

Erratum: Angular dependence of spin-orbit spin transfer torques [Phys. Rev. B **91**, 144401 (2015)]

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The sign convention is not consistent in some parts of the paper. In order to achieve the consistency, the following two equations should be modified. Equation (1) should be altered as follows,

$$\mathbf{T} = \tau_f \hat{\mathbf{M}} \times \hat{\mathbf{y}} - \tau_d \hat{\mathbf{M}} \times (\hat{\mathbf{M}} \times \hat{\mathbf{y}}),$$

where the sign of the damping-like spin-orbit torque (second term on the right-hand side) has been altered from + to -. Also Eq. (8) should be altered as follows,

$$\mathbf{s}_{(1)}^\pm = \int \frac{dk^2}{(2\pi)^2} \left[f_\pm \left(\mathbf{k} + \frac{eE\tau}{\hbar} \hat{\mathbf{x}} \right) - f_\pm(\mathbf{k}) \right] \mathbf{s}_{\mathbf{k}(1)}^\pm,$$

where the sign in front of the momentum shift $eE\tau/\hbar$ due to the electric field has been altered from - to +. Af-

ter these two modifications, the sign convention becomes consistent in the paper.

The signs of the resulting τ_f and τ_d depend on the signs of α_R and E . Regardless of the latter signs, however, the sign of the product $\tau_f \tau_d$ is positive (Figs. 2 and 3). This prediction is consistent with predictions of other theoretical works¹⁻³ on the Rashba spin-orbit coupling effect. To verify this point, it is convenient to check instead the following vector inequality,

$$(\hat{\mathbf{M}} \times \mathbf{T}_f) \cdot \mathbf{T}_d < 0,$$

which is independent of various choices of sign conventions used in different works. Here $\mathbf{T}_f (= \tau_f \hat{\mathbf{M}} \times \hat{\mathbf{y}})$ and $\mathbf{T}_d (= -\tau_d \hat{\mathbf{M}} \times (\hat{\mathbf{M}} \times \hat{\mathbf{y}}))$ are the field-like and damping-like spin-orbit torques, respectively.

¹ H. Kurebayashi, J. Sinova, D. Fang, A. C. Irvine, T. D. Skinner, J. Wunderlich, V. Novák, R. P. Campion, B. L. Gallagher, E. K. Vehstedt, L. P. Zarbo, K. Vyborný, A. J. Ferguson, and T. Jungwirth, *Nat. Nanotech.* **9**, 211 (2014).
² H. Li, H. Gao, L. P. Zárbo, K. Vyborný, X. Wang, I. Garate,

F. Doğan, A. Čejchan, J. Sinova, T. Jungwirth, and A. Manchon, *Phys. Rev. B* **91**, 134402 (2015).
³ Paul M. Haney, H.-W. Lee, K.-J. Lee, A. Manchon, and M. D. Stiles, *Phys. Rev. B* **87**, 174411 (2013).