OPEN Author Correction: Dynamics of chiral solitons driven by polarized currents in monoaxial helimagnets

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The original version of this Article contained errors in Equations 13 and 14.

Equation 13

$$\theta'' = (\varphi'^2 - 2\varphi' - h_y \cos \varphi) \cos \theta + \kappa \sin \theta \cos \theta - \Omega \theta' + \Gamma \sin \theta \varphi',$$

now reads:

$$\theta'' = (\varphi'^2 - 2\varphi' + \kappa) \sin \theta \cos \theta - h_y \cos \theta \cos \varphi - \Omega \theta' + \Gamma \sin \theta \varphi',$$

Equation 14

$$\varphi'' = h_y \sin \varphi - (\varphi' - 2) \cos \theta \theta' - \Gamma \theta' - \Omega \sin \theta \varphi'$$

now reads:

$$\sin \theta \varphi'' = h_y \sin \varphi - 2(\varphi' - 1) \cos \theta \theta' - \Gamma \theta' - \Omega \sin \theta \varphi'$$

The original version of this Article also contained errors in Figure 2 where the graph was incorrect in panel (b), and in Figure 3 where the graphs were incorrect in panels (a) and (b). The original Figures 2 and 3 and accompanying legends appear below.

In addition, in the Response of isolated chiral solitons to external currents section, under the subheading ‘Non-steady issues’,

“The numerical solution of the BVP for this set of parameters gives $\Gamma_c = 1.5735$ (see Fig. 2b).”

now reads:

“The numerical solution of the BVP for this set of parameters gives $\Gamma_c = 1.2405$ (see Fig. 2b).”

“Numerical simulations show that the system, starting from the metastable static soliton, reaches the steady motion state if the current is below the critical current, $j_c = 1.372 \text{ TA/m}^2$, which corresponds to $\Gamma = 1.224$, slightly smaller than the value of Γ_c predicted with the BVP.”

now reads:

“Numerical simulations show that the system, starting from the metastable static soliton, reaches the steady motion state if the current is below the critical current, $j_c = 1.372 \text{ TA/m}^2$, which corresponds to $\Gamma = 1.224$, in good agreement with the value of Γ_c predicted with the BVP.”

Figure 2. Limits of stability of the chiral soliton. **(a)** Stability diagram of the chiral soliton for $D > 0$, as a function of anisotropy and applied field. The blue continuous line corresponds to the stability limit for $\chi = +1$, with the dashed blue line indicating the onset of instability of the whole system against tilting towards the $\hat{z}$ direction. The orange dashed line corresponds to the stability limit for $\chi = -1$ case. The green dotted line is the stability limit for $D=0$ and $\chi = \pm 1$. Below the red dash-dotted line the FM state is itself metastable, the ground state being a CSL. The red star indicates the parameter values used to perform the numerical simulations. **(b)** The critical Γ_c value, proportional to the critical current density, as a function of h_y/h_{yc} for $\chi = +1$ and for several values of κ , as indicated. The red dashed line corresponds to $D=0$.

Figure 3. Steady motion of the chiral soliton. **(a)** Steady profiles for $\kappa = -5.17$, $h_y = 0.807$, and $\Gamma = 0.89$ ($j = 1 \text{ TA/m}^2$). Circles correspond to numerical simulations and lines to the BVP. **(b)** Velocity and soliton parameters as a function of the applied current density j . The steady velocity increases linearly with the current, with mobility $m = (\beta/\alpha)b_j$, as indicated by the continuous line (top panel). Middle and bottom panels: θ_0 , (tilt of the magnetization in the z direction) increases with j , whilst the soliton width Δ decreases. Both quantities show a considerable change when the critical current $j_c = 1.372 \text{ TA/m}^2$, indicated by the vertical dashed line, is approached. Continuous lines correspond to the solution of the corresponding BVP. Vertical dashed and dotted lines correspond to the critical values j_c obtained with numerical simulations and with the BVP, respectively.

The original Article has been corrected.

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