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Erratum: 'Collisionless damping of geodesic acoustic modes' [*J. Plasma Physics* (2006) 72, 825]

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We have found that expressions given by (2.6), (2.7) and (2.10) in [1] for the finite-orbit-width (FOW) effect on the geodesic acoustic mode (GAM) contained errors. Now, (2.6), (2.7) and (2.10) are corrected as

$$\begin{aligned}\delta\hat{f}_{ik_r 1}(\omega) &= \frac{(v_\parallel/R_0 q)}{\omega-(v_\parallel/R_0 q)}\left[\frac{e\phi_{k_r 1}(\omega)}{T_{\rm i}} + i\frac{e\phi_{k_r 0}(\omega)}{T_{\rm i}}\left(\frac{k_r\hat\delta}{2}\right)\right] \\ &\quad + \left(\frac{k_r\hat\delta}{2}\right)^2 \frac{2(v_\parallel/R_0 q)}{\omega-2(v_\parallel/R_0 q)}\left[\frac{e\phi_{k_r 1}(\omega)}{T_{\rm i}} + i\frac{e\phi_{k_r 0}(\omega)}{2T_{\rm i}}\left(\frac{k_r\hat\delta}{2}\right)\right] \\ &\quad + \delta\hat{I}_{ik_r 1}(\omega), \end{aligned} \tag{1}$$

$$\begin{aligned}\frac{1}{K(\omega)} &= -i\hat\omega - i\frac{q^2}{2}\Big[2\hat\omega^3 + 3\hat\omega + (2\hat\omega^4 + 2\hat\omega^2 + 1)Z(\hat\omega) - \frac{\hat\omega}{2}\{D_S(\hat\omega)\}^{-1} \\ &\quad \times \{2\hat\omega + (2\hat\omega^2+1)Z(\hat\omega)\}^2 + J_{\rm FOW}(\hat\omega)\Big] \end{aligned} \tag{2}$$

and

$$\begin{aligned}\gamma &= -\frac{\sqrt{\pi}}{2}q^2\left(\frac{v_{\rm Ti}}{R_0 q}\right)\left[1+\frac{2(23/4+4\tau_{\rm e}+\tau_{\rm e}^2)}{q^2(7/2+2\tau_{\rm e})^2}\right]^{-1}\Big[\exp(-\hat\omega_G^2)\{\hat\omega_G^4 + (1+2\tau_{\rm e})\hat\omega_G^2\} \\ &\quad + \frac{1}{4}\left(\frac{k_r v_{\rm Ti} q}{\Omega_i}\right)^2 \exp(-\hat\omega_G^2/4)\left\{\frac{\hat\omega_G^6}{128} + \frac{(1+\tau_{\rm e})}{16}\hat\omega_G^4 + \left(\frac{3}{8}+\frac{7}{16}\tau_{\rm e}+\frac{5}{32}\tau_{\rm e}^2\right)\hat\omega_G^2\right\}\Big], \end{aligned} \tag{3}$$

respectively. Here, we have used $D_S(\hat\omega) \equiv T_{\rm i}/T_{\rm e} + 1 + \hat\omega Z(\hat\omega)$, $\hat\omega \equiv R_0 q\omega/v_{\rm Ti}$ ($v_{\rm Ti} \equiv \sqrt{2T_{\rm i}/m_{\rm i}}$) and

$$\begin{aligned}J_{\rm FOW}(\hat\omega) &\equiv i\frac{\sqrt{\pi}}{2}\left(\frac{k_r v_{\rm Ti} q}{\Omega_i}\right)^2 e^{-\hat\omega_r^2/4}\Big[\frac{\hat\omega_r^6}{128} + \frac{\hat\omega_r^4}{16} + \frac{3\hat\omega_r^2}{8} + \frac{3}{2} + \frac{3}{\hat\omega_r^2} \\ &\quad - \frac{\hat\omega_r}{2}\{D_{Sr}(\hat\omega_r)\}^{-1}\{2\hat\omega_r + (2\hat\omega_r^2+1)Z_r(\hat\omega_r)\}\end{aligned}$$

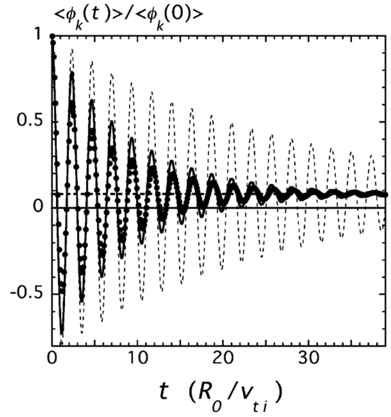

Figure 1. Zonal-flow potential as a function of time. Here $v_{\mathrm{Ti}} \equiv (T_{\mathrm{i}}/m_{\mathrm{i}})^{1/2}$.

$$\times \left\{ \frac{\hat{\omega}_r^4}{16} + \frac{3\hat{\omega}_r^2}{8} + \frac{3}{2} + \frac{3}{\hat{\omega}_r^2} - \{D_{Sr}(\hat{\omega}_r)\}^{-1} \right.$$

$$\left. \times \{2\hat{\omega}_r + (2\hat{\omega}_r^2 + 1)Z_r(\hat{\omega}_r)\} \left(\frac{\hat{\omega}_r^3}{16} + \frac{\hat{\omega}_r}{4} + \frac{1}{2\hat{\omega}_r} \right) \right\} \Bigg], \tag{4}$$

where $\hat{\omega}_r \equiv \mathrm{Re}(\hat{\omega})$, $Z_r(\hat{\omega}_r) \equiv \mathrm{Re}[Z(\hat{\omega}_r)]$ and $D_{Sr}(\hat{\omega}_r) \equiv \mathrm{Re}[D_S(\hat{\omega}_r)]$. The time evolution of the zonal-flow potential shown by Fig. 1 in [1] is plotted under the same conditions again here in Fig. 1, where the simulation result (solid circular symbols) is compared with the theoretical predictions (solid and dashed curves). Here, the theoretical formula given by (2.8) in [1] is used and the complex-valued GAM frequency $\omega = \omega_G + i\gamma$ is evaluated by using (2.9) in [1] and the corrected expression in (3). The solid (dashed) curve plotted in Fig. 1 represents the theoretical result obtained by including (neglecting) the FOW effect. As shown by the solid curve in Fig. 1, we can still justify the argument in [1] that the simulation result can be accurately described by taking into account the enhancement of the collisionless GAM damping due to the FOW effect.

Reference

[1] Sugama, H. and Watanabe, T.-H. 2006 *J. Plasma Physics* **72**, 825.