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Erratum: The SLUGGS Survey: a comparison of total-mass profiles of early-type galaxies from observations and cosmological simulations, to ∼4 effective radii

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This is an erratum to the paper "The SLUGGS Survey: A comparison of total-mass profiles of early-type galaxies from observations and cosmological simulations, to ∼4 effective radii" that was published in 2018, MNRAS, 476, 4543, which we refer to as the original paper.

Here we correct a bug identified in the code that generated 1D profiles for the model 2 stellar mass component from the 2D luminosity distribution (the deprojection of the Multi-Gaussian Expansion). This bug scaled the stellar mass component by the $(M/L)_*$ factor twice instead of only once, resulting in an overcontribution to the total profile by the stellar mass component. Since this process occurs in the final analysis stage of our code, none of the best-fitting parameters derived through the MCMC process is affected. Rather, only the final total-mass density profile for model 2 is affected, and the effect is greatest for galaxies with $(M/L)_* > 1$.

As a result, the published total-mass density profile slope values determined by model 2 published in the original paper were too steep by an average of ∼0.1. The updated $\gamma_{\rm tot}$ values (measured over three separate radial intervals, including the radial range 0.4 − $4R_e$) can be found in Table 1. We highlight that when the $(M/L)_*$ value is correctly implemented, the total-mass profiles determined by models 1 and 2 are in good agreement in the central regions of the galaxy. This is apparent in Fig. 1, in which the comparison of $\gamma_{\rm tot}$ values derived by models 1 and 2 show a much better agreement than in the original paper. The updated profiles for the eight galaxies we focus on in the original paper are plotted in Fig. 2. As discussed in the original paper, the galaxies for which the discrepancy between $\gamma_{\rm tot}$ still exists are those for which model 1 produces a visually bad kinematic fit to the input data.

The average value of slopes has been updated to $\gamma_{\rm tot} = -2.12 \pm 0.05$. As in the original paper, this value is steeper than the isothermal value of −2, and hence the conclusions of the original paper in this respect have not changed. In section 6.2 of the original paper we describe the slopes we measured to be fully consistent with the value of $\gamma_{\rm tot} = -2.25$ measured by Yıldırım et al. (2017). With our updated mean $\gamma_{\rm tot}$ value of -2.12 ± 0.05, this is no longer true, and the Yıldırım et al. (2017) value is now steeper than what is measured for SLUGGS galaxies.

The normalised profiles presented in figure 5 of the original paper have changed imperceptably, and hence we have not provided an updated version of that plot. We provide an updated version of figure 6 in the original paper comparing the $\gamma_{\rm tot}$ values to other observations (Poci, Cappellari & McDermid 2017; Serra et al. 2016; Tortora et al. 2014; Auger et al. 2010; Sonnenfeld et al. 2013) in Fig. 3. Although the new values are slightly shallower than those presented in the original paper, the agreement between our values and those of other studies is still excellent.

When comparing the total-mass density slopes to simulated values, which was conducted in the original paper in the radial range 0.4 − $4R_e$, the effect of an artificially high $(M/L)_*$ is augmented, as the dark matter dominance in this radial range is higher. As a result, the effect of the identified bug is large when comparing the results to simulations. We confirm that our identified bug did not affect any of the $\gamma_{\rm tot}$ measurements made for simulated galaxies. In the original paper, a large offset was noted in the slopes between the SLUGGS galaxies, and those of the simulated *Magneticum* and EAGLE glaxies. The updated offset has now been reduced by ∼0.2, and hence the offset between SLUGGS galaxies and Magneticum is now only 0.1 (reducing the discrepancy from 4.4 σ to 1.5 σ), whilst the offset with EAGLE galaxies is now 0.3 (reducing the discrep-

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Table 1. Updated $\gamma_{\rm tot}$ values for table 5 in the original paper, also including $\gamma_{\rm tot}$ values measured in the radial range $0.4 - 4R_e$.

Galaxy	$\gamma_{\rm tot}$ $(0.1 - 4\,R_e)$	$\gamma_{\rm tot}$ $(0.0 - 4\,R_e)$	$\gamma_{\rm tot}$ $(0.4 - 4\,R_e)$
(1)	(2)	(3)	(4)
	Galaxies in the new sample:		
NGC 1052	$-2.21^{+0.06}_{-0.06}$	$-1.69^{+0.57}_{-0.57}$	$-2.24^{+0.00}_{-0.02}$
NGC 2549	$-2.08^{+0.05}_{-0.05}$	$-1.92^{+0.11}_{-0.11}$	$-1.96^{+0.06}_{-0.06}$
NGC 2699	$-2.66^{+0.32}_{-0.32}$	$-2.11^{+0.87}_{-0.87}$	$-2.98^{+0.48}_{-0.00}$
NGC 4459	$-2.22^{+0.22}_{-0.22}$	$-1.96^{+0.47}_{-0.47}$	$-2.28^{+0.14}_{-0.16}$
NGC 4474	$-2.16^{+0.02}_{-0.02}$	$-1.83^{+0.31}_{-0.31}$	$-2.10^{+0.05}_{-0.04}$
NGC 4551	$-2.35^{+0.44}_{-0.44}$	$-1.85^{+0.94}_{-0.94}$	$-2.79^{+0.00}_{-0.00}$
NGC 5866	$-1.94^{+0.42}_{-0.42}$	$-1.01^{+1.36}_{-1.36}$	$-2.32^{+0.05}_{-0.04}$
NGC 7457	$-1.72^{+0.10}_{-0.10}$	$-1.74^{+0.08}_{-0.08}$	$-1.78^{+0.03}_{-0.04}$
	Other SLUGGS galaxies:		
NGC 821	$-1.76^{+0.04}_{-0.04}$	$-1.73^{+0.01}_{-0.01}$	$-1.61^{+0.10}_{-0.12}$
NGC 1023	$-2.31^{+0.08}_{-0.08}$	$-2.04^{+0.34}_{-0.34}$	$-2.36^{+0.03}_{-0.03}$
NGC 2768	$-2.03^{+0.04}_{-0.04}$	$-1.90^{+0.17}_{-0.17}$	$-1.98^{+0.03}_{-0.09}$
NGC 2974	$-2.30^{+0.10}_{-0.10}$	$-2.12^{+0.29}_{-0.29}$	$-2.36^{+0.04}_{-0.04}$
NGC 3115	$-2.16^{+0.07}_{-0.07}$	$-2.08^{+0.14}_{-0.14}$	$-2.20^{+0.03}_{-0.02}$
NGC 3377	$-1.76^{+0.31}_{-0.31}$	$-1.97^{+0.51}_{-0.51}$	$-1.39^{+0.03}_{-0.07}$
NGC 4111	$-1.99^{+0.42}_{-0.42}$	$-1.90^{+0.51}_{-0.51}$	$-2.39^{+0.02}_{-0.02}$
NGC 4278	$-2.11^{+0.09}_{-0.09}$	$-2.02^{+0.17}_{-0.17}$	$-2.16^{+0.03}_{-0.03}$
NGC 4473	$-2.01^{+0.05}_{-0.05}$	$-1.83^{+0.23}_{-0.23}$	$-2.02^{+0.04}_{-0.03}$
NGC 4494	$-2.16^{+0.20}_{-0.20}$	$-1.69^{+0.67}_{-0.67}$	$-2.31^{+0.27}_{-0.04}$
NGC 4526	$-2.08^{+0.15}_{-0.15}$	$-1.89^{+0.34}_{-0.34}$	$-2.19^{+0.03}_{-0.04}$
NGC 4649	$-2.32^{+0.12}_{-0.12}$	$-1.78^{+0.66}_{-0.66}$	$-2.39^{+0.04}_{-0.04}$
NGC 4697	$-2.13^{+0.08}_{-0.08}$	$-1.82^{+0.39}_{-0.39}$	$-2.16^{+0.06}_{-0.05}$

Columns: (1) Galaxy name. (2) Fitted slope of the total density profile, measured at $0.1 - 4\,R_e$ (Column 6 in the original paper). (3) Fitted slope of the total density profile, measured at $0.0 - 4\,R_e$ (Column 7 in the original paper). (4) Fitted slope of the total density profile, measured at $0.4 - 4\,R_e$.

ancy from $6.6\,\sigma$ to $3.4\,\sigma$). We provide an updated figure comparing these measurements to the simulations in Fig. 4.

Overall our general conclusions are unchanged.

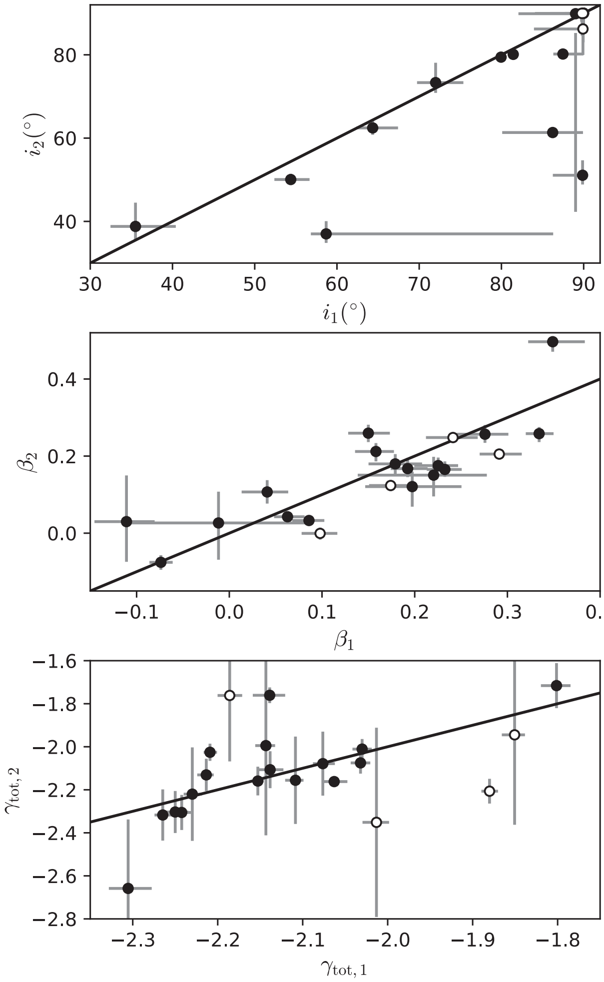

Figure 1. Updated comparison of common parameters between models 1 and 2. The *top* panel is a comparison of the inclination measurements, the *middle* panel shows the anisotropy measurements, and the *bottom* panel shows the total-mass density profile measurements. Within the bottom panel, $\gamma_{\rm tot}$ values derived from model 2 have been fitted in the radial range $0.1\,R_e - 4\,R_e$. Open circles indicate galaxies for which model 1 provides a visually bad fit to the data. The top two panels are identical to that published in the original paper, but we note that the agreement between the two models of $\gamma_{\rm tot}$ (bottom panel) has been significantly improved.

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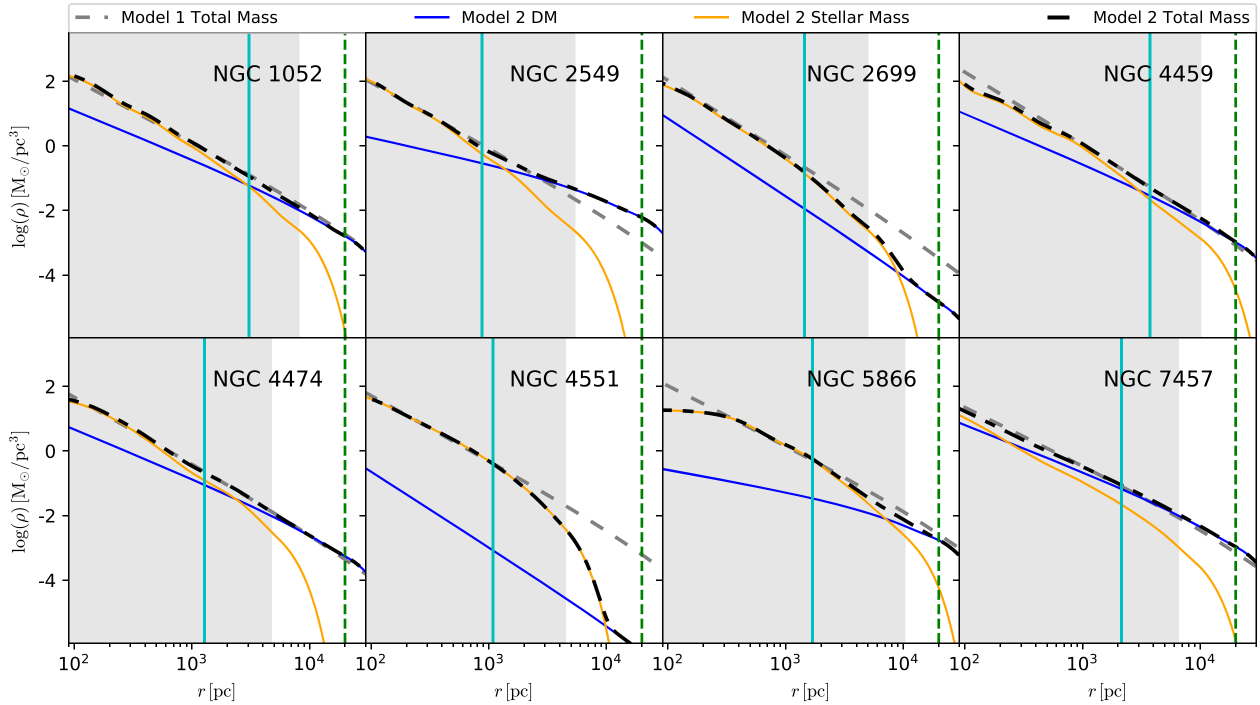

Figure 2. Updated mass density profiles generated with the separate models. Dashed grey lines show the total-mass density slopes generated by model 1 for each individual galaxy. Since model 2 separates the total mass into stellar and dark components, we plot three lines for model 2. The orange solid line shows the stellar component, while the blue solid line shows the dark matter component. The dashed black line represents the total-mass density slope for model 2. The vertical dashed green line shows the assumed break radius (fixed to be 20 kpc) for each galaxy, whereas the vertical solid cyan line indicates the effective radius (R_e) for each galaxy. The shaded grey region indicates the radial extent of the observational data used for each galaxy. Here, the stellar profiles have a lower normalisation than in the original paper, resulting in a better agreement between the total mass profiles of models 1 and 2 in this plot, especially in the inner regions.

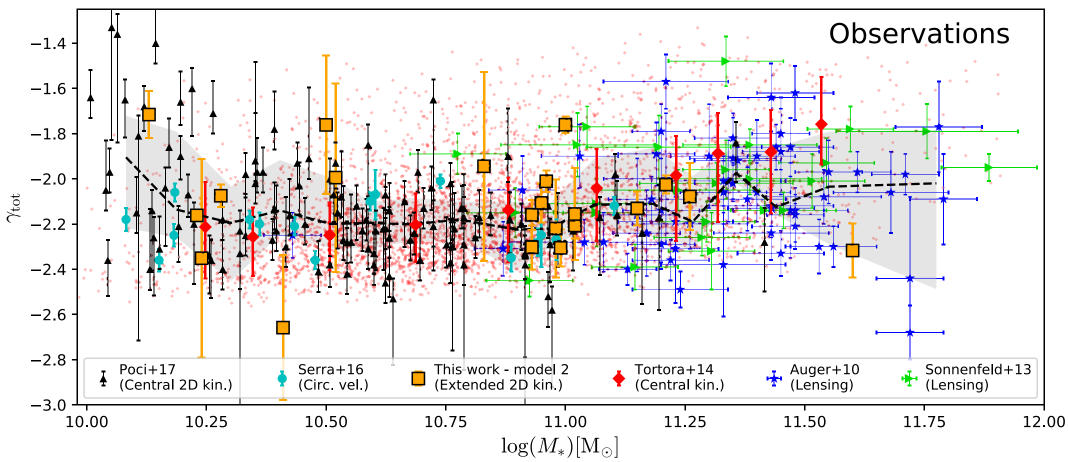

Figure 3. Updated variation of total-mass density slopes with stellar mass of the SLUGGS galaxies, compared with observations from the literature. The values measured for the SLUGGS galaxies in this work are plotted as orange squares. Observational measurements from Auger et al. (2010), Sonnenfeld et al. (2013), Tortora et al. (2014), Serra et al. (2016), and Poci et al. (2017) are included. We note that these studies did not use homogeneous mass models nor radial ranges in calculating total mass density slopes. The moving median of all observations is shown by the dashed line, with the 16th–84th percentile range shaded in grey. We note that none of the conclusions resulting from the original version of this plot has changed.

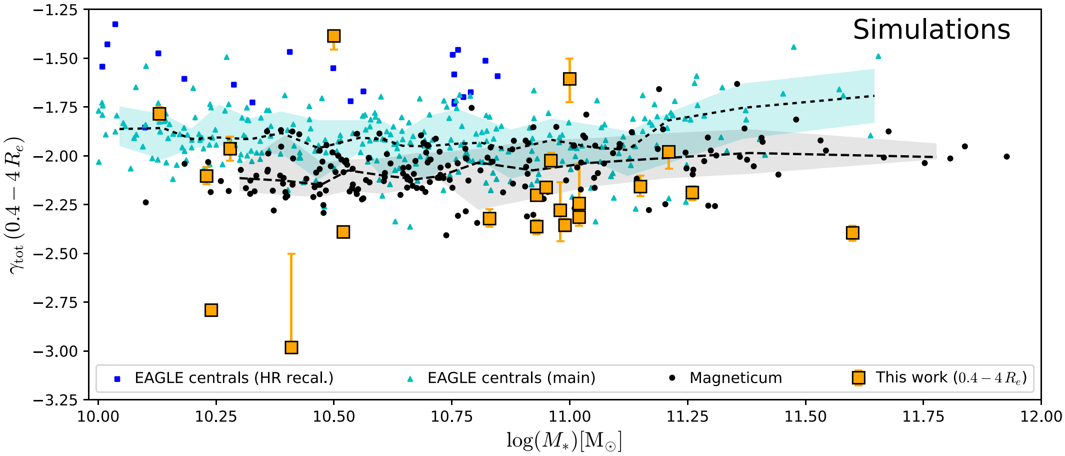

Figure 4. Updated variation of total-mass density slopes with stellar mass of the SLUGGS galaxies, compared to the simulated values of the *Magneticum* and the EAGLE simulations. Due to inner resolution effects within the simulations, we fit $\gamma_{\rm tot}$ only over the radial range $0.4\,R_e - \ 4\,R_e$. We therefore plot the observations from our work fitted in the corresponding radial interval. The main EAGLE and *Magneticum* moving medians have been shown as dashed cyan and black lines, with their 16th–84th percentile regions shaded in cyan and grey respectively. We note that at $M_* > 10^{11}\ \mathrm{M}_\odot$, the main EAGLE galaxies display an upturn in $\gamma_{\rm tot}$ values, whereas this is not the case for the *Magneticum* galaxies. We include as blue squares the $\gamma_{\rm tot}$ values for galaxies from the EAGLE high-res run.. Here, the SLUGGS values are shallower than in the original paper by ~0.2, resulting in a significantly better agreement with the simulations in this measured radial range. The two largest outliers are NGC 2699, and NGC 4551, both of which have a suppressed dark matter component. The mean offset with *Magneticum* is now ~0.1, and the mean offset with EAGLE values is now ~0.3.