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CORRIGENDUM

Ripple modifications to alpha transport in tokamaks – CORRIGENDUM

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Numerical coefficients are incorrect at the end of § 8 and in two places in the summary in § 9 of Catto (2018). The material before (8.39) is unaffected. To evaluate the pitch angle integral in (8.39), $\chi = \eta\sqrt{2k\ell n(\sqrt{2k})}$ with $\eta = (1-\kappa)/8$ should have been used. And on the right-hand side of (8.40) there is a 4π missing in the denominator. The overall effect is to increase the size of the coefficients of the fluxes and diffusivities by $16/\pi$ and to remove the 64 from all $\ell n(\sqrt{2k\ell n(\sqrt{2k})})$ and $\ell n(\sqrt{2k_0\ell n(\sqrt{2k_0})})$ terms. Correcting these errors (8.39), (8.40), (8.42) and (8.43) become as follows:

$$
\begin{aligned}
&Re\left\langle \sin\vartheta\, \mathrm{e}^{-\mathrm{i}\vartheta}\int_{B_0/\widehat{B}}^{B_0/B} \mathrm{d}\lambda \frac{\lambda}{\xi}[\mathrm{e}^{-(1-\mathrm{i})\eta\sqrt{2k\ell n(\sqrt{2k})}}-1]\right\rangle \\
&\simeq -\frac{\sqrt{2\delta}}{\pi} Re\left\{\mathrm{i}\int_0^1 \mathrm{d}\kappa\,\kappa[\mathrm{e}^{-(1-\mathrm{i})\eta\sqrt{2k\ell n(\sqrt{2k})}}-1]\ln\left(\frac{1}{\eta}\right)\right\} \\
&\simeq -\frac{8\sqrt{\delta}\ell n[\sqrt{2k\ell n(\sqrt{2k})}]}{\pi\sqrt{k\ell n(\sqrt{2k})}} Re\left[\mathrm{i}\int_0^\infty \mathrm{d}\chi\, \mathrm{e}^{-(1-\mathrm{i})\chi}\right] \\
&= 4\sqrt{\delta}\frac{\ell n[\sqrt{2k\ell n(\sqrt{2k})}]}{\pi\sqrt{k\ell n(\sqrt{2k})}},
\end{aligned}
\tag{8.39}
$$

$$
\int_0^{v_0} \mathrm{d}v\, v^{9/2}(Mv^2/2)^d \frac{\ell n[\sqrt{2k\ell n(\sqrt{2k})}]}{\sqrt{\ell n(\sqrt{2k})}}\frac{\partial f_s}{\partial\psi} \simeq \frac{v_0^{5/2}(Mv_0^2/2)^d \ell n[\sqrt{2k_0\ell n(\sqrt{2k_0})}]}{2\pi(5+4d)\sqrt{\ell n(\sqrt{2k_0})}\ell n(v_0/v_c)}\frac{\partial n_s}{\partial\psi},
\tag{8.40}
$$

$$
\Gamma_d^{\sqrt{\nu}} \simeq -\frac{\varepsilon^2 B_0^2 v_\lambda^{3/2} v_0^{5/2}(Mv_0^2/2)^d \ell n[\sqrt{2k_0\ell n(\sqrt{2k_0})}]}{8\pi(5+4d)q^{1/2}\Omega_0^2\omega\sqrt{\omega\tau_s\ell n(2k_0)}\ell n(v_0/v_c)}\frac{\partial n_s}{\partial\psi},
\tag{8.42}
$$

$$
D_0^{\sqrt{\nu}} \simeq \frac{(qv_\lambda/v_0)^{3/2}(\rho_0 v_0/R)^2 \ell n[\sqrt{k_0\ell n(2k_0)}]}{40\pi\omega\sqrt{\omega\tau_s\ell n(2k_0)}\ell n(v_0/v_c)}.
\tag{8.43}
$$

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In addition, the erroneous τ_s has been removed from the numerator of (8.42). These errors in numerical coefficients alter (9.3) and (9.4) which become

$$\frac{\omega\tau_s}{q} \sim \left[\frac{\ell n(\sqrt{k_0 \ell n(2k_0)})}{1.8\sqrt{\ell n(2k_0)}}\right]^{2/3}, \tag{9.3}$$

and

$$\frac{\omega R}{q v_\lambda} \gg \left[\frac{\ell n(\sqrt{k_0 \ell n(2k_0)})}{40\pi \ell n(v_0/v_c)\sqrt{\ell n(2k_0)}}\right]^{2/3} \left(\frac{\rho_0}{a_\alpha}\right)^{4/3} \left(\frac{v_0\tau_s}{R}\right)^{1/3}. \tag{9.4}$$

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REFERENCE

CATTO, P. J. 2018 Ripple modifications to alpha transport in tokamaks. *J. Plasma Phys.* **84**, 905840508 (39 pp).