Erratum: Generalized Gilbert equation including inertial damping: Derivation from an extended breathing Fermi surface model [Phys. Rev. B 84, 172403 (2011)]

Manfred Fähnle, Daniel Steiauf, and Christian Illg

(Received 28 November 2013; published 16 December 2013)

DOI: 10.1103/PhysRevB.88.219905 PACS number(s): 75.78.−n, 76.20.+q, 99.10.Cd

There is a sign error in Eq. (12), it should read

$$\frac{d\mathbf{e}}{dt} = -\gamma \mathbf{e} \times \mathbf{H}_{\mathrm{eff}} + \mathbf{e} \times \left(\underline{\underline{\alpha}} \cdot \frac{d\mathbf{e}}{dt} \right) - \mathbf{e} \times \left(\underline{\underline{\alpha}} \tau \cdot \frac{d^2\mathbf{e}}{dt^2} \right),$$

which directly follows from Eqs. (9)–(11). The sign of the inertial damping term (last term) is different from the sign of the usual damping term (second term) in agreement with Eq. (3) from the magnetostrictive damping theory of Suhl.[1] In contrast, in Ciornei *et al.*,[2] the signs of the two damping terms are the same. This probably results from the different physics behind the inertial damping terms considered in the various papers. In Fähnle *et al.* and Suhl,[1] the inertial damping term is a consequence of memory effects [see Eq. (8) of Fähnle *et al.*], whereas, in Ciornei *et al.*,[2] the term is related to the fact that, in analogy to a mechanical situation (where the dynamical state cannot be changed infinitely fast for a rigid body characterized by a tensor of inertia), the dynamical magnetization state also cannot be changed infinitely rapid. Perhaps measurements of the nutation loops (arising from the inertial damping) superimposed on the usual precession motion of the magnetic moments can show which physics dominates the inertial damping.

We are grateful to W. Bailey, who showed us the sign error in our original Eq. (12).

---

[1] H. Suhl, IEEE Trans. Magn. **34**, 1834 (1998).
[2] M.-C. Ciornei, J. M. Rubí, and J.-E. Wegrowe, Phys. Rev. B **83**, 020410(R) (2011).

