Erratum: Hunting galactic axion dark matter with gravitationally lensed fast radio bursts [Phys. Rev. D 109, L021303 (2024)]

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The motivation of our article was mainly inspired by Basu *et al.* [1]. Moreover, the writing and structure of [1] were used for reference in our paper. Regrettably, this close relationship has not been properly reflected in the original version of our manuscript. In addition to this declaration, we also would like to add [1] as a reference in the following positions:

Page 2 right column. As shown in [1], combining equations (2) and (3), we can obtain

$$\Delta\theta_{a,\mathrm{lens}} = K \sin\left[\frac{m_a \Delta t}{2}\right] \sin\left(m_a t_{\mathrm{obs}} + \delta_{\mathrm{obs}} - \pi/2\right)$$

with K in normalized units being

$$K = 1.225^\circ \left[\frac{\rho_{a,\mathrm{obs}}}{0.3\ \mathrm{GeV\,cm^{-3}}}\right]^{\frac{1}{2}} \frac{g_{a\gamma}}{10^{-12}\ \mathrm{GeV^{-1}}} \left[\frac{m_a}{10^{-22}\ \mathrm{eV}}\right]^{-1}.$$

Page 3 left column. For this Faraday rotation-corrected and frequency-free term, as suggested in [1], it can be further decomposed as the following three compositions: $\theta_0 = \theta_{\mathrm{FRB}} + \Delta\theta_a + \delta\theta$. θ_{FRB} is its intrinsic polarization angle, $\Delta\theta_a$ is the achromatic birefringence induced by the coupling between the photon and the axion field, and $\delta\theta$ is the systematic calibration offset and random error in observation.

Page 5 left column. Assuming that Δt satisfies a uniform distribution $\Delta t \in [0, \Delta t_{\mathrm{max}}]$ in which Δt_{max} is the maximum time delay in the lensed FRB systems, $\langle |\sin[\frac{m_a \Delta t}{2}]|\rangle$ is given by the following equation [1]:

$$\left\langle \left| \sin\left[\frac{m_a \Delta t}{2}\right] \right| \right\rangle = \frac{1}{\Delta t_{\mathrm{max}}} \int_0^{\Delta t_{\mathrm{max}}} \left| \sin\left[\frac{m_a \Delta t}{2}\right] \right| d(\Delta t).$$

Subsequently, $\langle |\Delta\theta_{a,\mathrm{lens}}| \rangle$ is

$$\begin{aligned} \langle |\Delta\theta_{a,\mathrm{lens}}| \rangle &= \frac{2K}{\pi \Delta t_{\mathrm{max}}} \int_0^{\Delta t_{\mathrm{max}}} \left| \sin\left[\frac{m_a \Delta t}{2}\right] \right| d(\Delta t) \\ &= \frac{4K}{m_a \pi \Delta t_{\mathrm{max}}} (2n + 1 - \cos\eta). \end{aligned}$$

We have added these notations to manifest the close relationship of our paper to [1]. Results and conclusions of the paper remain unchanged.

[1] A. Basu, J. Goswami, D. J. Schwarz, and Y. UrakawaBasu, Phys. Rev. Lett. **126**, 191102 (2021).

