Author Correction: Testing sub-gravitational forces on atoms from a miniature in-vacuum source mass

Correction to: *Nature Physics* https://doi.org/10.1038/nphys4189, published online 3 July 2017.

https://doi.org/10.1038/s41567-023-02255-5

Published online: 28 September 2023

Check for updates

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We miscalculated the gravitational acceleration arising from the tungsten mass by a factor of about two. The correct value is $a$grav = (33 ± 3) nm/s^2. The corrected anomalous acceleration is $a$anomaly = $a$cyl - $a$grav = (41 ± 24) nm/s^2. These values replace the erroneous ones of $a$grav = (65 ± 5) nm/s^2 and $a$anomaly = (9 ± 24) nm/s^2.

The corrected 95% confidence interval is −7 nm/s^2 < $a$anomaly < 89 nm/s^2. Using a one-tailed test to bound fifth-force interactions (which must be attractive for scalar fields with a universal matter coupling), we constrain anomalous accelerations $a$anomaly < 81 nm/s^2 (95% confidence level).

For chameleon fields with Λ = Λ0 = 2.4 meV and n = 1, we exclude up to $M < 1.7 \times 10^{-3}$ MP (replacing $M < 2.8 \times 10^{-3}$ MPl); the gap to torsion pendulum constraints is fully closed for Λ > 6.0 meV (replacing 5.1 meV), and for μ = 0.1 meV, we rule out λ < 0.8 (replacing 1).

Except for these corrections, our conclusions remain unchanged. We replotted the exclusion plot (Fig. 3 in the original paper) with the corrected $a$anomaly value. Owing to the wide range of parameters considered in the plot, the correction is barely visible.

We thank Philipp Treutlein, Jannik Wyss and Tilman Zibold for pointing out the issue to us and Cris Panda for re-creating the figure.

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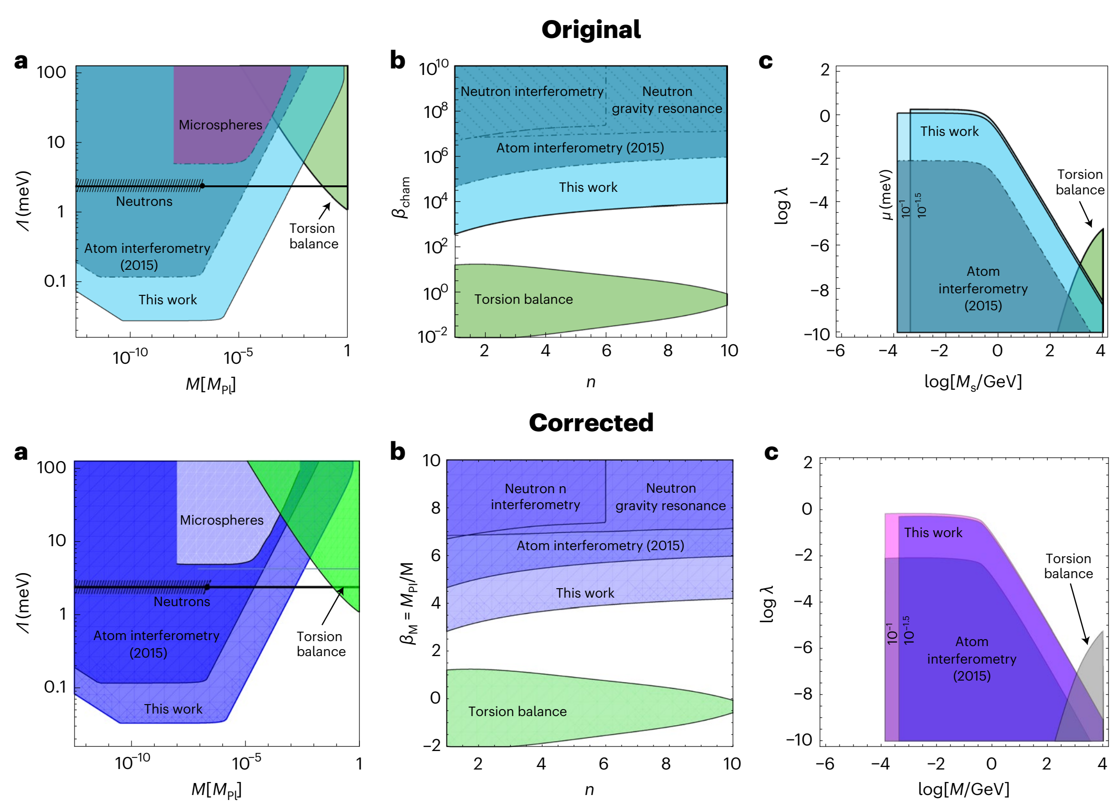

Fig. 1 | Original and Corrected Fig. 3. Corrected Fig. 3 demonstrates constraints on screened chameleons (**a**, **b**) and symmetrons (**c**).