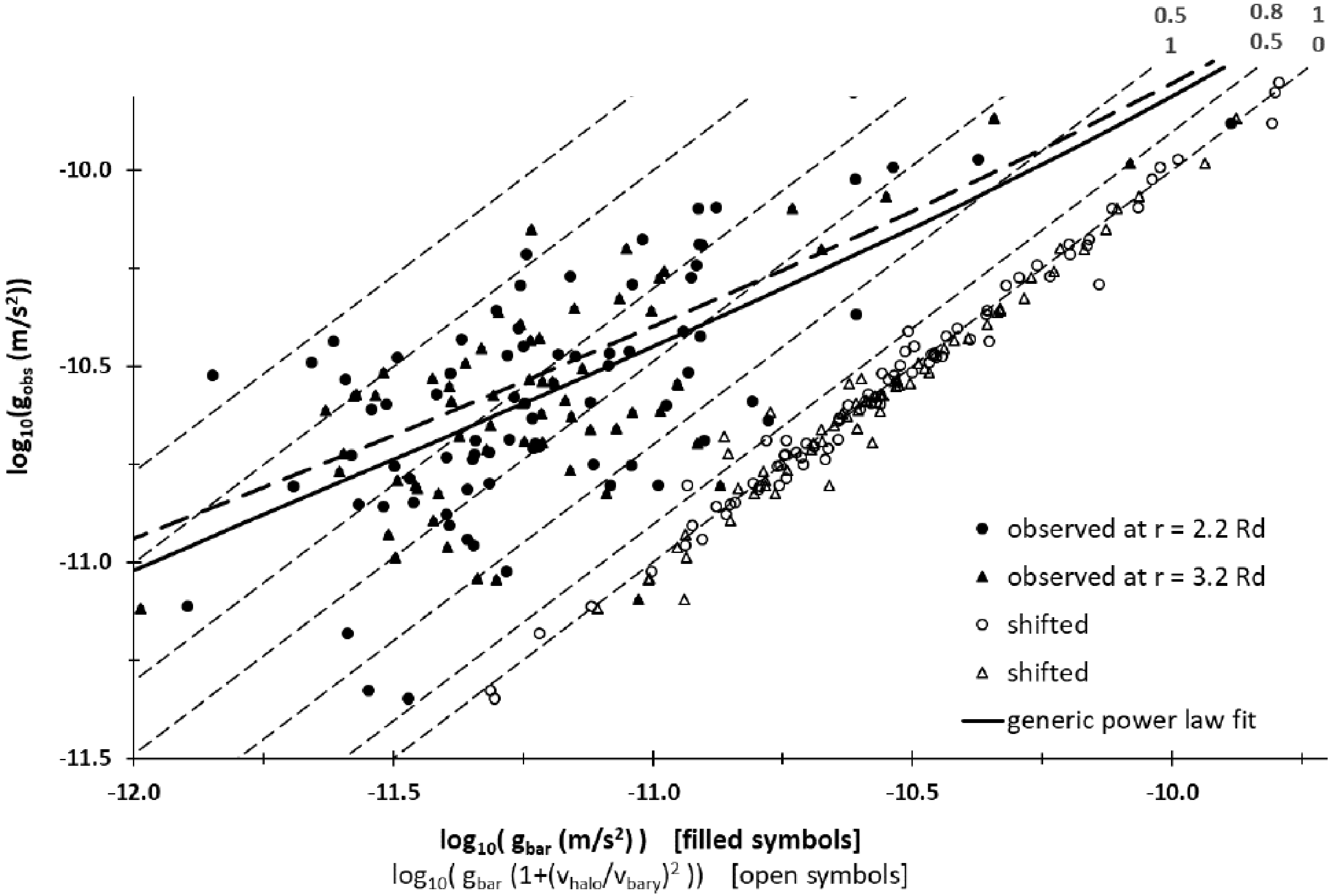
Structure-dynamics relations for late-type spiral and dwarf irregular galaxies revisited

arXiv: 1808.06634

Bernhard R. Parodi[1]★

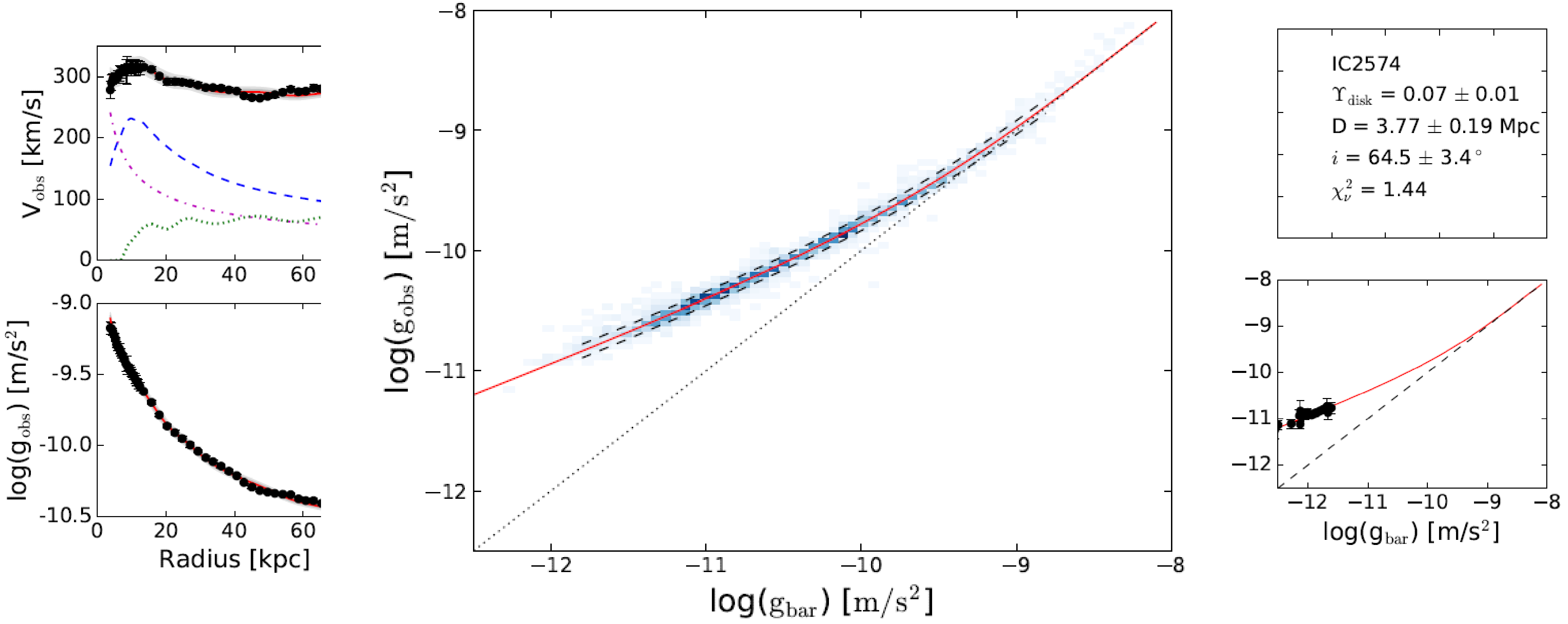




Fitting the radial acceleration relation to individual SPARC galaxies

arXiv:1803.00022

Pengfei Li[1], Federico Lelli[2,★], Stacy S. McGaugh[1], and James M. Schombert[3]



S I D M

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Self-interacting dark matter (SIDM)

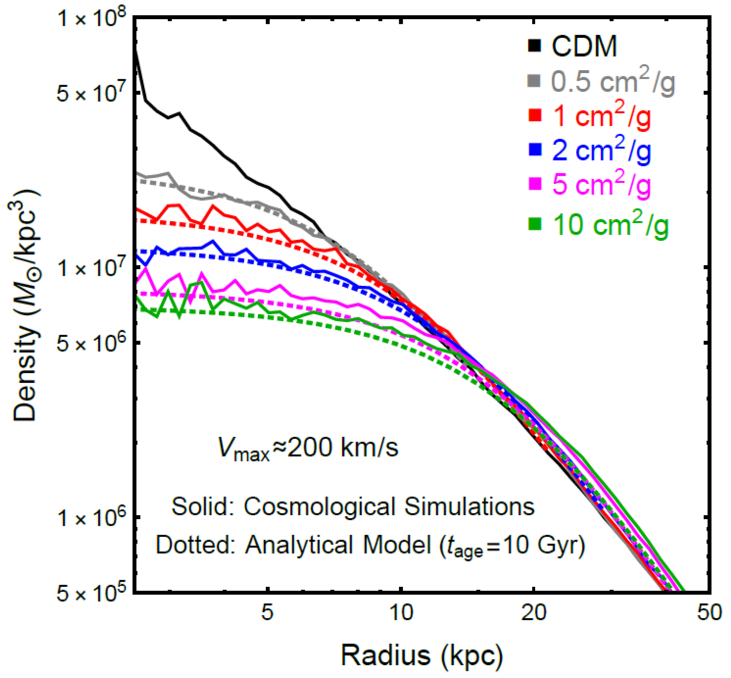
Reconciling the Diversity and Uniformity of Galactic Rotation Curves with Self-Interacting Dark Matter

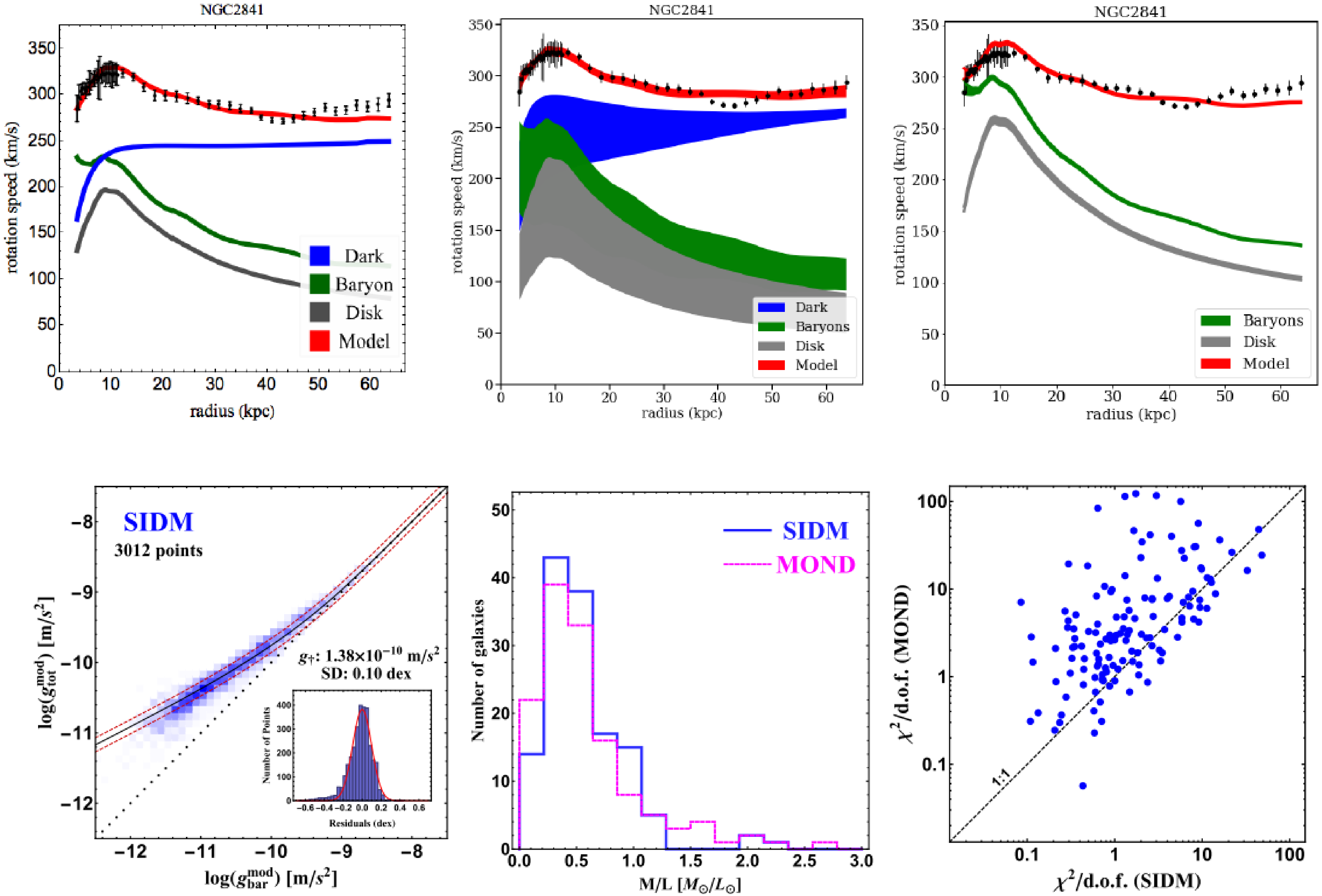
arXiv: 1808.05695

Tao Ren,[1] Anna Kwa,[2] Manoj Kaplinghat,[2] and Hai-Bo Yu[1]

- cross section per unit mass σ/m ~ 1 cm^2/g
  - dark matter self-interactions thermalize the inner regions of galactic halos
  - In the inner halo, thermalization ties dark matter an baryon distributions together
  - outer regions remains unchanged.

$$\rho_{\rm iso}(R, z) = \rho_0 \exp\left(\left[\Phi_{\rm tot}(0,0) - \Phi_{\rm tot}(R,z)\right]/\sigma_{v0}^2\right) ,$$





NGC2841
rotation speed (km/s)
radius (kpc)
Dark
Baryon
Disk
Model
NGC2841
rotation speed (km/s)
radius (kpc)
Dark
Baryons
Disk
Model
NGC2841
rotation speed (km/s)
radius (kpc)
Baryons
Disk
Model
SIDM
3012 points
$g_\dagger$: 1.38×10^{-10} m/s^2
SD: 0.10 dex
Number of Points
Residuals (dex)
$\log(g_{\rm tot}^{\rm mod})$ [m/s^2]
$\log(g_{\rm bar}^{\rm mod})$ [m/s^2]
SIDM
MOND
Number of galaxies
M/L [$M_\odot/L_\odot$]
1:1
χ^2/d.o.f. (MOND)
χ^2/d.o.f. (SIDM)


The Return of the
C D M

arXiv: 1808.06634

Dark matter heats up in dwarf galaxies

ABSTRACT
Gravitational potential fluctuations driven by bursty star formation can kinematically 'heat up' dark matter at the centres of dwarf galaxies. A key prediction of such models is that, at a fixed dark matter halo mass, dwarfs with more extended star formation will have lower central densities than those that stopped forming stars long ago. We use